

Physician-Focused Payment Model Technical Advisory Committee

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May 31, 2017

The Honorable Thomas E. Price
Secretary
U.S. Department of Health and Human Services
200 Independence Avenue, SW
Washington, DC 20201

Dear Secretary Price:

On behalf of the Physician-Focused Payment Model Technical Advisory Committee (PTAC), I am pleased to submit PTAC's comments and recommendation to you on a Physician-Focused Payment Model (PFPM) submitted by the American College of Surgeons (ACS), entitled the *ACS – Brandeis Advanced APM*. These comments and recommendations are required by the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) which directs PTAC to: 1) review PFPM models submitted to PTAC by individuals and stakeholder entities; 2) prepare comments and recommendations regarding whether such models meet criteria established by the Secretary of Health and Human Services (Secretary, HHS); and 3) submit these comments and recommendations to the Secretary.

With the assistance of HHS' Office of the Assistant Secretary for Planning and Evaluation (ASPE), PTAC's eleven members carefully reviewed ACS' proposed model (submitted to PTAC on December 14, 2016), additional information on the model submitted by ACS in response to questions from a PTAC Preliminary Review Team (PRT) and the PTAC as a whole, and public comments on the proposal. At a public meeting of PTAC held on April 11, 2017, the PTAC deliberated on the extent to which this proposal meets the criteria established by the Secretary in regulations at 42 CFR § 414.1465, and should be recommended.

PTAC concluded that the *ACS – Brandeis Advanced Alternative Payment Model* holds promise and recommends it for limited-scale testing with the following stipulations. First, the testing should be for a very limited number of both procedure episodes and condition episodes. This limited number

should be significantly smaller than the number proposed in the model. Second, testing should proceed when the model has developed and is able to implement a quality measurement and payment system that holds providers accountable for performance on quality measures (including patient-reported outcomes (PROs)) as opposed to merely the reporting of quality measures. Third, limited-scale testing should be undertaken only with Alternative Payment Entities where the majority of the members of the relevant clinical affinity group(s) have agreed to participate in the test of the model. Finally, the algorithms and construct of the episode grouper, which is the lynchpin of the model, should be made publicly available; and a mechanism should be in place for continuous update of the grouper so that it remains current with advances in healthcare.

The members of PTAC appreciate your support of our shared goal to improve the Medicare program for both beneficiaries and the physicians who care for them. The Committee looks forward to your detailed response posted on the CMS website, and would be happy to assist you or your staff as you develop your response. If you need additional information, please have your staff contact me at Jeff.Bailet@blueshieldca.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey Bailet", is written over a thin horizontal line.

Jeffrey Bailet, MD
Chair

Attachments

Physician-Focused Payment Model Technical Advisory Committee

REPORT TO THE SECRETARY OF HEALTH AND HUMAN SERVICES

Comments and Recommendation on

ACS – Brandeis Advanced Alternative Payment Model

May 2017

About This Report

The Physician-Focused Payment Model Technical Advisory Committee (PTAC) was established by the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) to: 1) review physician-focused payment models (PFPMs) submitted by individuals and stakeholder entities; 2) prepare comments and recommendations regarding whether such models meet criteria established by the Secretary of Health and Human Services (Secretary, HHS); and 3) submit these comments and recommendations to the Secretary. (See Appendix 1 for a list of PTAC members and their terms of appointment.) PTAC reviews submitted proposals using criteria established by the Secretary in regulations at 42 CFR § 414.1465. (See Appendix 2 for the Secretary's criteria.) As directed by MACRA, HHS's Office of the Assistant Secretary for Planning and Evaluation (ASPE) provides operational and technical support to PTAC.

This report includes: 1) a summary of PTAC's review of a PFPM submitted by the American College of Surgeons (ACS), entitled, *ACS – Brandeis Advanced Alternative Payment Model*; 2) a summary of this model; 3) PTAC's comments on the proposed model and its recommendation to the Secretary; and 4) PTAC's evaluation of the proposed PFPM against each of the Secretary's criteria for PFPMs. The appendices to this report include a record of the voting by the PTAC on this proposal (Appendix 3); the proposal submitted by ACS (Appendix 4); and additional information on the proposal submitted by ACS subsequent to the initial proposal submission (Appendix 5).

SUMMARY STATEMENT

PTAC recommends the *ACS – Brandeis Advanced Alternative Payment Model* for limited-scale testing with four stipulations. While finding that this model offers promise because of its broad scope and focus on episodes of care for many different health care procedures and conditions, PTAC recommends that limited-scale testing be undertaken because the model has not yet been implemented and could benefit from testing in a limited number of both procedure episodes and condition episodes.

PTAC REVIEW OF ACS PROPOSAL

The *ACS – Brandeis Advanced Alternative Payment Model* was submitted to PTAC by the American College of Surgeons on December 14, 2016. The proposal was first reviewed by a PTAC Preliminary Review Team (PRT) composed of three PTAC members, including one physician. These members reviewed the proposal and related data and information, secured additional clarifying information on the proposal from the American College of Surgeons, reviewed all comments on the proposal submitted by the public, and talked with the Centers for Medicare and Medicaid Services on current use of episode groupers by Medicare. The PRT's findings, conclusions, and recommendation were documented in a "Preliminary Review Team Report to the Physician-Focused Payment Model Technical Advisory Committee (PTAC)," dated March 22, 2017, and sent to the full PTAC on March 23, 2017 along with the proposal and all related information. At a public meeting held on April 11, 2017, the PTAC deliberated on the extent to which the proposal meets the criteria established by the Secretary in regulations at 42 CFR § 414.1465, and should be recommended.¹ Below are a summary of the *ACS – Brandeis Advanced Alternative Payment Model*, PTAC's comments and recommendation to the Secretary on this proposal, and the results of the PTAC's evaluation of the proposal compared to the Secretary's criteria for PFPMs.

PROPOSAL SUMMARY

The *ACS – Brandeis Advanced Alternative Payment Model* (the model), is an episode-based payment model that identifies more than one hundred candidate procedures and conditions (payment episodes) as its focus. These procedures and conditions are diverse, including but not limited to: upper respiratory infection; appendectomy; colonoscopy; cataract surgery; acute

¹PTAC member Rhonda M. Medows, MD, was not in attendance, and PTAC member Tim Ferris, MD, recused himself from voting.

simple, benign fibrocystic / dysplastic breast disease; juvenile idiopathic arthritis; lung resection; coronary artery bypass grafting; open heart valve surgery; liver transplant; heart failure; and breast neoplasm (malignant). These episodes are defined by an updated version of an episode grouper developed for the Centers for Medicare & Medicaid Services (CMS) by a team led by Brandeis University. In response to a question from the PTAC PRT, the American College of Surgeons clarified that more than 50 of these procedure episodes are ready for implementation in 2018.

In the model, an organizational entity (which could consist of “single-specialty practices, multispecialty practices or convenor groups of small provider practices with or without ties to particular facilities... as long as the entity is able to perform its management and fiduciary responsibilities.”) would enter into a risk-based contract with CMS for the quality and cost of its contributions to a set of procedure or condition episodes defined in the contract. The contract would involve Medicare payments for every instance of the procedure or condition episodes defined in the contract during a performance period for which the entity’s affiliated Qualified Participants (QPs) provide a service paid for by Medicare. Each entity participating in the model with CMS will identify its affiliated QPs who will participate under business agreements.

Improvements in care quality and efficiency would be brought about by financial incentives and Clinical Affinity Groups. Clinical Affinity Groups are sets of clinicians who regularly participate together in episodes of a given type. Their decisions and services are intended to influence the way in which patients are treated for a type of episode. Physicians would choose to participate by contracting with the Alternative Payment Model (APM) entity. If they did so, they would continue to have their services paid through the Medicare Physician Fee Schedule, but they would be at financial risk for spending on the episode based on their attributed role in providing care for the procedure/condition episodes defined in the entity’s contract with CMS. Attributed roles would be determined by clinical algorithms that retrospectively identify all clinicians who participated in the care of a patient for each type of episode and then infer each clinician’s role. Incentive payments would be made retrospectively based on the difference between the observed and expected spending for the episode. Each clinical role would be assigned a fixed proportion of the savings or loss amount. Savings or losses would be attributed to each participating QP based on the episodes he/she is involved in and on his/her specific role in that care. The APM entity would receive a share of these gains or losses based on the contract with CMS. The proposal states that “Several specific methods for determining the share may be considered.” In the case of savings, the shared savings component of the payment would be paid to the APM entity. According to the proposal, “The APM entity would engage in gainsharing with affiliated QPs as agreed upon in their business agreements with the participant, and guided at its discretion by the team-based fiscal attribution framework.” If

spending exceeded the expected amount, the difference would be paid to CMS by the entity. The entity would need to find a source of funds to make these payments, and the proposal indicates that "participating providers may also be required to contribute" and "to protect against catastrophic losses, the model will build in stop loss provisions."

RECOMMENDATION AND COMMENTS TO THE SECRETARY

PTAC concluded that the *American College of Surgeons – Brandeis Advanced Alternative Payment Model's* broad scope and focus on episodes of care for many different health care procedures and conditions holds promise and PTAC recommends it for limited-scale testing with the following stipulations. First, the testing should be for a very limited number of both procedure episodes and condition episodes. This limited number should be significantly smaller than the 54 procedural episodes most recently proposed by the submitter and should include both procedural and condition episodes. Second, testing should proceed when the model has developed and is able to implement a quality measurement and payment system that measures and incentivizes provider *performance* on quality measures (including patient-reported outcomes (PROs)) as opposed to measuring and rewarding the *reporting* of quality measures. Third, limited scale testing should only be undertaken with Alternative Payment Entities where the majority of the members of the relevant clinical affinity group(s) have agreed to participate in a test of the model. Fourth, the algorithms and construct of the episode grouper, which is the lynchpin of the model, should be made publicly available; and a mechanism should be in place for continuous update of the grouper so that it remains current with advances in healthcare.

These stipulations for limited scale testing were identified as a result of several issues identified by the PTAC (discussed below). PTAC believes that the proposed model's breadth could presage considerable impact if these issues are addressed.

Broad Scope and Complexity of the Model and Limited Detail on Key Aspects

The Committee concluded that the very broad scope of the model — the initial model submitted to PTAC identified more than 100 procedures involving more than 70 separate medical specialties — necessitates testing the model on a limited scale to better understand how the model is likely to change provider payments and patient care. This is particularly important because the model has not yet been implemented and therefore not yet produced any data on how the APM would function for any of the episodes described.

Committee members also note that the complexity of the model contributes to an unavoidable risk of unintended consequences which cannot be anticipated given the myriad number and variation of interacting parts within this model. These include, for example: variation in the numbers and types of included episodes, differing risk-sharing arrangements between the APM entity and its qualified providers, and the proportion and effect of non-participating providers on costs and patient outcomes.

Information on the model's effects on individual conditions and procedures, and its impact on provider payments and patient care was limited. As an example, PTAC found that the proposed model described its intended effect on physician behavior at a very high level. Because it has not been implemented, it could not provide an example of actual change in physician behavior that the model has achieved. PTAC is not clear on the extent to which the proposed model would achieve desired change in physician behavior.

Unclear Effect on Physician Behavior

The model involves creating sets of incentives to control spending for individual episodes of care and then allowing those incentives to operate differentially depending on the condition, the diagnosis, the nature of the care provided, and the venue of care. The model also is designed to encourage multiple physicians to collaborate in addressing cost drivers in resource use and variation in care.

PTAC members, however, had concerns about the way the model and its proposed behavioral economics would actually change the way clinicians practice. For example, PTAC took note of information sent by ACS that stated, "The ACS-Brandeis model does not begin with predetermined care redesign or formulate in advance the strategies of mechanisms for change. We designed the model to allow providers and provider groups to find their own way toward high-quality and high-value care." Additionally, in its April 11, 2017 reply to a question from a PTAC member on "Where do you see something that could really fundamentally change the way we practice medicine?" the submitter stated, "I'm not sure we're going to fundamentally change the way we practice medicine. We want to change the way we pay for it."

PTAC appreciates the evidence of widespread deficits in the delivery of health care nationwide, and that it is not reasonable to expect a payment model aimed at more than one hundred candidate procedures and conditions to describe the exact interventions to be used to improve care in all episodes of care. Nevertheless, PTAC did anticipate the model to identify some care delivery problems that potentially could be improved through the model and provide information on how the model would remove barriers that exist to the provision of high quality

healthcare. Related to this, PTAC noted that the Innovation Center's authorizing statute says that it is authorizing "payment and service delivery models where there is evidence that the model addresses a defined population for which there are deficits in care, leading to poorer clinical outcomes." One area of concern with this model is that it did not clearly identify specific deficits in care and how they would be addressed. Concern about the unknown effects on provider behavior is increased because of concern about the ability of the model to maintain or improve quality of care.

Questions about Potential Effects on Quality of Care

The premise of the model is that by: 1) providing information to providers on quality and total spending on episodes; 2) designating Clinical Affinity Groups (teams of providers involved in specific types of care delivery), and 3) giving physicians the ability to take on risk for spending relative to risk-adjusted benchmarks, physicians will be encouraged to improve team-based care processes and conserve resources. However, the quality measures to be used and the standard of performance that providers are to meet are not specified. The proposal states its intent is to move to outcome measures, but the measures are still under development. Although the model promises the use of patient reported outcomes (PROs) as quality measures, the model does not specify the PROs to be used.

Further, the proposed quality framework initially provides incentives simply for *reporting* of quality measures as opposed to accountability for *performance* on quality measures, and it specifies no minimum quality standards. Under the proposed model, if providers merely reported on measures, then they would be eligible to receive savings, regardless of their actual performance on the measures. This increases concern about the potential that the model could incentivize achieving savings by stinting on care as well as by improving quality and efficiency. Even if payment is tied to actual performance on measures, PTAC is concerned that the methodology could still reward savings when quality decreases. Additionally, it is not clear how cost and quality of care data resulting from physicians who are not participating in the model would be handled by the model.

The concerns about the model's protections for quality lead to a concern that in the initial years, spending could be reduced in ways that would not be beneficial to patients. In the future, the model might well overcome these issues, but there was no assurance of when changes in the quality measures and framework would be implemented. This concern is related to questions about where and how accountability for quality of care resides in the model and how it would be implemented.

Unclear Accountability

The proposed model relies on the APM entity in which physicians participate to transfer incentives to the individual physicians and other qualified providers to change their behavior. The proposal cannot indicate exactly how those incentives would work at the individual provider level because the model does not specify how entities would distribute savings and losses, and these decisions might be very different from entity to entity, as well as for different conditions and procedures. As a result, it is difficult to identify the accountability for performance when the incentives at the individual practitioner level are unknown.

In addition, there is no requirement that in order for providers to participate in a procedural episode, they must also participate in the associated condition episodes for the conditions to which the procedure is applied. Although there is accountability in a procedural episode for spending within an episode, accountability for the number of episodes would only exist if the providers were also accountable for overall spending on the underlying conditions. Consequently, if procedural episodes are not implemented along with the associated condition-based episodes, it is possible that providers could save money within episodes but also increase the number of episodes, which could increase total spending.

A third issue is that there is only accountability for the portion of the spending in the episode that is allocated to clinicians who are participating in the Alternative Payment Entity. If all members of a clinical affinity group do not participate in the model, then only a portion of the total spending would be allocated to the entity, and Medicare would be at risk for the balance.

As a result of these possible scenarios, PTAC members felt that there needed to be assurances that implementation would only occur where (a) both condition-based episodes and procedural episodes were implemented together, and (b) the majority of the members of a clinical affinity group were participating.

Questions on the Grouper

The use of a new updated version of the Episode Grouper for Medicare (EGM) is a core part of this proposal. PTAC received general information on how the grouper is intended to work and some information about what codes are included, but it did not receive the detailed clinical logic behind the grouper; e.g., when a code is included in an episode and when it is not, and comprehensive information on its performance.

PTAC members had several comments and questions on the grouper:

1. How does the grouper perform in action?
2. Validation of the grouper: How well does it accomplish what it is intended to do?
3. Will the grouper be accessible to all users without charge? and
4. Who will ensure the ongoing maintenance of the grouper?

PTAC also does not know whether Medicare will endorse and maintain the grouper as a public use grouper. It also is unclear if ACS and Brandeis University intend to put the grouper and all of its details in the public domain. PTAC notes that ACS responded in a question sent to it from the PRT that:

“One theme in our proposed APM is that CMS ensure a widespread but consistent diffusion of the underlying technologies, including the EGM software itself, as well as the clinical metadata used to specify episodes. We call this the “single-grouper” solution, and it is intended to create a consistent national standard for defining clinical concepts and episodes, determining how to assign services and cost to those episodes, and communicating important clinical associations such as indications for procedures and related sequelae

CMS owns the software . . . We wish for a situation in which the software and metadata are licensed or at least copyright protected.” However, “All copies of the clinical metadata and measurement algorithms for this APM currently reside at Brandeis. . . . The IP [intellectual property] aspect of these elements of the proposal are currently under internal review with regard to their proprietary nature. Our intent is for this model to be freely licensed as an APM for all payers and is not subject to change without review and approval by the ACS. . . . However, development costs and maintenance cost for performance measurement require resources. To the extent that payers do not support these development and maintenance expenses, we would expect licensing agreements that support a going concern in these programs.”

PTAC received information from the submitter about validation testing that has already taken place, is still underway, and planned for the future. This information is important and should be shared publicly, as part of this model. Further, PTAC believes that the grouper needs to be updated on a regular basis. As the submitter stated to the PTAC on April 11, 2017, “New treatments come out. All kinds of thing change. So episodes are dynamic, and they need to be managed.” PTAC believes that if CMS moves forward to implement this model, then CMS will need to figure out how to deploy this new episode grouper in a manner that that does not treat it as a proprietary product, but as a tool that should be in the public domain, and with its validity maintained over time.

EVALUATION OF THE PROPOSAL USING THE SECRETARY’S CRITERIA

PTAC Rating of Proposal by Secretarial Criteria

Criteria Specified by the Secretary (at 42 CFR §414.1465)	Rating
1. Scope of Proposed PFPM (High Priority) ¹	Meets criterion and deserves priority consideration
2. Quality and Cost (High Priority)	Meets criterion
3. Payment Methodology (High Priority)	Meets criterion
4. Value over Volume	Does not meet criterion
5. Flexibility	Meets criterion
6. Ability to be Evaluated	Meets criterion
7. Integration and Care Coordination	Meets criterion
8. Patient Choice	Meets criterion
9. Patient Safety	Meets criterion
10. Health Information Technology	Meets criterion

Criterion 1. Scope (High Priority Criterion)

Aim to broaden or expand the CMS APM portfolio by addressing an issue in payment policy in a new way, or including APM Entities whose opportunities to participate in APMs have been limited.

Rating: Meets Criterion and Deserves Priority Consideration

PTAC concluded that the proposal meets the criterion and deserves priority consideration because the model aims to provide a broad-scope Medicare payment approach whereby multiple types of clinicians currently not able to participate in APMs could do so through a mechanism that identifies episodes of care for both procedures and chronic conditions and for which teams of clinicians could jointly be held responsible for the cost and quality of care provided.

PTAC was impressed at the proposal’s aspiration to be a national model that could provide a mechanism for participation in alternative payment models for a large number of clinicians covering a broad range of services, from time-limited procedures to the ongoing management of patients with chronic conditions in varied settings, including in-patient, ambulatory, and outpatient facilities. Initial implementation was proposed to focus on 75 procedures in 10 clinical areas involving 75 separate medical specialties. Expansion into acute and chronic

¹Criteria designated as “high priority” are those PTAC believes are of greatest importance in the overall review of the payment model proposal.

conditions increases the scope of the model to potentially impact \$1.5 trillion in Medicare expenditures annually, with the potential for over half of all clinicians in the country to have greater than 75% of their professional fees covered by this methodology.

Criterion 2. Quality and Cost (High Priority Criterion)

Are anticipated to improve health care quality at no additional cost, maintain health care quality while decreasing cost, or both improve health care quality and decrease cost.

Rating: Meets Criterion

The proposed methodology asserts that cost will be lower and quality higher, but the submitter did not provide adequate information describing (1) the ways in which care delivery would change in order to improve quality and/or reduce costs and (2) the reasons those changes could not occur under current payment systems. The premise of the model is that by providing information on the total spending on episodes, the designation of Clinical Affinity Groups (teams of providers involved in specific types of care delivery), and giving physicians the ability to take on risk for spending relative to risk-adjusted benchmarks, physicians will be encouraged to improve team-based care processes and conserve resources. However, without a clear plan for how spending will be reduced in ways that are beneficial to patients, it is equally possible that spending could be reduced in ways that would *not* be beneficial to patients. Accountability for quality is primarily based on reporting on processes of care rather than performance on outcomes, and there are no penalties for reductions in quality.

The submitter states that the model's quality will be assessed for each performance period using quality measures relevant to the specific covered procedures and conditions, and indicates that the current MIPS quality measures will be a starting point for quality reporting. However, the submitter states that the current MIPS reporting data sets are "unlikely to produce clinically meaningful improvement in outcomes of care when rigorously evaluated" and proposes to develop sets of quality measures including process, outcome, and patient experience that are registry-based. For surgical care, the measures would be defined separately for five phases of surgical care and care coordination, including preoperative, perioperative, intraoperative, postoperative, and post-discharge. All clinicians would be required to report on patient-based quality measures that are not tied specifically to procedural episodes paid through the APM, and clinicians involved with a procedure would report additional quality measures specific to the procedure.

The proposal and the information provided in response to questions gave some examples of how spending could be reduced, but some of these examples could be pursued under the

current payment system or under other CMMI APMs. Although there are likely opportunities to reduce avoidable spending for all of the conditions and procedures the proposal is designed to encompass, the proposal does not explain whether and how the APM will enable physicians to successfully change care in a way that will take advantage of those opportunities. No examples were provided as to how the payment model would protect patients from actions designed to generate savings by reducing necessary services or how the payment model would ensure that patients with higher needs could continue to receive adequate services.

The proposal asserts that new Episode Grouper for Medicare (EGM) software –which analyzes Medicare reimbursement (claims) data and is proposed for use in this model – takes into account all spending in an episode of care for health care procedures and health conditions, including facility spending, costs of spending on nested procedural episodes, and spending arising from complications. The proposal states that the “end-goal is for participants to understand where they have excess utilization compared to the norm and to the highest performing groups,” but the proposal does not describe how physicians would control costs of services that they do not deliver directly, such as post-acute care costs, and whether the risk adjustment methodology adequately addresses differences in patient needs that can affect those costs.

The model is designed to enable multiple physicians to collaborate in addressing cost drivers in resource use and variation in care, but participation is optional for all members of the care team, and under the proposed methodology, less than full participation would leave Medicare at risk for the portion of spending that is attributed to physicians who are not participating in the clinical affinity group.

Criterion 3. Payment Methodology (High Priority Criterion)

Pay APM Entities with a payment methodology designed to achieve the goals of the PFPM Criteria. Addresses in detail through this methodology how Medicare, and other payers if applicable, pay APM Entities, how the payment methodology differs from current payment methodologies, and why the PFPM cannot be tested under current payment methodologies.

Rating: Meets Criterion

PTAC finds that the proposal meets the criterion because the methodology is described in sufficient detail with respect to its general principles, and specific examples were provided in response to follow-up questions. However, because the same basic methodology is intended to be customized to each of a large number of conditions, procedures, and settings, additional details will need to be developed before it can be implemented for all of those conditions, procedures, and settings. Further, the model proposes to assign each clinician involved in a

patient's care one of several designated clinical roles (e.g., primary provider, principal provider, episodic provider, supporting provider, and ancillary provider). Each clinical role would be determined by an algorithm and a priori would be assigned a fixed proportion of savings amount determined by "policy." Yet there is no information provided supporting the proportions proposed nor is any process defined for how those proportions might be adjusted over time.

The payment methodology also is dependent on CMS updating the episode definitions in the EGM episode grouper over time. The grouper is described as a "bundle of bundles" approach which permits multiple episodes of care for the same condition or procedure to be grouped and measured against normative spending targets with risk to the providers based upon costs and savings compared to risk-adjusted norms. The methodology is asserted to be applicable within other payment models such as ACOs, for most types of providers, in most settings, and for both procedures and chronic conditions, but no specific examples were provided describing how the model might be successfully implemented in such a broad range of settings. For several aspects of the model, options for implementation were described, but the proposal does not evaluate the options or recommend a specific approach, and so these options would have to be resolved before implementation could occur.

Criterion 4. Value over Volume

Provide incentives to practitioners to deliver high-quality health care.

Rating: Does Not Meet Criterion

The proposed model could incentivize efficient provision of episodes of care where there are opportunities for greater efficiencies, but it lacks specificity with respect to how the model will enable physicians to change care delivery in order to reduce utilization and how it will ensure medical appropriateness of provided care. Quality of care is neither rewarded nor penalized unless savings occur. The proposed use of a retrospective episode grouper methodology is intended to provide information and standards for individual providers, episodes, and patients that can be grouped for a more comprehensive set of information from which providers can be held accountable for costs and quality. However, driving spending down within individual episodes does not necessarily achieve savings in total cost of care, unless accompanied by methods of controlling the number of services provided or ensuring clinical appropriateness. Although the proposal indicates that utilization of procedural episodes would be controlled through their nesting within condition-based episodes, the proposal would not restrict the procedural episodes to only be implemented inside condition-based episodes, nor is there any

requirement that the physicians who would be accountable for managing utilization under condition-based episodes would actually participate in the model.

In addition, there are insufficient mechanisms in the model to ensure that savings are not achieved at the expense of quality, or to encourage or reward quality even with no change in spending, which are essential elements of a truly value-based approach.

Criterion 5. Flexibility

Provide the flexibility needed for practitioners to deliver high-quality health care.

Rating: Meets Criterion

The proposal meets this criterion because the proposed intervention could be used in inpatient, outpatient, and ambulatory settings for multiple procedures and chronic conditions involving multiple types of providers. Further, the model permits flexibility with respect to the number and types of physicians who could participate in clinical affinity groups.

However, the proposed model does not appear to make any provision for direct payment for innovative services that are not eligible for payment under current payment systems, so it is unclear whether and how physicians would have greater flexibility to control post-acute care costs and other types of non-physician services. Further, although it is clear how multi-specialty physician groups could participate, the proposal does not make clear how independent practices in different specialties that have overlapping but not identical service areas could effectively participate, since not all of the patients in one practice would be in the other practice and vice versa.

The submitter asserts that rural, critical access, and small group providers can participate “under the umbrella of a new corporate entity or convener group.” The nature of such entities is not spelled out with sufficient detail with respect to the logistical challenges or potential regulatory or monetary hurdles to determine how broadly such participation could occur. In order for there to be truly broad participation in the model, these issues would have to be resolved.

Criterion 6. Ability to be Evaluated

Have evaluable goals for quality of care, cost, and any other goals of the PFFM.

Rating: Meets Criterion

The proposal minimally meets this criterion because an evaluation could be performed by comparing changes in spending under the EGM for participating vs. non-participating practices. However, the proposal would be very complex to evaluate depending on how many different combinations of physicians participate in clinical affinity groups. The fact that not all clinicians in a clinical team are required to participate in this model creates flexibility in implementation, but it also increases the complexity of evaluation because of the potential for multiple configurations of clinical affinity groups and the potential for interactions between the variations in care delivery and variations in the clinical affinity group composition. In addition, the model depends upon the ability to identify members of the care teams accurately with respect to role (primary provider, principal provider, etc.) and their contributions across settings and the ability to report quality measures of greater specificity than is currently required by payers. These may increase complexity and thereby decrease the ability to be evaluated.

Criterion 7. Integration and Care Coordination

Encourage greater integration and care coordination among practitioners and across settings where multiple practitioners or settings are relevant to delivering care to the population treated under the PFFM.

Rating: Meets Criterion

The proposal meets the criterion because the model includes an innovative way to support multiple clinicians working together as part of clinical affinity groups. However, there does not appear to be any minimum threshold for the level of integration required, nor any way to encourage or require support by, and coordination with, the physicians who are not part of the alternative payment model entity. The model aims to increase integration across specialties by identifying those clinicians who regularly participate in a given type of episode for purposes of measuring and reporting utilization and quality data. The voluntary nature of the involvement of members of the care team may result in less integration and care coordination than would be desirable or necessary to successfully reduce spending and ensure quality.

Criterion 8. Patient Choice

Encourage greater attention to the health of the population served while also supporting the unique needs and preferences of individual patients.

Rating: Meets Criterion

The proposal meets the criterion because patients are not limited in terms of which physicians and other providers they can choose for the different components of care included in episodes. The proposal stated that “we do not expect patients to be able to opt out of individual bundled care arrangements of the providers from whom they seek care;” however, in response to questions from the PTAC PRT, the submitter indicated that patients would continue to have the right to seek care from whomever they choose. There is no requirement in this proposal for gatekeeper arrangements or narrowed networks that would limit patient choice.

The model may improve attention to individual differences in patient characteristics (including social needs, conditions, and health-related preferences) by incentivizing attention to the social determinants of health outcomes as a driver of adverse variances in cost and quality. However, it is not clear whether the risk adjustment methodology will adequately protect against participants avoiding high-need patients. If the model allows a wider range of clinicians to participate in advanced alternative payment models than what exists in the current CMS models, then expansion by demographical, clinical, or geographic diversity may be incentivized.

Criterion 9. Patient Safety

Aim to maintain or improve standards of patient safety.

Rating: Meets Criterion

The PTAC finds that the proposal meets the criterion. Because the episode definitions are intended to include the costs of treatment for any complications, there are implicit penalties for an increase in patient safety problems. Process measures used for the quality component would also help to ensure patient safety. The model aims to address patient safety by ensuring that episode spending measures include costs resulting from excessive care, delayed or avoided care, and poor outcomes of care that occur within the timeframes defined for the episodes. However, the proposed initial quality measures are only process measures and they only provide incentives for improvement or penalties for reduced quality if there are savings to be distributed to participating Qualifying APM Participants. The submitter did not describe how disruptions in care transitions and care continuity would be addressed if all of the clinicians involved in the services prior to and after the transition were not participating.

Criterion 10. Health Information Technology

Encourage use of health information technology to inform care.

Rating: Meets Criterion

PTAC finds that the proposal meets the criterion because the model does not restrict current health information integration efforts and may incentivize use of technology that promotes improved care coordination and monitoring of factors affecting rates of complications. The model requires “at least 50% of eligible clinicians in each APM entity to use CEHRT for clinical documentation, communication, and patient care,” similar to the requirement for advanced alternative payment models. The model requires identification of providers as either primary, principal, episodic, supporting, or ancillary; and it requires reporting of quality measures, which may require enhancements of current coding practices for claims reporting. The need for technology to identify high risk patients or technology-enhanced care innovations is not directly addressed in the proposal.

APPENDIX 1. COMMITTEE MEMBERS AND TERMS

Jeffrey Bailet, MD, Chair

Elizabeth Mitchell, Vice-Chair

Term Expires October 2017

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Providence Health & Services
Seattle, WA

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• *Weill Cornell*
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Bruce Steinwald, MBA
Independent Consultant
Washington, DC

Tim Ferris, MD
Partners Health Care
Boston, MA

APPENDIX 2. PFPM CRITERIA ESTABLISHED BY THE SECRETARY

PFPM CRITERIA ESTABLISHED BY THE SECRETARY

- 1. Scope.** Aim to either directly address an issue in payment policy that broadens and expands the CMS APM portfolio or include APM Entities whose opportunities to participate in APMs have been limited.
- 2. Quality and Cost.** Are anticipated to improve health care quality at no additional cost, maintain health care quality while decreasing cost, or both improve health care quality and decrease cost.
- 3. Payment Methodology.** Pay APM Entities with a payment methodology designed to achieve the goals of the PFPM criteria. Addresses in detail through this methodology how Medicare and other payers, if applicable, pay APM Entities, how the payment methodology differs from current payment methodologies, and why the Physician-Focused Payment Model cannot be tested under current payment methodologies.
- 4. Value over Volume.** Provide incentives to practitioners to deliver high-quality health care.
- 5. Flexibility.** Provide the flexibility needed for practitioners to deliver high-quality health care.
- 6. Ability to be Evaluated.** Have evaluable goals for quality of care, cost, and any other goals of the PFPM.
- 7. Integration and Care Coordination.** Encourage greater integration and care coordination among practitioners and across settings where multiple practitioners or settings are relevant to delivering care to the population treated under the PFPM.
- 8. Patient Choice.** Encourage greater attention to the health of the population served while also supporting the unique needs and preferences of individual patients.
- 9. Patient Safety.** Aim to maintain or improve standards of patient safety.
- 10. Health Information Technology.** Encourage use of health information technology to inform care.

**APPENDIX 3. DISTRIBUTION OF MEMBER VOTES ON EXTENT TO WHICH
PROPOSAL MEETS CRITERIA AND OVERALL RECOMMENDATION¹**

Criteria Specified by the Secretary (at 42 CFR §414.1465)	Does not meet		Meets		Priority consideration		Rating
	1	2	3	4	5	6	
1. Scope of Proposed PFP (High Priority) ²	0	0	2	2	4	1	Meets criterion and deserves priority consideration
2. Quality and Cost (High Priority)	0	4	5	0	0	0	Meets criterion
3. Payment Methodology (High Priority)	2	0	4	2	1	0	Meets criterion
4. Value over Volume	1	5	3	0	0	0	Does not meet criterion
5. Flexibility	0	1	4	4	0	0	Meets criterion
6. Ability to be Evaluated	0	2	6	1	0	0	Meets criterion
7. Integration and Care Coordination	0	1	5	1	1	1	Meets criterion
8. Patient Choice	0	2	5	2	0	0	Meets criterion
9. Patient Safety	0	1	8	0	0	0	Meets criterion
10. Health Information Technology	0	0	6	2	0	1	Meets criterion

Do not recommend	Recommend for limited-scale testing	Recommend for implementation	Recommend for implementation as a high priority	Recommendation
0	5	4	0	Recommend for limited-scale testing

¹PTAC member Rhonda M. Medows, MD, was not in attendance, and PTAC member Tim Ferris, MD, recused himself from voting.

²Criteria designated as “high priority” are those PTAC believes are of greatest importance in the overall review of the payment model proposal.

APPENDIX 4. PROPOSAL



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December 13, 2016

Proposal for a Physician-Focused Payment Model: ACS-Brandeis Advanced Alternative Payment Model

Attached, please find a submission from the American College of Surgeons for a Physician-Focused Payment Model entitled, the ACS-Brandeis Advanced APM.

If you have any questions related to the model, please contact:

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December 13, 2016

Physician-Focused Payment Model Technical Advisory Committee
C/o U.S. DHHS Asst. Sec. of Planning and Evaluation Office of Health Policy
200 Independence Avenue S.W.

Washington, D.C. 20201

PTAC@hhs.gov

Letter of Support – American College of Surgeons, ACS-Brandeis Advanced
Alternative Payment Model

Dear Committee Members,

On behalf of the more than 80,000 members of the American College of
Surgeons (ACS), I would like to express our strong support for the
accompanying proposal for a Physician-Focused Payment Model, which we
are submitting to the PTAC for review.

The ACS-Brandeis Advanced Alternative Payment Model (APM) seeks to
provide novel incentives and tools for both improving the quality of care and
reducing costs. The model is episode-based, built on an updated version of the
Episode Grouper for Medicare (EGM) software currently used by CMS for
measuring resource use. This grouper processes claims data using clinical
specifications for each episode that have been reviewed by our members and
affiliates, including trigger codes and relevant services. Financial risk is
attributed to providers based on their individual role in providing care to the
patient. The model incorporates a rigorous quality measurement framework
and will adjust payments based upon the quality of care delivered. Unlike
existing CMS episode-based payment models, the ACS-Brandeis model does
not require a hospitalization, allowing inclusion of procedures performed in the
outpatient setting as well as episodes for acute and chronic conditions cared for
by medical specialties. It is our intention that the proposal meet MACRA
Advanced APM requirements.

Our patient-focused approach, based on the team-based nature of care for the
surgical patient, easily translates to other forms of specialty care. The episodes
that form the basis for assessing cost also create a comprehensive and coherent
framework for evaluating clinically meaningful performance in quality,
efficiency, and value across a broad range of procedures and conditions

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provided in a wide range of settings. The model provides information and tools to the APM entities and individual providers that help them target cost drivers and improve quality.

If implemented, it is our sincere belief that this model will provide opportunities for participation in Advanced APMs to providers who have until now lacked options for meaningful participation. This will enhance the ability of many physicians to participate in transformative delivery system reforms in a way that is designed to be clinically meaningful to them and to the patients they serve.

Thank you for the opportunity to submit this proposal and for your consideration of its merits. If you have any questions about the attached proposal, please contact ACS Medical Director for Quality and Health Policy, Frank Opelka, MD, FACS, at fopelka@facs.org or ACS Manager of Policy Development, Matthew Coffron, at mcoffron@facs.org.

Sincerely,

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ACS-BRANDEIS

Advanced Alternative Payment Model

A Physician-Focused Payment Model
Submitted by the American College of Surgeons
December 2016

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Abstract

The ACS-Brandeis Advanced Alternative Payment Model (A-APM) is a new approach to physician-focused payment for Medicare and other payers. This model is designed to make sense to clinicians. It provides for specific and meaningful clinical contexts (episodes) that are needed to make inferences about quality and cost. Clinicians' involvement in care for each patient is identified and acknowledged in a structure of shared accountability for quality and cost outcomes. This level of precision is applied to a large majority of Medicare spending, which means that most clinicians in most specialties could practice as Qualified Participants (QPs) in an advanced APM environment.

The core model is focused on procedure episodes, but can easily be expanded to include acute and chronic conditions. QPs nested within an APM entity will go at risk for a set of episodes that represents the core of the care they provide. Each instance of a covered episode will be assigned an expected cost that reflects both a pre-determined standard cost and the patient's own risk factors. The difference between the observed and expected cost will represent the net saving/loss for that episode. During the risk period, responsibility for any savings or loss will be attributed to each participating QP based on the episodes he or she is involved in and on his or her specific role in that care (e.g., episodic provider). These QP based allocations are aggregated at the APM entity level. Cost reconciliation then involves integrating quality and resource use to come up with a net savings or loss for the entity.

Building on the episode framework, the ACS-Brandeis A-APM proposes a tiered quality model that creates a minimum floor for receiving shared saving and higher shared saving for those who demonstrate superior quality. Measure selection is key and will involve the medical specialties and other stakeholders to ensure clinical veracity to providers and beneficiaries. The A-APM is flexible and can fit with multiple reconciliation methods currently in use by CMS.

I. Background and Model Overview

A. Background

The ACS-Brandeis Advanced Alternative Payment Model (A-APM) is a new approach to physician-focused payment for Medicare and other payers. The model focuses on the patient, respects clinical context and team-based care, and quantifies clinical quality and cost-efficiency.

The ACS-Brandeis model leverages the Episode Grouper for Medicare (EGM), which is software developed by CMS with Brandeis University that translates administrative claims data into clinically meaningful episodes of care defined by the patient's clinical condition(s) or major procedures. EGM assigns the large majority of Medicare-covered services and costs into episodes in order to explain spending patterns, and to allow standardized comparisons of performance across delivery systems.¹ The system can track, without double-counting, each dollar of spending and savings.²

The development team has prepared and tested a suite of software components to augment the core EGM software package so that, in a very real and technical sense, preparation for implementation has already begun. Also, over the past year, the ACS-Brandeis team has established a consortium of professional organizations that have followed and supported development. For example, they participated in a series of webinars focused on policy options and technical aspects of the model. Representatives from physician specialty societies reviewed and updated clinical specifications underlying the episodes corresponding to their respective domains of clinical work. It is our hope and expectation that support from them and many others will continue and increase commensurate with interest and investment by PTAC and CMS. Given that this model is built upon existing software that is familiar to CMS, implementation could begin in stages as early as January 2018.

B. Model Overview

The ACS-Brandeis model is designed to make sense to clinicians. It provides for specific and meaningful clinical contexts (episodes) that are needed to make inferences about quality and cost. Clinicians' involvement in care for each patient is identified and acknowledged in a structure of shared accountability for quality and cost outcomes. This level of precision is applied to a large majority of Medicare spending, which means that most clinicians in most specialties could practice as Qualified Participants (QPs) in an advanced APM environment.

The ACS-Brandeis model posits to three important levels of aggregation above individual patients, episodes, and clinicians:

¹ Not all services for a patient are assigned to an episode because some occur in contexts lacking sufficient criteria to trigger a relevant episode (e.g., a single service for 'cough' in the absence of a diagnosed condition).

² CMS' Design Report for EGM (2016) is included in the supplemental materials accompanying this proposal.

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1. **Clinical Teams.** Individual clinicians participate in the care for a patient in the context of an episode. For example, a surgical patient may receive care from a PCP, surgeon, anesthesiologist, medical specialist, radiologist and a pathologist. These clinicians have their distinct roles in the context of team-based care, and together share accountability for the cost and quality of that episode for that patient.
2. **Clinical Affinity Groups (CAG).** These are sets of clinicians who regularly participate together in episodes of a given type, medical or surgical, and thus form the normative standards of care for those episodes. Most if not all team members for any individual episode of care would be members of a particular CAG, though not all CAG members would be on the team for a specific episode. These also can be the great innovators and accelerators of care redesign in pursuit of performance improvement for types and families of episodes.
3. **Advanced APM Entities.** These are the organizations that enter into risk-based contracts with Medicare and potentially other payers for the quality and cost of its contributions to episodes of care defined by EGM. Each A-APM entity would include one or more CAGs.

The model's key features are summarized here, and described further in the sections that follow.

- Each APM entity participating in the model will agree with CMS on a set of procedure or condition episodes to be covered.
- Each APM entity will identify its affiliated Qualified Participants (QPs) who participate under business agreements.
- The risk contract with CMS will include every instance of a covered procedure or condition episode during a performance period (e.g., calendar year) for which an entity's affiliated QP provides a service paid for by Medicare. The entity's share of the accountability for an episode is determined based on the QP's clinical role in the episode and the number of other clinicians providing care to the patient for that episode.
- Each instance of a covered episode will be assigned an expected cost that reflects both a pre-determined standard cost and the patient's own risk factors. All costs of the episode are taken into account, including facility costs, costs of nested procedural episodes, and costs arising from sequelae (e.g., complications).
- The APM entity's cost performance for a period will be the differences between the expected and actual cost, summed over all covered episodes, and weighted by the respective clinical role(s) of the affiliated QPs.
- The APM entity's quality will be assessed for each performance period using quality measures relevant to the covered procedures and conditions.
- The APM entity will share in these gains or losses, taking into account the entity's quality assessment. Several specific methods for determining the share may be considered.

II. Scope of Proposed PFPM

The ACS-Brandeis APM has the potential to be a national model, covering a broad range of services including time-limited procedures or the ongoing management of patients and chronic conditions. In this initial phase, we are focused on the work of general surgeons and other surgical specialties. However, we expect the model to expand over time to include both acute and chronic medical conditions as well. The ACS-Brandeis model can be operationalized as a single type of episode (e.g., CABG or transplantation), a selected set of procedural (or condition) episodes, or cumulative patient-level aggregations of all episodes. Including more episodes can contribute to large cumulative coverage of all Medicare spending, opportunities for systemic and cross-cutting improvement activities, and total patient management over time.

Our clinical logic currently includes 54 procedural episodes in 10 clinical areas involving as many as 75 specialties including general surgery, orthopedic and cardiac surgery, gastroenterology, cardiology, pulmonary disease, neurology, urology, anesthesiology, nurse anesthetist, pathology and internal medicine. Based on an analysis of 4.8 million Medicare beneficiaries, we estimate **13 million such procedural episodes nationally each year totaling \$77 billion in Medicare expenditures.** The APM can be expanded to include acute medical episodes such as pneumonia, acute myocardial infarction (AMI) or acute exacerbations of chronic conditions. These episodes constitute much of the work of hospitalists and intensivists, among others. EGM currently supports the analysis of 29 acute condition episodes. We estimate there are **7.3 million such acute condition episodes that account for \$24 billion in Medicare expenditures nationally.** EGM currently supports the analysis of 38 chronic condition episodes such as COPD, heart failure and osteoarthritis. These high-volume chronic conditions cover eight different clinical areas leading to **37 million episodes and over \$73 billion in Medicare expenditures annually.**

The ACS-Brandeis model can allow physicians to meet A-APM revenue thresholds. Exhibit 1 illustrates the percentage of Medicare professional fees involved in the EGM episodes by specialty for the median provider. For example, half of general surgeons (the median provider) would have 46% or more of their pro fees included in an APM that covered the 54 current procedural episodes. Half of all internal medicine physicians would have 70% or more of their pro fees included in an APM that covered the 121 episodes vetted to date. Half of all physicians in almost all specialties would have very large majorities of their pro fees (e.g., 75% for general surgery and 79% for internal medicine) included in an APM that covered the full spectrum of episodes for their patients, akin to population-based models.

Exhibit 1: Percent of Covered Part B Fees for Selected Specialties (Median Provider)

Specialty	Procedural episodes (54)	All vetted episodes (121)	All episodes (600)
General Surgery	46%	60%	75%
Vascular Surgery	40%	64%	75%
Orthopedic Surgery	48%	70%	83%
Internal Medicine	3%	29%	79%

III. Quality and Cost

A. Quality

The ACS-Brandeis APM is intended to both increase quality and reduce cost. As an organization founded more than a century ago to improve the quality of care for the surgical patient, the ACS has striven from the outset to ensure that this model improves outcomes and the quality of care. We have sought to achieve this by designing a team-based model that measures quality at key junctures across an episode of care. The model incentivizes all providers involved in caring for the patient to work together to increase efficiency by linking fiscal risk to key quality measures with shared accountability.

MACRA regulations have provided a substantial amount of flexibility related to the application of quality measures in Advanced APMs. At least a portion of payments in these models must be adjusted based on quality measures comparable to those used in MIPS, but not necessarily the same measures included in MIPS, as long as they are evidence-based, reliable and valid. This flexibility provides the ACS and other physician specialty societies an important opportunity to contribute meaningfully to the development, evaluation, and implementation of measures designed by providers to improve care, and to move away from those demonstrated to not be associated with process improvement or clinically meaningful outcomes.

Our intent is for this model to meet all of the Advanced APM requirements and, in the case of the quality requirement, we believe that what we are proposing greatly exceeds the minimum requirements. Although we take advantage of the quality measures for MIPS as a starting point, we believe that these alone may fail to produce clinically meaningful improvement in outcomes of care when rigorously evaluated. For this reason, relying solely on selecting from the existing list of currently used measures is likely to be an inadequate approach if our intention is truly to improve the quality of care provided to the patient. Our proposed quality set includes measures of process, outcome and patient experience. Some of these measures were selected from familiar items used in current CMS programs, while others represent emerging measure sets.

The ACS believes that registry-based quality measures that encompass the following five phases of surgical care, along with care coordination, will be meaningful and important to both surgeons and surgical patients: preoperative, perioperative, intraoperative, postoperative, and post-discharge. Many other specialties already have, or are in the process of developing Qualified Registries (QRs) and Qualified Clinical Data Registries (QCDRs) for use in reporting CMS performance measures. Such registry-based measures carry more reliability and validity than traditional measures and in the future can be applied to individual episodes on a system, team-based, or individual clinician level. More information on the Surgical Phases of Care quality measures can be found in Appendix A.

Quality Measurement Categories and Tiers

In developing our quality measurement framework, ACS has looked to the CMS-published list of current models that would qualify as *Advanced* APMs under the law's requirements as well as information on models or tracks likely to become available in the near future. For our purposes, the most applicable quality model was described in the proposed rule on Advancing Care

APPENDIX 4. PROPOSAL

Coordination Through Episode Payment Models (EPMs) (August 2, 2016), which provides for differential levels or tiers of quality based on applicable measures.

Because the episodes defined in our model include multiple clinicians providing care across a continuum, determining quality that maps both to the time window of the episode and spans all specialties involved adds complexity and challenges in shared accountability. Episodes included in the ACS-Brandeis model are either procedural or condition-based (both acute and chronic). Ideally, quality measurement within differing types of episodes should occur at the patient level, be tailored for each episode, and attributed to the team of clinicians providing care. Those services provided by all participating specialties contribute to the ultimate outcome of the care.

We describe below an example of how the model could be applied to surgical procedure episodes. However, we believe that a patient-centric measurement system could be widely adapted to additional procedures and condition-based episodes, with input from specialty societies. Such a measurement system holds great promise for improving outcomes and is therefore worth the effort. However, to allow participation from the broadest possible array of providers we have outlined two participation categories that differ based on how closely measurement tracks the episode of care.

With this in mind, we have divided quality measurement into two categories; an **Episode-based Quality Category** with measures tied closely to the episode being measured, and an **All Patient-based Quality Category** with measures that are not specific to a particular episode. The quality tiers are consistent with the EPM proposed rule framework (Unacceptable, Acceptable, Good and Excellent). Excellent quality is only attainable in the Episode-based Quality Category. Exhibit 2 summarizes the two categories, along with the tiers and their respective requirements.

In the early transition period of the model, measurement focuses on level of participation, with a level of performance metrics applied only to the Excellent quality tier. This would allow participants to transition into the model and set a baseline for performance-based payment adjustment in later years. Over time, the Secretary would set a minimum threshold based on performance levels tied to the measures in all the quality categories.

The **Episode-based Quality Category** includes measures specific to the episode and, depending on the level of achievement, tiers quality and links to the cost targets. Initial participation is based on care coordination, key processes, outcomes measures, and PROMs. In the **All Patient-based Quality Category** each clinician reports quality measures on at least 50% of the patients in their clinical practice, which may or may not relate to the actual APM episodes. Since the All Patient-based quality model is not tied as closely to the care provided in the episodes paid through the APM, an **excellent** quality score is not attainable in this quality category. However, this method will allow for the participation of additional professionals who may otherwise have been excluded due to lack of appropriate meaningful measures.

During the transition phase, assignment to the four quality tiers will emphasize reporting requirements, although the Excellent tier can only be achieved through being a top performer in at least one measure in the Episode-Based Quality Category. In the more mature phases of the

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program, assignment of quality tiers will be determined by performance using a composite score of the applicable quality measures.

Exhibit 2: Quality Requirements by Category for Procedural Episodes in Surgery During Transitional Phase of the Program

Quality Tier	All-Patient Based Quality Category (MIPS Measures)	Episode-Based Quality Category (Surgical Phases of Care)
Unacceptable	Failure to meet minimum reporting threshold*	Failure to meet minimum reporting threshold*
Acceptable	Meets minimum reporting threshold* + Reports at least 2 MIPS measures including 1 outcome measure	Meets minimum reporting threshold* + Reports measures for at least two surgical phases of care, including at least one outcome measure + Demonstrates ability to collect PROMs in at least one episode for 10% of patients
Good	Meets minimum reporting threshold* + Reports at least 6 MIPS Measures or a Specialty Measure Set	Acceptable + Demonstrates ability to collect PROMs in at least one episode for 50% of APM patients
Excellent	NA	Good + Scores in the top decile of performance for at least one measure

*(Measures reported on 50% of all patients involved in APM Episodes including at least 1 outcome measure)

B. Cost

1) Leveraging the Episode Grouper for Medicare (EGM)

The model is designed to deploy the CMS Episode Grouper for Medicare (EGM) within a single or multi-payer environment in order to create an efficient array of procedural and condition episodes. These episodes define the resource use of numerous clinical providers within team-based care systems for a given period of time, and can be used in payment models by applying two-sided (upside/downside) risk payments, consistent with MACRA regulations.

The episode grouper calculates risk-adjusted cost targets or expected resource use for each patient in each episode. These cost targets are then compared to actual resources used at the point

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of care. The cost targets are inclusive with respect to clinically plausible services observed in representative claims data, and exceed what might be considered the most efficient or “ideal” costs per episode.

EGM will deliver information necessary for multiple stakeholders to collaborate and make informed care decisions about the cost drivers in resource use and variation in care. The end-goal is for participants to understand where they have excess utilization compared to the norm, and to the highest performing groups. This should include actionable information on how best to increase value and succeed in the payment environment. Resource use reports could be provided to the APM entity and its affiliated clinicians for managing cost drivers (e.g. consults, complications, post-acute care variations, pharma (where available), lab testing and imaging, and cost differentials between the various care pathways used for a condition). Understanding the expected targets and the cost drivers informs participants about the transformative elements needed for this model to optimize resource use.

Two major types of episodes emerge from the grouper logic. Procedural episodes refer to an episode defined by a procedural service such as a surgical procedure, endoscopic procedure or a hybrid endovascular/open procedure. Condition episodes are defined by a particular diagnosis and include the related care for a defined period of time, such as cancer, pneumonia, acute myocardial infarction, or heart failure. Applying episode grouper logic to code sets identifies and constructs these various episodes. These episodes can then be used by a clinician singularly or in clusters to come together in payment constructs to form an APM. With time, a (virtual) delivery system can build a large enough array of procedural and condition episodes stacked within their care models such that all of these can be combined into a global payment system. Thus, the ACS-Brandeis model framework promotes the HCP LAN’s progression for transforming healthcare from Fee for Service to Category 3 APM and further to Category 4 Population-based payments.

Using the ACS-Brandeis model framework, MIPS-eligible clinicians would affiliate with an APM entity and use EGM episodes to define their practice. This means the clinician would have several episodes which would “*cluster*” together to define their practice within the APM framework. There are several subsets of practice types within each specialty. For example, a general surgeon may predominantly work as a trauma surgeon, a bariatric surgeon, a breast surgeon, or a surgical oncologist. Ten different subspecialties are recognized in the specialty of general surgery. The cluster of episodes needed to define each surgical subspecialty would be quite different. Thus, it is important to use an episode grouper which has a number of episodes running concurrently to allow for the best opportunity to capture all the surgical subspecialties.

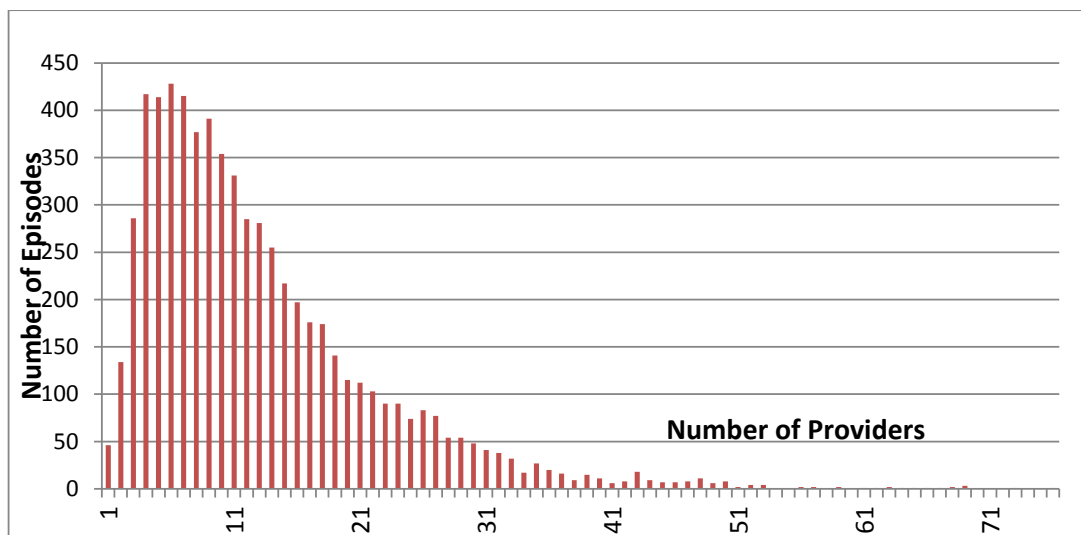
In addition to the clusters in a subspecialty, many procedural episodes may be “*nested*” in condition episodes and the grouper logic must accommodate nested episodes as well. For example, an acute MI episode may be a condition episode which has a long time window. The AMI condition episode may have PCI or CABG nested within it. The EGM grouper logic includes the PCI episode and the CABG episode in a manner that disallows double-counting. Allowing for clusters and nesting further increases the ability of physicians to participate in the Advanced APM program.

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The eligible clinicians and delivery system elements involved in the APM would receive predictive analytics from the episode grouper about expected resource use. The episode grouper applies risk adjustment for *each patient* based on the patient’s historical claims data, related to *each episode*, to establish an expected resource use for all the various providers who are involved in that patient’s episode at that moment in time. For example, a surgeon and other engaged physicians in team-based care for a colon cancer patient may have identified the colectomy as one of the episodes in the surgeon’s APM cluster of episodes. For this example, the episode grouper would define an expected resource use for *the colectomy episode for the individual patient* for the surgeon. The same surgeon may have a patient with the same diagnosis who carries several comorbid conditions or whose specific surgical requirements greatly affect the resource use needs for the patient. In this second instance, the colectomy episode for the second patient would have a different expected resource use – fit for the episode and for the patient.

Taking a closer look at the various services provided by clinicians for a procedural or condition episode reveals that multiple different services and locations are often involved in the care of a patient. A surprising number of TINs/NPIs are involved in care – more than one would consider if building an episode de novo in a work group or committee without the benefit of claims based information to consider. Exhibit 3 shows an example of the number of colectomy episodes in a representative database with different numbers of clinicians involved in the care.

Exhibit 3: Team Size Distribution for Colectomy



For surgical patients, typical episodes include surgeons, anesthesiologists, pathologists, radiologists and other consultants. Locations of care involve imaging centers, lab sites, hospitals and operating suites. Included in EGM are assignments of services to accommodate all the resources contemplated in care delivery. Some of these services vary for good reason and some may be excessive and avoidable resource use.

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These observations reinforce the nature of the episode construction for the APM, which is to be highly inclusive. This reflects the reality under status quo conditions, and sets the stage for the APM entity to improve efficiency over time by **avoiding unnecessary and duplicative relevant services**, and to streamline the composition of the team of caregivers in order to improve overall efficiency for patients.

2) Team-Based Fiscal Attribution (Clinicians' Shares)

The EGM logic assigns services to episodes, and the ACS-Brandeis model includes additional logic that assigns a level of fiscal risk attribution or accountability to these services. The ACS-Brandeis model complies with CMS' request for defining categories for fiscal risk attribution. Algorithms are used to identify all clinicians who participate in the care for each patient for each type of episode and infer the role of each. The clinical roles borrow from the MACRA patient relationship categories and are shown in Exhibit 4.³

Exhibit 4: Clinical Roles Defined for each Episode

Relationship to Patient/Episode	Description	Examples
Primary Provider	Primary care role; manages patient over time	<ul style="list-style-type: none"> • Internist • Pediatrician • Family practitioner
Principal Provider	Specialist; manages specific condition(s) over time;	<ul style="list-style-type: none"> • Psychiatrist • Nephrologist • Cardiologist
Episodic Provider	Manages an acute condition episode or a procedural episode	<ul style="list-style-type: none"> • Surgeon • Hospital medicine • Specialist
Supporting Provider	Supporting role during an episode	<ul style="list-style-type: none"> • Anesthesiologist • Radiation oncologist • Consulting specialist
Ancillary Provider	Focused role during a single service	<ul style="list-style-type: none"> • Diagnostic radiologist • Pathologist • Cardiologist (reading ECG)

For example, a patient with multiple chronic conditions may be managed over time by an internist as primary provider. One or more of those conditions could be managed by a specialist as principal provider, such as a cardiologist for ischemic heart disease or coronary artery disease.

³ These categories are highly concordant with those published by CMS for public comment, and could be made consistent with categories that CMS eventually finalizes.

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Other clinicians might provide supporting and ancillary roles such as consultations and tests. In time, the patient might experience an AMI (acute exacerbation) or undergo a revascularization procedure, which would trigger their own (nested) episodes with the requisite team-based care. Responsibility for appropriate care for such a family of episodes or a “line of service,” is the proper domain of the CAG, which in this example would include PCPs, cardiologists, radiologists, surgeons and surgical teams affiliated with an entity participating in the ACS-Brandeis model.

These assignments are a critical part of the APM framework. Only providers who are QPs in the APM entity and are involved in the patient’s care are considered for inclusion in the at-risk payment models in the APM. In a surgical patient, these typically include primary providers, anesthesiologists, intensivists, hospitalists, radiologists, pathologists and other consultants. Levels of fiscal risk attribution must be assigned to each category within each episode in order to distribute the upside rewards or seek the downside penalties.

Providers do not participate at the same level of clinical involvement in each episode, and therefore, depending on a given scenario, the providers have variable shares, portions, or weights regarding the outcomes. In some instances, the condition or procedure as an episode of care may have primary care physicians as the lead, or perhaps a medical specialist. Supporting and ancillary roles usually involve other medical specialties, anesthesia or pathologists. For each condition or procedural episode, the APM provides an assignment of fiscal risk attribution to serve as a guide for payment to or from the APM entity.⁴

Fiscal attribution in the APM is premised on team-based care. Medicare spending on behalf of a beneficiary is judged against risk-adjusted benchmarks, and savings are attributed to all of the clinicians working on behalf of that beneficiary, and with respect to their clinical roles.

Each clinical role is allocated a fixed proportion of the savings amount (Exhibit 5). Each clinician is identified through billed services, and assigned his or her role by algorithm.⁵ The total allocation of savings for each role is distributed with equal shares to all clinicians falling into that clinical role. The proposed formulas for allocating portions or shares of the episode-specific cost outcomes differ by class of episode:

⁴ The episode framework can provide similar ways of organizing quality information. Outcomes are inherently tied to the patient by episode. Quality process measures are the “responsibility of” certain clinicians, while that implies and corresponds to their respective role in the episode and for the patient. Hence, episodes can be used to link quality outcomes and process measures to resource use, and to enable accountability and analyses that consider the respective levels and trade-offs.

⁵ Providers could designate their respective roles on claims, as heralded in MACRA.

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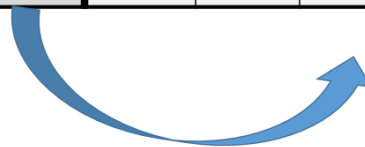
Exhibit 5: Percentage Shares for Fiscal Attribution by Clinical Role

Class of Episode	Clinical Role				
	Primary	Principal	Episodic	Supporting	Ancillary
Procedural	10%	15%	40%	30%	5%
Acute Condition	10%	15%	40%	30%	5%
Chronic Condition	40%	35%	N/A	20%	5%

The approach is illustrated in Exhibit 6. Using a mastectomy procedural episode as an example, the risk-adjusted expected cost (benchmark) for this patient is \$10,000 (Column b). Suppose the actual cost for this episode is \$9,000 (Column c), resulting in positive savings of \$1,000 (Column d). The right-side of Exhibit 6 shows the fiscal attribution of that \$1,000 to the clinicians involved in the case. The dark rectangle encloses the \$1,000 and the attributed portions of that savings amount: \$400 (0.4, or 40%) to the Episodic provider; a total of \$300 (0.3, or 30%) to the Supporting providers; a total of \$50 (0.05, or 5%) to the Ancillary providers; a total of \$100 (0.1, or 10%) to the Primary provider(s); and a total of \$150 (0.15, or 15%) to the Principal provider(s).

Exhibit 6: Team-Based Fiscal Attribution for Procedural Episodes

Type of Episode	Episode Level Savings				Clinical Roles				
	Count of episodes	Expected Cost	Actual Cost	Savings ($a \times [b - c]$)	Primary ($d \times 0.10$)	Principal ($d \times 0.15$)	Episodic ($d \times 0.40$)	Supporting ($d \times 0.30$)	Ancillary ($d \times 0.05$)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mastectomy	1	\$10,000	\$9,000	\$1,000	\$100	\$150	\$400	\$300	\$50



Thus, the cost outcome for each patient and each episode is fully taken into account by way of attribution to the clinicians participating in the team-based care. Each patient and each episode contributes one result, which is a part of the aggregated results as Episode Clusters for MIPS-Eligible Clinicians and Qualified Participants in APMs, and financial shares in AMP entities. The next sections describe those components of the model.

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3) Episode Clusters: The Clinician's Signature

A clinician may have a particular role in a given episode with a particular patient, and a different role in another episode. For example, a surgeon could spend the majority of his or her time performing surgery, and would be designated the Episodic Provider for most of those procedural episodes. The same surgeon could also participate as a supporting provider in a procedural episode or a condition episode (e.g., consult on non-operative cases). Many clinicians who are not surgeons might participate with various roles in procedural episodes as well as condition episodes.

Thus, the body of work for any given clinician will convey a particular pattern that reflects his or her clinical specialty, office location or practice environment, individual skills and interests, and so on. That pattern is operationally defined in terms of the episodes that the clinician works on (i.e., submits clinically relevant claims to Medicare for reimbursement), and the corresponding role for that clinician in each of those episodes.

Taken together, the determination of which episodes account for a clinician's work, and the respective role of the clinician in each of those episodes, forms the Episode Cluster for that clinician during a specified period of time, such as a performance year. In other words, the individual episodes become the building blocks for composite measures of performance. Each clinician will have a unique episode cluster that corresponds to the mix of patients, condition episodes, and procedural episodes comprising his or her clinical work during a specific period of performance.

Exhibit 7 illustrates some of the steps toward fiscal attribution. In this example, a surgeon cares for 50 Medicare patients in each of four types of procedural episodes, for a total of 200 procedural episodes during the performance period. The surgeon is the Episodic Provider for all 200 procedural episodes, which means he or she would be accountable for 40% (a policy variable to be determined) of the total savings calculated per episode.

Exhibit 7 shows a breakdown of the calculations related to the example.

- During the performance period, the surgeon performed 50 (column A) colectomy procedures which had an average risk-adjusted expected cost of \$25,000 per procedural episode (column B). The surgeon's average actual cost per procedural episode was \$22,000 (column C), which translates into average savings of \$3,000 per procedural episode, and total savings of \$150,000 (column D) for the 50 colectomy episodes.
- As the episodic provider in each case, the surgeon is accountable for 40% of the total savings, which would be \$60,000 (column E) for colectomy procedural episodes.
- Similar calculations are presented for the three other types of procedural episodes, i.e., with attributable savings of \$20,000 for mastectomy, \$-10,000 for cholecystectomy, \$10,000 for inguinal hernia repair, and \$80,000 cumulatively over all four types of procedural episodes.

The remainder of the total savings for these episodes, \$120,000 (\$200,000 minus \$80,000), would be attributable to the other providers who cared for the patients during these episodes

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according to their respective roles, i.e., supporting providers and ancillary providers. And those would represent the shares for those clinicians in their respective episode clusters. Similar steps are taken for fiscal attribution as applied to condition episodes.

Exhibit 7: Illustration of Attribution to a General Surgeon as Episodic Provider

	Number of Episodes (a)	Expected Cost (b)	Actual Cost (c)	Total Savings (a × [b – c]) (d)	Attributable Savings (d × 0.40) (e)
Colectomy	50	\$25,000	\$22,000	\$150,000	\$60,000
Mastectomy	50	\$10,000	\$9,000	\$50,000	\$20,000
Cholecystectomy	50	\$15,000	\$15,500	\$(25,000)	\$(10,000)
Inguinal Hernia Repair	50	\$9,000	\$8,500	\$25,000	\$10,000
Total	200			\$200,000	\$80,000

An APM entity is attributed the sum of the shares for its affiliated QPs, as illustrated in Exhibit 8. Here, a hypothetical entity (based on actual data using a TIN) has affiliated QPs participating in care for thousands of patients across several types of episodes. Using colectomy as an example, this entity’s QPs participated in the care of 478 patients, with Total Shares of 291 (about 61%, or $291 \div 478$), which is the sum of the Episodic (126), Supporting (77), and Ancillary (88) shares.⁶

The last three columns of Exhibit 8 show the results of the fiscal attribution. The affiliated QPs bring to the A-APM entity their respective shares of each episode, which are the actual costs of those episodes, the expected costs of those episodes, and the net savings calculated from those episodes, as illustrated previously in Exhibit 7. For colectomy, this entity had net savings of \$199,679, which was the difference between the total expected cost attributed to its affiliated QPs of \$5,364,643; and total actual cost of \$5,164,964. The full measure of resource use and relative efficiency of the entity can be obtained by summing the columns across all episodes covered in the risk-contract for the entity.

To the extent that clinicians involved in the episodes are affiliated with different APM entities, their respective shares would be attributed similarly to the other APM entities. Similarly, the shares of MIPS-eligible clinicians could be attributed to them as components of the MIPS Cost Category. Thus, CMS can measure resource use and relative efficiency for each APM entity, and could adopt this accountability rubric broadly to ensure tracking of dollars and savings, without double-counting, across the portfolio of payment models.

⁶ For greater simplicity, this example ignores Shares associated with Primary and Principal roles, but they would be included in a full illustration of the model, following the same rules.

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Exhibit 8: Fiscal Attribution to A-APM Entity through Shares of Affiliated QPs

	All Episodes	Total Shares	Episodic Shares	Supporting Shares	Ancillary Shares	Sum of Actual	Sum of Expected	Net Savings
Colonoscopy	8,029	6,055	3,595	850	1,609	\$5,491,256	\$5,169,323	\$(321,933)
EGD endoscopy	5,906	3,618	1,750	752	1,115	\$3,915,063	\$3,997,562	\$82,499
Colectomy	478	291	126	77	88	\$5,164,964	\$5,364,643	\$199,679
Cholecystectomy	431	263	100	86	77	\$1,948,602	\$1,988,356	\$39,755

Note: Shares are the fractional weights (percentages) of a whole episode attributed to a clinician by role.

IV. Payment Methodology

Overview of Payment Model Design

The ACS-Brandeis APM is a retrospective payment model, which incorporates an updated CMS episode grouper to produce patient-specific, risk-adjusted cost targets (episode benchmarks) using Medicare Parts A and B claims data. Target prices are compared to the actual cost of the care provided. Payment adjustments are based on quality performance.

Physicians who voluntarily choose to participate with the model by contracting with the APM entity would continue to have their services reimbursed through the MPFS. In the case of cost savings, the shared savings component of the payment would be paid to the APM entity. The APM entity would engage in gainsharing with affiliated QPs as agreed upon in their business agreements with participants, and guided at its discretion by the team-based fiscal attribution framework previously discussed. Conversely, in a situation where the APM entity's attributed costs overrun the expected target, the APM entity would be required to repay losses up to the agreed upon limit in its contract with CMS. Participating providers may also be required to contribute based upon their agreement with the APM entity, possibly guided by the team-based fiscal attribution framework. To protect against catastrophic losses, the model will build in stop-loss provisions and outlier protections similar to those in current CMS models but adjusted to be commensurate with the size and capitalization of the APM entity.

As noted previously, considerable flexibility regarding the composition of the participating APM entity is built into the model. Participating entities could consist of single-specialty practices, multispecialty practices, or convener groups of small provider practices with or without ties to particular facilities. All could qualify as long as the entity in its entirety is able to perform its management and fiduciary responsibilities. The risk arrangement for the APM entity including, total risk and stop-loss provisions would vary based upon its size, resources and capitalization and would be agreed upon in the APM entity's contract with CMS.

Model Innovations

Unlike current Episode Payment Models in which a single episode constitutes the APM, we have designed what can be described as a “bundle of bundles.” The ACS-Brandeis design goes beyond a single episode by nesting acute condition episodes within chronic condition episodes, and by clustering episodes within an Advanced APM, all with the intention of creating business efficiencies in a multi-payer environment. This method may promote future scaling across the market to cover a higher percentage of clinicians’ patients or Medicare charges, which will be vital when MACRA-mandated Advanced APM participation thresholds increase.

In order for the A-APM solutions to be successful in sustaining behavioral changes, there must be clinician buy-in for how the model addresses both quality and cost reduction. If so, the model will motivate clinicians and drive toward efficient, optimal care. Financial incentives are only one aspect of achieving clinician buy-in. Meaningful quality metrics add to fiscal incentives by stimulating the intrinsic motivation within clinical professionals. Sound, reliable fiscal incentives serve to reinforce the clinical motivation and drive for excellence. Thus, it is vitally important to design episode of care within Clinical Affinity Groups (or service lines) which best draw clinicians together to optimize care. Using clinical roles based on patient relationship categories to define shared risk, and applying a meaningful matrix of quality measures, will realign incentives toward a combination of intrinsic professional motivation fortified with financial incentives. The episode-based quality and cost measurement system within a cluster of episodes brings clinicians together through meaningful measurements in episode-based quality and risk-adjusted cost.

Basing Payment on Quality and Incorporating Two-Sided Risk

In meeting the Advanced APM requirements that payment be adjusted based on quality, we are proposing the quality method described in the previous section. We believe that this method is flexible enough to accommodate multiple risk models and payment methods including 1) the effective discount factor method similar to that described in the EPM proposed rule; 2) risk arrangements that define the percentage of resulting savings or losses that are shared with the entity; or at a later stage of implementation 3) prospective global prices based on trend factors and specified quality standards. Any of the three payment approaches could work well within the ACS-Brandeis model (Exhibit 9).

The entity’s composite performance in measurement places them in a quality tier. Each tier corresponds to a “discount factor” for the retrospective or prospective targets, or the percentages of savings or losses shared with the entity. The better the quality, the smaller the discount CMS applies, the more positive savings shared with the entity, or less negative savings owed by the entity. Our framework is sufficiently flexible to allow for consideration of population-based risk models (with capitated payments) as the model matures and a large enough number of procedural and condition episodes are built to cover a majority of a population’s care. CMS could determine a target price for one year based on the risk-adjusted expected cost with discounts set by observed quality tiers, and then trend that forward into one or more future years prospectively.

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Advanced APM Considerations

We believe that the payment system options under consideration are consistent with those in current CMS APMs determined to meet Advanced APM risk requirements. CMS may elect to offer multiple payment system options to APM entities as different tracks with different levels of upside/downside risk based upon an entity’s resources and preferences. The ACS-Brandeis Model could also be applied to other payers in a single framework, which would greatly reduce administrative burden. We are in discussion with potential partners to further explore testing of this model with payers other than Medicare.

Exhibit 9: Payment Methods Applicable in the ACS-Brandeis Model Framework

	Benchmark Model	Effective Discount Factor (Similar to CMS EPMs)	Future Option: Population-Based Payment Model
Quality Adjusted Payment	Quality performance used post-reconciliation to determine: share of savings retained by the APM entity or the amount of excess episode spending to be repaid to CMS for savings/losses: Unacceptable: NA/100% Acceptable: 50%/60% Good: 60%/50% Excellent: 100%/NA	Effective Discount Factor based on quality performance is applied to the benchmark to adjust the target price. Unacceptable: 3% discount Acceptable: 3% discount Good: 2% discount Excellent: 1.5% discount	Combine episode benchmark prices with historical data and other information to set prospective target price for a population or a service line. Quality results would affect next year’s target. Unacceptable: 3% discount Acceptable: 3% discount Good: 2% discount Excellent: 1.5% discount
Risk Limit	Upside risk capped at 15-20%, downside risk capped at 8% of the benchmark (total expected cost for the entity)	Upside risk capped at 15-20% of benchmark. Downside risk capped at 8% below the quality adjusted target price	Upside risk capped at 15-20%. Downside risk capped at 8% below the quality adjusted target price

V. Value Over Volume

The payment model will include tools and services that empower physicians to deliver better value for their patients along with financial incentives that effectively reward those who are effective in delivering higher quality care at lower cost. Specifically, a shared savings financial incentive structure, combined with new tools that identify cost drivers in the context of patient-centered, team-based care, will engage and empower providers in the model to improve the value of care.

Shining a light on the cost components of an episode, and making comparisons across all instances of clinically similar episodes, will identify physicians with more efficient patterns of care and motivate new practice patterns when combined with proper financial incentives. Analytic tools will provide the necessary information on cost by setting as well as information on the drivers of cost, like readmissions or high rates of specialty consultation. Physician groups and health systems that enter alternative payment contracts and deliver the highest value to Medicare may benefit through gainsharing when total Medicare spending is reduced, depending on their individual agreements with the APM entity.

VI. Flexibility

This payment model has been designed to support provider-driven care without being proscriptive in terms of redesign activities. In fact, if successful, this payment method will inspire new settings and mixes of services that are not yet common in Medicare, such as increased use of preventative therapy, innovative care design for chronic conditions, greater use of ambulatory surgery centers, hospital at home, home visiting for patients with chronic conditions, or among numerous other innovations.

Rural, critical access and small group providers can all find ways to participate, particularly if they join with other providers under the umbrella of a new corporate entity or convener group. As with BPCI, third-party entities may come into existence to pool the clinical work of a set of small providers, take on risk, support practice management or help with care redesign. Such arrangements also would permit practices to share the cost burdens associated with reporting requirements (e.g., registries) and care redesign.

VII. Ability to be Evaluated

The episode based structure and quality framework of the ACS-Brandeis APM makes it a candidate for evaluation on par with CMMI payment demonstrations. Secondary data could be used to construct comparison groups and to define outcomes of interest related to changes in quality and cost. The EGM framework that underlies the model also can bolster such comparison by defining similar cohorts outside of the participating A-APMs; for example, beneficiaries with conditions that serve to indicate the procedures of interest; or setting of care or surgical techniques relevant to those procedures. For these and other questions, the cost and quality measurement framework that supports implementation and reconciliation can also be used for evaluation.

VIII. Integration and Care Coordination

The episode model in the ACS-Brandeis A-APM is based on shared accountability, integration, and care coordination as fundamental building blocks. The episode grouper automatically

identifies most of the clinicians who are participating in the care for a patient during a defined episode of care.

The model aims to increase integration across specialties by identifying those clinicians who regularly participate in a given type of episode together and then considers this body of professionals as a clinical affinity group for resource use and quality measurement. The clinical affinity group is essentially the members of a body of professionals whose decisions and services jointly affect the way patients are treated for that type of episode, and who therefore have the ability to influence the quality and cost of that care. The individual providers that constitute a clinical affinity group are encouraged through incentives to participate in the risks for the episodes through contracting with the APM entity.

In a surgical episode of care, the integrated and coordinating providers being measured by a single set of cost and quality metrics include the PCP, surgeon, anesthesiologist, hospitalists, radiologists and pathologists. Those who participate in the A-APM for an episode with an APM entity would all share in the quality and cost accountability.

The informatics platform within the EGM that is integral to the APM can provide extremely detailed, episode-specific information about service utilization patterns, cost drivers, and the participation and respective role of all clinicians. This information in the hands of both APM participants and the APM entity are a driving force for change, empowering care redesign that could include communication protocols among the clinicians in team-based care; adoption of clinical guidelines for care; or even investing in cost-saving technologies, workforce, or alternative care settings.

The episode grouper is capable of identifying and accommodating all of the clinicians who participate in episodes paid through the APM, yet the flexibility of the model's design means that not all of those clinicians must have a contract with the APM entity in order for the model to function. The attribution framework assigns the responsibility for the care provided to all involved clinicians in each patient relationship category. The model addresses care coordination between participating and non-participating clinicians by creating financial incentives for improved quality and reduced cost in the form of shared savings and by providing detailed information to the APM entity and participants. Participating providers who work with or refer patients to other efficient providers who deliver high-quality care are more likely to share in savings and avoid penalties.

IX. Patient choice

As with CMS's episode-based payment models (EPMs), the ACS-Brandeis model would not limit a beneficiary's ability to choose among Medicare providers or the range of services that would be available to them. Nothing in this Advanced APM changes Medicare's benefit structure or benefits. Beneficiary copayments would not change. However, as with other CMS episode-based payments, we do not expect that patients will be able to opt out of individual bundled care arrangements of the providers from whom they seek care.

A key principle of CMS's bundled payment models is the development of a quality measurement strategy that incorporates shared decision-making, and outcomes that are meaningful to patients. Shared decision-making is a key indicator within the Surgical Phases of Care measure set, and therefore is encouraged by our model. Involving patients in their own care can lead to increased adherence to treatment and rehabilitation regimens, and thus better outcomes.

Finally, it is increasingly understood that socioeconomic status and other social determinants of care can impact clinical performance and health outcomes. For example, poor patients are more likely to be readmitted to hospital, resulting in more penalties for providers who care for low income and vulnerable patients. Our model has the ability to adjust for selected indicators, such as dual Medicare-Medicaid status, disability status, rural/urban location, and other factors. In addition, we are aware that the Assistant Secretary for Planning and Evaluation (ASPE) is undertaking a major effort as a requirement of the Improving Medicare Post-Acute Care Transformation (IMPACT) Act to study the effect of socioeconomic status on quality, resource use, and other measures. A final report is due October 2019. Should other indicators become available, they can be tested for inclusion in our risk-adjustment models.

X. Patient Safety

In an episode based payment model there are three primary patient safety concerns: 1) excessive care, 2) delayed or avoided care, 3) poor outcomes after care.

The first concern arises when providers initiate unnecessary episodes of care to increase volume, a type of provider-induced demand for services, thus exposing beneficiaries to unnecessary tests and procedures, with their attendant risk. Implementing the ACS-Brandeis model should help against this risk because it rewards value over volume of services.

Inappropriately delayed or avoided care can be addressed by monitoring both levels of care and outcomes and looking for correlations. Samples of episodes in entities with significantly different rates of "gaps in care" could be flagged for further investigation.

Finally, in episode-based care, providers have strong incentives to reduce complications, as they invariably add to the cost of care and reflect poorly on quality metrics. The EGM builds sequelae into each episode of care that include complications, which could be avoided with more proactive management. Sequelae could be divided into avoidable and unavoidable complications to create a measure of potentially avoidable adverse events for each episode. Providers with high rates of these complications or avoidable events could be flagged for further investigation by CMS.

XI. Health Information Technology

We do not believe that this model introduces elements that would undermine current protections for personal health information (PHI). The model will require at least 50 percent of eligible clinicians in each APM Entity to use CEHRT "to document and communicate clinical care with

patients and other health care professionals.” We intend that this model would similarly implement a CEHRT use requirement thus meeting the Advanced APM CEHRT criterion.

XII. Supplemental Information

The appendices that follow contain additional information on the Episode Grouper for Medicare and Surgical Phases of Care along with a whitepaper from the Society of Thoracic Surgeons detailing potential future collaboration based on the model described in this proposal.

- Appendix A: Surgical Phases of Care Measure Descriptions
- Appendix B: Example of Episodes Stacked Within an Entity (Based on a TIN)
- Appendix C: Society of Thoracic Surgeons Whitepaper on APM Collaboration
- Appendix D: Episode Grouper for Medicare (EGM) Design Report

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Appendix A

Surgical Phases of Care Measure Descriptions

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Surgical Phases of Care: Measure Descriptions

Phase	Pre-Operative	Immediate Pre-operative	Intra-Operative	Postoperative	Post-discharge
	← Participation in a National Risk-adjusted Outcomes Surgical Registry →				
Proposed measures	Surgical Plan and Goals of Care (Preoperative Phase)	Perioperative Composite	Intraoperative Timeout Safety Checklist	Postoperative Care Plan	Postoperative Care Coordination and Follow-up with Primary/Referring Provider
	Identification of Major Co-Morbid Medical Conditions		Intraoperative Surgical Debriefing	Postoperative Review of Patient Goals of Care	Postoperative Plan Communication with Patient and Family
	Preventive Care and Screening: Tobacco Screening and Cessation Intervention				Post-Discharge Review of Patient Goals of Care
	Preoperative Key Medications Review for Anticoagulation Medication				Resumption Protocol
	PQRS 358: Patient-Centered Surgical Risk Assessment and Communication				PQRS 356: Unplanned Hospital Readmission within 30 Days of Principal Procedure
	Patient Frailty Evaluation (*Applicable for age 80 and over only)				Patient Experience with Surgical Care Based on the Consumer Assessment of Healthcare Providers and Systems (CAHPS) [®] Surgical Care Survey (S-CAHPS)

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Pre-Operative Phase

Surgical Plan and Goals of Care (Preoperative Phase)

Measure title	Surgical Plan and Goals of Care
Measure ID	
Measure description	Percentage of patients who have been given the purpose for the recommended procedure AND goals of care discussion has been documented in the medical record.
Numerator	<p>All patients who are 1) brought from their home or normal living environment on the day of surgery AND 2) undergo a non-emergent/non-urgent, scheduled surgical procedure, AND 3) have the purpose of the procedure documented in the medical record AND 4) have goals of care discussion documented in the medical record.</p> <p>(A) The purpose of the procedure was described and documented to be one or more of the following:</p> <ol style="list-style-type: none"> 1. Establish a diagnosis 2. Relieve symptoms 3. Treat or cure a condition 4. Improve function and/or quality of life 5. Other <p>(B) The patient’s dominant goal of care and the goal of care discussion have been documented as one or more of the following:</p> <ol style="list-style-type: none"> 1. Living as long as possible 2. Living independently

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	<ol style="list-style-type: none"> 3. Keeping comfortable, symptom relief 4. Establishing a diagnosis or treating / curing a condition 5. Other (single sentence)
Denominator	All adults (18 years and older) who 1) are brought from their home or normal living environment on the day of surgery AND 2) Surgeyr must be non-emergent/non-urgent scheduled procedure, performed in an operating room under MAC, regional, or general anesthesia
Exclusions	<ol style="list-style-type: none"> 1. Patients who are inpatient at an acute care hospital 2. Patients who are transferred from an ED 3. Patients who are transferred from a clinic 4. Patients who undergo an emergent/urgent surgical case 5. Patients whose admission to the hospital was on any date prior to the date of the scheduled surgical procedure for any reason
Measure Type*	Process
Which clinical guideline(s)?	

Identification of Major Co-Morbid Medical Conditions

Measure title	Identification of Major Co-Morbid Medical Conditions
Measure ID	
Measure description	Percentage of patients age 18 or older who are taken to the operating room for an elective surgical intervention under regional, and/or general anesthesia AND who have documentation of a significant co-morbid condition(s) in their medical record within 30 days of operation date

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Numerator	All patients evaluated by an eligible professional who are scheduled for an elective surgical procedure AND who have documentation of clinically accurate and relevant co-morbid medical conditions in the medical record within 30 days prior to the procedure.
Denominator	All adults (18 years and older) evaluated by an eligible professional who are scheduled for an elective surgical procedure.
Exclusions	Documentation in the patient’s medical record that patient does not have any co-morbid medical conditions within 30 days prior to a patient undergoing an elective surgical procedure.
Measure Type*	Process
Which clinical guideline(s)?	

Preventive Care and Screening: Tobacco Screening and Cessation Intervention

Measure title	Preventative Care and Screening: Tobacco Screening and Cessation Intervention
Measure ID	
Measure description	Percentage of patients age 18 or older who are active tobacco users who receive tobacco screening AND are offered cessation counseling at least 2 months prior to elective surgical procedure in order to delay the procedure until smoking cessation is possibly achieved.
Numerator	All adults (18 years and older) who undergo an elective surgical procedure AND who are active tobacco users AND received cessation counseling at least 2 months prior to the scheduled elective procedure.
Denominator	All patients evaluated by an eligible professional who are scheduled for an elective surgical procedure AND who are active tobacco users.
Exclusions	Documentation in the patient’s medical record that the patient did not receive tobacco cessation counseling at least 2 months prior to the procedure due to the risk of delaying the elective surgical procedure is greater than the benefits of

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	cessation of tobacco use.
Measure Type*	Process
Which clinical guideline(s)?	

Preoperative Key Medications Review for Anticoagulation Medication

Measure title	Preoperative Key Medications Review for Anticoagulation Medication
Measure ID	
Measure description	Percentage of patients who take anticoagulation medication who are taken to the operating room for an elective intervention under regional anesthesia, monitored anesthesia care (MAC), and/or general anesthesia who have a peri-operative management plan for anticoagulation medications documented in the medical record.
Numerator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia for whom an intraoperative surgical debriefing takes place at the end of the case confirming correct counts, procedure and specimen review, wound class, fluids recorded, equipment review, postoperative destination and postoperative care plan including plan for perioperative antibiotics, VTE prophylaxis and Foley. The debriefing must be documented in the medical record.
Denominator	All patients who take anticoagulation medication who are taken to the operating room for an elective surgical intervention under regional, MAC, or general anesthesia.
Exclusions	Documentation that the plan for pre-operative anticoagulation management was discussed with the physician responsible for managing the patient's anticoagulation between 48 hours and 30 days prior to surgery.
Measure Type*	Process

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Which clinical guideline(s)?	
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PQRS 358: Patient-Centered Surgical Risk Assessment and Communication

Measure title	Patient-Centered Surgical Risk Assessment and Communication
Measure ID	PQRS 358
Measure description	Percentage of patients age 18 or older who underwent a non-emergency surgery who had their personalized risks of postoperative complications assessed by their surgical team prior to surgery using a clinical data-based, patient-specific risk calculator and who received personal discussion of those risks with a surgeon
Numerator	Documentation of empirical, personalized risk assessment based on the patient’s risk factors with a validated risk calculator using multi-institutional clinical data, the specific risk calculator used, and communication of risk assessment from risk calculator with the patient and/or family
Denominator	All adults (18 years and older) who underwent non-emergency surgery
Exclusions	
Measure Type*	Process
Which clinical guideline(s)?	

*Patient Frailty Evaluation (*Applicable for age 80 and over only)*

Measure title	Patient Frailty Evaluation
Measure ID	
Measure	Percentage of patients age 80 and older who have been evaluated for frailty prior to an elective operation.

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description	
Numerator	All patients age 80 years and over who are 1) brought from their home or normal living environment on the day of surgery AND 2) undergo a non-emergent/non-urgent, scheduled surgical procedure, AND 3) have documented frailty screening AND outcome of screening in the medical record.
Denominator	All adults 80 years and older who 1) are brought from their home or normal living environment on the day of surgery AND 2) undergo a non-emergent/non-urgent, scheduled surgical procedure.
Exclusions	Frailty screen could not be completed due to patient condition (cognitive impairment, physical disability preventing participation) OR Frailty screen offered and patient refused participation.
Measure Type*	Process
Which clinical guideline(s)?	

Immediate Pre-Operative Phase

Perioperative Composite

Measure title	Perioperative Composite
Measure ID	
Measure	Percentage of patients who are taken to the operating room for an elective surgical intervention under regional

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description	anesthesia, monitored anesthesia care (MAC), and/or general anesthesia who have an updated history and physical (H&P), documentation that recent laboratory values were reviewed, and documentation of the site and side of surgery in the medical record within the 24 hours prior to surgery.
Numerator	All patients who are taken to the operating room for an elective surgical intervention under regional, MAC, and/or general anesthesia for whom an updated H&P, documentation of the review of recent laboratory values, and documentation of the site and side of surgery are present in the medical record within the 24 hours prior to surgery.
Denominator	All adults (18 years and older) who undergo an elective surgical procedure under regional, MAC, and/or general anesthesia.
Exclusions	Documentation within the 24 hours prior to surgery that no BMP, CBC, and/or PT/INR results from the 30 days prior to surgery are available for review.
Measure Type*	Process
Which clinical guideline(s)?	

Intra-Operative Phase

Intraoperative Timeout Safety Checklist

Measure title	Intraoperative Timeout Safety Checklist
Measure ID	
Measure	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical

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description	intervention under regional, MAC, and/or general anesthesia for whom an intraoperative safety checklist is performed prior to incision that includes the patient’s name, the procedure to be performed, laterality, confirmation of site marking, allergies, confirmation of the administration of preoperative antibiotic prophylaxis and VTE prophylaxis if appropriate, anticipated equipment, placement of Bovie pad, correct patient positioning, and display of essential imaging
Numerator	All patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia for whom an intraoperative safety checklist is performed prior to incision that includes the patient’s name, the procedure to be performed, laterality, confirmation of site marking, allergies, confirmation of the administration of preoperative antibiotic prophylaxis and VTE prophylaxis if appropriate, anticipated equipment, placement of Bovie pad, correct patient positioning, and display of essential imaging
Denominator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia
Exclusions	Trauma or emergent cases in which the patient is unstable, and completion of a full time-out is felt to compromise the patient’s safety
Measure Type*	Process
Which clinical guideline(s)?	The WHO Guidelines for Safe Surgery 2009 recommend the use of a Safe Surgery Checklist

Intraoperative Surgical Debriefing

Measure title	Intraoperative Surgical Debriefing
Measure ID	
Measure	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical

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description	intervention under regional, MAC, and/or general anesthesia for whom an intraoperative surgical debriefing takes place at the end of the case confirming correct counts, procedure and specimen review, equipment review, postoperative destination and postoperative care plan including plan for perioperative antibiotics, VTE prophylaxis and Foley
Numerator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia for whom an intraoperative surgical debriefing takes place at the end of the case confirming correct counts, procedure and specimen review, wound class, fluids recorded, equipment review, postoperative destination and postoperative care plan including plan for perioperative antibiotics, VTE prophylaxis and Foley. The debriefing must be documented in the medical record.
Denominator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia
Exclusions	
Measure Type*	Process
Which clinical guideline(s)?	The WHO Guidelines for Safe Surgery 2009 recommend the performance of post-procedure debriefings

Postoperative Phase

Postoperative Care Plan

Measure title	Postoperative Care Plan
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Measure ID	
Measure description	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan of care at the beginning of the postoperative phase of care that addresses: mobilization, pain management, diet, resumption of preoperative medications, management of drains/catheters/invasive lines, and wound care
Numerator	All patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan of care at the beginning of the postoperative phase of care that addresses: mobilization, pain management, diet, resumption of preoperative medications, management of drains/catheters/invasive lines, and wound care
Denominator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia
Exclusions	
Measure Type*	Process
Which clinical guideline(s)?	

Postoperative Review of Patient Goals of Care

Measure title	Postoperative Review of Patient Goals of Care
Measure ID	
Measure description	Percentage of patients who are taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate.

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<p>Numerator</p>	<p>All patients who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate. The patient’s dominant goal of care and the goal of care discussion have been documented as one or more of the following:</p> <ol style="list-style-type: none"> 1. Living as long as possible 2. Living independently 3. Keeping comfortable, symptom relief 4. Establishing a diagnosis or treating / curing a condition 5. Other (single sentence)
<p>Denominator</p>	<p>All patients who are brought from their home or normal living environment on the day of surgery AND taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia AND have goals of care discussion documented in the medical record. The patient’s dominant goal of care and the goal of care discussion have been documented as one or more of the following:</p> <ol style="list-style-type: none"> 1. Living as long as possible 2. Living independently 3. Keeping comfortable, symptom relief 4. Establishing a diagnosis or treating / curing a condition 5. Other (single sentence)
<p>Exclusions</p>	<ol style="list-style-type: none"> 1. Patients who are inpatient at an acute care hospital at the time of their current operation 2. Patients who are transferred from the Emergency Department (ED) 3. Patients who are transferred from a clinic 4. Patients who undergo an emergent/urgent surgical operation 5. Patients whose admission to the hospital was on any date prior to the date of the scheduled surgical procedure for any reason

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Measure Type*	Process
Which clinical guideline(s)?	

Post-discharge Phase

Postoperative Care Coordination and Follow-up with Primary/Referring Provider

Measure title	Postoperative Care Coordination and Follow-up with Primary/Referring Provider
Measure ID	
Measure description	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who had documented post-operative communication regarding the surgery with the patient’s primary care physician or referring physician within the 30 days following surgery.
Numerator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia for whom documentation of post-operative communication with the patient’s PCP or referring physician regarding the surgery is present in the medical record within the 30 days following surgery.
Denominator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia.
Exclusions	Documentation that the patient does not have a PCP or referring physician to communicate with post-operatively within 30 days following surgery.

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Measure Type*	Process
Which clinical guideline(s)?	

Postoperative Plan Communication with Patient and Family

Measure title	Postoperative Plan Communication with Patient and Family
Measure ID	
Measure description	Percentage of patients who are taken to the operating room for an elective or emergent surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication regarding the surgery and plan for care after discharge with the patient and the patient’s family
Numerator	All patients age 18 or older who are taken to the operating room for an elective or emergent surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication regarding the surgery and plan for care after discharge with the patient and the patient’s family
Denominator	All patients age 18 or older who are taken to the operating room for an elective or emergent surgical procedure under regional anesthesia, MAC, and/or general anesthesia
Exclusions	
Measure Type*	Process
Which clinical guideline(s)?	

Post-Discharge Review of Patient Goals of Care

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Measure title	Post-Discharge Review of Patient Goals of Care
Measure ID	
Measure description	Percentage of patients who are taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate occurring after discharge up until 90 days following discharge date.
Numerator	<p>All patients who had documented post-discharge communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate occurring after discharge up until 90 days following discharge date. The patient’s dominant goal of care and the goal of care discussion have been documented as one or more of the following:</p> <ol style="list-style-type: none"> 1. Living as long as possible 2. Living independently 3. Keeping comfortable, symptom relief 4. Establishing a diagnosis or treating / curing a condition 5. Other (single sentence)
Denominator	<p>All patients who are brought from their home or normal living environment on the day of surgery AND taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia AND have goals of care discussion performed in the preoperative phase and documented in the medical record. The patient’s dominant goals of care and the goal of care discussion have been documented as one or more of the following:</p> <ol style="list-style-type: none"> 1. Living as long as possible

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	<ol style="list-style-type: none"> 2. Living independently 3. Keeping comfortable, symptom relief 4. Establishing a diagnosis or treating / curing a condition 5. Other (single sentence)
Exclusions	<ol style="list-style-type: none"> 1. Patients who are inpatient at an acute care hospital at the time of their current operation 2. Patients who are transferred from the Emergency Department (ED) 3. Patients who are transferred from a clinic 4. Patients who undergo an emergent/urgent surgical operation 5. Patients whose admission to the hospital was on any date prior to the date of the scheduled surgical procedure for any reason
Measure Type*	Process
Which clinical guideline(s)?	

Resumption Protocol

Measure title	Resumption Protocol
Measure ID	
Measure description	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan during a post-discharge follow-up encounter updating patient improvements in mobility, pain control, diet, resumption of home medications, wound care, and management of cutaneous/invasive devices (drains, IV lines, etc).

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Numerator	All patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan during a post-discharge follow-up encounter updating patient improvements in mobility, pain control, diet, resumption of home medications, wound care, and management of cutaneous/invasive devices (drains, IV lines, etc). This encounter must take place within 30 days of discharge.
Denominator	All adults (18 years and older) who undergo an elective or emergent surgical procedure under regional, MAC, and/or general anesthesia.
Exclusions	None
Measure Type*	Process
Which clinical guideline(s)?	

PQRS 356: Unplanned Hospital Readmission within 30 Days of Principal Procedure

Measure title	Unplanned Hospital Readmission within 30 Days of Principal Procedure
Measure ID	PQRS 356
Measure description	Percentage of patients age 18 or older who had an unplanned hospital readmission within 30 days of principal procedure
Numerator	All adults (18 years and older) who underwent elective or emergency surgery who had an Inpatient readmission to the same hospital for any reason or an outside hospital (if known to the surgeon), within 30 days of the principal surgical procedure
Denominator	All adults (18 years and older) who underwent elective or emergency surgery
Exclusions	

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Measure Type*	Outcome
Which clinical guideline(s)?	

Patient Experience with Surgical Care Based on the Consumer Assessment of Healthcare Providers and Systems (CAHPS)[®] Surgical Care Survey (S-CAHPS)

Measure title	Patient experience with surgical care based on the Consumer Assessment of Healthcare Providers and Systems (CAHPS)[®] Surgical Care Survey (S-CAHPS)
Measure ID	
Measure description	The S-CAHPS survey was designed by the American College of Surgeons (ACS) and the Surgical Quality Alliance (SQA) to address the specific needs of surgical patients. It was endorsed by the CAHPS Consortium in 2010 and by the National Quality Forum (NQF) in 2012. 6 composites and 1 single-item measure are generated from the S-CAHPS Survey. Each measure is used to assess a particular domain of surgical care quality from the patient’s perspective.
Numerator	We recommend that S-CAHPS composites be calculated using a top-box scoring method. The top box score refers to the percentage of patients whose responses indicated excellent performance for a given measure. This approach is a kind of categorical scoring because the emphasis is on the score for a specific category of responses. The composite measures do not have a typical numerator. This section is used to describe the composite score. The composite score is the average proportion of respondents who answered the most positive response category across the questions in the composite. The top box numerators for items within Composite measures 1, 2, 4, 5, and 6 is the number of respondents who answered “Yes, definitely” across the items in each composite. The top box composite score is the average proportion of respondents who answered “Yes, definitely” across the items in the composite. The top box

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	<p>numerator for items within Composite measure 3 is the number of respondents who answered “Yes” across the items in this composite. The top box composite score is the average proportion of respondents who answered “Yes” across the items in this composite. The top box numerator for the Measure 7, the Global Rating Item, is the number of respondents who answered 9 or 10 to the Global Rating Item. Note that for users who want to case-mix adjust their scores, case-mix adjustment can be done using the CAHPS macro and the adjustment is made prior to the calculation of the total score.</p>
Denominator	<p>The composite does not have a typical denominator statement. This section describes the target population. The major criteria for selecting patients were having had a major surgery as defined by CPT codes (90 day globals) within 3 to 6 months prior to the start of the survey.</p> <p>Both male and female adults (18 years of age and older)</p>
Exclusions	<p>The following patients would be excluded from all composites: (1) Surgical patients whose procedure was greater than 6 months or less than 3 months prior to the start of the survey. (2) Surgical patients younger than 18 years old. (3) Surgical patients who are institutionalized (put in the care of a specialized institution) or deceased. (4) Surgery performed had to be scheduled and not an emergency procedure since emergency procedures are unlikely to have visits with the surgeon before the surgery (5) Multiple surgery patients within the same household can be included in the sampling frame. However, once one patient in the household is sampled, any other patients in the same household would be excluded from being sampled in order to minimize survey burden to the household.</p>
Measure Type*	Patient Reported Outcome
Which clinical guideline(s)?	

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Phases of Care	MEASURE NAME	Measure List Source	MEASURE DESCRIPTION	NQF	MEASURE TYPE	PRIORITY MEASURE	DATA SUBMISSION METHOD	SPECIALTY MEASURE SET	PRIMARY MEASURE STEWARD		
A. Pre Op Phase	Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up Plan	CMS Gen Surgery List	Percentage of patients aged 18 years and older with a BMI documented during the current encounter or during the previous six months AND with a BMI outside of normal parameters, a follow-up plan is documented during the encounter or during the previous six months of the current encounter Normal Parameters: Age 18 years and older BMI => 18.5 and < 25 kg/m2	421	Process	No	HR, CMS Web Interface	Internal Medicine, Cardiology, Gastroenterology, General Surgery, Hospitalists, Neurology, Obstetrics/Gynecology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Centers for Medicare & Medicaid Services		
A. Pre Op Phase	Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	CMS Gen Surgery List	Percentage of patients aged 18 years and older who were screened for tobacco use one or more times within 24 months AND who received cessation counseling intervention if identified as a tobacco user	28	Process	No	HR, CMS Web Interface	Internal Medicine, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Physician Consortium for Performance Improvement		
A. Pre Op Phase	Documentation of Current Medications in the Medical Record	CMS Gen Surgery List	Percentage of visits for patients aged 18 years and older for which the eligible professional attests to documenting a list of current medications using all immediate resources available on the date of the encounter. This list must include ALL known prescriptions, over-the-counters, herbals, and vitamin/mineral/dietary (nutritional) supplements AND must contain the medications' name, dosage, frequency and route of administration.	419	Process	Yes	Claims, EHR, Registry	Internal Medicine, Anesthesiology, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Centers for Medicare & Medicaid Services		
A. Pre Op Phase	Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented	CMS Gen Surgery List	Percentage of patients aged 18 years and older seen during the reporting period who were screened for high blood pressure AND a recommended follow-up plan is documented based on the current blood pressure (BP) reading as indicated	N/A	Process	No	Claims, EHR, Registry	Internal Medicine, Anesthesiology, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Centers for Medicare & Medicaid Services		

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A. Pre Op Phase	Care Plan	CMS Gen Surgery List	Percentage of patients aged 65 years and older who have an advance care plan or surrogate decision maker documented in the medical record or documentation in the medical record that an advance care plan was discussed but the patient did not wish or was not able to name a surrogate decision maker or provide an advance care plan	326	Process	Yes	Claims, Registry	Internal Medicine, Cardiology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine	National Committee for Quality Assurance		
A. Pre Op Phase	Patient-Centered Surgical Risk Assessment and Communication	CMS Gen Surgery List Phases of care	Percentage of patients who underwent a non-emergency surgery who had their personalized risks of postoperative complications assessed by their surgical team prior to surgery using a clinical data-based, patient-specific risk calculator and who received personal discussion of those risks with the surgeon	N/A	Process	Yes	Registry	General Surgery, Orthopedic Surgery, Otolaryngology, Thoracic Surgery, Urology, Plastic Surgery	American College of Surgeons		
A. Pre Op Phase	Surgical Plans and Goals for Care	Phases of care	Percentage of patients who have been given the purpose for the recommended procedure AND goals of care discussion has been documented in the medical record		Process		Registry	General Surgery			
A. Pre Op Phase	Preoperative Key Medications Review for Anticoagulation Medication	Phases of care	Percentage of patients who take anticoagulation medication who are taken to the operating room for an elective intervention under regional anesthesia, monitored anesthesia care (MAC), and/or general anesthesia who have a peri-operative management plan for anticoagulation medications documented in the medical record.		Process		Registry	General Surgery			
A. Pre Op Phase	Identification of Major Co-morbid Medical Conditions	Phases of care	Percentages of patients age 28 or older who are taken to the operating room for an elective surgical intervention under regional, and/or general anesthesia AND who have documentation of a significant co-morbid condition(s) in their medical record within 30 days of operation date		Process		Registry	General Surgery			
A. Pre Op Phase	Patient Frailty Evaluation	Phases of care	Percentage of patients age 18 or older who underwent a non-emergency surgery who had their personalized risks of postoperative complications assessed by their surgical team prior to surgery using a clinical data-based, patient-specific risk calculator and who received personal discussion of those risks with a surgeon		Process		Registry	General Surgery			
A. Pre Op Phase	Preventive care and Screening: Tobacco Screening and Cessation Intervention	Phases of care	Percentage of patients aged 18 years and older who are active tobacco users who receive tobacco screening AND are offered cessation counseling at least 2 months prior to elective surgical procedure in order to delay the procedure until the smoking cessation is possibly achieved.		Process		Registry				
A. Pre Op Phase or E. Post Discharge Phase	Closing the Referral Loop: Receipt of Specialist Report	CMS Gen Surgery List	Percentage of patients with referrals, regardless of age, for which the referring provider receives a report from the provider to whom the patient was referred	N/A	Process	Yes	EHR	Allergy/Immunology, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery	Centers for Medicare & Medicaid Services		
B. Peri Op Phase	Perioperative Care: Selection of Prophylactic Antibiotic - First OR Second Generation Cephalosporin	CMS Gen Surgery List	Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for a first OR second generation cephalosporin prophylactic antibiotic who had an order for a first OR second generation cephalosporin for antimicrobial prophylaxis	268	Process	Yes	Claims, Registry	General Surgery, Orthopedic Surgery, Otolaryngology, Thoracic Surgery, Plastic Surgery	American Society of Plastic Surgeons		
B. Peri Op Phase	Perioperative Care: Venous Thromboembolism (VTE) Prophylaxis (When Indicated in ALL Patients)	CMS Gen Surgery List	Percentage of surgical patients aged 18 years and older undergoing procedures for which venous thromboembolism (VTE) prophylaxis is indicated in all patients, who had an order for Low Molecular Weight Heparin (LMWH), Low- Dose Unfractionated Heparin (LDUH), adjusted-dose warfarin, fondaparinux or mechanical prophylaxis to be given within 24 hours prior to incision time or within 24 hours after surgery end time	239	Process	Yes	Claims, Registry	General Surgery, Orthopedic Surgery, Otolaryngology, Thoracic Surgery, Plastic Surgery	American Society of Plastic Surgeons		

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B. Peri Op Phase	Peri-operative Composite	Phases of care	Percentage of patients who are taken to the operating room for an elective surgical intervention under regional anesthesia, monitored anesthesia care (MAC), and/or general anesthesia who have an updated history and physical (H&P), documentation that recent laboratory values were reviewed, and documentation of the site and side of surgery in the medical record within the 24 hours prior to surgery.		Process		Registry	General Surgery		
C. Intra-Op Phase	Intraoperative Timeout Safety Checklist	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia for whom an intraoperative safety checklist is performed prior to incision that includes the patient's name, the procedure to be performed, laterality, confirmation of site marking, allergies, confirmation of the administration of preoperative antibiotic prophylaxis and VTE prophylaxis if appropriate, anticipated equipment, placement of Bovie pad, correct patient positioning, and display of essential imaging		Process		Registry	General Surgery		
C. Intra-Op Phase	Intraoperative Surgical Debriefing	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia for whom an intraoperative surgical debriefing takes place at the end of the case confirming correct counts, procedure and specimen review, equipment review, postoperative destination and postoperative care plan including plan for perioperative antibiotics, VTE prophylaxis and Foley		Process		Registry	General Surgery		
D. Post Op Phase	Anastomotic Leak Intervention	CMS Gen Surgery List Phases of care	Percentage of patients aged 18 years and older who required an anastomotic leak intervention following gastric bypass or colectomy surgery	N/A	Outcome	Yes	Registry	General Surgery	American College of Surgeons	
D. Post Op Phase	Surgical Site Infection (SSI)	CMS Gen Surgery List	Percentage of patients aged 18 years and older who had a surgical site infection (SSI)	N/A	Outcome	Yes	Registry	General Surgery, Otolaryngology, Vascular Surgery, Plastic Surgery	American College of Surgeons	
D. Post Op Phase	Postoperative Care Plan	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan of care at the beginning of the postoperative phase of care that addresses: mobilization, pain management, diet, resumption of preoperative medications, management of drains/catheters/invasive lines, and wound care		Process		Registry	General Surgery		
D. Post Op Phase	Postoperative review of Patient Goals of Care	Phases of care	Percentage of patients who are taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate.		Process		Registry	General Surgery		
D. Post Op Phase E. Post Discharge Phase	Unplanned Reoperation within the 30 Day Postoperative Period	CMS Gen Surgery List	Percentage of patients aged 18 years and older who had any unplanned reoperation within the 30 day postoperative period	N/A	Outcome	Yes	Registry	General Surgery	American College of Surgeons	
E. Post Discharge Phase	Unplanned Hospital Readmission within 30 Days of Principal Procedure	CMS Gen Surgery List	Percentage of patients aged 18 years and older who had an unplanned hospital readmission within 30 days of principal procedure	N/A	Outcome	Yes	Registry	General Surgery	American College of Surgeons	
E. Post Discharge Phase	Postoperative Care Coordination and Follow-up with Primary/Referring Provider	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who had documented post-operative communication regarding the surgery with the patient's primary care physician or referring physician within the 30 days following surgery.		Process		Registry	General Surgery		
E. Post Discharge Phase	Post Discharge Review of Patient Goals of Care	Phases of care	Percentage of patients who are taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate occurring after discharge up until 90 days following discharge date.		Process		Registry	General Surgery		
E. Post Discharge Phase	Resumption Protocol	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan during a post-discharge follow-up encounter updating patient improvements in mobility, pain control, diet, resumption of home medications, wound care, and management of cutaneous/invasive devices (drains, IV lines, etc).		Process		Registry	General Surgery		

E. Post Discharge Phase	Patient experience with surgical care based on the Consumer Assessment of Healthcare Providers and Systems (CAHPS) * Surgical Care Survey (S-CAHPS)	Phases of care	The S-CAHPS survey was designed by the American College of Surgeons (ACS) and the Surgical Quality Alliance (SQA) to address the specific needs of surgical patients. It was endorsed by the CAHPS Consortium in 2010 and by the National Quality Forum (NQF) in 2012. 6 composites and 1 single-item measure are generated from the S-CAHPS Survey. Each measure is used to assess a particular domain of surgical care quality from the patient's perspective.		Outcome			General Surgery			
All Phases	Participation in a National Risk-adjusted Outcomes Surgical Registry	Phases of care			Process		Registry	General Surgery			

Phases of Care	MEASURE NAME	Measure List Source	MEASURE DESCRIPTION	NQF	MEASURE TYPE	PRIORITY MEASURE	DATA SUBMISSION METHOD	SPECIALTY MEASURE SET	PRIMARY MEASURE STEWARD		
Post Op Phase	Anastomotic Leak Intervention	CMS Gen Surgery List Phases of care	Percentage of patients aged 18 years and older who required an anastomotic leak intervention following gastric bypass or colectomy surgery	N/A	Outcome	Yes	Registry	General Surgery	American College of Surgeons		
Post Op Phase	Surgical Site Infection (SSI)	CMS Gen Surgery List	Percentage of patients aged 18 years and older who had a surgical site infection (SSI)	N/A	Outcome	Yes	Registry	General Surgery, Otolaryngology, Vascular Surgery, Plastic Surgery	American College of Surgeons		
Post Discharge Phase	Patient experience with surgical care based on the Consumer Assessment of Healthcare Providers and Systems (CAHPS) * Surgical Care Survey (S-CAHPS)	Phases of care	The S-CAHPS survey was designed by the American College of Surgeons (ACS) and the Surgical Quality Alliance (SQA) to address the specific needs of surgical patients. It was endorsed by the CAHPS Consortium in 2010 and by the National Quality Forum (NQF) in 2012. 6 composites and 1 single-item measure are generated from the S-CAHPS Survey. Each measure is used to assess a particular domain of surgical care quality from the patient's perspective.		Outcome			General Surgery			
Post Discharge Phase	Unplanned Hospital Readmission within 30 Days of Principal Procedure	CMS Gen Surgery List	Percentage of patients aged 18 years and older who had an unplanned hospital readmission within 30 days of principal procedure	N/A	Outcome	Yes	Registry	General Surgery	American College of Surgeons		
Post Op Phase Post Discharge Phase	Unplanned Reoperation within the 30 Day Postoperative Period	CMS Gen Surgery List	Percentage of patients aged 18 years and older who had any unplanned reoperation within the 30 day postoperative period	N/A	Outcome	Yes	Registry	General Surgery	American College of Surgeons		

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Phases of Care	MEASURE NAME	Measure List Source	MEASURE DESCRIPTION	NQF	MEASURE TYPE	PRIORITY MEASURE	DATA SUBMISSION METHOD	SPECIALTY MEASURE SET	PRIMARY MEASURE STEWARD		
All Phases	Participation in a National Risk-adjusted Outcomes Surgical Registry	Phases of care			Process		Registry	General Surgery			
Intra-Op Phase	Intraoperative Timeout Safety Checklist	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia for whom an intraoperative safety checklist is performed prior to incision that includes the patient's name, the procedure to be performed, laterality, confirmation of site marking, allergies, confirmation of the administration of preoperative antibiotic prophylaxis and VTE prophylaxis if appropriate, anticipated equipment, placement of Bovie pad, correct patient positioning, and display of essential imaging		Process		Registry	General Surgery			
Intra-Op Phase	Intraoperative Surgical Debriefing	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia for whom an intraoperative surgical debriefing takes place at the end of the case confirming correct counts, procedure and specimen review, equipment review, postoperative destination and postoperative care plan including plan for perioperative antibiotics, VTE prophylaxis and Foley		Process		Registry	General Surgery			
Peri-Op Phase	Perioperative Care: Selection of Prophylactic Antibiotic - First OR Second Generation Cephalosporin	CMS Gen Surgery List	Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for a first OR second generation cephalosporin prophylactic antibiotic who had an order for a first OR second generation cephalosporin for antimicrobial prophylaxis	268	Process	Yes	Claims, Registry	General Surgery, Orthopedic Surgery, Otolaryngology, Thoracic Surgery, Plastic Surgery	American Society of Plastic Surgeons		
Peri-Op Phase	Perioperative Care: Venous Thromboembolism (VTE) Prophylaxis (When Indicated in ALL Patients)	CMS Gen Surgery List	Percentage of surgical patients aged 18 years and older undergoing procedures for which venous thromboembolism (VTE) prophylaxis is indicated in all patients, who had an order for Low Molecular Weight Heparin (LMWH), Low- Dose Unfractionated Heparin (LDUH), adjusted-dose warfarin, fondaparinux or mechanical prophylaxis to be given within 24 hours prior to incision time or within 24 hours after surgery end time	239	Process	Yes	Claims, Registry	General Surgery, Orthopedic Surgery, Otolaryngology, Thoracic Surgery, Plastic Surgery	American Society of Plastic Surgeons		
Peri-Op Phase	Peri-operative Composite	Phases of care	Percentage of patients who are taken to the operating room for an elective surgical intervention under regional anesthesia, monitored anesthesia care (MAC), and/or general anesthesia who have an updated history and physical (H&P), documentation that recent laboratory values were reviewed, and documentation of the site and side of surgery in the medical record within the 24 hours prior to surgery.		Process		Registry	General Surgery			
Post Discharge Phase	Postoperative Care Coordination and Follow-up with Primary/Referring Provider	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who had documented post-operative communication regarding the surgery with the patient's primary care physician or referring physician within the 30 days following surgery.		Process		Registry	General Surgery			
Post Discharge Phase	Post Discharge Review of Patient Goals of Care	Phases of care	Percentage of patients who are taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate occurring after discharge up until 90 days following discharge date.		Process		Registry	General Surgery			
Post Discharge Phase	Resumption Protocol	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan during a post-discharge follow-up encounter updating patient improvements in mobility, pain control, diet, resumption of home medications, wound care, and management of cutaneous/invasive devices (drains, IV lines, etc).		Process		Registry	General Surgery			
Post Op Phase	Postoperative Care Plan	Phases of care	Percentage of patients age 18 or older who are taken to the operating room for an elective or emergent surgical intervention under regional, MAC, and/or general anesthesia who have a documented plan of care at the beginning of the postoperative phase of care that addresses: mobilization, pain management, diet, resumption of preoperative medications, management of drains/catheters/invasive lines, and wound care		Process		Registry	General Surgery			

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Post Op Phase	Postoperative review of Patient Goals of Care	Phases of care	Percentage of patients who are taken to the operating room for an elective surgical procedure under regional anesthesia, MAC, and/or general anesthesia who had documented postoperative communication reviewing original goals of care expressed preoperatively and updating goals of care as appropriate.		Process		Registry	General Surgery		
Pre Op Phase	Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up Plan	CMS Gen Surgery List	Percentage of patients aged 18 years and older with a BMI documented during the current encounter or during the previous six months AND with a BMI outside of normal parameters, a follow-up plan is documented during the encounter or during the previous six months of the current encounter Normal Parameters: Age 18 years and older BMI => 18.5 and < 25 kg/m2	421	Process	No	HR, CMS Web Interface	Internal Medicine, Cardiology, Gastroenterology, General Surgery, Hospitalists, Neurology, Obstetrics/Gynecology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Centers for Medicare & Medicaid Services	
Pre Op Phase	Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	CMS Gen Surgery List	Percentage of patients aged 18 years and older who were screened for tobacco use one or more times within 24 months AND who received cessation counseling intervention if identified as a tobacco user	28	Process	No	HR, CMS Web Interface	Internal Medicine, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Physician Consortium for Performance Improvement	
Pre Op Phase	Documentation of Current Medications in the Medical Record	CMS Gen Surgery List	Percentage of visits for patients aged 18 years and older for which the eligible professional attests to documenting a list of current medications using all immediate resources available on the date of the encounter. This list must include ALL known prescriptions, over-the-counters, herbals, and vitamin/mineral/dietary (nutritional) supplements AND must contain the medications' name, dosage, frequency and route of administration.	419	Process	Yes	Claims, EHR, Registry	Internal Medicine, Anesthesiology, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Centers for Medicare & Medicaid Services	
Pre Op Phase	Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented	CMS Gen Surgery List	Percentage of patients aged 18 years and older seen during the reporting period who were screened for high blood pressure AND a recommended follow-up plan is documented based on the current blood pressure (BP) reading as indicated	N/A	Process	No	Claims, EHR, Registry	Internal Medicine, Anesthesiology, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine, Allergy/Immunology,	Centers for Medicare & Medicaid Services	

Pre Op Phase	Care Plan	CMS Gen Surgery List	Percentage of patients aged 65 years and older who have an advance care plan or surrogate decision maker documented in the medical record or documentation in the medical record that an advance care plan was discussed but the patient did not wish or was not able to name a surrogate decision maker or provide an advance care plan	326	Process	Yes	Claims, Registry	Internal Medicine, Cardiology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery, General Practice/Family Medicine	National Committee for Quality Assurance		
Pre Op Phase	Preoperative Key Medications Review for Anticoagulation Medication	Phases of care	Percentage of patients who take anticoagulation medication who are taken to the operating room for an elective intervention under regional anesthesia, monitored anesthesia care (MAC), and/or general anesthesia who have a peri-operative management plan for anticoagulation medications documented in the medical record.		Process		Registry	General Surgery			
Pre Op Phase	Patient-Centered Surgical Risk Assessment and Communication	CMS Gen Surgery List Phases of care	Percentage of patients who underwent a non-emergency surgery who had their personalized risks of postoperative complications assessed by their surgical team prior to surgery using a clinical data-based, patient-specific risk calculator and who received personal discussion of those risks with the surgeon	N/A	Process	Yes	Registry	General Surgery, Orthopedic Surgery, Otolaryngology, Thoracic Surgery, Urology, Plastic Surgery	American College of Surgeons		
Pre Op Phase	Identification of Major Co-morbid Medical Conditions	Phases of care	Percentages of patients age 28 or older who are taken to the operating room for an elective surgical intervention under regional, and/or general anesthesia AND who have documentation of a significant co-morbid condition(s) in their medical record within 30 days of operation date		Process		Registry	General Surgery			
Pre Op Phase	Patient Frailty Evaluation	Phases of care	Percentage of patients age 18 or older who underwent a non-emergency surgery who had their personalized risks of postoperative complications assessed by their surgical team prior to surgery using a clinical data-based, patient-specific risk calculator and who received personal discussion of those risks with a surgeon		Process		Registry	General Surgery			
Pre Op Phase	Preventive care and Screening: Tobacco Screening and Cessation Intervention	Phases of care	Percentage of patients aged 18 years and older who are active tobacco users who receive tobacco screening AND are offered cessation counseling at least 2 months prior to elective surgical procedure in order to delay the procedure until the smoking cessation is possibly achieved.		Process		Registry				
Pre Op Phase	Surgical Plans and Goals for Care	Phases of care	Percentage of patients who have been given the purpose for the recommended procedure AND goals of care discussion has been documented in the medical record		Process		Registry	General Surgery			
Pre Op Phase or Post Discharge Phase	Closing the Referral Loop: Receipt of Specialist Report	CMS Gen Surgery List	Percentage of patients with referrals, regardless of age, for which the referring provider receives a report from the provider to whom the patient was referred	N/A	Process	Yes	EHR	Allergy/Immunology, Cardiology, Dermatology, Emergency Medicine, Gastroenterology, General Surgery, General Oncology, Hospitalists, Neurology, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Physical Medicine, Preventive Medicine, Rheumatology, Thoracic Surgery, Urology, Vascular Surgery, Mental/Behavioral Health, Plastic Surgery	Centers for Medicare & Medicaid Services		

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Appendix B

Example of Episodes Stacked Within an Entity (Based on an Actual TIN)

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Example of Episodes Stacked for Entity (TIN) Episode Type	Savings	Sum of Actual	Sum of Expected	Total Clinicians' Shares	Total Number of Episodes
msk-Lumbar and sacral spine surgery	46,912	\$ 15,354,760	\$ 15,401,672	1,309.4	2,123
msk-Knee replacement	(354,222)	\$ 15,200,993	\$ 14,846,772	570.1	988
cvas-CABG	360,033	\$ 12,568,460	\$ 12,928,493	277.3	406
msk-Hip replacement	(70,482)	\$ 12,528,826	\$ 12,458,344	444.6	720
eye-Cataract surgery IOL	(1,275,340)	\$ 11,349,360	\$ 10,074,020	2,816.4	3,763
uro/gen-Urinary endoscopy	(807,487)	\$ 10,947,261	\$ 10,139,773	4,233.1	5,067
cvas-Insertion of permanent pacemaker/AICD	(195,386)	\$ 10,456,615	\$ 10,261,229	593.0	689
cvas-Percutaneous cardiac intervention	336,091	\$ 10,423,393	\$ 10,759,484	618.8	971
msk-Fracture/dislocation treatment pelvis/hip/femur	345,233	\$ 10,035,424	\$ 10,380,656	413.1	666
gi-Colonoscopy	171,214	\$ 8,425,002	\$ 8,596,216	6,819.8	7,411
gi-Colectomy	40,389	\$ 8,133,233	\$ 8,173,622	292.7	409
gi-EGD endoscopy	715,930	\$ 6,461,051	\$ 7,176,981	3,084.8	4,026
cvas-Open heart valve surgery	57,286	\$ 5,332,315	\$ 5,389,601	108.1	156
cvas-Cardiac catheterization	173,781	\$ 3,355,590	\$ 3,529,371	666.7	969
cvas-Leg revascularization	(104,563)	\$ 3,133,365	\$ 3,028,802	141.0	252
fgen-Mastectomy	301,448	\$ 2,574,514	\$ 2,875,962	334.4	431
gi-Cholecystectomy	102,360	\$ 2,440,369	\$ 2,542,729	231.5	326
gen/unsp-AV fistula creation and revision	134,615	\$ 2,128,815	\$ 2,263,430	224.8	275
msk-Fracture/dislocation treatment arm/wrist/hand	(88,434)	\$ 2,016,482	\$ 1,928,048	523.9	643
msk-Shoulder arthroscopy / rotator cuff repair	65,192	\$ 1,704,642	\$ 1,769,834	169.8	211
gi-Repair inguinal hernia	71,982	\$ 1,258,749	\$ 1,330,732	313.5	352
eye-Retina and vitreous procedures	(82,672)	\$ 1,178,898	\$ 1,096,225	225.1	282
msk-Shoulder total arthroplasty	(55,743)	\$ 1,125,273	\$ 1,069,530	53.6	82
mgen-TURP	27,652	\$ 1,096,242	\$ 1,123,894	189.4	298
msk-Knee arthroscopy	26,804	\$ 998,287	\$ 1,025,091	232.0	303
entd-Endoscopic sinus surgery	(147,877)	\$ 924,359	\$ 776,483	161.1	180
eye-Glaucoma surgery	(82,615)	\$ 910,955	\$ 828,340	500.5	564
gi-ERCP	(4,154)	\$ 700,188	\$ 696,034	125.9	151
msk-Fracture/dislocation treatment lower leg/ankle/f	15,376	\$ 632,732	\$ 648,109	257.4	313
gi-Repair ventral hernia	79,501	\$ 575,108	\$ 654,609	138.2	158
eye-Cataract surgery sec mem	(137,929)	\$ 508,334	\$ 370,405	492.4	557
cvas-Leg vein angioplasty	62,763	\$ 480,754	\$ 543,518	54.4	87
fgen-Hysterectomy	66,943	\$ 394,276	\$ 461,220	78.3	95
fgen-Colporrhaphy	(53,482)	\$ 339,325	\$ 285,843	61.0	71
entd-Thyroidectomy	8,924	\$ 297,278	\$ 306,202	63.6	58
fgen-Breast reconstruction	(16,908)	\$ 276,132	\$ 259,224	35.1	37
eye-Retina/choroid destructive therapy	(17,249)	\$ 275,199	\$ 257,950	131.1	202
cvas-Leg vein ablation	15,274	\$ 150,811	\$ 166,085	39.9	52
endo/met-Parathyroidectomy	2,917	\$ 146,103	\$ 149,020	31.7	29
gi-Anti-reflux surgery	24,879	\$ 137,098	\$ 161,977	18.5	21
fgen-Mammaplasty	(4,536)	\$ 133,033	\$ 128,497	26.4	31
cvas-Aortic repair	7,967	\$ 111,103	\$ 119,070	20.3	30
msk-Fracture/dislocation treatment knee	3,113	\$ 95,328	\$ 98,441	30.5	40
gi-Appendectomy	2,581	\$ 87,490	\$ 90,071	16.2	24
chest-Lung resection	14,677	\$ 80,877	\$ 95,553	18.9	22
fgen-Colpopexy	42,150	\$ 80,301	\$ 122,451	29.4	33
gi-Liver transplant	14,237	\$ 78,452	\$ 92,689	7.6	9
msk-leg amputation	8,867	\$ 48,862	\$ 57,729	9.5	11
neur-Carotid endarterectomy	6,663	\$ 36,715	\$ 43,377	24.0	22
uro/gen-Kidney transplant	4,559	\$ 25,125	\$ 29,684	4.4	7
gi-Bariatric surgery	4,353	\$ 23,987	\$ 28,340	10.0	9
mgen-Prostatectomy	4,178	\$ 23,022	\$ 27,200	12.0	12
uro/gen-Nephrectomy	3,662	\$ 20,182	\$ 23,844	9.3	10
gi-Esophagectomy	2,011	\$ 11,082	\$ 13,093	1.9	2
gi-Pancreatectomy	1,050	\$ 5,785	\$ 6,834	1.0	1

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Appendix C

Society of Thoracic Surgeons Whitepaper on APM Collaboration

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MEMORANDUM

To: STS Board of Directors

CC: Rob Wynbrandt
William Seward

From: Courtney Yohe

Date: October 16, 2016

Re: STS-APM

Overview

On April 16, 2015 President Barack Obama signed the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), Public Law 114-10, which among other things, repealed the Sustainable Growth Rate (SGR) mechanism of updating payment for physician services in Medicare.¹ The Society of Thoracic Surgeons (STS) played a substantial role in advocating for the passage of MACRA.

Section 101(e) of MACRA promotes the development of, and participation in, Alternative Payment Models (APMs) with payment incentives equal to 5% of Medicare payments. This payment incentive is available annually to those who qualify. Specifically, this section: (1) Creates a payment incentive program that applies to providers who are qualifying APM participants for each payment year beginning in 2019 through 2024; (2) requires the establishment of a process for stakeholders to propose Physician-Focused Alternative Payment Models (PF-APMs) to an independent “Physician-Focused Payment Model Technical Advisory Committee” (PTAC) that will review, comment on, and provide recommendations to the Secretary on the proposed PF-APMs; and (3) requires the establishment of criteria for PF-APMs for use by the PTAC for making comments and recommendations to the Secretary. In essence, the legislation provides a mechanism for the development and evaluation of PF-APMs by interested stakeholders, including medical specialty societies. It is important to note that surgical specialties have had few options to participate in existing APMs, with the options limited to those such as Accountable Care Organizations (ACOs).²

On December 10, 2013, STS held a policy planning meeting with members of STS leadership to discuss and identify key features to include in any cardiothoracic surgery APM model. As part of the project, STS examined the current procedural terminology (CPT) codes and diagnostic-related group (DRG) codes most used by STS members. Based on this information, over the

¹ Medicare Access and CHIP Reauthorization Act of 2015, Public Law 114-10.

² James M. Dupree et al., “Attention to Surgeons and Surgical Care Is Largely Missing from Early Medicare Accountable Care Organizations,” *Health Affairs*, Vol. 33, No. 6 (June 2014), pp. 972-979, <http://content.healthaffairs.org/content/33/6/972>

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course of the past few years, STS has designed the following “STS-APM” proposal specifically related to cardiothoracic disease (including coronary artery bypass grafting (CABG)^{3,4} and valve repair and replacement procedures) and treatments for lung cancer.⁵ Previous data for CABG support the premise that the use of evidence-based team care can avoid unnecessary testing and inappropriate or futile therapy.^{6,7} In addition, the identification and reduction of high cost postoperative complications can substantially improve quality and reduce spending.^{8,9,10,11}

The following document provides a high-level summary and framework for the heart team and lung cancer care team APM. It also makes a number of critical assumptions which include the Society’s ability to access all the resources necessary to implement the payment model as described and optimize the STS National Database including:

1. Linkages between the STS National Database, Medicare claims and other payer data, and fact of death data from the Social Security Death Master File (SSDMF) or the Centers for Disease Control and Prevention’s National Death Index (NDI);
2. Collection of Unique Device Identifiers (UDIs) in medical claims forms;
3. Implementation of the STS National Database participant Dashboard;
4. Ability to display resource use (claims data) and death information (SSDMF/NDI) on the Dashboard in a meaningful way;
5. Maintenance of the STS National Database status as a Qualified Clinical Data Registry (QCDR);
6. Continued development of relevant quality measures through the National Quality Forum (NQF) or alternate pathways;
7. Development of patient reported outcome measures;

³ The CPT codes most commonly used by STS members in the treatment of CABG-related conditions include the following: 33510-33519, 33521-33523, 33533-33536, 33508, 33530, and 35600.

⁴ On August 2, 2016, CMS [published in the Federal Register](#) a proposed rule for the expansion of Episode Payment Models (EPMs) into CABG and AMI proposed for implementation with an initial performance period start date of April 1, 2017. Simultaneously, CMS proposed to create a Cardiac Rehabilitation Incentive Payment related to patient receipt of cardiac rehabilitation and intensive cardiac rehabilitation in the context of the EPMS related to AMI and CABG. Comments on the proposed rule are due on October 3, 2016.

⁵ The CPT codes most commonly used by STS members in the treatment of lung cancer include the following: 32096-32098, 3210, 32440, 32442, 32445, 32480, 32482, 32484, 32486, 32488, 32491, 32501, 32503-32507, 32540, 32663, 32666-32672, 32674, 38746, and 32701.

⁶ Alan M. Speir, MD, Vigneshwar Kasirajan, MD, Scott D. Barnett, PhD, and Edwin Fonner, Jr, DrPH, Additive Costs of Postoperative Complications for Isolated Coronary Artery Bypass Grafting Patients in Virginia, *Ann Thorac Surg* 2009;88:40–6

⁷ Ruben L. Osnabrugge, MS, Alan M. Speir, MD, Stuart J. Head, PhD, Philip G. Jones, MS, Gorav Ailawadi, MD, Clifford E. Fonner, MA, Edwin Fonner, Jr, DrPH, A. Pieter Kappetein, MD, PhD, and Jeffrey B. Rich, MD, Prediction of Costs and Length of Stay in Coronary Artery Bypass Grafting, *Ann Thorac Surg* 2014;98:1286–93

⁸ Osnabrugge, MSc, Ruben L, et al. "Cost, quality, and value in coronary artery bypass grafting." *The Journal of Thoracic and Cardiovascular Surgery*, 2014: 2729-2735.e1.

⁹ LaPar, MD, MSc., Damien J., et al. "Preoperative renal function predicts hospital costs and length of stay in coronary artery bypass grafting." *The Annals of Thoracic Surgery*, 2016: 606-612.

¹⁰ LaPar, MD, MS, Damien J., et al. "Postoperative atrial fibrillation significantly increases mortality, hospital readmission, and hospital costs." *The Annals of Thoracic Surgery*, 2014: 527-533

¹¹ Holmes, Jr. MD, David R., Jeffrey B. Rich, MD, William A. Zoghbi, MD, and Michael J. Mack, MD. "The Heart Team of Cardiovascular Care." *The Journal of the American College of Cardiology*, 2013: 903-907.

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8. Maintenance of the STS Risk Calculator;
9. Ability to establish registry interoperability with electronic health records (EHRs) should such linkages become feasible;
10. Continued maintenance of STS Public Reporting.

Collaboration with the American College of Surgeons

The American College of Surgeons (ACS) has developed an ongoing partnership with the Heller School for Social Policy and Management at Brandeis University and the Center for Surgery and Public Health at Brigham and Women's Hospital. ACS has engaged in these relationships to leverage the work that Brandeis University had already performed to assist the Centers for Medicare and Medicaid Services (CMS) in developing episode grouper methodologies. In recognition of the criteria set forth under MACRA that require a certain percentage of revenues or patients to be part of an APM to create eligibility for the aforementioned 5% APM Incentive Payment, ACS engaged in this work to broaden the scope of episode groupers, which currently are primarily utilized as a measure of resource use, to expand into a broader tool as an Advanced APM where payments are affected not only by the ability to efficiently administer resources but also based on the quality of care delivered in the episode.

In order to achieve the APM Incentive Payment thresholds referenced, ACS has acknowledged that “one off” episode-based APMs likely yield little potential access to the MACRA APM Incentive Payment. Therefore, ACS is seeking to create an episode-based payment model that can be applied across many procedures and conditions. This work requires the involvement and participation of many specialty societies. STS has been in discussions with ACS to ensure that STS priorities related to episode-based payment models are met and to assess the model as a vehicle for implementing the APM goals discussed in this document.

ACS is coordinating its efforts to submit details on the model to the Center for Medicare and Medicaid Innovation (CMMI) in Fall 2016 as well as a separate submission to the PTAC which is expected to begin accepting models for consideration on December 1, 2016. STS is prepared to provide input for these submissions as appropriate, including information on clinical quality measures as well as guidance on how to utilize data from the STS National Database to help redesign care related to clinically relevant episodes.

With approval from the STS Board of Directors, it is my expectation that the Whitepaper that follows will be submitted as an addendum to the ACS proposal. It will also be used in other STS communications and advocacy efforts as appropriate.

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The Society of Thoracic Surgeons STS-Alternative Payment Model Proposal

DRAFT 10/16/16

Heart/Lung Cancer Care Models

The current Medicare payment system supports fragmented care delivery and encourages overutilization of health care services, neither of which is in the best interest of the beneficiary. Thus, STS recommends Medicare adopt a physician-focused alternative payment model (PF-APM) that fosters collaboration among a multi-disciplinary team of providers. Such a model could use the STS National Database to combine clinical and cost data to develop evidence-based protocols with the goal of improving clinical performance in targeted aspects of care, such as atrial fibrillation prophylaxis, transfusion reduction, early extubation, perioperative glucose management, and postoperative wound management among others.¹² The additive cost of complications in cardiac surgery is well described by the Virginia Cardiac Surgery Quality Initiative (VCSQI)¹³ and their impact on health care spending is substantial¹⁴. For example, when VCSQI members noted high rates of blood transfusions, best practice protocols were identified and reproduced in the region. Transfusion rates fell by 40% with \$49M in savings over a two-year period. Similarly, reductions in the incidence of atrial fibrillation were associated with \$21M in savings. A combined clinical/financial database tool has been an essential cornerstone of the Virginia project and has been critical to its success^{15,16,17,18}.

Creating payment models, especially those involving hospital and multiple physician payments requires time and a large amount of work. In addition, physician practices, hospitals and other entities are likely to be at various levels of readiness to participate in APMs. Therefore, STS proposes an incremental approach to APM development for cardiothoracic care representing different levels of complexity. The models described below can be layered over the current Fee-for-Service Medicare payment structure or could become the quality incentive component of the American College of Surgeons' bundled payment proposal. Future iterations of this model could

¹² Alan M. Speir, MD, Jeffrey B. Rich, MD, Ivan Crosby, MD, and Edwin Fonner, Jr, DrPH., Regional Collaboration as a Model for Fostering Accountability and Transforming Health Care, *Semin Thorac Cardiovasc Surg* 21:12-19

¹³ VCSQI is a voluntary consortium of 18 hospitals and 14 cardiac surgical practices providing open-heart surgery in the Commonwealth of Virginia. VCSQI's members perform over 99 percent of Virginia's open-heart procedures. The group has convened since 1996, comparing data and exchanging information to improve the quality of surgical care and contain costs. VCSQI helps implement protocols to reduce post-operative complications, was involved in the adoption of quality measures in cardiac surgery for the National Quality Forum, and has formulated policies on pay for performance programs.

¹⁴ Damien J. LaPar, MD, MS, Alan M. Speir, MD, Ivan K. Crosby, MD, Edwin Fonner, Jr, DrPH, Michael Brown, PA-C, Jeffrey B. Rich, MD, Mohammed Quader, MD, John A. Kern, MD, Irving L. Kron, MD, and Gorav Ailawadi, MD,, Postoperative Atrial Fibrillation Significantly Increases Mortality, Hospital Readmission, and Hospital Costs, *Ann Thorac Surg* 2014;98:527-33

¹⁵ Osnabrugge, MSc, Ruben L, et al. "Cost, quality, and value in coronary artery bypass grafting." *The Journal of Thoracic and Cardiovascular Surgery*, 2014: 2729-2735.e1.

¹⁶ LaPar, MD, MSc., Damien J., et al. "Preoperative renal function predicts hospital costs and length of stay in coronary artery bypass grafting." *The Annals of Thoracic Surgery*, 2016: 606-612.

¹⁷ LaPar, MD, MS, Damien J., et al. "Postoperative atrial fibrillation significantly increases mortality, hospital readmission, and hospital costs." *The Annals of Thoracic Surgery*, 2014: 527-533

¹⁸ Holmes, Jr. MD, David R., Jeffrey B. Rich, MD, William A. Zoghbi, MD, and Michael J. Mack, MD. "The Heart Team of Cardiovascular Care." *The Journal of the American College of Cardiology*, 2013: 903-907.

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focus on longitudinal disease management with the addition of clinical and financial information from other sources.

Fee-for-Service / Bundled Payment Shared Savings

The Society's recommendations rely on recognition of high cost complications and over-utilization of resources for certain procedures (CABG, valve replacement, and surgical procedures used to treat lung cancer) with targeted application of best practices to improve care quality and efficiency and reduce complications. Although we believe this quality-based payment proposal could be implemented almost immediately in the current fee-for-service environment, we are submitting it as a part of the ACS proposal for bundled surgical payments.

Data: STS-APM aims to blend the STS National Database and claims information from Medicare and other payers to create a clinical/financial tool to track patient outcomes relative to costs, while identifying high frequency and/or costly complications. The blended database would be used to develop best practice protocols aimed at reducing health care costs by minimizing complications and/or cutting excess resource utilization while maintaining quality. VCSQI has already created such a tool with demonstrated success. Although the Virginia model has had success accessing cost data from the Virginia Health and Hospital Association, a direct linkage to payer data is preferred. Adding UDIs and mortality data from the SSDMF or NDI to claims information would also yield important information on long-term efficacy of medical devices. Future iterations of this tool could potentially be linked with other clinical data registries to facilitate a longitudinal, population management payment model.

The linked data will serve as a feedback mechanism for participants. When the STS National Database dashboard feature is developed, STS members will be able to evaluate their respective performances relative to their peers and make adjustments as necessary. This information could include quality reporting and resource use measures. STS will continue to monitor MACRA implementation and what would be required to incorporate this functionality into the new dashboard feature.

Quality/Cost Metrics: Regardless of the exact payment methodology used, either the Merit-Based Incentive Payment System (MIPS) or APMs, MACRA requires providers to report on certain quality measures before they can benefit from any financial incentives established under the statute. Because STS believes that the best measures of physician performance are generated by physicians, using robust clinical information, the Society will continue to develop quality measures which, if endorsed by the NQF or approved through an alternate quality measure approval pathway, could be used in this APM. STS has sponsored more NQF-endorsed quality measures (34) than any other professional organization and which include risk-adjusted morbidity and mortality measures that have already driven change and improvements in care for Medicare beneficiaries. The STS National Database will maintain its status as a qualified clinical data registry (QCDR) and could report to CMS on quality measures on behalf of all database participants, regardless of whether those STS members are participating in MIPS or the STS-APM, should they elect to have STS report on their behalf. In addition, future measures will include both patient reported outcome measures and patient functional status when those measures are vetted and meaningful.

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Payment Methodology: The framework for payments to providers would rely on retrospective reconciliation of the payment bundles proposed by ACS. Tracking of spending, outcomes, and savings would occur through the database by calculating the ratio of observed to expected costs attributed to a patient’s care. Risk adjustment, an essential component of the model, will be accomplished using the STS National Database and the STS Risk Calculator. Cost benchmarks (or the “expected” cost) would be established for “typical” global episode periods by using historical data.

Once the infrastructure is in place, STS would appoint a panel or other working group to annually develop a menu of quality improvement initiatives (QII) for general thoracic and adult cardiac surgery APM participants to adopt. The group would be comprised of members of the STS Task Force on Quality Initiatives but could also have representation from other stakeholder groups including patients, payers (e.g., Medicare) and hospitals. Possible QII will be derived from peer-reviewed journals. The group will consider publications that utilize the STS National Database. However, other QII may be selected based on the evidence or consensus that they will improve patient outcomes and/or patient experience and may be associated with cost savings. Although CMS has stated that infrastructure costs, like cost associated with implementing new QII or even database participation in general do not count toward downside financial risk, it will be important to track the financial burden of QII implementation to participants.

APM Participants would be required to select a subset of QIIs from the proposed menu of activities and implement them over the course of the year.

Shared Savings: The main goal of the STS-APM is to drive quality improvement and reduce costs through the creation of standardized treatment protocols. If the resulting care transformations generate savings relative to agreed-upon pricing targets, cardiothoracic surgeons would be allowed to share in those savings.

Analysis of data extracted from the STS National Database will serve two purposes for APM participants. It will allow them to accurately assess patient risk and it will also be the primary method of clinical performance feedback. The importance of accurate risk adjustment and continuous member feedback cannot be overstated.

Third Party Administrator: Under the MACRA statute, Medicare payments will be made to the APM entity. In the proposed rule, CMS makes clear that it does not wish to interfere with the financial arrangements in which each APM Entity might wish to engage with those providers (including physicians and physician group practices) delivering services related to the APM.

Waivers: Current Medicare rules and regulations may prove a hindrance to these types of provider arrangements (waivers already exist for the Acute Care Episode demonstration project). However, in similar circumstances (e.g., the Medicare Shared Savings Program), Congress has provided a pathway for entities to seek a waiver from certain rules and regulations (e.g., gain-sharing regulations). Members of the heart or lung cancer team, as needed, could seek a waiver allowing them to provide financial incentives, which would encourage Medicare beneficiaries to accept referral to the heart and lung cancer team and treatment from those team members.

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Other Surgical Bundled Payment Initiatives

In July, 2016, CMS published a proposed CABG Episode Payment Model (EPM), essentially a mandatory bundled payment for CABG that would potentially allow participants to earn Advanced APM bonus payments. STS provided extensive comments on the proposed rule. If the STS-APM is implemented, it would be our expectation that voluntary participation in the STS-APM would preclude mandatory participation in the mandatory CABG EPM.

Longitudinal Disease Management Bundled Payment

Future iterations of this model could replace the FFS infrastructure with a payment for a surgical episode. In order to effectively implement this model, the STS clinical/financial tool may need to be combined with the robust clinical information found in the American College of Cardiology's National Cardiovascular Data Registry (NCDR®) and/or other sources of clinical data reported by members of the care team.

In 2015, the Department of Health and Human Services established the Health Care Payment Learning and Action Network (HCP-LAN) with the goal of aligning private payers and CMS in moving payment from traditional FFS methods to FFS-linked to quality and APMs.¹⁹ STS has provided substantive comments on the HCP-LAN whitepaper on Accelerating and Aligning Clinical Episode Payment Models: Coronary Artery Disease. It is the Society's position that a population-based payment model will not be implemented successfully in the near term.. We think that incremental implementation of the quality-based care principles outlined in this document and the combination of clinical and claims data from across the spectrum of care are essential to the success of such a model. We will continue to engage actively in this space to ensure that those principles are upheld.

Summary

STS looks forward to taking a lead role in the creation of PF-APMs that reward providers based on the value, rather than the volume of care they provide to millions of Medicare beneficiaries. With a focus on high cost, high risk patients and high impact procedures, STS recommends APMs that incentivize and reward coordination and collaboration among providers. With adoption of the PF-APMs described above, the Medicare program would be creating a system through which all the involved providers are collectively responsible for the care provided. By advancing a model that helps ensure that the patient receives the most appropriate care in the right setting, at the right time, from the most appropriate provider, outcomes could be maximized while extraneous costs could be minimized – goals shared by patients, Congress, CMS, and STS alike.

¹⁹ <http://hcplan.wpengine.com/about-us/faqs/>

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Appendix D

Episode Grouper for Medicare (EGM) Design Report



Episode Grouper for Medicare (EGM)

DESIGN REPORT

FINAL

February 29, 2016

Submitted by
Brandeis University

In collaboration with
American Board of Medical Specialties
American Medical Association Physician Consortium for Performance Improvement
Booz Allen Hamilton
IPRO

Project Director
Christopher P. Tompkins, Ph.D.



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EXECUTIVE SUMMARY

Medicare and other third-party payers maintain very detailed records of reimbursements for individual healthcare services. In addition to supporting provider payment, these records represent a wealth of information about patterns of care and information about opportunities for improvement. The conceptual framework presented here involves using an episode grouper (or “grouper”) to organize administrative claims data into episodes-of-care, or simply episodes, which are sets of services provided to care for an illness or injury during a defined period of time. The National Quality Forum endorsed this approach in its consensus report on a measurement framework for evaluating efficiency,¹ and wrote the following in its more recent report on evaluation of episode groupers:

In recent years, there has been a drive toward performance measurement based on the patient’s episode of care in how to better understand the utilization and costs associated with certain conditions. Measurement based on an episode of care facilitates this by attributing care to condition-specific or procedure-specific episodes based on the relationship of the healthcare service to the care of a specific condition (i.e., all diabetes-related care is attributed to the diabetes episode of care)...

Episode grouper software tools are a generally accepted method for aggregating claims data into episodes to assess condition-specific utilization and costs. Using an episode grouper, healthcare services provided over a defined period of time can be analyzed and grouped by specific clinical conditions to generate an overall picture of the services used to manage that condition.²

In response to the legislative mandate to create a publicly available grouper for Medicare, the Centers for Medicare & Medicaid Services (CMS) began to solicit proposals for episode grouping approaches from public and private entities to be considered for adoption. In 2012, CMS awarded the contract to develop a public domain episode grouper for Medicare to Brandeis University. Thus, CMS has developed a software application—the Episode Grouper for Medicare (EGM)—for organizing administrative claims into information about resource use that can be used to support various program objectives.

This Design Report describes the tool with respect to its development and logical components. Potential uses could include accountability, where cost outcomes could be linked to other performance domains; and performance improvement, where cost and utilization patterns could identify opportunities to coordinate care, and provide more efficient healthcare for individuals or populations.

i. What is the Episode Grouper for Medicare (EGM)?

EGM is a software application that reads Medicare administrative claims data chronologically by beneficiary, and assigns services and their associated Medicare payments to episodes of care. Episodes correspond to

¹ National Quality Forum (NQF). Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care. Washington, DC: NQF; 2009

² National Quality Forum (NQF). Evaluating Episode Groupers: A Report from the National Quality Forum. Washington, DC: NQF; 2014

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clinically meaningful topics such as a clinical condition defined by diagnosis codes (e.g., pneumonia), or in other cases, a particular type of treatment defined by procedure codes (e.g., pacemaker insertion).

One of the most basic objectives of EGM is to describe or account for Medicare cost and utilization using categories that make sense to clinicians and others who are responsible for patient care and healthcare systems. For example, how much does diabetes or ischemic heart disease cost Medicare in terms of routine care, acute exacerbations, and sequelae that emerge over time? What settings or types of providers are involved in the care of patients simultaneously or sequentially?

EGM standardizes and automates the construction of resource use measures. Clinically meaningful episodes provide the context from which to interpret the relevance of various services provided to patients over time. The goal is to be inclusive with respect to the services and costs that result from an episode including claims for non-specific diagnoses such as signs and symptoms (relevant diagnoses); plausible procedure/service codes (relevant services); and aftereffects and secondary results of care (i.e., sequelae).

ii. Why build episodes?

Another objective of EGM is to estimate average Medicare payments for episodes, risk-adjusted according to patient-level information and other factors as appropriate. These risk-adjusted costs can serve as reference points for comparison; for example, to know the extent to which actual episode costs for specific patient cohorts (e.g., defined geographically or by attribution to providers) may deviate from the average cost for clinically similar patients.

Another objective is to frame spending patterns in ways that highlight opportunities for improvement. Some opportunities may reside within a physician practice (e.g., low-value or duplicative services), while others might be “downstream” consequences such as sequelae (e.g., hospital admissions for sepsis following surgery), or problems “upstream” (e.g., missed opportunities to avoid acute exacerbations, or reduce the need for surgery). Layers of information can be produced for different aspects of decision-making, including individual practitioners or facilities, and the continuum of care in delivery systems or whole market areas.

iii. How does EGM incorporate clinical expertise?

Clinicians interpret patient information based on known relationships and probabilities. For example, clinicians understand that cough can be a symptom of pneumonia, sepsis is a possible sequela of pneumonia, and a case of pneumonia rarely lasts more than a week or so. Each condition has its own time course and set of possible symptoms and sequelae with implicit time-dependent probabilities for each relationship. Clinicians also know which tests and treatments are used and likely effective for different conditions. EGM emulates this set of relationships and probabilities using administrative claims data.

EGM has been developed with input from physicians and other clinicians, including individuals at CMS and the Agency for Healthcare Research and Quality, support contractors, and other experts recruited through

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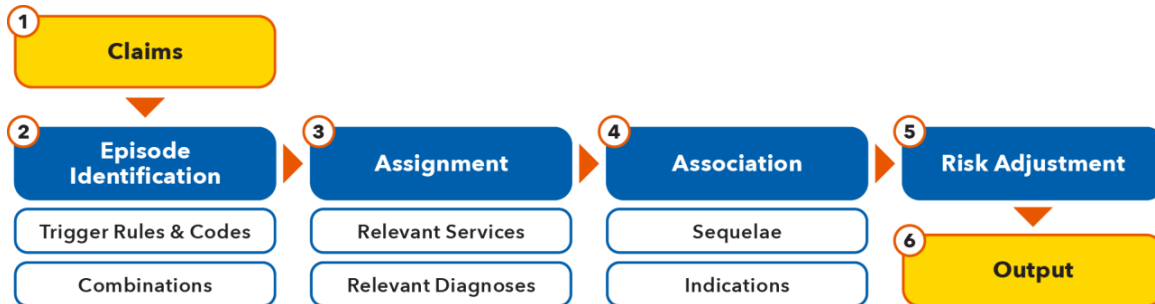
broad invitations.³ This led to the development of detailed clinical information, or specifications for each episode, which are stored in tables that are accessed by the EGM software as it processes information on claims data. (Section 2 of this document discusses how episode specifications are derived.) Those tables are called the Episode Definition Data (EDD) and include clinical facts, such as possible symptoms, tests, treatments, and sequelae for **each type of episode**. The full EDD can be found in the companion *EDD Metadata Table*.

EGM software uses those tables along with patient-specific claims data, including date and place of service, type of provider, diagnosis, and procedure/service codes to construct episodes, and in effect, assemble an automated history for each patient. Just as an encrypted message may seem meaningless, raw claims data might also seem, at first glance, to be a jumble of information. But, the actions of clinicians are purposeful, and a patient's claims can be deciphered into a meaningful history using clinical intelligence in the EDD as the key to unlock the code.

iv. How does EGM construct episodes?

EGM functions through interactions between the rules encoded in the software application and the clinical knowledge stored in the EDD tables. Figure ES-1 provides an overview of how EGM constructs episodes.

Figure ES-1: Overview of How EGM Constructs Episodes



Claims. EGM processes Medicare Part A and Part B claims data that are arranged in chronological order by beneficiary. The software first links pairs of service elements that are disjointed in Medicare Fee for Service bills, such as producing an image study along with the clinician's reading and reporting on the study, into more clinically-meaningful services (e.g. an imaging test). The result of this linking is a database of services ready for episode identification.

Episode Identification. EGM reads the resulting set of services in chronological order to determine when a patient is involved in an episode of any given type. For example, a hospital admission for heart failure could trigger an episode of acute heart failure.

³ The project team solicited advisors through a number of channels; for example, see: American Medical Association. Call for Nominations to Participate in the CMS Episode Grouper Project. Physician Consortium for Performance Improvement Newsletter. June 11, 2013.

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Assignment. EGM reads the service data again to determine which services provided to the patient are relevant to each open episode. For example, an Electrocardiogram is relevant to an open episode for acute myocardial infarction (AMI).

Association. EGM determines the clinical relevance among episodes, such as an acute condition episode that also is an acute exacerbation of an underlying chronic condition episode, or is a sequela to a specific condition or treatment episode. For example, acute heart failure immediately following treatment for AMI or a major surgery could be deemed a sequela of those antecedent episodes.

Risk Adjustment. EGM determines drivers of episode costs such as case-mix, severity, and recent clinical events, and adjusts cost estimates for these factors in order to improve the validity of comparisons across groups of patients with clinically similar episodes.

Output. The last segment of Figure ES-1 shows that EGM produces output data sets consisting of the episodes of care applicable to each patient. These include episodes defined by diagnoses, called condition episodes, and episodes defined by procedures, which are called treatment episodes. In other words, condition episodes are defined in terms of what diagnosis the patient has, whereas treatment episodes are defined in terms of what the physician does.

Subsequent sections of this executive summary consider each of the major steps in more detail.

v. How is an episode triggered?

EGM examines claims data in chronological order by patient and compares the information to specified criteria needed to trigger any given episode. Episodes are triggered by a combination of trigger rules (i.e., the nature of the evidence in claims required to trigger an episode) and trigger codes (i.e., the particular codes on claims that identify a particular type of episode). To trigger an episode for acute myocardial infarction (AMI), for example, there must be one of the specified diagnosis trigger codes for that condition (e.g., AMI of anterolateral wall, initial episode of care) conforming to the trigger rule for that condition (i.e., trigger code in principal position on an inpatient facility claim). For each episode there is a corresponding set of trigger codes and one or more trigger rules.

Trigger codes are used in conjunction with trigger rules to identify each instance of an episode. EGM supports a number of rules that reflect information available from different types of providers (e.g., hospital versus physician claims) and how that information can be used to trigger an episode. A trigger code for a particular condition may have to be observed only once on an inpatient claim, or more than once on outpatient claims. Similarly a trigger code for a treatment episode may have to be observed on a facility claim, a professional claim, or both. For example, a principal diagnosis of heart failure on a hospital claim can trigger acute (and chronic) heart failure episodes, whereas more than one professional evaluation and management services in the outpatient setting for heart failure can trigger a chronic heart failure episode. Section 4.1 describes the identification of episodes from claims data.

Triggering a chronic condition episode is not necessarily the same thing as identifying when the patient's illness began, or even when it became diagnosed for the first time. However, it is important to use the information when it becomes available, including the presence of an episode of care for the chronic condition. This allows EGM to track services and costs related to that condition, and use information about

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the presence of the condition to set cost expectations related to that condition as well as likely other conditions that may be caused or exacerbated by the underlying condition.

vi. How is an episode closed?

Episode specifications indicate when an episode will close. EGM is optimized currently for episodes to close after a predetermined fixed-length interval. Episodes defined by acute conditions typically close 90 days after the date on which they were triggered. Similarly, treatment episodes defined by a specific procedure will close 90 days after the trigger date. Episodes defined by chronic conditions may last for as long as the patient is covered by Original Medicare. For any given type of episode, exceptions to the default rules are specified in the EDD.

A second approach also is available by which the duration of an episode can be determined by service patterns instead of a fixed length. Using this approach, an episode will close after a predetermined time interval in which the patient does not receive services indicating continued care for that episode. This variable-length approach to closing episodes can support analyses of variability in service utilization patterns. For example, treatment for clinical depression may be brief or more prolonged. Section 4.2 describes closing rules for episodes.

vii. Can more than one episode be open at the same time?

Under most circumstances a patient can have more than one episode at a time representing different conditions or treatments. For example, a patient can have multiple concurrent chronic condition episodes open, perhaps overlapping in time with acute condition episodes or treatment episodes of various types. EGM permits such overlapping or concurrent episodes, even while recognizing that clinical treatment patterns and resource use can be affected by interactions between conditions, and between conditions and treatments. For example, the occurrence of pneumonia can influence clinical management and resource use for concurrent conditions such as Chronic Obstructive Pulmonary Disease (COPD) or heart failure. Section 4.3 describes how EGM combines condition episodes that cannot co-exist; Section 4.5 discusses overlapping treatment episodes.

Exceptions exist to the general rule that multiple episodes can be open at the same time. One such circumstance relates to observing in the claims data what could appear to be more than one condition episode (sufficient to trigger each one, respectively), but more likely represents uncertainty among providers about what is the patient's true underlying condition. EGM applies rules that also clarify which episodes to build, and which episode(s) to merge, subsume, and otherwise essentially discard.⁴ For example, an episode of community-acquired pneumonia may be triggered by outpatient evaluation and management (E&M) services with corresponding trigger codes; but followed shortly by a hospital admission for aspiration pneumonia. Given such a pair of episodes triggered closely in time, EGM would interpret the aspiration pneumonia as primary and would merge with the community-acquired pneumonia episode. Services and costs that would

⁴ Merging can occur when two episodes appear to begin around the same time, but only one of the pair will be considered an open episode. Subsuming can occur when one episode is already open, another episode appears to begin, and EGM determines which episode in the pair is open thereafter.

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have been assigned to community-acquired pneumonia would instead be assigned to aspiration pneumonia, and the community-acquired pneumonia episode is discarded.

viii. How are services assigned to an episode?

A major aspect of building an episode is determining which services that a patient receives ought to be assigned to that episode. EGM does not build one episode at a time. Rather, EGM builds multiple episodes simultaneously by passing through the claims data to assign each service to one episode that is open on the date of the service, to more than one episode, or to no defined episode at all (e.g., a single service for a non-specific diagnosis that is not relevant to any open episode).

EGM uses a hierarchical set of rules for service assignment that allow the best evidence available to determine the assignment. The rules are summarized in the next several sections. The governing principle is that a service should be assigned to the episode(s) for which it is most relevant, taking into account procedure codes, diagnosis codes, and timing. Generally, codes that identify an episode (i.e., trigger codes) are highly relevant and likely to be assigned to the episode. Commonly used services with potential clinical benefit, or commonly observed or treated symptoms also can be assigned to an episode. Assignment can be affected by timing as well. For example, an ambulance service may be assigned to the same episode as the emergency department or dialysis center claim that follows. Section 5 describes the service assignment rules, and circumstances that can affect assignment.

ix. What are an episode's relevant services?

Each episode specification has a set of procedure codes, called **relevant services**. Relevant services are those services that are considered to have a plausible clinical purpose related to that episode. A nebulizer, for example, is a relevant service for asthma but not for osteoarthritis. A patient may receive a nebulizer while episodes for asthma and osteoarthritis are both open. If the claim including the nebulizer was included on an outpatient department claim (which allows multiple diagnoses but does not align specific diagnosis codes with specific procedure codes), the EGM would determine that the nebulizer is a relevant service for asthma but not for osteoarthritis and therefore the service is likely to be assigned only to asthma.

However, it is common for beneficiaries to have many episodes open when a given service is provided, and that service may be relevant to more than one episode. Furthermore, the mere fact that a procedure code is listed as relevant to an episode does not mean that the service automatically will be assigned to that episode. For example, a certain type of lab test may be relevant to any of several open episodes, but the diagnosis code on the claim may indicate a specific episode.

The list of relevant services for each type of episode was developed using a two-stage process. First, a representative Medicare claims database was examined for services that included one or more trigger codes for the episode of interest. The procedure codes from those claims were used to produce a candidate list of relevant services, i.e., procedure codes that might be clinically relevant to that episode. Such a culling also could include other procedure codes that co-occurred with the trigger codes, but for reasons other than plausible clinical relevance to the type of episode defined by those trigger codes. The candidate list was then limited to the services that contributed most to the costs attributed to that type of episode.

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Second, clinicians reviewed the candidate list, and removed all service codes for which clinical relevance to that episode was not clinically plausible under virtually any conceivable scenario. Note, the criteria applied here were looser than strict clinical appropriateness; rather, the attempt was to capture the most impactful procedures that were provided to beneficiaries in relation to that type of episode.

x. What are an episode's relevant diagnoses?

Each episode has a set of diagnosis codes, called **relevant diagnoses**, which are considered to be plausible findings, symptoms, and various presentations that often occur in relation to a given episode. Suppose a patient has episodes open for hypertension and pneumonia, and has an E&M office visit or an emergency department visit with a diagnosis code indicating treatment for cough symptoms. Following from the clinical fact that cough could arise from pneumonia but not hypertension, the service would be assigned only to the pneumonia episode and not the hypertension episode. Including diagnoses relevant for each episode helps to capture the range of services and costs that are related to an episode even when more specific diagnoses are not included on the claim.

The list of relevant diagnoses for each episode was developed following a two-stage process similar to the one used for relevant services. First, a representative Medicare claims database was examined for all diagnosis codes that appeared on service claims during the same time intervals as service claims with trigger codes for that type of episode. In other words, during the time in which an episode would be open based on the pattern of trigger codes, what other services occurred with what diagnosis codes? A threshold of statistical likelihood or association was applied. To be considered further, the diagnosis codes must occur significantly more often when the episode is open than when it is not. This produced a candidate list of relevant diagnoses that might be clinically relevant to that episode, but still could include other diagnosis codes that occurred contemporaneously by coincidence. This list was trimmed to include only those codes associated with significant contributions to episode cost.

Second, clinicians reviewed the candidate list, and deleted all diagnosis codes for which clinical relevance to that episode was not clinically plausible. Listing a relevant diagnosis does not automatically mean assignment of a service to that episode. Indeed, the presence of a relevant diagnosis by itself (not paired with an affirmed relevant service) is considered weak evidence for assignment.⁵

xi. What other criteria can affect service assignment?

In addition to clinical assertions in the EDD regarding relevant services and relevant diagnoses, there are other episode construction rules that can affect service assignment. This generally occurs when diagnosis codes do not provide enough information. For example, an ambulance service may have a provisional or general code that does not directly connect to any open episode. In this situation the ambulance service is assigned to the same episode to which a facility claim that is submitted on the same day is assigned, such as a hospital emergency department, or a kidney dialysis center. In other words, the assignment process is not one of examining the data elements on the ambulance claim for clinical details, but using pragmatic logic that

⁵ As with relevant services, the relevant diagnoses captured in the EDD is not exhaustive, but optimized for analysis and profiling purposes. Future versions of the EDD can refresh, update, and add to the lists of relevant services and diagnoses.

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those two events on the same day (temporal proximity) is sufficient to make a plausible assignment of the ambulance service to the same episode as the facility service. This is determined by the clinical relevance of the facility claim to open episodes.

xii. What is the hierarchy of information used to assign a service to one or more than one episode?

EGM assesses if a service is relevant to each episode that is open for a patient. The relevance is neither a simple dichotomy of yes or no, nor a continuous scale. Rather, relevance is determined by a hierarchical set of categories: trigger code, combination of relevant service and relevant diagnosis, and then either a relevant service or relevant diagnosis.

Once a service has been assigned to one or more episodes based on the hierarchy, EGM does not proceed to consider any other categories (lower) in the hierarchy. For example, an Electrocardiogram with a principal (trigger code) diagnosis of Acute Myocardial Infarction can be assigned to an open AMI episode with no need to go through subsequent steps that examine the relevance of an Electrocardiogram to other open episodes.

xiii. What options affect service assignment rules?

The default option in EGM is to assign services according to the rules and hierarchy described in the previous sections. EGM provides an alternative option that assigns all services delivered to a beneficiary during a hospital stay to the same episode to which the hospital stay is assigned. Choosing this option overrides the examination of clinical evidence based on relationships between diagnosis codes, procedure codes, and any other open episode.

Similarly, EGM provides the option to assign post-acute services to the same episode to which a recent hospital stay is assigned without any further consideration regarding clinical relevance to other open episodes. This allows a user to integrate the acute and post-acute segments of care into a single episode for analysis. This also reflects Medicare benefit rules whereby coverage for a skilled nursing facility admission is contingent on a qualifying hospital admission.

xiv. How are Service Pairs determined?

EGM processes Medicare Part A and Part B claims data that are arranged in chronological order by beneficiary. The software first links pairs of service elements that are disjointed in Medicare Fee for Service bills, such as the technical component of an image study along with the reading of the study, into more clinically-meaningful services. The result of this step is a database of services ready for episode identification.

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xv. How are costs allocated to episodes?

Allocation of costs to episodes follows directly from service assignment. In the simplest case where a service is assigned to a single episode, then Medicare payments for that service will be allocated fully and only to that episode.

In the case in which a service is assigned to more than one episode, the user has two options. The first option is called “apportioned cost,” and allocates the Medicare payment amount in equal or user selected shares to each episode to which the service is assigned. For example, if an E&M service for which Medicare paid \$100 is assigned to two episodes, then half of the observed Medicare payment amount, \$50, is allocated to each episode, respectively. The second option being developed is called “full cost,” and allocates the entire Medicare payment amount to each episode to which the service is assigned. For each of the two episodes, \$100 would be allocated for the E&M service for which Medicare paid \$100. In other words, the full-cost option double counts dollars across episodes.

The apportioned-cost option helps to explain the likely reasons that Medicare made certain payments. In the example, Medicare paid \$100 for an E&M visit, which served two episodes for which the same resources were shared. In other words, both episodes shared the single visit. The full-cost option describes what the episode likely would have cost without interactions with other episodes involving shared resources and joint production.

xvi. How many types of episodes can EGM identify?

Every type of episode supported by EGM is a row-entry in the EDD clinical data tables. Development of the episode specifications resulted from review of all diagnosis codes and all procedure codes. Section B.1 describes the diagnosis and service taxonomies.

Diagnosis codes were grouped into meaningful clinical concepts, distinguishing over one thousand condition concepts and another two hundred concepts related to symptoms or other non-specific diagnoses. The large majority of condition concepts are recognized by EGM as limited episodes, which means they are not intended to function as episodes that are the subjects of comparisons in resource use. The specifications for limited episodes are not as complete. They lack sequela assertions, and generally have few or no relevant services or diagnoses stored in the EDD.

EGM identifies and constructs limited episodes, which helps to direct service assignment to its “best explanation” rather than allowing mis-assignments to other episodes of interest, or discarding the services and costs with no regard to any useful explanation. In addition, many limited episodes may arise as sequelae of primary episodes of interest, and hence can become factors in performance and accountability indirectly by association. For example, heart disease or major surgery may contribute to onset of depression. Having a limited episode defined for depression helps to track its timing and onset as a potential sequela in relation to an open episode. Similarly, limited episodes can be used as case-mix indicators for risk-adjusting expected costs for any given episode of interest. For example, an open episode for stomach cancer could significantly affect cost and utilization related to other open episodes.

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xvii. Does EGM recognize associations among episodes?

The steps described previously refer to direct assignment of services on claims to one or more episodes. Direct assignment of a service to one or more episodes reflects the best explanation as to why that service was provided: that service was “part of” or “done for” that episode. EGM recognizes that, once formed, certain episodes (and other limited episodes) can be clinically related in various ways. A treatment episode occurs in order to treat a particular condition. EGM produces the treatment episode for analysis and reporting, and includes the treatment episode services and costs as part of the condition episode. At the same time, the condition for which a treatment episode occurs can be very important to the services and resources used for that episode. Stated in a different way, the **indication** can be a very important attribute of the treatment episode; for example, distinguishing colon surgery that occurs to treat an obstruction versus to treat cancer.

EGM recognizes another type of association among episodes and other limited episodes, namely sequelae. For example, a patient may acquire an infection following surgery. Another patient may experience sepsis or respiratory failure following treatment for pneumonia. A third patient with chronic COPD may be admitted to the hospital for an acute exacerbation of the COPD. The services and costs for these sequelae, including office visits, emergency visits, and hospital (re)admissions are associated and linked to their primary (causal) episodes.

The individual services may be directly assigned to specific episodes such as the infection or acute exacerbation, but nevertheless, those conditions are sequelae. Accordingly, performance evaluations centered on the primary episode can consider these sequelae and their costs, which presumably could be lower in frequency or cost for “high performers,” versus more frequent or costly for “low performing” providers. In other words, evaluating efficiency and value with regard to a given primary episode of interest includes clinical consequences observed as sequelae and their costs.

EGM outputs include each episode and limited episode along with assigned services and costs; all condition episodes with their associated treatment episodes; all episodes with their associated sequelae; and all truly primary episodes (not occurring as a sequela) for each patient with their associated acute exacerbations, treatment episodes, and sequelae, where applicable.

xviii. Are episodes specified identically for every use case?

EGM allows users to customize construction of individual episodes through a stratification feature. This allows the attributes of episodes to be segmented into strata, which in turn, can be used to select, segregate, or filter (exclude) cases with the particular attribute. For some types of analysis, important differences in efficiency may be observed in the tendency to use expensive treatment options more than necessary, such as inpatient hospital. For example, a user may wish to analyze the resource implications of differential hospitalization rates for pneumonia, which would involve analyzing pneumonia episodes regardless of setting.

A different use case, or a different focus of efficiency analysis may call for stratifying pneumonia episodes by setting, choosing only episodes that involved hospitalization, or only those that were treated in ambulatory settings. Profiling hospitalists, for example, would naturally be restricted to patients who were hospitalized. Similarly, inpatient episodes can be stratified by Medicare Severity-Diagnosis Related Group (MS-DRG), and

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the user can retain cases based on one or more MS-DRGs, combine cases into specified groupings of MS-DRGs, and exclude some cases such as rare or idiosyncratic MS-DRGs.

xix. Does EGM risk-adjust episode costs for valid comparisons?

Any given patient or episode, and any given provider's patients, can be different from average in terms of expected resource use. Differences in expected resource use can stem from things like the patient's comorbidity burden or severity of illness. Thus, comparing average resource use for one provider's patients to another provider's patients, or to a simple unadjusted average of all other providers' patients, can bias an analysis or inference about relative performance.

EGM attempts to remove such bias by calculating expected costs for each episode using information about the patient's medical history.

Specifically, EGM uses a patient's constellation of episodes (including limited episodes) as factors in risk adjustment:

- At the start of each estimation period for expected costs, which is the beginning of any episode, or again every 90 days for chronic conditions, EGM looks at past and present episodes that may affect the expected cost for the episode of interest.
- Any that are already open at the beginning of the estimation period are considered potential risk factors. For example, when updating the expected cost estimates for a chronic COPD episode, a patient in the midst of a pneumonia episode could have higher expected cost for COPD in the near future (the next 90 days).
- Any episodes for the patient that may have closed within the past six months also are considered as potential risk factors. For example, when updating the expected cost estimates for a chronic heart failure episode, a patient who experienced a recent AMI may have higher expected cost for heart failure as a result. Similarly, recent implantation of a pacemaker could affect the expected costs of arrhythmia.
- Episodes that closed more than six months before the period of interest are considered and also used as potential risk factors.

EGM calculates expected costs for all episodes using EGM's own identification rules to trigger episodes, which are used as risk factors. This standardizes their definitions and pinpoints their time parameters. EGM calculates the risk factors using the identical choices made by the user in stratifying episodes according to their attributes. Similarly, the actual and observed costs included in EGM outputs reflect the user's choice of actual Medicare payment amounts versus payment amounts that have been standardized to remove differences attributable to regional or other pricing variation.

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I. INTRODUCTION

The Episode Grouper for Medicare (EGM) is a software application that organizes Medicare administrative data into clinically meaningful **episodes of care**, or simply episodes, which are sets of services provided to care for an illness or injury during a defined period of time. EGM is part of a broad set of efforts to help improve care by describing how Medicare dollars are spent and providing comparative performance data on the costs and consequences of medical care delivered to clinically similar patients.⁶

An episode grouper bundles all care provided for a condition or a treatment into a single unit of analysis that is intended to serve as the basis for cost comparisons. For the comparisons to be useful and actionable, costs must be complete, and the groupings clinically valid and statistically reliable. For clinicians to improve care, they need to understand processes of care, not just in the abstract, but for their own patients. Opportunities to improve care can be overlooked despite the best of intentions. Such opportunities are hard to see because health care often involves many providers and is dispersed over time and place, and because adjustment for comorbidities and other risk factors is usually needed for valid conclusions. Formal analytics are needed to support clinical judgment to identify areas for improvement. EGM assembles the services a patient receives relevant to each episode, which users can attribute to providers using their own preferred logic, in order to improve efficiency and value of care.

The key to analysis is standardizing the logic for defining and constructing episodes, which may seem inconsistent with the complexity and individuality of illness and health care. However, a person's medical history can be summarized by a small number of clinical data tables. Thus, a first step is to develop the data tables that, taken together, represent the course of illness, diagnosis, and treatment at the patient level. A second step involves the processing of claims by algorithms that map claims into these data tables. The resulting tables can then be queried to produce a wide range of metrics to measure performance and identify opportunities for improvement.

This report describes how EGM works in terms of its logical components and processes: how the clinical data tables are organized, and how the software constructs episodes from claims data that are sorted chronologically and by beneficiary. The following section discusses the definitions and specifications of the types of episodes supported by EGM (i.e., the types of health conditions and treatments). Subsequent sections describe the process by which EGM constructs episodes and related information from the claims data.

2. EPISODE DEFINITIONS AND SPECIFICATIONS

EGM forms episodes generally belonging to two classes:

⁶ See §131 (c) of the Medicare Improvements for Patients and Providers Act of 2008 and §§3003, 3007 of the Affordable Care Act of 2010; Medicare Access and CHIP Reauthorization Act of 2015. For information on the CMS Quality Strategy, see: <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityInitiativesGenInfo/CMS-Quality-Strategy.html>

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- Conditions for which services are provided. These are called “condition episodes”. Patients receive services for clinical reasons—that is, to detect or treat specific conditions (illnesses and injuries). EGM supports a large number of condition episodes, such as ischemic heart disease and pneumonia, which cumulatively account for a large proportion of total Medicare expenditures for the beneficiary population. A condition episode includes services for a particular condition over time, and across settings and providers.
- Treatments that have been provided. These are called “treatment episodes”. Some types of treatment can be costly in their own right, and represent opportunities for improvement in efficiency. EGM supports many treatment episodes, such as hip replacement and coronary artery bypass grafting (CABG). Treatment episodes are more narrowly focused on major procedures, along with accompanying or ancillary services.

These two classes of episodes recognize the utility of different perspectives on resource use. Condition episodes allow for analysis of cost variation driven partly by differences in treatment patterns, such as medical management versus surgical intervention, or greater versus lesser use of institutional services (e.g., hospital versus outpatient treatment, or skilled nursing facility versus home health). Treatment episodes allow for a similar analysis of cost variation after the defining treatment has been provided, such as major surgery.

2.1 Defining Condition Episodes

A guiding principle for EGM is to use clinical concepts (i.e., a condition, a set of similar symptoms, or a particular type of treatment) and terminology in ways that are familiar to clinicians generally, and not invent new terms for existing concepts, or use familiar terms in ways that are inconsistent with common conventions. In addition, episodes and other concepts used in EGM must rely on operational definitions of billing codes because episodes ultimately are constructed from administrative claims data.

Moreover, defining conditions and episodes is not simply a matter of putting conventional labels on sets of codes; episodes are clinical and statistical constructs that must fulfill applicable criteria for performance measures, including scientific acceptability and usability.⁷ Development of episodes is an optimization problem involving trade-offs in construction and corresponding results. One part of the challenge involves optimizing the degree of heterogeneity (lumping concepts and codes into larger aggregations) versus homogeneity (splitting concepts and code sets into smaller units). Generally, larger aggregations allow more sources of variation affecting cost outcomes, larger patient volumes (sample sizes) per episode, and more providers meeting minimum thresholds set for inclusion in comparisons. Narrower specifications rule out some sources of variation affecting cost outcomes, making episodes more comparable; but reduce patient volumes and provider participation, and could be more susceptible to variation in coding practices.

Episodes are specified to be heterogeneous (lumpy) to the extent that their specifications (relevant services, diagnoses, and conditions asserted to be potential sequelae) are clinically plausible for all instances (patients) (See Section 2.3). Furthermore, EGM allows users to “configure,” stratify (Section 4.6) or risk-adjust (Section

⁷ National Quality Forum (NQF). Evaluating Episode Groupers: A Report from the National Quality Forum. Washington, DC: NQF; 2014

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7) episodes to be more homogeneous as appropriate for the intended purpose, such as restricting analysis to a single setting of care.

The ability to configure episodes reflects a design-principle of giving users flexibility to suit their particular needs, and not providing a single one-size-fits-all solution.

2.1.1 Conditions

For the purpose of defining a condition episode, a condition is:

- A single, distinct disease process (or injury), or
- A set of closely related disease processes (or injuries/incidents) having characteristics that are similar within the set (i.e., consistent specifications),⁸ and distinct from other diseases (or injuries).

Furthermore, a condition is characterized by the existence of one or more clinically accepted approaches to diagnosis, treatment, and management. A condition episode is intended to reflect elements of diagnosis, treatment, and management for each condition relying upon information captured through the standard code sets used for Medicare billing.

Conditions may be further delineated with sub-categories, which can signify location or severity, and often can be associated with differential expected resource use. For episode types with defined sub-categories, each instance (patient) includes the sub-category as an attribute of the episode based on the particular trigger codes observed for that case. Thus, sub-categories can be used as risk factors when determining expected resource use. Sub-category also is available for stratification of episodes in order to focus analysis or reporting on one or more particular sub-category (see Section 4.6).⁹

Out of the universe of available diagnosis codes, the EGM development team constructed a diagnosis taxonomy hundreds of clinical concepts or topics, and hundreds of other diagnosis concepts representing non-specific clinical states, symptoms, or clinical presentations (see Section B.1). Each clinical condition concept is evaluated for development into one or more condition episodes.

2.1.2 Condition Episodes for Reporting and Analysis

The approach to developing episodes for analysis and inference is founded upon a desire to build episodes to measure resource utilization of clinically meaningful and well-defined diseases and illnesses that make-up a significant percentage of Medicare spending. The EGM development team used a decision tree to identify and consider sources of resource variation in order to help focus on variation related more to differences in providers' discretionary practice patterns.

⁸ Here, specifications refer to relevant services, relevant diagnoses, and sequela assertions. These are described in Section 2.3.

⁹ Episode specifications can include a residual sub-category consisting of instances with ambiguous or conflicting information such as codes corresponding to more than one definitive sub-category. A residual sub-category may be a useful risk factor for analysis of the entire condition episode, but may be too heterogeneous to be a focal point for analysis as a single stratum.

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The evaluation process to determine suitability for analysis considers several factors. First, the clinical concept/topic in question must represent a condition defined by a clinically accepted approach(es) to diagnosis, treatment and management. Second, those approaches must be present and distinguishable using the standard coding systems available to EGM.

The evaluation process aims to determine whether the clinical topic can be specified adequately for development as a condition episode that can function as the subject of analysis. While there are many conditions that are satisfactory for this purpose, there are others that are not. For problematic clinical topics, the question becomes, “Can the clinical concept/topic be split or divided in a meaningful way so that one or more of the resulting clinical topics are suited to be the subject of analysis?” For example, treatment and management of chronic kidney disease (CKD) is predicated on the stage of the illness. If CKD could be “split” so that each stage of the disease were treated as its own condition episode, those new CKD condition sub-categories might function satisfactorily as condition episodes.

Still, many conditions face a challenge because codes defining those conditions represent a heterogeneous mix of clinical conditions that are not sufficiently distinguishable in claims data alone. A common example of this problem is many cancers, the treatment for which can depend greatly on the stage of illness. In such cases, the codes do not allow for EGM specifications to assert a consistent set of treatment approaches for the heterogeneous clinical concept. Such a heterogeneous specification would implicitly mix resource variation due to case-mix differences (i.e., different patients with different clinical conditions). A mitigating strategy for some conditions is to eliminate a source of resource variation by excluding selected codes from the definition of the condition episode (i.e., exclude some “types” of the condition and focus more narrowly on other types).

2.1.3 Limited Episodes

Not all condition episodes are able or intended to function as the subject of resource use measures for analysis and reporting. EGM distinguishes between episodes that are intended for analysis and reporting, from “limited episodes.” Limited episodes are structured similar to episodes intended for analysis, but lack sufficiently comprehensive specifications (i.e., could be specified more fully with additional development) or fall short of the criteria needed for clinical validity (Section 2.1.2). Limited episodes can be useful for purposes other than analysis and reporting, such as:

1. Enhance the validity of service assignment. If the diagnosis code for a service is a trigger code for a given condition, then specifying that condition in the EDD helps to steer services to the most appropriate episode, and away from plausible but less valid alternatives. It also lowers the amount of spend by Medicare for which there is “no apparent explanation.”
2. Be available to function as sequelae, as determined by clinical logic, to capture the full cost of an episode of interest; i.e., the subject of analysis or reporting. If a certain condition is asserted to be a plausible sequela of a given episode that is the subject of analysis, then specifying that condition in the EDD, and determining its cost when applicable for a patient, can help to determine the full cost of the (causal) episode of interest.
3. Serve as risk factors; i.e., to signify the presence of conditions that could be significant comorbidities that affect resource use for various episodes.

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2.2 Defining Treatment Episodes

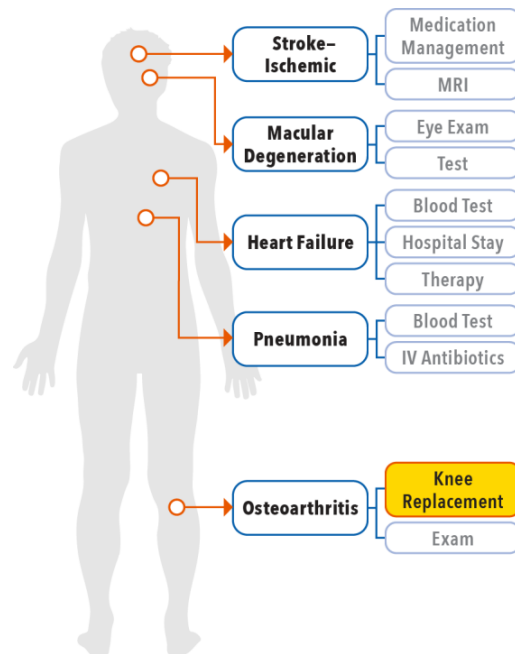
This section addresses issues in deciding which types of treatments, such as major procedures and therapies, should be considered in EGM as their own episodes. Selection criteria allow high cost and high frequency treatment episodes to be identified and defined separately from, but within the context of, the associated condition episode(s); i.e., the indications for the treatment episode. Treatment episodes can be the subject of reporting and analysis for policy purposes.

The definition of a particular treatment episode must be clinically meaningful such that all instances of the episode share common treatment or diagnostic goals, require similar supportive environments, and have similar expected sequelae and aftercare.¹⁰ The specifications for a treatment episode, including relevant services, relevant diagnoses, and sequelae, should therefore be consistent in terms of their clinical plausibility and applicability to the treatment episode type, considering the specific nature or approach taken in the treatment. The intent is to be inclusive within the episode type with respect to possible discretionary aspects of the treatment signifying relative efficiency, while minimizing incorrect assignment of services (false positives) that may occur if the patient has some other concurrent condition or other treatment episode overlapping in time that may explain services within the specifications of the given treatment episode of interest.

2.2.1 Selecting Treatment Episodes

EGM takes a stepwise approach to identifying treatment episodes from among all the service codes (procedure codes or claim lines) that may be found on a claim that is submitted to Medicare for payment (See Figure 1: Example Treatment Episode). Service codes are mapped onto a list of service concepts, created by the EGM development team, which articulate and describe clinically coherent groupings of service codes with common purposes and modalities routinely used in clinical communication by health care providers in actual practice settings (see Section B.1). Then, from within the list of all service concepts, the EGM development team identified the candidate treatment episodes. To be eligible for consideration as a treatment episode, a service concept must have prominence according to criteria that are clinical or related to utilization and performance.

Figure 1: Example Treatment Episode



¹⁰ Regardless of the location or setting, a treatment episode should imply having similar supportive environments. For example, PCI in the hospital or in an outpatient setting still needs the same advanced imaging, advanced life support equipment, and cardiac surgery back-up.

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Clinical Criteria

A treatment episode is defined by a primary procedure delivered towards a therapeutic, diagnostic, rehabilitative or palliative goal for specific condition(s), and should be considered substantial and direct towards this goal rather than ancillary. Thus, hip replacement surgery is a substantial service towards treatment of osteoarthritis, while the anesthesia is ancillary to the surgery. Coronary artery bypass grafting is a direct and substantial service, while the vein harvesting procedure is ancillary. To qualify as a treatment episode, a service concept such as a major surgical procedure, should:

- Have a direct impact on the patient, with benefits and harms to the patient clearly attributable to the intervention.
- Include a specific time frame anticipated for the course of treatment. This could be a single one-time encounter, episodic encounters, or ongoing treatment depending on the type of the service.

EGM is designed to go beyond routine care expected from the surgical or treatment team in order to capture potential subsequent resource use related to the treatment of interest, such as post-acute care, home health versus skilled nursing facility (SNF), emergency department visits, readmissions, and sequelae. Thus, the timeframes used for treatment episodes in EGM are different and distinct from those used in Medicare's global surgery payment policy.

The EGM developers evaluated service concepts as potential treatment episodes as part of the clinical criteria and selected concepts to become treatment episodes. Service concept standards include those that:

- Provide direct and primary treatment to cure or resolve the associated condition (e.g., cholecystectomy, cataract surgery)
- Are intended to change the course or prognosis of the associated condition (e.g., chemotherapy for cancer, critical care services)
- Provide important diagnostic information about the associated condition (e.g., colonoscopy with biopsy, cardiac catheterization)
- Serve a major rehabilitative or palliative role for the patient with the associated condition (e.g., rehabilitation after hip fracture, hospice care)

Utilization Criteria

Among the service concepts matching the clinical criteria, preference in development is given to those with high cost or high frequency among CMS beneficiaries. By prioritizing treatment episodes with high utilization, CMS would focus attention on opportunities for greater potential impact. The EGM development team used data on claims costs and volume to inform the selection of treatment episodes.

Performance Criteria

A useful treatment episode is for an intervention for which there are meaningful and discernable performance differences between providers and provider groups, or performance improvements to be made. Treatment

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episodes can have important implications for the creation of bundled payment programs, provider accountability, and provider buy-in for the EGM profiling functions. The development priority for treatment episodes reflects the intention to detect inefficiency in health care delivery and variation in cost and resource use beyond what is explained by variation in patient characteristics.

2.2.2 Development of Treatment Episodes from Service Concepts

The EGM developers further refined service concepts that were deemed appropriate to be raised to the level of treatment episode, and specified the boundaries between candidate treatment episodes based on similarities or differences in indications, anatomy, techniques or expected sequelae. The challenge is to define episodes to be distinct from others, yet to avoid defining episodes so narrowly as to preclude useful contrasts in provider performance.

The process of defining episodes involves choosing a service type and sub type from the EGM taxonomy, and then individually examining each service concept within the sub type, along with all of the procedure codes related to that service concept. Procedure codes are then classified as either belonging to the treatment episode, not applicable to the treatment episode, or an ancillary service to the treatment episode.

In some cases, a treatment episode can be identical to the original service concept. Procedure codes are then mapped onto the treatment episode. In other cases, a service concept contains more than one potential treatment episode. In such cases, procedure codes are mapped selectively to each of the treatment episodes within that service concept.

In general, procedure codes are combined into treatment episodes that are broadly construed. For example, surgical procedure codes are grouped into a single treatment episode when they represent the same treatment concept, even when they are applied to differing anatomies or use different operative approaches (e.g., laparoscopic versus open colectomy, or endovascular versus open femoral artery repair). Specifications for treatment episodes can include defined sub-types, which become attributes of the episodes for particular instances (patients). The sub-types can indicate important distinctions such as anatomy or operative approach. Sub-types can be used as risk factors when determining expected resource use. Sub-type also is available for stratification of episodes in order to focus analysis or reporting on one or more particular sub-type (see Section 4.6).

In other cases, a single treatment concept (e.g., aortic repair) is split into two or more separate treatment episodes based upon more profound differences in operative anatomy or surgical approach that mandate different providers or technologies (cardiac surgeons and cardiopulmonary bypass for thoracic aortic repair versus vascular surgeons and no cardiopulmonary bypass for abdominal aortic repair).

Once candidate treatment episodes are identified, the EGM development team further defines the boundaries of a treatment episode with regard to the:

- Indications for the treatment episode (i.e., the underlying conditions leading to the decision to initiate treatment). Each treatment episode will have a clearly defined and limited number of condition episodes that are listed as indications for that treatment episode
- Expected sequelae from the treatment episode, which also are chosen from among condition episodes

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- Time parameters, which define the length of the entire episode including a time window in which sequelae are plausible and a look-back period (i.e., days before the procedure during which clinically relevant services may occur)

As with condition episodes, treatment episodes are intended to be defined such that they are homogeneous with respect to these specifications. In other words, the specifications are clinically plausible for all instances of a given episode. For example, if plausible sequelae vary by indication, then the treatment episode is defined to be homogeneous with regard to indication.

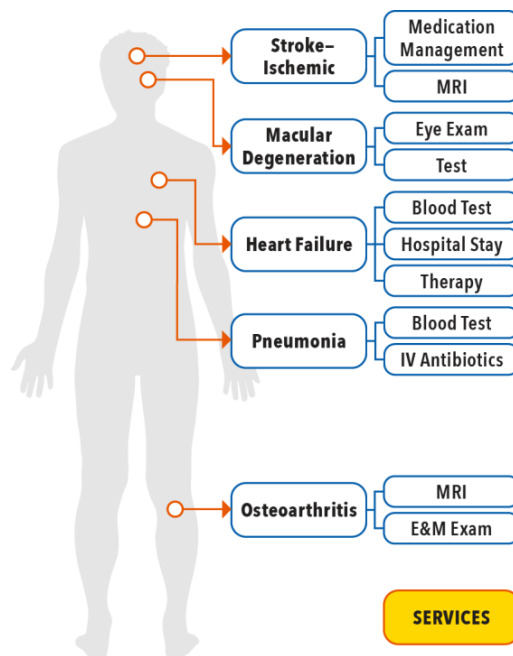
For every type of episode supported in EGM, it is important to identify plausible relevant services, relevant diagnoses, and sequelae (See Section 2.3). For example, a patient with the condition Ischemic Heart Disease (IHD) may have the treatment Percutaneous Coronary Intervention (PCI), both of which are episodes supported in EGM. While the services identifying PCI can be noted and considered as relevant services for an IHD episode, there are other services done ancillary to the PCI that also must be identified if PCI is to be viewed as a treatment episode. A properly constructed treatment episode will capture the full cost of the care that is associated with the primary procedure, e.g., the PCI, as well as the costs of sequelae (e.g., post-op infection). The specifications of a treatment episode are intended to reflect the clinical menu of services from which providers draw to manage patients for the primary procedure of interest. The actual combination of services drawn from the menu that is used to manage an individual patient's condition may vary in type and units.

2.3 Relevancy

The previous sections have described how condition episodes and treatment episodes can be defined from the universe of diagnosis codes and procedure codes, respectively. The code sets that constitute the operational definition of an episode are “relevant” to an episode when it comes to assigning individual services. In addition, an open episode is populated from those services in the claim stream that are determined to be relevant to the episode, although these services are less definite than the services that trigger the onset of the episode. For example:

- A patient with pneumonia may receive services to treat a symptom such as coughing, or a patient undergoing surgery may receive services to treat pain. These diagnoses are considered relevant for those specific episodes, meaning they represent clinical factors, such as signs and symptoms that are likely alternative expressions of the condition or treatment episode.
- A patient with asthma may receive a nebulizer for treatment of his or her condition. This is an example of a relevant service; one that has potential benefit for the condition or treatment episode. Relevant services may include procedures, imaging, lab tests, etc.

Figure 2: Example Services



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Each service provided for a patient was presumably determined by the ordering clinician to have possible diagnostic or therapeutic benefit for one or more conditions. Any particular service may be relevant to some open conditions or episodes, but not to others. EGM defines for each type of episode its relevant services, as well as relevant diagnoses and sequelae. Those specifications of clinical relevancy (and their temporal parameters) are used to query the patient's claims and assign services to the appropriate episode among those that are open for the patient.¹¹

Relevant services. The process for developing the specifications for relevant services is iterative and combines clinical judgment with empirical data from claims.¹²

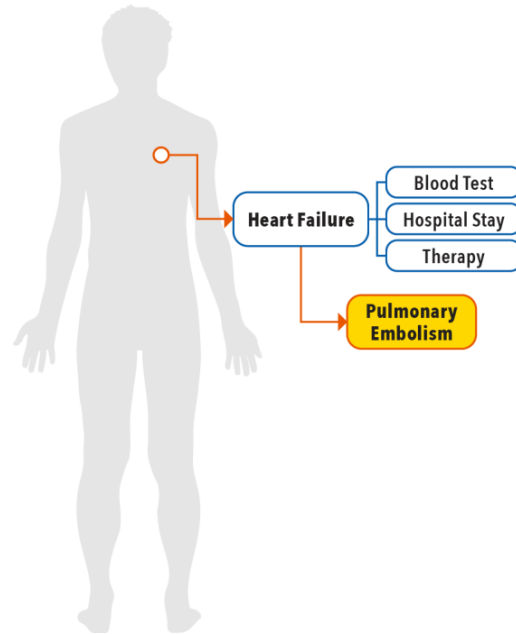
In the first of two stages, a representative Medicare claims database is queried for all instances of services that occur in conjunction with a given condition or treatment. This is examined by analyzing all services that carry diagnosis codes that are trigger codes for the given condition or treatment. The result is a candidate list of procedure/service codes that co-occur with those trigger codes. These codes are candidates to be specified as relevant services in the EDD.¹³ In the second stage of the process, the candidate list is reviewed by clinical experts who delete (reject) any service codes for which there is no plausible diagnostic or therapeutic benefit in relation to the episode of interest.

It is not the purpose of the clinical review to pare the list to include only services that “should be” provided ideally. Rather, the intent is to define a realistic set of services that are frequently provided with plausible clinical intent in the management of the episode.

Relevant diagnoses. The claims data also were used to generate lists of diagnoses that occurred on service claims other than the preselected trigger codes used to define a condition episode. These diagnostic codes are candidate alternative clinical descriptors of the condition being triggered and can include alternative coding, such as for symptoms and findings that are needed to fully capture the care (and costs) for the episode.

These candidate codes were reviewed by clinical experts, and those codes without plausible clinical relationship to the condition of interest were removed. For instance, cough symptoms are plausibly related to

Figure 3: Example Sequela



¹¹ The EDD specifies trigger codes for limited episodes, but may contain few or even no relevant services, relevant diagnoses, or sequela assertions.

¹² A particular procedure or diagnosis may be relevant to more than one episode. Section 5 addresses the assignment of services, including situations of relevance to multiple open episodes for a patient.

¹³ All services were ranked by the share of total payments for services having a trigger code for the condition as the line diagnosis (or principal diagnosis on Outpatient Department claims). Services were retained that had an odds ratio greater than 1, meaning they were significantly more likely to occur when the episode would be open than otherwise. Ranked from highest to lowest contribution to total episode cost, services were retained that accounted for a cumulative 95 percent of episode cost.

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pneumonia, so those codes would be retained in the EDD as relevant diagnoses for pneumonia. The intent is to remove from the candidate list any diagnoses that co-occur because of inappropriate correlations, such as symptoms that are clinically related to other conditions that happen to co-occur in patients with pneumonia.

Sequelae. A sequela episode is a condition episode that occurs secondary to (or in consequence of) a pre-existing episode. Sequela episodes can follow both condition episodes and treatment episodes. Each episode in EGM contains parameters that define its pertinent sequela episodes. Sequela episodes may be acute exacerbations of a chronic condition¹⁴ or secondary events, such as complications, readmissions or other consequences of the index condition episode or treatment episode. Potential sequelae are identified using a two-stage process analogous to the process used to identify relevant diagnoses:¹⁵

In the first stage, a claims database is used to identify condition episodes that occur contemporaneously with the open primary episode.¹⁶ A statistical correlation test (odds ratio) is applied to determine which of those condition episodes occurred with significantly and substantially greater frequency in the presence of the open episode of interest compared to circumstances in which the primary episode of interest was not open. For example, surgical wound infections occur in patients with an open treatment episode for CABG significantly more frequently than patients who do not have an open CABG episode.¹⁷

In the second stage of the process, clinical experts review the candidate list for clinical relevancy to the primary (causal) episode of interest. As with other specifications, there must be a plausible clinical explanation for how the candidates for sequelae can be “caused by” the primary episode. Clinicians review the candidate sequelae for each primary episode and reject those assertions for which a plausible explanation is lacking. The EDD includes assertions about the sequelae for every episode that is intended to be the subject of analysis and reporting.¹⁸

When evaluating assertions about sequelae arising during inpatient hospital stays, EGM considers whether a given sequela was present on admission (POA). EGM requires that, in order to be interpreted as a sequela, a condition must be triggered at least one day after the trigger date of the presumed primary (causal) episode. EGM specifies time windows related to sequelae of specific or acute events such as the maximum number of days (e.g., 10 or 30) between the trigger date of the parent episode and the trigger date of the sequela. If any condition that is asserted to be a sequela arises after the specified maximum number of days, it is deemed not

¹⁴ Acute exacerbations of a chronic condition can be specified as episodes in their own right; i.e., acute condition episodes that may be the subject of analysis or reporting. EGM also associates those acute condition episodes to the underlying chronic condition episode when it serves as the subject of analysis or reporting.

¹⁵ Sequela is a concept analogous to relevant diagnosis. Whereas relevant diagnoses include signs, symptoms, and findings that arise in the context of the primary episode, sequelae are other diagnosed conditions that are identified as contemporaneous or pursuant episodes, and clinically related to the primary episode.

¹⁶ This process would not identify a sequela that arose after a substantial gap in time after the primary, causal episode has closed, such as transfusion-associated graft-versus-host disease in immunocompromised patients that becomes evident after six weeks. In future versions the EDD could be made more complete by expanding parameters and inclusion criteria (or relaxing exclusion criteria).

¹⁷ As can be seen in this example, some conditions may be candidates for sequelae for many different primary episodes, as surgical infection may be a sequela for many different surgeries. EGM links the sequela condition episode to each of the open (causal) episodes for which it is asserted to be a sequela.

¹⁸ The combined criteria do not lead to an exhaustive list that includes all theoretical or rare sequelae. This conforms to the anticipated purposes of EGM, which are statistical profiling of general tendencies that can affect average resource use and systematic factors leading to divergence from the average. It is also more pragmatic for development to base assertions on reliable findings from representative data, rather than speculating about events that may occur rarely or idiosyncratically even if their occurrence would substantially affect the “average” cost for patient cohorts attributed to a particular provider entity.

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to be a sequela of that parent episode, but instead likely arose for other reasons. For other conditions asserted to be sequelae, there may also be a minimum number of days (e.g., 5) that must transpire before the condition could have been attributed to the acute event.¹⁹ Sequelae to chronic condition episodes can occur at any time.

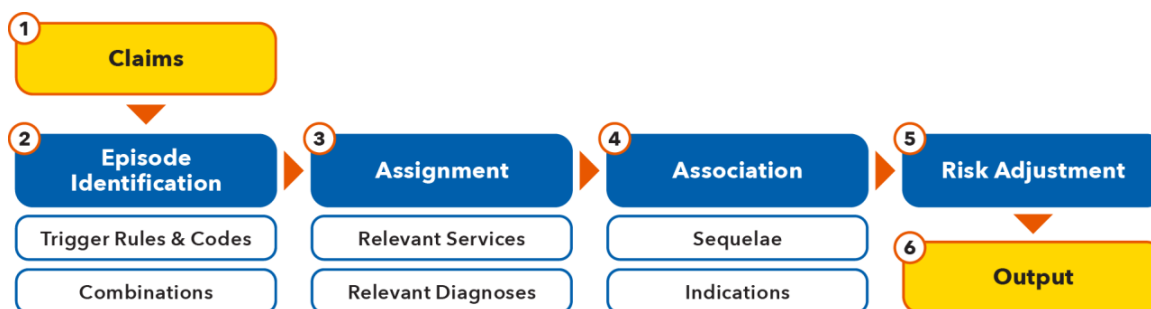
3. BUILDING EPISODES: A SUMMARY OF THE PROCESS

This section is a summary or preview of the remaining sections of the design report. It provides a quick tour of the major steps involved in processing claims data into identified episodes of care and the services assigned to them. The major steps are depicted in Figure 4.

Claims

Building episodes begins with administrative claims data that contain information on date and place of service, diagnosis and procedure codes, provider, and more. EGM begins by building units of service called **interventions**. An intervention is a combination of the individual components of a clinically meaningful service, which may reside across multiple claims. The components of a clinically meaningful service, such as vaccines (i.e., supplies) and the administration of the vaccine (i.e., professional services), or the administering and reading of an imaging test, are so closely related that they are functionally a single unit. However, at this stage in the episode creation process, the large majority of services on claims are not combined with any others and are simply carried forward as their own “interventions.”²⁰ The process of building interventions is driven by a set of data tables that provide information about how to handle particular combinations of service codes.

Figure 4: Episode Construction Process



Episode Identification

The episode grouping process begins with episode identification, which answers the questions: “What types of episodes does the patient experience; and when does each episode begin and end?” When specified criteria are met in the patient’s claims history, an episode is said to “trigger,” which means that the episode has been

¹⁹ In either case, only the services and costs for a sequela that occur before the parent (causal) episode’s end date are associated to the parent episode.

²⁰ For ease of communication, the terms interventions and services are used interchangeably except when context requires technical precision.

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opened and is eligible to have services assigned to it for as long as the episode remains open. As part of this process, EGM uses trigger logic, made up of trigger codes and trigger rules to indicate the presence of an episode of care. Trigger codes are diagnostic or procedure codes that are generally unique to a particular condition or treatment, such as pneumonia or CABG.²¹ Additional criteria related to trigger codes, such as frequency of occurrence, presence on certain types of claims, or care setting, may be considered by EGM in determining when to trigger an episode. Together, these different types of information constitute *episode identification rules* for triggering an episode (see Section 4.1).

Once an episode has been preliminarily identified, it is called an episode shell and is assigned a set of attributes such as its type (for example, pneumonia or CABG), and its start and end dates. EGM can identify relevant services that occur prior to the episode start date by defining a “look-back period,” which is specified in the EDD for each episode. This feature helps to identify the total cost of care for the episode, such as to capture pre-operative services, and the signs, symptoms and preliminary diagnoses that may precede the diagnosis or service that triggers the episode.

An end date is assigned based on the *episode closing rule* (see Section 4.2). Closing rules vary by episode type. Chronic condition episodes, for example, can remain open as long as the patient is participating in Original Medicare, or until services for that condition are not observed for a specified duration, such as a year). Acute condition episodes have a default fixed length of 90 days following an outpatient triggering event (such as confirmed pneumonia) or discharge from a triggering inpatient hospital stay. Treatment episodes also have fixed lengths specified in EDD, with a default value of 90 days. Additionally, EGM supports closing rules resulting in patient-specific, variable-length episodes.²²

During a given time period, a patient could have several chronic conditions, one or more acute conditions, and one or more major treatments. EGM allows for multiple simultaneous open episodes for a patient. As episode shells are formed for a patient, EGM tracks those that overlap in time and evaluates whether to confirm their existence, or to combine them into a single episode if they are not permitted to coexist as separate episodes (see Section 4.3). This can happen for overlapping conditions, such as episodes for aspiration pneumonia and community-acquired pneumonia, which must be merged if they trigger within days of each other.

This combination process can also take place with treatment episodes that have identical or nearly identical start dates, such as when two procedures are performed during the same hospital stay or outpatient visit. Some treatment episodes can occur as discrete events, while others will be combined if they occur in conjunction with another treatment episode (see Section 4.3).

Assignment

²¹ Trigger codes can be shared by episodes that reflect the same condition, such as chronic heart failure and acute heart failure. EGM allows users to analyze the acute condition in its own right, but integrates the acute condition as a segment of the underlying chronic condition episode.

²² For fixed-length episodes, the end date is specified in advance as a parameter in the EDD. For variable-length episodes, the end date is determined in each case according to the pattern of service dates involving qualifying trigger codes. In other words, the episode for each patient ends only after active treatment (trigger codes) is no longer observed. EGM proceeds to assign services to the episode after the shell is formed.

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At this stage, the episode shell is complete and ready for services to be assigned. Relevant services and relevant diagnoses are identified and linked to the episode for assignment. EGM has a hierarchical set of service assignment rules that gauge the appropriateness of assignment to an episode using information about diagnosis and procedure codes on the intervention, as well as timing and setting (see Section 5). Each service for a patient is evaluated chronologically, and can be assigned to any open episode. The clinical and temporal information is used to inform whether a given service is assigned to one episode based on the strength of evidence, more than one episode based on equally good evidence, or to no open episodes because of lack of sufficient evidence. Such **direct assignments** of services are made to episodes in their most basic form; i.e., as episode shells.

Trigger codes for a specific episode are always considered relevant to that type of episode. Other relevant services for every type of episode are stored in the EDD (See Section 2.3). For treatment episodes, the trigger code is definitive. Other services can be assigned based on their relevance. Similarly for condition episodes, the strongest evidence for assignment occurs for a service that has a procedure code that is a relevant service, combined with a diagnosis code that is a trigger code for that condition episode. Lesser evidence exists for a relevant service without a trigger code or other relevant diagnosis; or a relevant diagnosis for a service (procedure code) that is not listed as relevant.²³ EGM supports both single and multiple assignment of interventions to episodes.²⁴ Assignment rules are discussed in Section 5.

Association

Once services have been assigned directly to episodes, the next step in the process is identifying the logical associations that exist among the episodes. However, meaningful descriptions of resource use for a given episode of interest also require associations with other clinically related episodes.

There are two major categories of association. First, treatment episodes are linked to the condition episodes for which the primary procedure is indicated. This type of association serves two purposes: to provide the clinical context and rationale for the treatment episode; and to provide a more complete picture of the services and resource use attributable to the condition episode.

Second, condition episodes deemed to be sequelae of primary condition or treatment episodes are linked to their primary (causal) episodes. This type of association also serves two purposes: to provide a clinical context or rationale regarding the emergence of the sequela condition for the patient; and to provide a more comprehensive, patient-centered construct that can be used to describe or analyze the totality of care related to a given condition or treatment episode of interest.

Risk Adjustment

The final step in the process is determining risk-adjusted expected costs (Medicare payments) for each type of treatment and condition episode. The risk-adjusted cost is based on multivariable regression models that

²³ Currently in EGM, a relevant diagnosis alone without a relevant service code is considered below the evidence threshold for assignment.

²⁴ In multiple assignment mode, EGM will assign a service to more than one episode that meets the best available evidence for assignment. In single-assignment mode, EGM employs tie-breaker rules in order to make the “best” possible assignment for each intervention.

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include information about patient demographic characteristics, as well as diagnostic and episode-based risk factors that describe the beneficiary's clinical history up to the start of the episode or cost-estimation period. The expected and actual costs for each type of episode are calculated at the patient level, which can be aggregated to higher levels for purposes defined by the user, such as comparing actual resource use to expected resource use for groups of similar patients.

4. EPISODE SHELLS



Medicare beneficiaries utilize health care services for many different reasons, including prevention, screening, evaluating symptoms; and diagnosing, managing, and treating chronic and acute conditions. All of these encounters with the delivery system generate claims with a wide array of procedure and diagnostic codes. Episode identification is the process of scanning all of the claims for a beneficiary in chronological order to identify the episodes of care that account for the services received.

The first step in the process uses trigger logic—trigger codes and trigger rules—to produce the outline of an episode, which is called the **episode shell**. See Figure 5. The episode shell includes three basic attributes:

- **Start date:** the calendar date when services provided to that patient can first be assigned to that episode. The start date is determined from the trigger date and the look-back period (Section 5.5). The trigger date corresponds to when the “trigger event” occurs for a patient, formally causing the episode to be open. The trigger event is the service that causes the trigger rule for an episode to be invoked, such as the primary procedure defining a treatment episode or the first of two requisite outpatient evaluation and management (E&M) visits to trigger a condition episode. EGM adds a look-back period prior to the trigger date in order to capture clinically relevant services occurring prior to the triggering event.
- **End date:** the calendar date when the patient's episode closes and services can no longer be assigned directly to that episode
- **Episode type:** the condition or treatment that defines the episode (e.g., pneumonia or CABG)

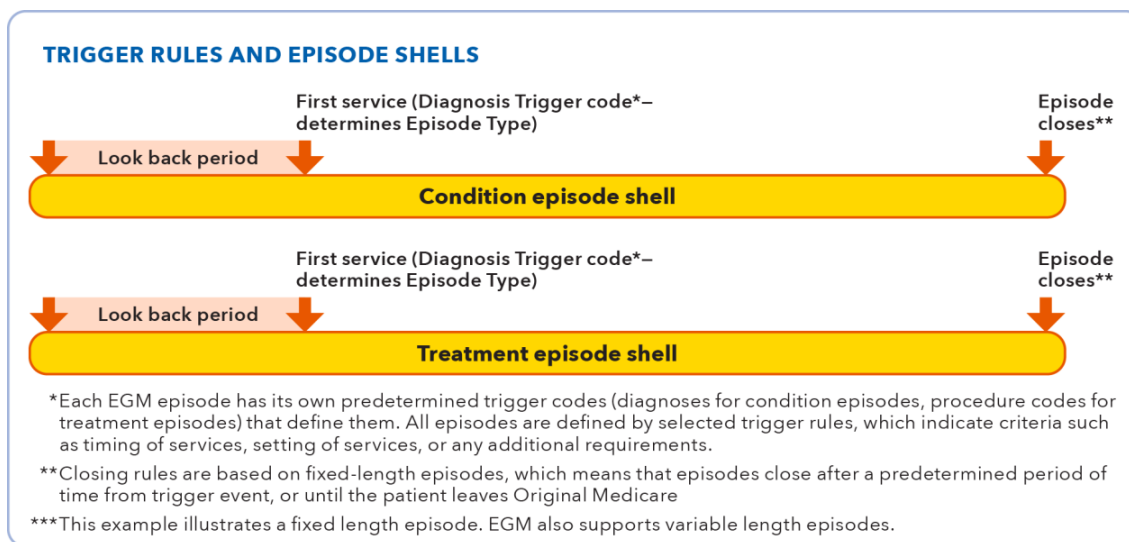
EGM supports two major classes of episodes: condition episodes and treatment episodes (see Section 2). Condition episodes are triggered according to the condition a patient has (that is, by diagnosis trigger codes). Treatment episodes are triggered according to the action taken by a clinician (by procedure trigger codes). For example, suppose a patient visited an ambulatory surgery center for percutaneous coronary intervention (PCI). The episode shell includes the episode type (PCI), the trigger date of the episode (the day of the procedure), the start date when services can first be assigned, and the end date, which is a specified number of days after the date of the procedure.²⁵ The type of episode—the specific condition or treatment defining

²⁵ The duration of treatment episodes can vary. Major surgery episodes may remain open for 90 days, for example. Episodes for simpler procedures may be considerably shorter, for example, 10 or 30 days. For episodes for which the triggering intervention is a hospital inpatient stay, the end date is computed from the discharge date of that hospital stay.

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the episode—determines the relevant services and diagnoses that can be assigned to the episode, as well as associations with other episodes such as treatment indications²⁶ and sequelae.

Figure 5: Trigger Rules and Episode Shells



4.1 Episode Identification

A possible condition episode might be identified simply by one or more ICD-9 diagnoses codes on claims that correspond to the condition. For example, any claim with a reported diagnosis code of 493.XX could identify a possible asthma episode. However, not all possible episodes are necessarily “real.” There could be possible errors in reporting or diagnosis, or the clinician could be using a working diagnosis or seeking to rule out the diagnosis with further testing.

EGM sets standard criteria using information from the chronology of claims to infer whether a patient has the condition. The criteria for identifying condition episodes vary by type of condition. For instance, severe life-threatening conditions that cannot be safely treated in an ambulatory setting (e.g., acute myocardial infarction [AMI]) must include a hospital admission to be confirmed. For less serious conditions, observing some form of treatment may be required if treatment is mandatory and can be reliably identified from claims data. Therefore, evidence of treatment might be required for most fractures. In contrast, treatment cannot be required to confirm hypertension because treatment cannot be reliably identified without outpatient prescription claims, which are currently unavailable. In addition, no specific treatment can be required to confirm ischemic heart disease because conservative treatment often is appropriate.

In some cases, an episode may be confirmed by a test that is used to diagnose the condition, provided that it is followed by a post-test E&M service that affirms that the condition was actually present. For example, prostate cancer can be confirmed by a biopsy followed by an E&M service on a subsequent date with

²⁶ An indication is the associated condition episode for which an intervention or treatment episode occurred.

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prostate cancer listed as a diagnosis. Other conditions can be confirmed by a specific number of E&M services with corresponding trigger codes. Finally, for minor conditions that typically require just a single encounter (e.g., acute pharyngitis), criteria must be further relaxed to perhaps a single service carrying a trigger code for the condition.

EGM has standardized criteria necessary to trigger an episode, which are detailed as a set of trigger rules in the software. Used in conjunction with trigger codes for each respective type of episode, these form the **trigger logic** that answers the question, “When do we know that a particular type of episode is occurring for a patient?” In other words, for each type of episode, the trigger logic defines the threshold of evidence required to create an episode shell. As EGM reads each service claim in chronological order for each patient, the software examines information on the claim. This information is compared to the trigger logic for every type of episode that is defined in the EDD.

Every type of episode supported by EGM has corresponding information in the EDD that is particularly relevant to identifying an episode:

- **Trigger codes** are the predetermined diagnosis codes that define each type of condition episode, or the predetermined procedure codes that define each type of treatment episode.
- **Trigger rules** are the predetermined rules for each type of episode, which are used in conjunction with its trigger codes. For example, triggering an episode for AMI requires that EGM includes a designated trigger code as the first (principal) diagnosis on an inpatient hospital claim. Trigger rules for many types of episodes use combinations of services, such as more than one E&M service spaced apart in time or active treatment of a diagnosed condition (for example, neoplasms). Table 1 lists trigger rules that are available in EGM for identifying condition episodes. For each of the six rules, the table shows the trigger event and, where applicable, a confirming intervention, such as an appendectomy for appendicitis. Generally, individual services that satisfy one or more episode identification rules are called **qualifying interventions**.

Table 1: Trigger Rules for Identifying Condition Episodes

Rule	Trigger	Confirming Service	Illustrative Characteristics of Condition Targeted by the Rule
1	Inpatient facility claim with condition as the <i>principal or secondary</i> diagnosis	None required	Condition arises as patient is hospitalized; as secondary diagnosis could be comorbidity or sequela
2	E&M with condition as the principal or secondary diagnosis*	One or more subsequent E&Ms with condition listed in the first or secondary position on a claim within interval specified for that episode	Condition typically requires more than 1 visit but does not need (billed) test for diagnosis
3	E&M with condition as the principal (line) or secondary (header) diagnosis*	Diagnostic test for condition preceding the trigger within specified interval	Condition typically requires more than 1 visit and needs (billed) test for diagnosis
4	E&M with condition as the principal (line) or secondary (header) diagnosis*	Treatment for condition preceding or following the trigger within specified interval	Treatment generally is required and can be identified by claims

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Rule	Trigger	Confirming Service	Illustrative Characteristics of Condition Targeted by the Rule
5	Inpatient facility claim with condition as the principal diagnosis	None required	Condition cannot be treated safely on an ambulatory basis
6	Condition as the principal or secondary diagnosis*	None required	Minor condition typically requires 1 visit and does not need test for diagnosis
7	E&M and Trigger Code value in any (line or header) position	None required	A chronic condition that is present but not necessarily requiring immediate or active treatment

* Note: Principal and secondary diagnoses for professional services refer to “line diagnosis” (the diagnosis listed on the same line as a procedure code), and “header diagnosis” (other diagnoses listed on a claim but not necessarily on any line accompanying a procedure code). For hospital facility claims, principal diagnosis refers to the first diagnosis on the claim and conveys which occasioned the admission to the hospital. Principal diagnosis on the claims is the primary reason for the bill. However, CMS claims also include a number of secondary diagnoses. The exact number varies by claims type (e.g., ambulatory versus inpatient)

* Note: The trigger event, which determines the trigger date, is determined by the date of the qualifying intervention listed in the table as Trigger, not the confirming service; for example, the hospital admission date or the first of two E&M visit dates.

Two of the rules (1 and 5) involve the use of inpatient hospital stays with a trigger code for the condition listed as the principal diagnosis (Rule 5) or either the principal or secondary diagnosis (Rule 1). The principal diagnosis is the condition established at discharge to be chiefly responsible for the admission. It indicates the attending physician’s judgment about the condition that originally led to the inpatient admission. EGM considers the principal diagnosis on a hospital claim to be strong evidence for triggering a condition episode when that condition episode is not already open for that patient.

Rule 1 relaxes the requirement that the trigger code be the principal diagnosis for the hospital stay, and would trigger the condition episode even if a trigger code were listed as a secondary diagnosis. These other diagnoses represent all conditions that coexist at the time of admission, develop subsequently, or affect the treatment received and/or the length of stay. Hence, a secondary diagnosis could be a preexisting comorbidity (not yet documented or triggered), an emerging comorbidity (not present on admission), or a sequela.

Such conditions could resolve during the hospital stay or continue after discharge. Conditions associated with secondary diagnoses during hospital stays may be important clinically, and they may implicitly affect observed Medicare costs. However, because of the Diagnosis Related Groups (DRG) payment system, it is generally not possible to isolate and measure all costs during the inpatient stay that are attributable to comorbidities or sequelae.²⁷ For this reason, such condition episodes are not comparable in terms of observed costs to episodes for the same conditions that are treated in other settings. Users can distinguish these instances of a condition episode using stratification criteria (See Section 4.6). Episodes that are triggered based on a secondary diagnosis may be informative for purposes of tracking sequelae and for risk-adjustment of episodes for analysis.

²⁷ Medicare payments for the institutional services are generally tied to the MS-DRG, which could correspond to the principal diagnosis, a sequela (e.g., respiratory failure), or a procedure (e.g., use of a mechanical ventilator).

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The other episode identification rules focus on professional services. Other conditions can be identified by E&M services affirming (documenting) their presence.²⁸ E&M services are specified because they reflect patient encounters, which are most likely to reflect professional appraisal and intent with respect to a condition. This is in contrast to tests or ancillary services, which may reflect imprecise or tentative diagnoses.

Rule 2 specifically uses an E&M service with a trigger code along with a subsequent E&M service, also with a trigger code for the condition, to trigger a condition episode. The requirement for a second service is to provide specificity, and not to trigger the condition episode simply on the basis of a single service with a trigger code. This rule is often applied to chronic conditions for which services are expected over long periods of time. Specifically for those conditions, Rule 2 is frequently applied with time parameters indicating that the services used for triggering the episode must be at least 30 days apart, but not more than one year apart. The rationale for the minimum time interval between qualifying interventions (30 days apart) is to avoid inordinate sensitivity to documentation occurring around a short time interval, such as diagnostic work-up and consideration of differential diagnoses. The rationale for the maximum time interval between qualifying interventions (1 year) is to avoid inordinate sensitivity to isolated events, such as similar diagnostic work-ups occurring for a patient in the course of time.

In other cases, the presence of a condition may be confirmed by a test that is specific for the condition, provided that it is followed by a post-test E&M service that lists the condition (trigger code) and thereby affirms that the condition was present (Rule 3). For example, a malignancy can be identified by a biopsy followed by an E&M service on a subsequent date with cancer listed as a diagnosis.²⁹ Also, some conditions may be identified in part through confirming services (Rule 4); for example, lymph node excision may confirm a breast cancer episode.

A combination of rules may be specified for each type of episode. For example, heart failure can be identified through ambulatory encounters, which can trigger the chronic condition episode, or an inpatient hospital admission, which can trigger an acute heart failure episode as well as the underlying chronic condition episode. The date of service on the first qualifying intervention determines the start date of a condition episode, date of hospital admission, or first of the ambulatory qualifying interventions.³⁰

The simplest rule supported in EGM (Rule 6) requires only one service with a trigger code in any position on an E&M service, such as some viral upper respiratory infections. Although most episode types triggered only by Rule 6 may not be analyzed typically for cost variation or relative provider performance, they could serve to document prevalence rates for such conditions, describe how Medicare dollars are spent comprehensively, and may signify potentially important clinical events for patients that could interact with care patterns for other episodes.

²⁸ Certain billable procedure codes involve evaluation and management services. See http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/eval_mgmt_serv_guide-ICN006764.pdf

²⁹ In the example in the text, without any post-test mention of cancer, it is likely that the biopsy was negative.

³⁰ Services may be assigned to an episode even before this start date via a look-back period recognizing that some relevant services and relevant diagnoses may occur before a bona fide condition is documented sufficiently. See Section 5.6.

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4.2 Closing Rules

The end date of an episode is determined by the **closing rule** and the application of **closing-rule parameters**. EGM supports closing rules based on fixed-length, where the episode closes after a predetermined period of time. For example, a surgical treatment episode might have a defined length (closing-rule parameter) of 90 days following the date of the surgery or, for inpatient surgery, the date of hospital discharge. Similarly, acute condition episodes, such as pneumonia, will close 90 days after the episode was triggered. Closing rules based on a fixed length hold the time window constant for every patient with the same type of episode. These fixed-length closing rules fall into one of three categories, which are defined below:

- **Fixed number of days.** The episode ends after a specified number of days. The end date of the episode is the trigger date plus the specified length in days. For episodes for which the triggering intervention is a hospital inpatient stay, the end date is computed from the discharge date of that hospital stay. This closing rule is applicable to acute condition episodes and treatment episodes.
- **No end.** The episode does not end until the date the patient leaves the original Medicare program. This closing rule is applicable to chronic condition episodes.
- **Clear period.** An episode remains open until a specified time interval occurs with no activity (the “clear period”), i.e., no qualifying interventions for that episode. This closing rule can be applied to acute or chronic condition episodes. For acute condition episodes, it permits analysis of varying durations of care. For chronic condition episodes, it helps to end episodes with no activity, which may have been triggered inadvertently, or may reflect changes in clinical status (e.g., lifestyle modification, or organ transplant).

4.3 Combining Condition Episode Shells

A “true” episode can be mistakenly split into two episode shells because trigger criteria were met for two different condition episodes. A patient could have services for two conditions that are very different, but can present with similar symptoms or findings. One condition might correspond to an incorrect working diagnosis that was abandoned in favor of a subsequently identified correct final diagnosis. In this case, the episode that corresponds to the working diagnosis should be combined with (merged into) the final diagnosis episode.

Combining episode shells is a manifestation of an EGM concept known as “condition pairs” or “sibling relationships” among episodes, where combining condition episodes reflects their clinical similarity. Once episode shells for a patient are identified, EGM compares each pair to see whether any two episodes should be combined into a single episode, or remain as concurrent episodes. EGM compares each condition episode shell with every other open condition episode shell for the beneficiary.

Two episode shells representing two different types of conditions are combined if they both:

- Occur near each other in time (either they overlap or the interval between the end of one and the start of another is less than a specified time that can vary by condition); and

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- Correspond to a pair of conditions listed in the EDD indicating a specific clinical relationship stemming from similarity of the underlying conditions.

In these scenarios, EGM combines the two episode shells into a single condition episode, with start and end dates derived from the episode shell for the primary condition in the pair. Determining which condition in the pair is the ‘winning’ or primary condition can depend on:

- **Predetermination.** In some cases, there is a clinical predetermination as to which condition would be primary, such as the more specific or severe form of a condition. For example:
 - Hemorrhagic stroke is primary in relation to “Other cerebrovascular disease”
 - Cardiac arrest is primary in relation to atrial fibrillation/flutter (acute)
 - Acute shock is primary in relation to shock not otherwise specified

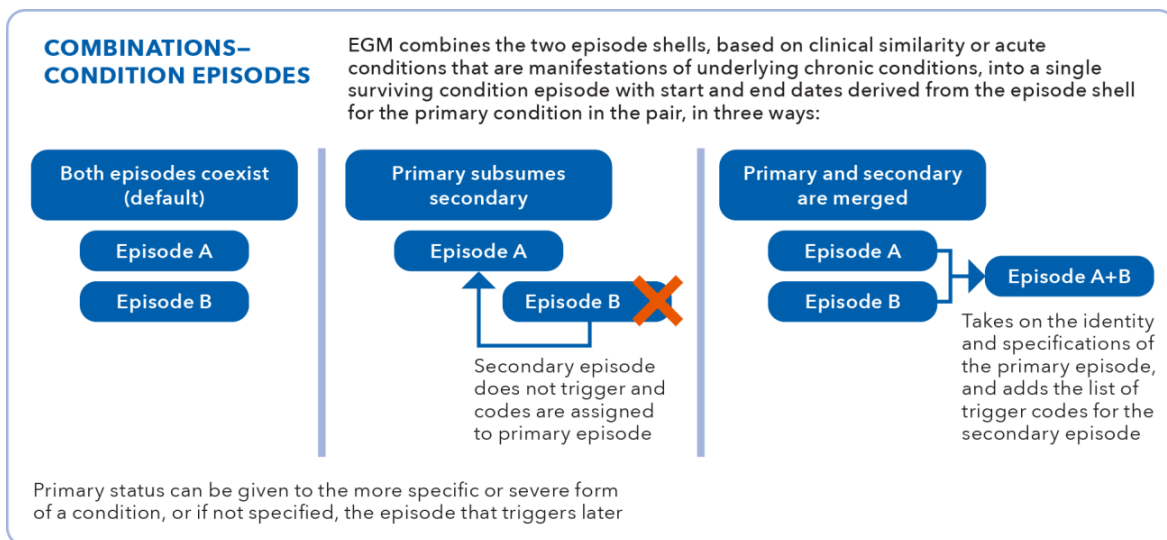
The pairs of conditions for which the sibling relationship is predetermined are recorded in the EDD and used by EGM to adjudicate such pairs when they occur for a patient.

- **Patient-specific patterns.** If the EDD indicates that two conditions should be combined but does not specify a predetermination as to which condition is primary, EGM makes a determination based on timing. Currently in EGM, primacy is given to the episode that triggers later in time. For example:
 - If transient ischemic attack (TIA) triggers first, followed by stroke, EGM interprets this to mean that initial suspicion and testing for TIA confirmed a stroke.
 - However, if stroke triggers first, followed by TIA, EGM interprets this to mean that a patient may have presented with a deficit, which resolved, leading to a final diagnosis of TIA.

Generally, the discussion above has focused on how EGM handles condition episodes that trigger near to each other in time, which results in **merging** the two episode shells into a single episode for that patient. A variation on that scenario is when one condition episode is already open and established and trigger criteria for the other condition episode in the condition pair appear subsequently. In this latter scenario, either the open condition episode can block the establishment of the second condition episode, or the second condition episode replaces the existing condition episode. This results in one episode **subsuming** the other and absorbing the services that would have been assigned to it. Figure 6 below illustrates both the default in EGM that allows condition episodes to co-exist and the alternative scenarios that represent exceptions to the rule.

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Figure 6: Combining Condition Episode Shells



The two alternative scenarios are logically similar, and have the same effect. The difference is in the context that gives rise to combining the episode shells:

- **The primary and secondary episodes are merged.** Under some pairs of conditions, when an episode for the primary condition triggers around the same time as the secondary condition, the two episode shells are merged. The resulting merged episode shell takes on the identity of the primary condition episode, retains the specifications for the primary condition episode, and adds the list of trigger codes for the secondary condition to the list of relevant diagnoses for the (merged) primary condition episode. Any services with trigger codes for the secondary condition are eligible to be assigned to the merged episode for as long as the episode for the secondary condition would have been open; that is, between the start and end dates for the secondary condition episode shell.
- **The primary episode subsumes the secondary episode.** This occurs when either:
 - Another episode that is primary in the relationship is already open for a patient—In other words, the condition episode that is considered primary remains open, and a condition episode that is considered secondary cannot be triggered but instead is subsumed by the open primary episode; or
 - Another episode triggers corresponding to the primary condition in the pair. An episode for the secondary condition can be triggered and remain open until an episode for the primary condition is triggered, at which time the primary episode subsumes the secondary episode, which ceases to exist as its own episode.

In either case, when a secondary condition episode is subsumed, its trigger codes are added to the list of relevant diagnoses for the primary condition episode, and services with those trigger codes are eligible to be assigned to the primary condition episode for the duration specified in the episode shell for the secondary condition; that is, between the start and end dates for episode that was subsumed.

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For example, a community-acquired pneumonia may be triggered in outpatient settings, followed two days later by the triggering of an inpatient aspiration pneumonia episode. Instead of allowing the outpatient pneumonia to continue throughout its fixed duration (i.e., 90 days) and compete for services with the overlapping inpatient pneumonia episode, the two conditions are combined into a single condition episode representing the primary episode in the condition pair—*aspiration pneumonia*.

4.4 Acute and Chronic Episodes for the Same Condition

In addition to the need for EGM to discern between conditions that may be working or differential diagnoses, it must also discern between chronic condition episodes and acute condition episodes that are exacerbations of the underlying chronic conditions. Acute exacerbations of chronic conditions may be defined as short-term, time-limited changes in a condition. During the acute event, the patient may be unstable, have severe symptoms, or be at increased risk for sequelae. Afterwards, the patient may return to his or her pre-exacerbation baseline. For example, a patient with heart failure may decompensate and be admitted to the hospital. The hospitalization will trigger an acute condition episode and will also trigger the chronic condition episode if the patient did not previously have the chronic condition episode open.

EGM recognizes acute episodes separately and recognizes that they are clinically related to an underlying chronic condition. This process of recognizing each episode distinguishes the acute condition from the chronic condition and permits analysis and reporting of episodes reflecting either the acute or the chronic aspect of the patient's total experience. Meanwhile, analysis and reporting of the episode for the chronic condition incorporates such acute events in order to convey the total picture for the patient in relation to that particular condition.

EGM recognizes the acute exacerbation as a special case of a sequela relationship. The acute condition (exacerbation) is considered to be a definite (not just a potential) sequela of the chronic condition. Thus, the chronic condition episode is always associated with and always incorporates the acute exacerbation for analysis and reporting. Also, relevant services for the chronic condition episode may be assigned directly and preferentially to the acute condition episode when both are open, and then indirectly by association for analysis and reporting.

4.5 Combining Treatment Episode Shells

By default, a new treatment episode is triggered every time its respective trigger criteria are met. However, EGM links episodes that are part of a single treatment or where the episodes overlap in time as the services and costs of each cannot be separated for analysis. An intervention could be part of a larger intervention, as in the following cases:

- Two interventions are provided at the same time as part of combined treatment for increased effect
- The first intervention is performed as a preventive measure to reduce risk associated with the second intervention, such as a carotid endarterectomy performed to reduce stroke risk prior to a major cardiac procedure
- The second intervention is part of a staged procedure, as in a staged angioplasty for multi-vessel disease

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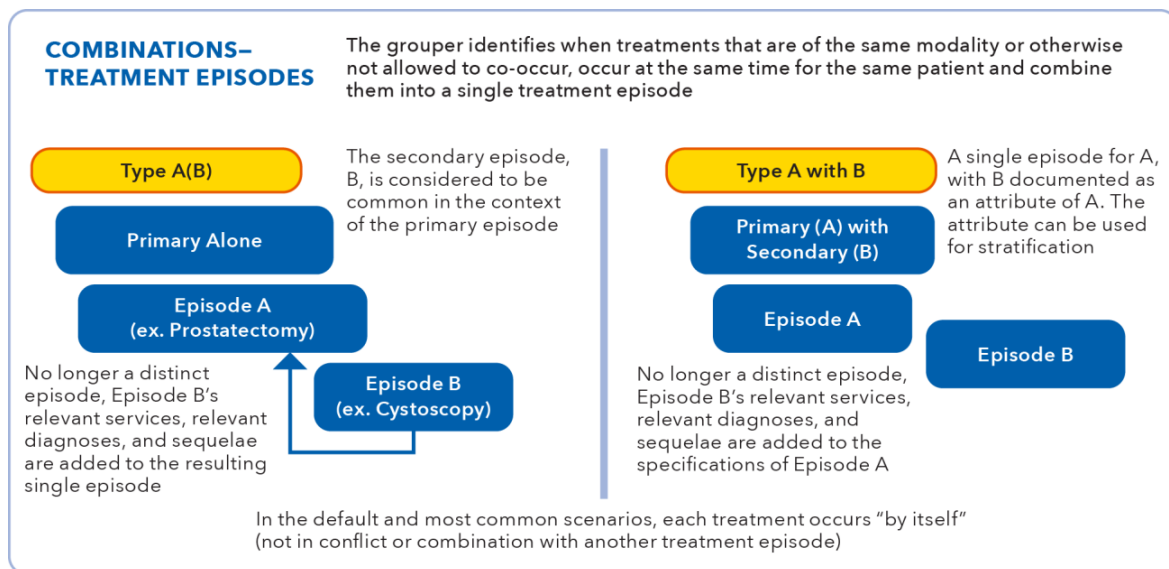
- The second intervention is a retreatment after an initial treatment failure, as in a repeat angioplasty
- The second intervention is provided to treat a sequela of the first intervention, as in a procedure to stop post-operative hemorrhage

In these cases, the interventions can be thought of as constituting a single treatment and can be linked to allow for combined analysis of costs and outcomes.

In other cases that do not fall into one of the categories listed above, the two interventions may be clinically distinct, but not analytically separable if performed at the same time. For example, the costs and risks of two surgical procedures may not be fully separable if performed during the same surgery or same inpatient stay.

Linking or combining treatment episodes has drawbacks. Because each combination could be a new episode type, the total number of analytic categories may increase substantially and many of the resulting combinations may have too few observations for meaningful analysis. Hence, EGM can identify when such treatments occur at the same time for the same patient and combine them into a single treatment episode.

Figure 7: Combining Treatment Episode Shells



When EGM combines individual treatment episodes, the resulting combined episode is classified as either Type A(B), which is Primary Alone, or Type A with B, which is Primary with Secondary. These types are detailed below and depicted in Figure 7:

- **Type A(B) (Primary Alone):** The primary episode in the pair is specified in the EDD and defines the treatment episode without qualification. Here, the occurrence of the secondary treatment episode, B, is considered to be common and even routine in the context of the primary treatment episode, A. For example, a cystoscopy procedure could be primary and correspond to its own treatment episode (B); however, it could be a secondary procedure when its function is complementary to a more major procedure, such as a prostatectomy (A). In this type of combination, EGM would only retain a

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treatment episode for prostatectomy. The cystoscopy episode no longer remains as a distinct treatment episode; its relevant services, relevant diagnoses, and sequelae are added to the specifications of the resulting single treatment episode.

- **Type A with B (Primary with Secondary):** The resulting combined treatment episode is classified according to the episode that is determined to be primary within the pair. The episode type (A) is modified in that instance as occurring *with* the secondary treatment episode (B). For example, a combination of two respective treatment episodes would be classified as “heart valve repair with pacemaker insertion.” EGM would produce a single treatment episode for heart valve repair, but the insertion of a pacemaker would be documented as an attribute of the episode for valve repair. The attribute can be used for stratification of the primary episode for purposes of reporting and adjusting expected costs (see Section 4.6). After combination, the pacemaker episode no longer remains as a distinct treatment episode; its relevant services, relevant diagnoses, and sequelae are added to the specifications of the valve repair in the resulting treatment episode combination.

Generally, all instances of an episode should reflect similar specifications—the same lists (assertions) of relevant services, relevant diagnoses, and sequelae. In the default and most common scenarios, each treatment episode occurs “by itself” (not in conflict or combination with another treatment episode) and is constructed according to its own specifications stored in the EDD. Combined treatment episodes deviate from that principle because the specifications for the resulting combined episode reflect the union of the specifications for the treatment episode pair.

In Type A(B) combinations (Primary Alone), all instances of the primary episode are considered to be clinically similar and appropriate for pooled analyses without regard to whether it had been combined with an episode shell triggered by a complementary procedure. However, Type A with B combinations (Primary with Secondary) result in instances of the primary episode that are sufficiently different to warrant identification for analysis and reporting. The co-occurrence of the secondary episode and the addition of its relevant services, diagnoses, and sequela can alter the characteristics of the primary episode and its resource use.

4.6 Stratification of Episodes

The trigger logic for an episode type establishes, in effect, inclusion criteria for patient cohorts; patients who trigger a given type of episode are included in the cohort of patients who experience that type of episode. EGM provides exclusion criteria whereby certain attributes of an episode can be used to define more homogeneous subgroups—those that separate or exclude certain patients in order to conduct more focused analysis and reporting. Thus, stratification divides an episode type into mutually exclusive categories based on one or more attributes. The resulting categories can be used to filter instances of a particular episode type.

To illustrate, EGM supports stratification on the basis of Medicare Severity Diagnosis Related Groups (MS-DRGs) assigned to a patient’s episode. Episodes involving an inpatient hospital claim will have the corresponding MS-DRG available for stratification. Episodes without an inpatient hospital claim or MS-DRG could constitute one stratum (i.e., outpatient or ambulatory settings), while other cases can be stratified separately (by unique MS-DRG), or using combinations of MS-DRGs as defined by the user. For example, a user analyzing pneumonia episodes might select cases involving MS-DRGs representing the condition

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(pneumonia), and exclude cases involving MS-DRGs for other conditions (such as sepsis) or procedures (mechanical ventilation).

Condition episodes can be stratified by sub-category, which are defined as subsets of the condition episodes based on observed trigger codes. Sub-categories can reflect severity or other clinical information that may correlate with expected resource use. EGM can produce episodes for cases separately by stratum, including their actual and expected costs, conditional on having sufficient case volumes to produce reliable cost statistics.

Treatment episodes also can be stratified, for example by MS-DRG or by a laterality modifier—referring to which side of the body—(e.g., cataract surgery in the right eye) observed on qualifying interventions (i.e., facility and professional claims).³¹ Episode types for which laterality is relevant, such as hip replacement and cataract surgery, can be stratified as cases involving the treatment for:

- Only one side
- Both sides at the same time
- Both sides in temporal proximity (overlapping episodes) but not at the same time

Treatment episodes also can be stratified by the particular sub-type of the procedure; or by attributes related to treatment combinations (see Section 4.5). For example, users could stratify CABG episodes as those with:

- No combinations, along with CABG episodes (Primary Only)
- Open valve procedure
- PCI
- Carotid endarterectomy
- Insertion of automatic implantable cardioverter defibrillator
- Pacemaker insertion
- Lung resection

If the co-occurrence of a primary episode such as CABG with a particular secondary treatment episode is common, then the combined episode may be useful for reporting. However, if the co-occurrence is uncommon, then that stratum might serve to exclude (filter) those instances of the primary episode for reporting.

Users can use episodes created by EGM in combination with other episodes to form composite measures. For example, a user who wanted to analyze all treatment episodes for open valve procedures, including those combined with CABG, could combine episodes for CABG with open valve procedure (cases within the appropriate stratum for CABG episodes) with some or all treatment episodes for open valve procedure.³²

Finally, condition episodes can be stratified according to the occurrence of relevant treatment episodes. For example, AMI could be stratified as follows:

- AMI alone

³¹ In addition to the laterality modifier, EGM looks for evidence of services on one side versus the other side.

³² The actual and expected costs would be calculated as weighted averages for all combined episode types.

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- AMI with PCI
- AMI with CABG

As shown in these examples, EGM supports stratification by DRG, laterality, co-occurring condition or treatment, or episode sub-category or sub-type, meaning narrower specifications of a given episode based on additional clinical criteria. EGM allows users to stratify the episodes in order to focus analyses on more narrowly defined or attributed cases.

5. ASSIGNMENT OF SERVICES TO EPISODES



Assigning services to episodes is complicated by the varying formats of Medicare claims. Facility claims identify principal and secondary diagnoses for admissions or visits paid in bundles (MS-DRGs and Hospital Outpatient Prospective Payment), but do not link different diagnoses with individual services. This differs from practitioner claims, which identify diagnoses for each service provided. Some ambiguities remain even with practitioner claims because the diagnostic information sometimes appears to be incomplete or inaccurate.

By constructing a logic table that specifies relevant services for an episode, that information can supplement or compensate for ambiguities in claims data. For example, if an outpatient hospital claim lists hypertension as a primary diagnosis and diabetes as a secondary diagnosis, such classification can be used to assign an insulin injection to the patient's diabetes episode. Or, if a practitioner claim lists hypertension as the diagnosis for insulin injection, relevancy could be used to identify an alternate open episode (e.g., diabetes) for service assignment.

This section describes how EGM assigns services directly to episodes. Services can be provided to prevent, diagnose or treat a condition or to screen for possible sequelae and are “relevant” for the condition, and thus eligible for assignment to an episode for that condition. Care for a sequela (other than initial screening) should not be classified as part of routine care for the condition, and should instead be assigned to an episode for the sequela. For example, costs for treatment of deep venous thrombosis (DVT) complicating an episode of hip fracture should be included in a DVT episode, not in the fracture episode. Still, the costs of such sequelae are clinically relevant to the fracture episode and need to be recognized as affecting the relative performance of the primary (fracture) episode. See Section 6 on how clinical relationships among episodes are used to accomplish this objective.

5.1 Overview of the Logical Steps in Assignment

After EGM has identified episode shells, it then assigns services directly to each open episode. Assignment occurs in the following way, as shown in Figure 8:

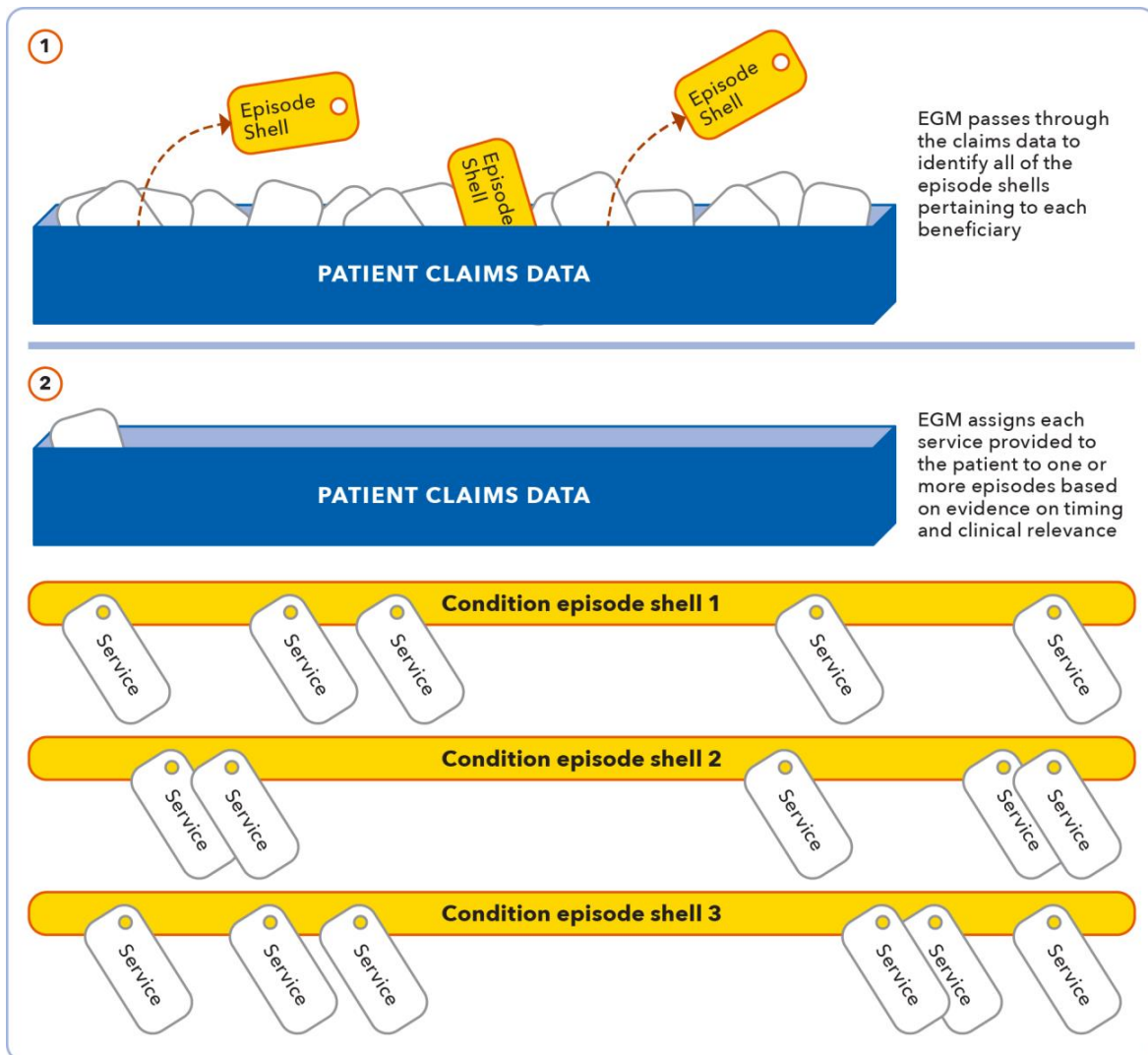
1. EGM passes through the claims data to identify all of the episode shells pertaining to each beneficiary.
2. With the knowledge of what episode types were open for a patient at any given time, EGM passes through the claims data once again in chronological order to assign each service provided to the

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patient to one or more episodes based on the best available evidence on timing and clinical relevance.³³

Figure 8: Assignment of Services to Episodes



The assignment process uses timing, procedure, and diagnostic information from each service to reconstruct the care delivery process for any given episode. Since health care is complex and patients may have multiple episodes open at a time, EGM attempts to find the best assignment for a service given the available information. EGM proceeds as follows:

³³ The user can select among options that are available for some service assignments (see Section 5.6).

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- Step 1: To assign a service directly, EGM first considers each and every episode that is open and therefore eligible to receive any services at the time that the particular service of interest was provided.
- Step 2: For each eligible episode, EGM considers whether the particular service has relevance based on the procedure and diagnosis codes. In each instance in which there is relevance, that service is linked to the episode.
- Step 3: Once initial linkages are made, EGM uses a set of hierarchical criteria to determine the basis for the linkage to each episode. It considers the strongest evidence for relevance before moving to lesser evidence. EGM continues down the list of criteria until an assignment is made or the service remains unassigned.

Claims for many services are reported using diagnosis codes for symptoms, findings, or other “non-specific” diagnoses. Suppose that a claim for a chest x-ray has cough as its only diagnosis with no mention of any potential cause. Now consider three alternative scenarios:

- *Scenario 1*—The patient has no condition episodes close in time that could have resulted in cough. In this case, it is reasonable to conclude that the cough was an isolated occurrence not part of any diagnosed condition, and is not assigned to any episode.
- *Scenario 2*—The patient also has a pneumonia episode close in time to the x-ray with no other possible cause for the cough. In this case, it would be reasonable to assume that the cough was due to pneumonia, and the chest x-ray and its costs should be included in the patient’s pneumonia episode.
- *Scenario 3*—Same as scenario 2, but the patient also has chronic bronchitis. In this case, the cough could have been caused by pneumonia, chronic bronchitis, or both.

EGM includes logic tables that identify symptom, sign, and other non-specific diagnoses related to each condition; these are called relevant diagnoses. Timing could be included in the logic table, as well. For instance, cough might precede the trigger date for the pneumonia episode by only a few days,³⁴ but might persist for several weeks after the trigger date. Thus, the clinical information for each episode, including pneumonia, should specify the maximum time before the trigger date during which services may be assigned (i.e., the look-back period). EGM searches for all condition episodes that can match with a claim for a particular non-specific diagnosis given the time intervals involved. The result is a set of one or more condition episodes that link to the claim.

Separately, it is important to note that claims for some non-specific diagnoses also might be assigned to a treatment or treatment episode and not to a condition episode. For example, claims with a diagnosis of acute post-operative pain (ICD 338.18) should be linked directly to a surgical treatment episode. Similarly, a claim with a diagnosis of nausea may be more appropriately linked to a chemotherapy treatment episode rather than to a condition episode for which the chemotherapy was provided.

³⁴ A claim for cough might precede the first claim for pneumonia in cases where pneumonia was not initially diagnosed. Because of the time course of pneumonia, it is unlikely that a claim for cough could be related to an episode of pneumonia if the encounter for cough precedes the diagnosis of pneumonia by more than a few days.

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The remainder of this section considers more specific criteria that are applied in order to link and assign services to episodes. The criteria can differ by type of service. Section 6 addresses how episodes are linked and associated with each other using a similar approach.

5.2 Service Pairs and Interventions

Building episodes begins with administrative claims data that contain information on date and place of service, diagnosis and procedure codes, provider, and more. EGM begins by building units of service called **interventions**. An intervention is a combination of the individual components of a clinically meaningful service, the components of which may reside across multiple claims. The components, such as vaccines (supplies) and the administration of the vaccine (professional services), or the administering and reading of an imaging test, are so closely related that they are functionally a single unit. By specifying the service-pairs that comprise corresponding interventions, EGM supplements diagnosis codes and other criteria that are used for assigning services to episodes.

The large majority of services on claims are not combined with any others and are simply carried forward at this stage as their own “interventions.”³⁵ The process of building interventions is driven by a set of data tables that provide information about how to handle particular combinations of service codes.

Populating the Service Pair Table

As with other tasks of EDD population (e.g., Relevant Services and Relevant Diagnoses), we used an empirical approach to obtain lists of candidate service pairs. These were based on large samples of claims and were drawn from all couplets of service codes billed to the same patient within 1–2 days of each other (N~4.6M). We used individual code and pair frequency counts to narrow this list to ~10K pairs and sort by descending pair frequency. Table 2 shows the first few rows of the result.

Table 2: Service Pair Table

svc_code_b	svc_code_desc_b	svc_code_a	svc_code_desc_a	Clinical Review
36415	Collection of venous blood by venipuncture	85025	Blood count; complete (CDC), automated (Hgb, Hct, RBC	Y
36415	Collection of venous blood by venipuncture	85610	Prothrombin time;	Y
36415	Collection of venous blood by venipuncture	80053	Comprehensive metabolic panel This panel must include the	Y
Q4081	Injection, epoetin alfa, 100 units (for esrd on	90999	Unlisted dialysis procedure, inpatient or outpatient	Y
36415	Collection of venous blood by venipuncture	80061	Lipid panel This panel must include the following: Cholesterol,	Y
36415	Collection of venous blood by venipuncture	80048	Basic metabolic panel (Calcium, total) This panel must include	Y
36415	Collection of venous blood by venipuncture	84443	Thyroid stimulating hormone (TSH)	Y
J2501	Injection, paricalcitol, 1 mcg	90999	Unlisted dialysis procedure, inpatient or outpatient	Y
A4657	Syringe, with or without needle, each	90999	Unlisted dialysis procedure, inpatient or outpatient	Y
36415	Collection of venous blood by venipuncture	83036	Hemoglobin; glycosylated (A1C)	Y
36415	Collection of venous blood by venipuncture	85027	Blood count; complete (CBC), automated (Hgb, Hct, EBC,	Y
142	Anesthesia for procedures on eye; lens	66984	Extracapsular cataract removal with insertion of intraocular lens	Y
36415	Collection of venous blood by venipuncture	71020	Radiologic examination, chest, 2 views, frontal and lateral;	N
36415	Collection of venous blood by venipuncture	82550	Creatine kinase (CK), (CPK); total	Y
36415	Collection of venous blood by venipuncture	81001	Urinalysis, by dip stick or tablet reagent for for bilirubin, glucose,	N
36415	Collection of venous blood by venipuncture	92565	Creatinine; blood	Y
71010	Radiologic examination, chest; single view,	36556	Insertion of non-tunneled centrally inserted central venous	N
36415	Collection of venous blood by venipuncture	80076	Hepatic function panel This panel must include the following:	Y
36415	Collection of venous blood by venipuncture	93005	Electrocardiogram, routine ECG with at least 12 leads; tracing	N
71010	Radiologic examination, chest; single view,	36620	Arterial catheterization or cannulation for sampling, monitoring	N

³⁵ For ease of communication, the terms interventions and services are used interchangeably except when context requires technical precision.

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The results of the empirical review then went through a clinical review to confirm those pairs that represent clinically meaningful units, i.e., interventions. The clinical review resulted in an assertion about each pair (Y=keep, N=drop). The criteria for keeping a pair included plausibility and unambiguity that the services were related to/billed for a single interaction between provider(s) and the patient. Frequent examples of pairs relate to venipuncture for clinical lab tests; and another common pairing had to do with renal dialysis and services/supplies that would be rendered/used during the dialysis encounter.

Radiologic examination of the chest and venipuncture represent a pair that was not accepted for combination into a single intervention even though they happen to occur together frequently. Each one is quite frequent and both are quite commonly done during the same encounter/visit, but they are not related clinically as a single meaningful unit.

5.3 Direct Assignment of Interventions by Type of Service

The informational content of services varies because of differences in both the structure of claims and the practices of the providers (or coders) preparing them. Thus, different algorithms are used to assign different types or places of service. As described above, each algorithm consists of a hierarchy of rank-ordered criteria for determining service assignment. An important aspect of each hierarchy is that the algorithm proceeds step-by-step looking for the most relevant links, and then ends (stops looking any further) once the criterion is met. Hence, within a given step EGM can find multiple, equally strong matches for a given service. These matches are retained for users selecting the option to retain multiple assignments of a service to more than one episode.

The hierarchy of rules for type of claim is shown in Table 3. The algorithm for each type of claim is described briefly in the subsections that follow.

Table 3: Hierarchy of Rules for Service Assignment

Claim Type	Criteria	Assign to Episode Class	
		Treatment	Condition
Inpatient	Any procedure is a trigger for a treatment episode	X	
	Principal diagnosis is a trigger for a condition episode		X
	Principal diagnosis is relevant or principal diagnosis is a trigger for a condition episode that a treatment episode treats	X	X
E&M	1. Principal diagnosis is a trigger for condition episode or condition episode a treatment episode treats	X	X
	Principal diagnosis is relevant	X	X
All Other Part B and durable medical equipment (DME)	2. Procedure is a trigger for treatment episode	X	
	Procedure is relevant and principal diagnosis is a trigger for condition episode a treatment episode treats	X	
	Procedure is relevant and principal diagnosis is relevant	X	
	Procedure is relevant	X	
	Procedure is relevant and principal diagnosis is a trigger for condition episode		X

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Claim Type	Criteria	Assign to Episode Class	
		Treatment	Condition
	Procedure is relevant and principal diagnosis is relevant		X
	Principal diagnosis is a trigger for condition episode or condition episode a treatment episode treats	X	X
	Principal diagnosis is relevant	X	X
All Other Outpatient Department	3. Procedure is a trigger for treatment episode	X	
	Procedure is relevant and any diagnosis is a trigger for condition episode a treatment episode treats	X	
	Procedure is relevant and any diagnosis is relevant	X	
	Procedure is relevant	X	
	Procedure is relevant and principal diagnosis is a trigger for condition episode		X
	Procedure is relevant and principal diagnosis is relevant		X
	Procedure is relevant and secondary diagnosis is a trigger for condition episode		X
	Procedure is relevant and secondary diagnosis is relevant		X
Home Health	4. Procedure is a trigger for treatment episode	X	
	Procedure is relevant and any diagnosis is a trigger for condition episode a treatment episode treats	X	
	Procedure is relevant and any diagnosis is relevant	X	
	Procedure is relevant and any diagnosis is a trigger for condition episode		X
	Procedure is relevant and any diagnosis is relevant		X
	Principal diagnosis is a trigger for condition episode or condition episode a treatment episode treats	X	X
	Principal diagnosis is relevant	X	X
Skilled Nursing Facility	5. Principal diagnosis is a trigger for condition episode or condition episode a treatment episode treats	X	X
	Principal diagnosis is relevant	X	X

5.3.1 Acute Hospital Inpatient Services

The criteria for acute inpatient hospital facility claims are designed to make the optimal assignment(s) for each inpatient service and are shown in the first panel of Table 3. EGM examines the procedure codes that were listed on the hospital claim and determines whether any of those procedure codes are triggers for treatment episodes.³⁶ If one of the procedure codes is a trigger for a treatment episode, then the hospital claim will be

³⁶ For some types of treatment episodes (e.g., PCI and CABG), certain MS-DRGs correspond to the defining procedure and can serve as trigger codes.

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assigned to that treatment episode (Criterion 1).³⁷ If not, EGM examines the principal diagnosis code on the hospital claim and checks to see whether it is a trigger code for a condition episode. If such is the case, the hospital claim will be assigned to that condition episode (Criterion 2).

If neither of those first two criteria is met, EGM determines whether the principal diagnosis is relevant to any open condition episode or is a trigger code for a condition episode that is an indication for a treatment episode; if so, it will assign the hospital claim to that (or those) episode(s) (Criterion 3). If none of these criteria are met, the hospital claim will remain unassigned to any episode.

5.3.2 Assignment of Evaluation and Management (E&M) Services

In the process of having face-to-face encounters with patients, physicians and other clinicians can diagnose or treat one or more conditions. Most of this activity is captured on claims with E&M procedure codes. Accordingly, EGM handles E&M procedure codes as relevant to all supported episode types; assignment of E&M services therefore is guided by diagnosis codes that are observed on the claim. The second panel in Table 3 shows the hierarchical criteria used to assign E&M services to episodes. If the primary diagnosis (listed on the claim alongside the service (E&M code) is a trigger code for a condition, then the service will be assigned to the condition episode (Criterion 1). If it is not a trigger code, then the principal diagnosis listed on the claim will be examined for its relevance to any one or more open episodes. EGM will assign the service to the episode(s) for which relevance is asserted in the EDD (Criterion 2), or else the service will be unassigned.

The second panel in Table 3 shows the hierarchical criteria used to assign to episodes other Medicare Part B professional and supplier services, as well as DME. Because other professional and supplier services do not have universal relevance to all types of episodes, the assignment rules examine the procedure codes defining the service for relevance to episodes, along with the documented diagnosis codes.

The first four criteria relate to assignment to treatment episodes; where the procedure is a trigger code (Criterion 1); the diagnosis code is a trigger for a condition episode that is an indication for an open treatment episode (Criterion 2); the procedure and diagnosis codes are relevant to an open treatment episode (Criterion 3); or the procedure code is relevant to an open treatment episode (Criterion 4).

The next two criteria relate to assignment to condition episodes; where the procedure is relevant and the diagnosis code is a trigger for a condition episode (Criterion 5); or the procedure and diagnosis codes are relevant to an open condition episode (Criterion 6).³⁸

The last two criteria in this panel relate to diagnosis codes and assignment to either treatment episodes or condition episodes; where the diagnosis code is a trigger for a condition episode or a treatment episode's indication (Criterion 7); or the diagnosis code is relevant to an open episode (Criterion 8).³⁹

³⁷ If more than one episode shell had been triggered by the hospital claim, then the episode combination logic will determine the episode type opened for the patient (see Section 4.5).

³⁸ Comparing criteria 3 and 6, for example, illustrate priority given to treatment episodes over condition episodes in the particular use of EGM for Medicare Quality and Resource Use reports (QRUR). The choice of rules and their order are a matter of optimizing for a particular use case. EGM stores these in data tables are easily modified.

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The criteria used to assign durable medical equipment (DME) services to episodes are the same as the criteria for professional and supplier services. EGM tracks these separately given differences in the record layouts and data elements in the respective data sources.

5.3.3 Assignment of Outpatient Department and Other Services

Logic for assigning outpatient department and other services is similar to those already described. However, outpatient departments and other facility or agency claims are not as detailed as provider or Part B bills.⁴⁰ Thus, there can be multiple services occurring in the same setting and around the same time, but the connection between those individual services and particular conditions (diagnoses) is less clear than with professional services billed to Part B. Nevertheless, the aim is to assign the individual interventions to individual episodes, and not to assign all services during an outpatient visit as a unit.

5.3.4 Assignment of Home Health or Skilled Nursing Facility Services

Logic for assigning Home Health services is similar to those already described (see Section 5.3 for options available for post-acute services). Skilled Nursing Facility services are considered relevant to any type of condition episode; hence, service assignment is guided by whether the principal diagnosis code is a trigger code (Criterion 1), or a relevant diagnosis (Criterion 2).

5.4 Alternatives for Acute and Post-acute Services

Users may override (toggle) the assignment rules described above in special circumstances, namely during acute inpatient hospital stays and in the post-acute period following discharge from an acute hospital stay. Specifically, interventions that occur during these respective periods can be assigned as a group to the same episode as the inpatient hospital claim itself.

- **Inpatient toggle:** All covered services with dates of service that coincide with an acute hospital inpatient stay will be assigned to the same episode as the inpatient hospital claim itself. This includes all professional services by physicians visiting the hospitalized patient for any reason.
- **Post-acute toggle:** Certain post-acute services are assigned in the same way that the preceding acute hospital stay is assigned. These include sub-acute hospital, skilled nursing facility (SNF), and home health services that are part of an uninterrupted “chain” of services that begins with institutional placement within 30 days (or home health within 20 days) following discharge from the acute hospital stay.

5.5 Look-Back Periods

In addition to clinical criteria regarding plausibility, much of the relevance of the service to one or more episodes must be interpreted in light of temporal sequence and circumstances. Thus, for the most part

³⁹ Criterion 8 is illustrated here although it was not implemented for QRUR.

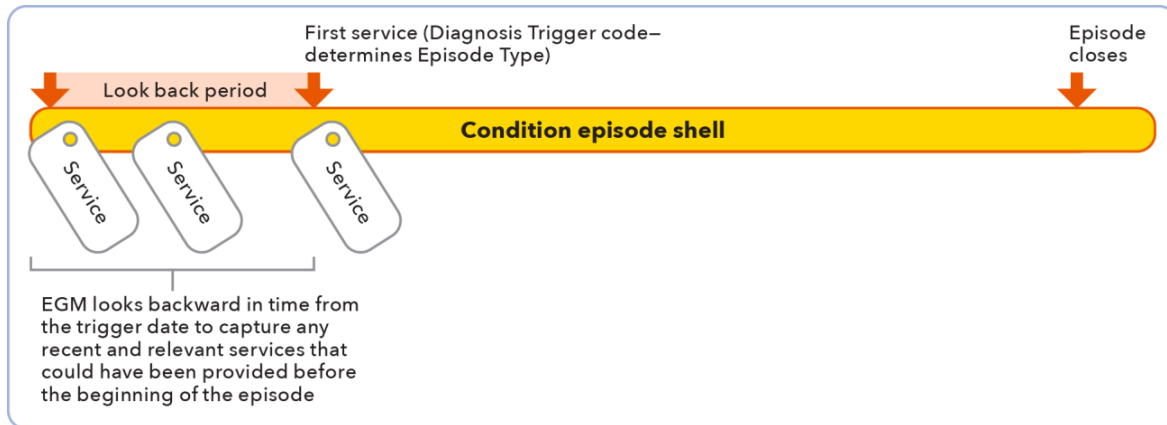
⁴⁰ More specifically, these claims lack line-level diagnoses corresponding to specific procedure codes.

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services are considered relevant (temporally) when the date of service corresponds to a time interval during which the candidate episode is open for a patient. However, for determining assignment of services, the time window can start prior to the service date of the episode's trigger event.

Figure 9: Look-Back Periods



The interval of time that is added prior to the trigger event is called a *look-back period* because EGM looks backward in time from the trigger date to capture relevant services that could have been provided before the beginning of the episode. For example, symptoms due to pneumonia might predate the first claim for the pneumonia by a few days if pneumonia is not diagnosed upon initial presentation. Similarly, preoperative visits and testing may precede the date of a surgery. The duration of the look-back period (in days) is specific for each type of episode and captured in the EDD. Look-back periods are defined for each episode shell and are determined when the episode shell is established. Figure 9 illustrates the role of look-back periods.

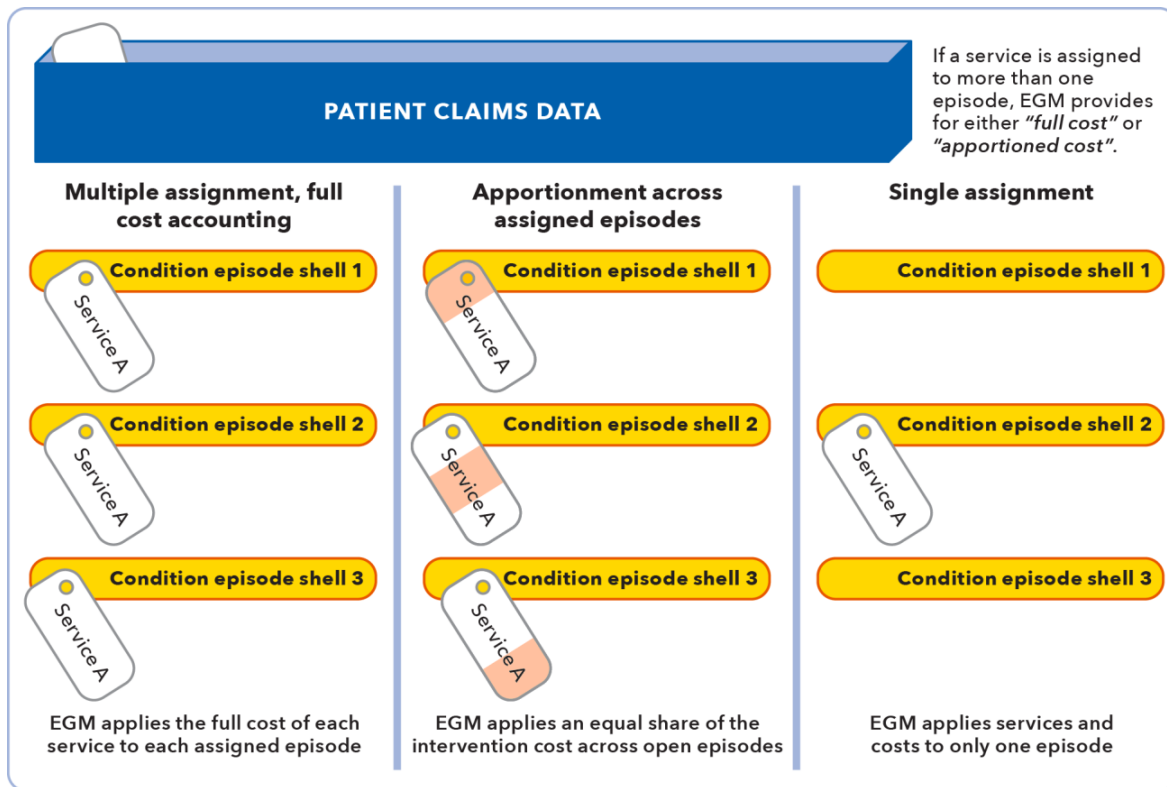
5.6 Allocating Service Costs to Episodes

As services are assigned to respective episodes, EGM accounts for the costs (Medicare-allowed amounts) that correspond to those services. EGM supports three basic options for cost accounting, which are illustrated in Figure 10. If a given service is assigned to only one episode, its costs are as well (**full cost**). Alternatively, if a service is assigned to more than one episode, EGM provides for either “**full cost**” or “**apportioned cost.**”⁴¹

⁴¹ EGM mirrors whichever allocation method the user selects when calculating risk-adjusted expected costs for episodes. In other words, the framing of the actual costs for an episode is replicated in the methods for calculating expected costs for the same episode.

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Figure 10: Allocating Service Costs to Episodes



There is also a method that combines multiple-assignment of services to episodes, along with full cost accounting. Under this option, EGM applies the full cost of each service to each assigned episode. This involves double-counting of dollars across all episodes to which the service was assigned. For example, a physician visit costing \$100 that is assigned to two concurrent episodes would each be allocated the “full” \$100. In other words, analyzing both episodes involves consideration of the same \$100. If the same visit was assigned to three different episodes, the \$100 would be allocated to each of the three episodes.

As an alternative to the full-cost option, EGM supports apportionment of dollars across assigned episodes. The process of assigning an intervention to more than one episode determines the proportions of the payment amount for the intervention allocated to each episode. The proportion of each dollar allocated to each episode is called its **apportionment weight**. The apportionment weight algorithm supported in EGM is *equal shares*—each assigned episode gets an equal weight⁴²—so that if a \$100 service has been assigned to two episodes, \$50 will be allocated to each of the two episodes.

If a user selects the single-assignment option in EGM, meaning that all service assignments are limited to only one episode, all dollars are allocated to the assigned episode, which results in a representation of full cost

⁴² Apportionment can be carried out using different formulas, so this option can be specified in various ways.

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for each episode without double-counting dollars across episodes.⁴³ For example, if a \$100 physician visit could have been assigned to two different episodes but was instead assigned to one, then the \$100 would be allocated to the one (assigned) episode, and \$0 would be allocated to the other (not assigned) episode.

6. ASSOCIATIONS AMONG EPISODES



At this point in the construction process, the system has identified episodes and assigned services directly to basic episodes, including the relevant services (procedure codes) and relevant diagnoses (symptoms and findings). See Section 2.3 regarding relevancy, and Section 5.2 for logic steps in direct service assignment.

In order to support analysis and reporting purposes, episodes must be sufficiently complete. A complete episode generally includes all relevant services, relevant diagnoses, and sequelae. This section describes how episodes supported by EGM are made complete by way of appropriate associations and aggregation into complete episodes for reporting and analysis.

Episodes are building blocks that can be combined to fulfill various purposes for the user. Additional steps are needed to associate those building blocks in ways that are suitable for reporting and analysis:

- **Level 0.** In their most basic form, episodes include only services that are assigned directly. These are included in EGM outputs as “Level 0” episodes, and generally are considered the building blocks for episodes meant for analysis and reporting.
- **Level 1.** Treatment episodes are associated with their respective indications (condition episodes for which the treatments were performed). This supplies the condition episodes with relevant services that were initially defined as treatment episodes; it also supplies treatment episodes with important clinical context.⁴⁴ These are included in EGM outputs as “Level 1” episodes, and like Level 2, are generally are considered the building blocks for episodes meant for analysis and reporting.
- **Level 2.** Treatment and condition episodes are associated with their respective sequelae (condition episodes). Sequelae are important consequences with implications for relative performance and accountability. These are included in EGM outputs as “Level 2” episodes, and generally are considered appropriate for analysis and reporting.⁴⁵ Acute exacerbations are acute condition episodes that are associated with chronic condition episodes for the same illness. Level 2 episodes include the acute exacerbations separately; and the underlying chronic condition episodes with their constituent acute exacerbations. This supplies chronic condition episodes with relevant services and costs that were initially defined as acute condition episodes.

⁴³ The current version of EGM was optimized for multiple assignment; single assignment is under development.

⁴⁴ Many services assigned to the treatment episode, including the principal procedure itself, are relevant to the condition for which the treatment episode was provided. Also, the relevant services for the treatment episode can include various services that also are specified to be relevant services for the condition episode. Priority is given to the treatment episode for assignment while both episodes are open on the premise that accountability for resource use during the treatment episode rightfully includes contemporaneous medical services for the same condition.

⁴⁵ Treatment episodes with their sequelae are included in Level 2a. Condition episodes are included in Level 2c. Level 2b is a latent capacity in EGM to designate other phases of an episode besides acute exacerbations such as stages of progression.

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- **Level 3.** For each patient, each condition episode is identified that was NOT deemed to be a sequela. These are included in EGM outputs as “Level 3” episodes, and generally are considered appropriate for analysis and reporting. These include constituent treatment episodes and acute exacerbations, along with their sequelae, and condition episodes that were sequelae to the Level 3 episode itself. Thus, Level 3 episodes provide clinically coherent episodes without double-counting of dollars across different episodes for the same patient.

These associations provide for alternative representations of how services and costs occur for patients, particularly how individual episodes relate to and affect each other.

6.1 Episodes and Their Sequelae

EGM identifies potential associations among condition and treatment episodes in relation to their sequelae, which are condition episodes that arise as aftereffects or secondary results of a condition episode or a treatment episode. The basic requirements for identifying and linking sequelae are similar to requirements for linking signs or symptoms to episodes. The steps are detailed below:

1. **Clinical experts must agree that a particular condition or treatment can result in a particular sequela.** These are recorded as sequela assertions in the EDD, indicating what primary (causal) episodes can lead to which sequelae. Clinicians recognize that the occurrence of conditions can be multifactorial, while individual condition or treatment episodes can contribute to the causation.
2. **Timing must be taken into account.** The cause of a sequela (the trigger date for condition or treatment episode) should predate the sequela. Potential sequelae episodes revealed through secondary diagnoses on a hospital claim and which were present on admission can be negated, and not considered sequelae related to the acute hospital stay. Also, a sequela episode will not be linked to a condition or treatment if its onset is beyond a maximum time interval.⁴⁶ If these requirements are met, sequelae as episodes will be linked and assigned to one or more causative condition or treatment episodes.
3. **EGM examines all condition episodes for consideration as potential sequelae episodes.** That is, for each open condition or treatment episode, EGM looks for the appearance of the condition episodes that are listed as potential sequela conditions for that episode and that occur within the specified time parameters for the sequela relationship. In each affirmative case, the sequela condition episode linked to the primary episode as a sequela.

⁴⁶ This means that the onset (start date) of a sequela (condition episode) must occur within a specified time interval in relation to the primary (causal) episode to which it is linked.

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4. **Each condition episode that is linked to a primary episode as a sequela has its services assigned indirectly to that primary episode by association.** Its costs are then allocated to the primary episode as sequela costs.⁴⁷
5. **A condition can be associated as a sequela with more than one episode that is open for a patient.** In other words, more than one primary episode can be associated with the same sequela condition. Generally, EGM proceeds with hierarchical criteria to identify the primary assignment of sequela, as follows:
 - Priority is given to a treatment episode over a condition episode.
 - A condition episode of more recent onset (no more than 30 days) before the trigger date of the sequela episode.
 - The episode with the fewest days between its start date and the earliest service that is assigned to the sequela.

The EDD are limited to assertions about direct (first-order) sequelae relationships. Higher-order linkages can be derived from the first-order linkages by tracking multiple linkages (or chains) in succession. In other words, the application constructs chains of sequelae whereby one episode can lead to another as a sequela, which in turn can lead to another condition as a sequela, and so on. For example, a patient with a treatment episode for CABG may experience pneumonia as a sequela shortly after the surgery, which is a first-order sequela relationship. In turn, the pneumonia may lead to a subsequent admission for sepsis, which also is a first-order sequela relationship. By default rule, only the first-order sequelae (and their costs) are assigned back to primary causative episodes. Higher-order linkages can be analyzed implicitly, such as when a treatment episode (and its sequelae) is linked back to its indication, or when an acute condition episode is linked to its “parent” chronic condition episode.

EGM uses condition episodes to fulfill assertions about the sequela from a parent or causal episode. EGM uses the specifications of those condition episodes to represent and trigger the conditions deemed to be sequelae. There can be circumstances in which not all trigger codes for a given condition are plausible pathways for a sequela relationship. For example, anthrax may lead to sepsis. A patient with an open episode for which sepsis is asserted to be a sequela may be exposed to anthrax coincidentally as the real cause of the sepsis. The current version of EGM could associate the sepsis to the open episode erroneously because it does not customize the sequela assertions according to subsets of the trigger codes for a condition (e.g., sepsis).

The example of anthrax and sepsis represents a general observation about EGM and statistical profiling. The attempt is to optimize assignments and associations based on probabilities and average tendencies. For a given patient, a sequela relationship among episodes is not intended to isolate with certainty the single cause of an event or to ignore multifactorial relationships.

⁴⁷ This assignment is called indirect because it comes about through associations among episodes, rather than the original direct assignment of services to the basic episodes, e.g., the primary (causal) condition or treatment episode and the condition episode that is determined to be a sequela for a given patient.

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6.2 Treatment Episodes and Their Indications

A treatment episode is triggered when the claims data for a patient satisfy the trigger logic, which generally consists of one or more procedure codes, sometimes paired with other factors such as setting of care. In some cases, triggering a particular treatment episode will automatically trigger a particular condition episode. For example, a PCI treatment episode can automatically trigger an ischemic heart disease condition episode. This only happens in cases where a treatment is so specific that its occurrence alone is enough to trigger the condition episode. However, in most cases, EGM must determine the indication for the treatment episode—the patient’s condition for which the treatment was performed or, more specifically, the patient’s condition episode of which the treatment episode ought to be a component.⁴⁸ For EGM, this means associating the treatment episode with the appropriate condition episode.

In order to complete the condition/indication episode, the services from the treatment episode are assigned indirectly to the condition episode. Also, the indication for a treatment episode can be used for risk-adjustment or stratification in order to account for potential differences in resource use or to focus analysis and reporting.

In the case of a surgery, a single condition episode will typically serve as the indication. For example, the indication for a knee-replacement treatment episode is determined by the diagnosis codes included on the surgery itself (such as injury or osteoarthritis).⁴⁹ An ongoing therapy episode (e.g., chemotherapy for cancer, psychotherapy) may have indications that are repeated periodically.⁵⁰

The list of condition episodes that qualify as potential indications for each treatment episode was built empirically from a claims database. A list of condition episodes that occur contemporaneously with the open treatment episode was reviewed by clinical experts, and any condition episodes that are plausible indications for the procedure were retained. In some cases there may be ambiguity about the indication for a treatment. For example, a colorectal procedure episode may occur in the context of diverticulitis, ulcerative colitis, or colon cancer, with one or more of those conditions documented on the services related to the colectomy. Logic for linking and assigning indications to treatment episodes is similar to that used for linking and assigning services and relevant diagnoses to episodes: priority is given to an open condition episode for which the treatment episode’s principal diagnosis is a trigger code; otherwise, one or more links are made to open condition episodes for which the principal diagnosis is relevant. These associations permit analysis of condition episodes with respect to the incidence rates and costs related to treatment episodes supported in EGM.

In some cases there may be ambiguity about the indication for a treatment. For example, a colorectal procedure episode may occur in the context of diverticulitis, ulcerative colitis, or colon cancer, with one or more of those conditions documented on the services related to the colectomy. Logic for linking and

⁴⁸ Recall that treatment episodes are an expansion of the concept of relevant services. A procedure could be listed as a relevant service for a condition episode. Alternatively, an entire treatment episode could be defined for that procedure, with its own relevant (complementary) services, relevant diagnoses, and sequela. When a procedure or a treatment episode is provided it was provided as a component of the care provided for a condition, which in turn is defined as the indication for that treatment.

⁴⁹ EGM examines diagnosis codes on claims for the primary service and not on diagnoses reported for ancillary or supporting services that happen to be assigned to the treatment episode.

⁵⁰ A therapy episode may have a more than one trigger intervention that is repeated periodically. The diagnoses for these trigger interventions can be considered collectively.

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assigning treatment episodes is the same as that used for linking and assigning services to episodes: priority is given to an open condition episode for which the treatment episode's principal diagnosis is a trigger code; otherwise, one or more links are made to open condition episodes for which the principal diagnosis is relevant. These associations permit analysis of condition episodes with respect to the incidence rates and costs related to treatment episodes supported in EGM.

6.3 Acute and Chronic Condition Episodes for the Same Illness

EGM can identify and construct episodes for acute and chronic manifestations of the same illness. Some patients might have an episode for a chronic illness such as COPD and never have an acute exacerbation sufficient to trigger its own episode. Other patients with chronic COPD may have one or more acute exacerbations sufficient to become their own episodes. EGM will trigger the distinct acute condition episode and associate the acute exacerbation to the chronic condition episode.⁵¹

The association is a form of sequela relationship in which the underlying chronic condition gives rise to the acute condition episode. The relationship however extends to overlapping relevant services and diagnoses. During the process of assigning services directly to episodes, services that are relevant to both acute and chronic episodes for the same condition are assigned to the acute condition episode. This allows a complete accounting and attribution of the services and costs for COPD during the acute exacerbation, which EGM includes in the output files. Meanwhile, a complete accounting of COPD in its entirety requires that the acute manifestations be associated with the underlying chronic illness, and the services directly assigned to the acute condition episode be assigned indirectly to the chronic condition episode. EGM also includes the (complete) chronic condition episode inclusive of services occurring during any acute exacerbations.

7. DETERMINING EXPECTED COSTS



The final task for EGM is to determine the expected costs for episodes produced by the system. The term “expected cost” is used here with its technical meaning of statistical estimates of cost after risk adjustment, not in a normative sense about what is clinically appropriate, economically optimal, or what someone should expect ideally. Analysis can quantify and illuminate divergence in care patterns and relative cost performance across market areas or other attributed entities. A major approach in such analyses is to compare observed episode costs with expected costs.

Costs per episode can be highly variable across patients, even for treatment of the same conditions. The mean and distribution of costs can reflect a number of factors related to patient or provider characteristics. In performance evaluations, an important concern is the potential for confounding health care efficiency measures with differences in patient clinical characteristics. Accordingly, EGM adjusts expected costs per episode according to each patient's history of conditions and treatments.

⁵¹ For some patients, COPD may first manifest as an acute illness represented by an acute condition episode for COPD, after which there remains open an episode for chronic COPD.

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7.1 Risk Adjustment

EGM constructs episodes according to the taxonomy reflected in the EDD as customized by the user's choices regarding stratification (Section 4.6). EGM calculates expected cost per patient within each type of episode, conforming exactly to the specifications used to determine the actual cost per patient. EGM includes a risk-adjustment module that consists of several statistical models, the purpose of which is to determine the average expected cost per episode for all patients in the cohort. The statistical models determine and adjust the expectation according to characteristics of the patient that are observed to affect costs on average. For example, if statistical models find that female patients cost more than male patients on average for a given episode, then the predicted cost for each female patient will be higher than for a male patient corresponding to the average cost difference observed between the two subgroups. If females are more likely to have a particular morbidity than male patients and that accounts for some of the observed difference by gender, then the statistical model will adjust each patient's expected cost in relation to that person's combination of gender and the presence or absence of the comorbidity. The relevance of gender, that comorbidity, and all other factors is determined for each episode separately.

7.1.1 Time Periods for Estimation

In order to make use of updated information, the risk adjustment module in EGM divides chronic episodes into time periods. The episode costs during each time period are then estimated separately based on information known at the beginning of the time period. The length of the time period of episodes is user-specified with values conceivably ranging from as short as 1 month to as long as a year. By default, EGM uses a period length of 91 days (i.e., a quarter-year) because this duration is sufficiently short to make meaningful updates of clinical events and service patterns, yet sufficiently long for the large majority of patients to accumulate some services and costs and thereby avoid too many cases with no services and zero costs. For other episodes, such as acute conditions and treatments, the quarter-year is considered long enough to represent the episode's appropriate duration for comparisons and accountability. For this reason, acute and treatment episodes are not divided into sequential time periods but have their costs modeled as a single time period.

The expected costs per quarter for a chronic condition episode can be added together, allowing the user to calculate totals for longer time intervals, such as for a given fiscal or calendar year.⁵² This approach allows the user to estimate expected costs for specific policy applications.

7.1.2 Risk Factors

The risk factors, or explanatory variables in the risk adjustment model, are situated in several categories: demographics, health conditions (comorbidities), prior treatments, episode-specific severity, and selected concurrent risk factors. The demographic variables include age, sex, and whether the patient recently became

⁵² Still, the results reflect the time-ordered structure of the comparisons between actual and expected costs by quarter, with (future) expected costs estimated using only information available at the beginning of the estimation period. This is different from estimating an entire year at once, for example, with all clinical events occurring even late in the year "explaining" all costs occurring even early in the year, which is commonly known as concurrent risk adjustment.

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eligible for Medicare (within six months of the beginning of the observation period).⁵³ Recent eligibility is included because the medical histories observed in claims for recently enrolled patients are likely to be incomplete. Claims-based indicators of costs (diagnoses and other episodes) paid by payers other than Medicare are not observable, which can understate factors that predict expected cost. As a result, unhealthy patients would appear to be relatively healthy for lack of their medical claims histories, and their expected costs would be biased downward.

To adjust for the presence of other health conditions, EGM includes episodes currently supported in the EDD as risk adjusters. If a patient had triggered a condition episode prior to the period being estimated for the episode of interest, then its presence is used to adjust the expected cost for the upcoming period. It is the existence of the episode, though not its costs, that is used to estimate expected costs for the episode of interest. This logic is applied using several types of characteristics, including conditions and treatments. Patients who are being treated for one condition may, at the same time, have other comorbidities that are important in their own right but that also may affect expectations for the condition or treatment episode being evaluated. Multiple co-occurring episode types can interact with each other in the entire experience of the patient. One episode type, such as heart failure, may be exacerbated and be more costly because of the presence of another episode type, such as pneumonia.

EGM distinguishes between other episodes that are open at the time the expected costs for an episode are being calculated and episodes that have recently closed. For example, when determining the expected cost for a heart failure episode, the program considers whether the patient has COPD as well. The program also determines whether the patient has concurrent comorbidities such as pneumonia, or has resolved a recent bout with an illness such as pneumonia, or has recently concluded a treatment episode such as CABG.

EGM uses the timing of episodes in relation to risk factors. More specifically, the software distinguishes between episodes open at the beginning of the episode or the time period for which expected costs are being estimated and those that have already closed. The four time periods of interest are:

- **Open episodes.** These are other episodes that are open at the beginning of the episode or chronic episode period being estimated.
- **Recent episodes.** These are episodes that have recently closed—within the last 180 days as of the beginning of the episode or time period for which expected costs are being estimated.
- **Old episodes.** These are episodes that had closed more than 180 days prior the beginning of the episode or time period for which expected costs are being estimated.
- **Concurrent events.** These are episode-specific events that are observed only after an episode has been open, such as specialized devices or procedures occurring during a surgical treatment episode that signify relative health status (severity) of a patient during the episode.

Figure 11 shows how different episodes relate temporally to the example of heart failure (HF). EGM has been configured to support episodes open in each of the three time frames described—concurrent or open,

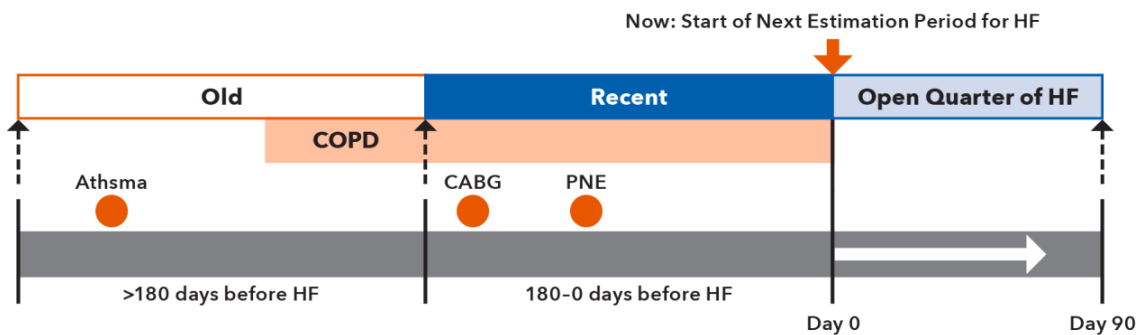
⁵³ This time period can be specified by the user based on the availability of data to determine information for expected cost (e.g., six months, one year, eighteen months, etc.).

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recent, or old—in relationship to the episode or 90-day period of interest. In the example, when determining the expected cost for a period of a heart failure episode, the program would determine that the patient has an open COPD episode, a recently resolved episode of pneumonia (PNE), a treatment episode for CABG recently closed, and placement of a cardiac pacemaker even more distantly in the past. EGM uses the logic of the grouper to validate the occurrence of condition and treatment episodes, as well as the timing of events in relation to the episode and time period of interest.

Figure 11: Example of Risk-Adjusting Heart Failure Using Patient’s Episode Profile



End of Life. Anticipating that patients may be nearing end of life can have significant effects on treatment decisions and cost variation. Degrading health or spiraling circumstances may provoke greater volume and intensity of services, leading to higher costs. This or other effects could differ significantly by type of episode. To address this, EGM calculates relative likelihood of death in 90 days globally for each patient and then allows that probability to adjust expected cost individually for each open episode for which the effect is statistically significant.

Additional details on episode costs, including the statistical modeling approach and variables used, are included in the Technical Note: Risk Adjustment.

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APPENDIX A. GLOSSARY

Accounting period

The period of time for which episode costs are accounted. This can vary based on available data, an arbitrary period, such as a calendar year, or some other criteria.

Acute exacerbation

An acute condition episode that also is a time-limited portion of a chronic condition episode marked by a hospitalization or other event signifying a period of more intensive treatment.

Apportionment weights

When multiple assignment is selected, this is the proportion of the payment amount for the *intervention* (service) that is allocated to each of the respective episodes. The apportionment weights add to 1 over all assignments.

Apportioned Cost

When multiple assignment is selected the cost of an *intervention* can be split between multiple episodes. The apportioned cost is the amount allocated to each episode.

Association

Linking two episodes according to their clinical and temporal relationship, including a treatment episode with the condition episode for which it is indicated, and a condition deemed to be a sequela in relation to a primary (causal) episode.

Chronic Condition

A long lasting or persistent illness that can remain stable, improve, or deteriorate over time. Some chronic conditions have intermittent periods of stability and acute exacerbation.

Clear Period logic

A closing rule that allows an episode to remain open until a specified time interval has elapsed during which no services with trigger codes are observed.

Combination

A pair of condition or treatment episodes of the same type that cannot co-exist for the same patient at the same time. When such a pair of closely related episodes is triggered during an overlapping period of time, only one episode in the pair will be retained.

Complication

A potentially avoidable *sequela*; a *sequela* that can be reduced in probability or cost during the current performance period.

Complementary services

Related services that are grouped by date of service, rather than by diagnosis or procedure so that more accurate linkages can be made. Example: an anesthesiologist claim is grouped with the associated surgery.

Condition

An illness, injury, or status that defines a type of episode.

Condition episode

One of a class of episodes that represents all services provided during a period of time for an acute or chronic illness, injury or clinical status. The underlying condition can be either a single, distinct disease process (or injury) or a set of closely related disease processes (or injuries/incidents).

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Closing rule

Rule that determines when an episode ends, such as a fixed length time period, or variable length according to clear period logic.

Closing rule parameters

Specific time interval or other information specific to an episode type that is used in conjunction with a closing rule; e.g., the episode closes 90 days after the trigger date.

Direct assignment

An intervention that is assigned to an episode because the intervention has a trigger code, relevant service or diagnosis for that episode.

Episode or episode-of-care

A set of services provided to care for an illness or injury or associated with a treatment during a defined period of time.

Episode construction logic

Information and rules that determine when episodes open and close, and the assignment of services and cost to each episode.

Episode Definition Data (EDD)

A set of tables that define the clinical details of an episode including trigger rules, closing rules, trigger codes, relevant services codes, relevant diagnosis codes, combinations, indications, and sequelae.

Episode identification rules

Part of the episode construction logic that contains the criteria for forming episode shells.

Episode shell

An outline of an episode that is created when the episode identification rules have been applied. The shell includes a start date, an end date (for fixed length closing rule situations), and diagnosis or procedure information that is used to identify and construct episodes.

Event

An encounter with a physician in a particular location at a particular point in time, such as a hospital admission, emergency room (ER) visit, or office visit.

Expected cost

Statistical estimates or predictions of normative costs for an episode.

Fixed-length

A specified number of days after a trigger event that an episode.

Full cost

In situations of multiple assignment, this method allocates the entire payment amount of the intervention to each episode to which the intervention is assigned.

Indication

The associated condition episode for which a treatment episode was provided. For example, ischemic heart disease is an indication for coronary artery bypass graft surgery.

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Indirect Assignment

Inclusion of services in an episode through linkage and association to another episode. Examples are treatment episode to condition episode, or sequela to primary episode. In both cases the associated episode brings its services and costs to the new, linked pair.

Inpatient toggle

An option to group all services occurring during the hospital stay with the same episode as the hospital claim.

Intervention

A unit of care formed by grouping data elements within or across claim records, such as the technical and profession components of an imaging test. Once they are created, these units are used in the rest of the application for episode identification and service assignment. Although a minority of services are grouped in this way, most interventions are individual services. For ease of communication, intervention and service are terms used interchangeably unless the context requires precise usage.

Level

A specific aspect provided among the outputs of EGM: episodes consisting only of services assigned directly (Level 0); condition episodes with integrated treatment episodes (Level 1); treatment and condition episodes with associated sequelae (Level 2); primary episodes (not identified as sequela) with integrated treatment episodes and respective sequelae (Level 3).

Limited Specification Episodes

Condition episodes or treatment episodes that are not built or intended for analysis or inference regarding cost variation often have fewer specifications asserted in the EDD, and do not have expected costs included in EGM outputs. These episodes are identified and assigned services, can serve as risk factors for other episodes, and can serve as indications or sequelae.

Look-back period

A number of days specified prior to the triggering intervention in which some diagnoses (e.g., symptoms) or relevant services (e.g., diagnostic tests) can occur before an episode is opened.

Multiple assignment

An episode construction rule that allows interventions to be assigned directly to more than one open episode for which they are relevant. See single assignment.

Post-acute toggle

This option requires the assignment of services for skilled nursing facilities and home-health care occurring in the aftermath of a hospitalization be assigned to the same episode as the prior hospital stay.

Primary episode

An episode to which another condition episode, a treatment episode or a sequela is assigned. This can be the focal point for reporting.

Primary service

The main service that is used to define a treatment episode. It could be for therapeutic, rehabilitative, or palliative care. Examples include complex, singular events such as cardiac surgery, or sequences of repeating interventions, such as chemotherapy.

Qualifying intervention

An intervention that potentially triggers or confirms an episode; used with the episode identification rules.

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Relevant diagnoses

Specific diagnosis code categories to represent clinical factors important in the care of a condition or treatment episode. These include signs, symptoms, and selected “service” diagnosis codes. All trigger codes are relevant to a condition episode.

Relevant services

Services that are determined by clinicians to possibly offer benefit in relation to the care of a condition or treatment episode. Such interventions include procedures, imaging, and lab tests.

Risk factor

Information that is used in statistical models to adjust the expected cost of an episode.

Risk adjustment

A statistical process that establishes expected costs for an episode that account for variation attributable to selected risk factors, providing a more accurate assessment of outcomes related to other factors (e.g., provider discretion).

Sequela

Aftereffect or secondary results of care in the form of a new condition episode that is caused by an open condition or treatment episode.

Severity

Variants of a condition or treatment episode that are expected to be correlated with symptoms, prognosis and average cost.

Service concept

Specific sets of medical services with common purposes and modalities routinely used in clinical communication by health care providers in actual practice settings. As with diagnostic concepts, some service concepts may be called out as treatment episodes. Otherwise, service concepts are useful for organizing and displaying relevant services for EGM assignment tables and logic in support of the comprehensive set of condition episodes as described above.

Single assignment

An episode construction rule that assigns *interventions* to only a single open episode based on the “best match” available evidence. Also see *multiple assignment*.

Specific

High degree of relevance or correspondence of an *intervention* to an episode; used in the service assignment rules.

Stratification

Division of episodes, prior to grouping, into categories based on characteristics or circumstances pertaining to the patient or episode.

Treatment episode

One of a class of episodes that represents all services provided during a period of time for the treatment of a condition. These episodes allow the end user to focus specifically on all services necessary for the particular treatment or diagnostic intervention, and services incurred to treat sequelae of the particular intervention.

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Trigger codes

ICD-9/10 or CPT codes that are used in combination with Trigger Rules to identify the start of an episode.

Trigger event

An *intervention* that defines the beginning of an episode when the trigger rules for a supported episode have been met. See definition of *intervention* above.

Trigger logic

The combination of trigger rules and trigger codes that must be satisfied for an episode to be opened.

Trigger rule

The episode construction logic used in conjunction with trigger codes to define the evidence required to open an episode.

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APPENDIX B. DESIGN REPORT TECHNICAL NOTES/REPORTS

B.1. Technical Note: Cost Accounting Options

This appendix focuses on accounting periods, which are often tied to a 12-month calendar or fiscal year. This contrasts with episodes describing a patient's experiences, which can start or end on any given calendar day, and span the boundaries of a calendar year. For example, an acute condition episode may begin for a patient on November 1 and continue until January 31 of the following year. Or, a chronic condition episode could begin on November 1 and continue indefinitely.

It could be problematic if an episode were to be truncated, meaning artificially ended on December 31 without careful attention to implications for accounting and inference. For example, the average resources used per month for a patient with IHD just prior to a CABG treatment episode are different than an average that includes the resource used for the CABG. Similarly, if the accounting period ends just before the CABG, or in the middle of the CABG treatment episode, then the results and apparent performance could be impacted by the end-point for accounting, which is arbitrary from the perspective of the patient's unfolding clinical history.

The empirical results that occur as a result of that arbitrariness also would occur for other physicians and other episodes used for comparison. Over a large pool of patients and providers, the effects could cancel out. That is, arbitrary cut-points would occur in a distribution that included various fractions of a CABG episode, or similarly, a probability distribution of whether a given patient's CABG episode was or was not included during the accounting period, in part or in full. However, while that is true in the aggregate, it would not be true for small case volumes, such as an individual physician.

As described in Section 7, EGM creates an expected cost of an episode based on a patient's clinical picture at the beginning of the episode, or at each periodic update of chronic condition episodes. This is done for acute condition episodes and treatment episodes, i.e., for episodes lasting up to 90 days, and for each successive calendar quarter within an episode that lasts more than about 90 days (including all chronic condition episodes). Thus, the actual and expected cost results for the entire episode or period are available for analysis. The full episode provides the scientific basis for making inferences about comparisons between actual (observed) and expected resource use. What can be validly attributed to providers are the results of those comparisons, expressed either as risk-adjusted costs, or as dollar amounts below (positive savings) or above (negative savings) for an episode.

In order to express episode results in an accounting period, EGM gives users a choice of:

1. Including entire episodes (and periods) that end during an accounting period;
2. Including entire episodes (and periods) that begin during an accounting period; or,
3. Proration of entire episodes (and periods) across accounting periods.

These options provide useful ways of mitigating the effects of calendar breaks because the user has a summary of actual and expected cost for every episode in its entirety, or every (quarterly) update period, from

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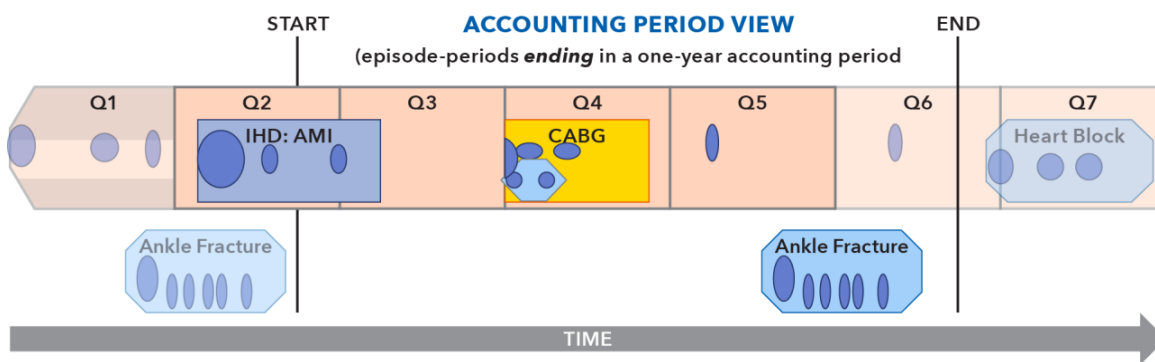
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which to draw analytical conclusions. In the case of proration, actual and expected costs during episode-periods that are not fully within the performance period are apportioned.

These time periods of analysis and inference are referred to as “performance period summations,” and are illustrated in Figure 12. The START and END markers define the accounting period of interest. An open IHD episode for this patient is illustrated by episode-periods (Q1, Q2, etc.), which also includes an acute exacerbation episode for AMI, a treatment episode for CABG, and a later episode for heart block. Unrelated to the IHD episode are two separate episodes for ankle-fracture.

An EGM user may choose to have included in a performance period summation all episode-periods ending in the performance period. In Figure 12, this would include the CABG, the AMI, the second ankle fracture, and Q2 through Q5 of IHD. These are illustrated with darker shades of color. The AMI would not be included if the user chose only episodes that began during the accounting period, or alternatively could be included partially on a prorated basis. In this example, the first ankle fracture would not be represented in the accounting period (except perhaps as a risk-adjuster), nor would the heart block episode, which occurs entirely after the accounting period.

Figure 12: Accounting Periods Selected from a Patient’s Episode Experiences



B.2. Technical Note: Risk Adjustment

The EGM risk-adjustment component generates risk-adjusted costs for each episode using linear regression models with risk factors as covariates. The risk factors in these models can include exogenous health circumstances of the subject derived from claims data (e.g., past or initial comorbidities), demographic factors (e.g., age, sex, and race) and socio-economic circumstances (e.g., median local income). However, factors generally not included are health circumstances that arise during the episode as a consequence of the patient’s care management (e.g., sequelae such as infections or treatments for those complications).

The EGM software program provides separate risk-adjusted and actual costs for each episode (and period)⁵⁴ identified in the EDD (i.e., the episode risk-factor table). The results provide the expected and actual costs of

⁵⁴ A “period” represents the entire duration of acute condition episodes and most treatment episodes, as well as each 90-day time interval into which the entire duration of a chronic condition episode is partitioned.

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each episode/period for each patient. Users of EGM can group the patients into cohorts suitable for the particular purpose in mind, such as episodes attributed to particular provider organizations.

B.2.1. Use of Statistical Modeling to Determine Expected Episode Costs

In general, risk-adjustment methods employ statistical models that use a patient's demographics, comorbidities and severity to adjust estimation of the patient's episode cost compared with the overall average cost of treatment. Cost variation after risk adjustment is meant to reveal modifiable resource use by provider, practice, delivery system, market area, or other considered entity.

The risk adjustment approach must specify the frequency of updating risk factors and estimated cost (e.g., monthly, quarterly, annually). A simple procedure may use a single time period per episode and quantify diagnosis and procedure risk factors as 0/1 based on a single fixed period beforehand (e.g., within one year of the start of the episode). More sophisticated risk adjustment procedures might make greater use of the timing and current status of patients' medical conditions. The EGM approach falls in this latter category.

EGM specifications are modifiable and can be optimized for a particular use case. Currently, EGM is optimized for profiling beneficiaries and physicians in Original Medicare, i.e., without assumptions of beneficiary enrollment or providers taking risk for extended periods of time (e.g., an entire year). Acute conditions and surgical treatment episodes are short enough to have their total costs estimated once based on risk factor values as of the episode start. However, for Original Medicare, longer episodes are subject to periodic updating of risk factors and corresponding expected cost in order to reflect the information available to providers in managing care, and to anticipate changes in attributed providers over time. Thus, the dependent variables in models for chronic condition episodes are costs aggregated over evenly spaced periods, such as quarterly, and the risk factors are based on a fixed date near the start of each period being estimated. In other words, EGM strives to update expected costs at the patient level so that newly attributed physicians "inherit" unbiased estimates of expected resource use for all patients.⁵⁵ This includes adjusting future costs for sequelae (or complications) that already occurred before the beginning of the estimation period.

EGM includes a modifiable parameter to indicate the number of days a risk factor is allowed in relation to the period start. By default, all risk factors are based on the parameter value of -1 , indicating that the information must be known at the start of the time period being estimated (i.e., the day before). A positive value would indicate a risk factor that is recognized after the start of the estimation period; these are commonly known as concurrent risk factors. EGM includes such risk factors only when they are considered to be strong indicators of patient status, but not reflecting provider discretion among treatment options, or deterioration in patient status since the onset of the estimation period.

⁵⁵ EGM can be modified and optimized for other use cases. For example, if beneficiaries were enrolled or providers entered defined risk arrangements prospectively for defined lengths of time, the updates could be delayed in order to allow implicit (endogenous) effects on clinical needs and related resource use to accumulate without adjustment or "rebasing."

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B.2.2. Use of episodes as risk adjusters

EGM uses risk information from other episodes to help estimate the cost of a selected episode. For example, in estimating the cost of a patient's episode of heart failure, the risk adjustment model would include information that the patient had episodes of pneumonia and/or ischemic heart disease. Using episodes takes advantage of the trigger logic to specify conditions and treatments, and provides specific information on their status and timing, for example, whether something is ongoing or has ended.

An important advantage of an episode-based risk factor is that the episode exists over some time period, while an ICD-9 diagnosis is observed at a single moment in time. As such, an episode-based factor may be open at the start of the period being cost estimated, it may have recently closed (for example, within 182 days prior to the period), or it may have closed in some earlier time period (for example, between 365 and 183 days prior). These three situations are used in EGM Version 3 to create three distinct risk factors—open, recent, or old—for each episode employed for risk adjustment.

B.2.3. Specific Approaches

EGM uses a modular approach to processing health care information. Episodes, the basic building blocks of EGM, are the collective units for service utilization, which in turn, lie within a logical framework that preserves and utilizes associations with respect to other episodes, concurrently and sequentially. The final module of EGM, risk adjustment, estimates expected costs per episode after accounting for patient-level complexity under *ceteris paribus* conditions, i.e., standard care as observed for average providers in average markets. As noted previously, default EGM risk adjustment is based on patient factors only, not for geographical or provider differences. If desired by a user, adjustments for geographical and provider variables can be included.

In order to make use of updated information, the risk adjustment module in EGM may divide episodes into time periods. The episode costs during each time period are then estimated separately based on information known at the beginning of the time period. The length of the time period of episodes is user-specified with values conceivably ranging from as short as one month to as long as a year. By default, EGM uses a period length of 91 days (i.e., a quarter-year) because this duration is sufficiently short to make meaningful use of clinical events and service patterns, yet sufficiently long for the large majority of patients to accumulate some services and costs and thereby avoid too many cases with no services and zero costs. For other episodes, such as acute conditions and treatments, the quarter-year is considered long enough to represent the episode's appropriate duration for comparisons and accountability. For this reason, acute and treatment episodes are not divided into sequential time periods but have their costs modeled as a single time period.

The expected costs per quarter for a chronic condition episode can be added together, allowing the user to calculate totals for longer time intervals, such as for a given fiscal or calendar year.⁵⁶ This approach allows the

⁵⁶ Still, the results reflect the time-ordered structure of the comparisons between actual and expected costs by quarter, with (future) expected costs estimated using only information available at the beginning of the estimation period. This is quite different from estimating an entire year at once, for example, with all clinical events during the year “explaining” all costs during the year, which is commonly known as concurrent risk adjustment.

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user to estimate expected costs for specific policy applications, and provides a basis for measuring performance, determining financial incentives, or establishing prospective payment rates or targets.

B.2.4. Model Development

In order to develop customized models for each episode, the team developed an analytic approach that involved drawing multiple (e.g., 250) independent beneficiary samples from the available claims database, and repeating the same stepwise selection procedure to determine potentially significant (i.e., reliable) risk factors. The risk factors were coded as covariates that were eligible to compete for entry into the regression models based on their potential significance. Basic beneficiary demographics were included in the models, while customized episode-specific severity indicators and comorbidities (other episodes) competed for selection into the model(s).

To be selected as a risk factor for a given episode, a treatment episode, condition episode (comorbidity), or severity indicator must have satisfied two preconditions:

- To avoid spurious effects due to inadequate representation, the factor must be present in at least .1% (1 instance per 1000) of the periods in the sample for that episode, and
- The factor must be statistically significant a minimal percentage of times among a large number of replicate models using independently drawn subsamples. For EGM V4 the specific criterion was that the factor was statistically significant in 80% of 250 replicate half-samples.

Those requirements were implemented in order to ensure reliable results, given a finite data sample and limits to patient volumes for any given type of episode. Finally, risk factors that emerged from this process, i.e., those considered to be reliable within the limits of the available data, were reviewed for plausibility by research team clinicians. This review focused on removing risk factors that seemed invalid or nonsensical despite the statistical reliability hurdles.

B.2.5. Risk Factors

The explanatory variables selected for EGM are situated in three categories: demographic, health conditions, and prior treatment. The demographic variables include age, sex and whether the patient recently became eligible for Medicare (i.e., within six months of the beginning of the observation period).⁵⁷ Recent eligibility is included for a practical reason. The medical histories observed in claims for recently enrolled patients are likely to be incomplete and claims-based indicators of costs (diagnoses and other episodes) paid by payers other than Medicare are not observable, which can understate factors that would predict expected cost more accurately. As a result, unhealthy patients would appear to be relatively healthy for lack of their medical claims histories, and their expected costs would be biased downward.⁵⁸

⁵⁷ This time period can be specified by the user based on the availability of data to determine information for expected cost (e.g., six months, one year, eighteen months etc.).

⁵⁸ This bias would be offset by a smaller average bias in the other direction for other patients.

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To adjust for the presence of other health conditions, EGM includes episodes as risk adjusters. If a patient had triggered a condition episode prior to the period being estimated for the episode of interest, then the presence and experience of that is used to adjust the expected cost for the period. For example, when estimating the expected cost of IHD for the next quarter, treatments and even sequelae related to IHD can be used as risk factors. In effect, this updating of risk-adjustment information attempts to reflect how a physician must function, continually monitoring a patient's situation, choosing services and using resources based on a patient's history and current status.

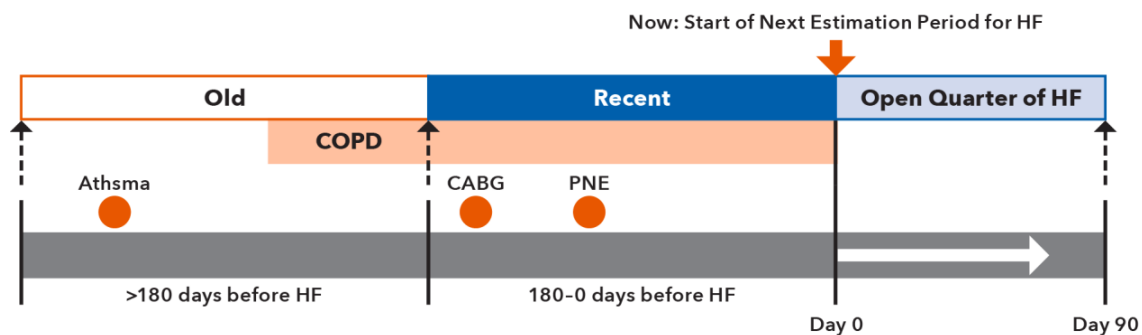
EGM distinguishes between episodes as risk factors according to time parameters in relation to the beginning of the episode or time period for which expected costs are being estimated:

- **Open episodes.** These are episodes that are still open at the beginning of the period being estimated. The fact of their existence is used to estimate expected costs for the episode of interest, although costs and consequences of the other open episodes are not; in other words, the risk-adjustment approach is prospective, not concurrent.
- **Recent episodes.** These are episodes that have recently closed, i.e., within the last 180 days as of the beginning of the episode or time period for which expected costs are being estimated.
- **Old episodes.** These are episodes that had closed more than 180 days prior the beginning of the episode or time period for which expected costs are being estimated.

For example, when determining the expected cost for a period of a heart failure episode, the program could determine that the patient has an open COPD episode, a recently resolved episode of pneumonia, a treatment episode for CABG recently closed, and placement of a cardiac pacemaker even more distantly in the past. Thus, EGM uses the logic of the grouper to validate the occurrence of condition and treatment episodes, as well as the timing of events in relation to the episode and time period of interest.

Figure 13 below shows how these different episodes relate temporally to the example of heart failure (HF). EGM has been configured to support episodes open in each of the three time frames described—concurrent or open, recent, or old—in relationship to the episode or 90-day period of interest.

Figure 13: Example of Risk-Adjusting Heart Failure Using Patient's Episode Profile



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B.2.6. Statistical Modeling Approach

EGM implements the determination of expected costs using a multi-step statistical modeling approach, crafted in accordance with assumptions about the underlying distributions of the variables as applied to various types of episodes. The modeling approach has two or three steps depending on the user's choice:

- Construction and inclusion of an indicator for “potential end of life” status—user option,
- Estimation of the likelihood of the beneficiary having positive episode costs,
- Corresponding estimated magnitude of episode costs, condition on this cost being positive.

The service costs per time period consist of costs assigned directly or indirectly to the episode. Based on an application of Chebyshev's equation, the logistic and linear regression estimates must be multiplied together to determine a patient's final expected cost for an episode:

$$E(Y|X_1, X_2, \dots, X_n) = E(Y|X_1, X_2, \dots, X_n, Y > 0) * P(Y > 0 | X_1, X_2, \dots, X_n),$$

where the left hand side is the expected episode cost (Y) within the time period given risk adjusters X1, X2, ... Xn, the first factor on the right is the expected episode cost from the regression model using X1, X2, ... Xn, and limited to cases with positive cost (Y > 0), and the second factor is the transformed value of the predicted outcome of the logistic model for the likelihood of episode cost being greater than zero:

$$P(Y > 0 | X_1, X_2, \dots, X_n) = 1 / (1 + \exp(-\text{logit}(Y > 0 | X_1, X_2, \dots, X_n))).$$

B.2.7. Modeling Quarterly Expenditures

Starting from the trigger date and continuing for the duration of the episode, expected costs are estimated for increments of approximately 91 days (i.e., a quarter-year). For chronic episodes, the quarter-year is the specified time interval for predicting costs incrementally, but many successive increments are predicted. The 91-day interval is sufficiently short to update and include recent clinical events and service patterns for accurate predictions, yet sufficiently long for the large majority of patients to accumulate services and costs, i.e., to avoid observing too many cases with no services and zero costs. For other episodes, such as many acute and treatment episodes, the 91-day period is considered long enough to represent the episode's full duration.

EGM provides the capability to add together episode costs over a user-defined duration, thereby producing totals for some fixed time period, such as a given fiscal or calendar year. A calendar year estimate, for example, would be based on all episodes contained within the year, as well as either episodes that overlap with the beginning or the end of the year. This approach allows the user to estimate expected costs for specific policy applications.

B.2.8. Modeling Potential End-of-Life Status

Providers may allocate resources differently to patients facing potential end-of-life prognoses. These prognoses may lead to higher costs, if the resources represent extreme measures to prolong life, or conversely

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they may lead to lower costs, if treatment is changed to palliative care and hospice. The statistical estimation models for expected costs in EGM may, at the user's option, include a probability of death as an additional risk factor. This factor is a probability based on a logit model. It is intended to reflect how providers treat patients facing potential end-of-life prognoses. It is not intended to adjust retrospectively for the "fact" of a patient's death.

As a practical issue, when the end-of-life probability is included as a risk factor, it may be more significant and have higher magnitude for some episodes (e.g., AMI) compared with others (e.g., Asthma). In addition, while patients with higher probabilities of death commonly have higher cost estimates for most episodes, for some episodes the higher likelihood of death actually predicts lower estimated costs. As noted earlier, users of EGM have the option to not include the potential end-of-life variable. In this case, the derived expected costs will depend solely on the direct effects of the other demographic and medical history variables in the models.

User Options

The EGM risk adjustment module makes default choices concerning the risk factors, how risk factors are further categorized as open, recent, or old, and the time periods of these categories, but an EGM user has the option to alter these default choices. The means for choosing other risk factors and/or associated time periods involve the alternative specification of values in three tables that accompany the risk adjustment module. A description of these three tables and possible alternative specifications is provided below:

The Risk Parameters table: This specification table identifies each combination of risk set (e.g., condition episodes, treatment episodes, global risk factors) and time period (open, recent, and old) used for risk adjustment and by way of the variables, *before_days* and *after_days*, indicates the time span distinguishing recent episodes from old episodes. A common value of (*before_days*, *after_days*) for recent episodes might be (182,-1) indicating recent episodes must end within a half year of the time period being risk adjusted. A common value of (*before_days*, *after_days*) for old episodes might be (365,-183) indicating old episodes must end within the half year previous to the time period for recent episodes.

The Risk Sets table: The risk sets specification table identifies the collection of risk factors that belong to each risk set.

The Episode Risk table: The episode risk table links episodes with the risk sets that will be used for their risk adjustment.

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APPENDIX C. EGM CLINICAL VIGNETTE

C.1. Technical Note: Clinical Vignette in Detail

The following vignette is designed to show how EGM groups claims for a single Medicare beneficiary. This example represents a 76-year-old female with a history of hypertension & ischemic heart disease (IHD). Her encounters with the delivery systems begin when she presents with chest pain to the Emergency Department (ED) and is hospitalized with the diagnosis of acute myocardial infarction (AMI). During the hospitalization the patient undergoes a several diagnostic procedures including a diagnostic cardiac catheterization. She is discharged to home with scheduled follow-up with her cardiologist. Within 7 days of discharge the patient is re-admitted with similar but worse symptoms and undergoes a percutaneous coronary intervention (PCI) procedure with the placement of two coronary stents. The patient does well and is again discharged to home. Three days later the patient is re-admitted once again for a urinary tract infection (UTI). The following illustrates how EGM would handle this patient's claims for the AMI, PCI and UTI episodes.



Table 4: AMI Admission

ICD9Px/CPT/HCPCS Code	ICD9PX/CPT/HCPCS Label	ICD9 Label
71010	Radiologic examination, chest; single view, frontal	Chest pain NOS
93010	Electrocardiogram, routine ECG with at least 12 leads; interpretation and report only	Subendo infarct, initial
93307	Echocardiography, transthoracic, real-time with image documentation (2D), includes M-mode recording, when performed, complete, without spectral or color Doppler echocardiography	Crnry athrsc1 natve vssl
93320	Doppler echocardiography, pulsed wave and/or continuous wave with spectral display (List separately in addition to codes for echocardiographic imaging); complete	Crnry athrsc1 natve vssl
93510	Left heart catheterization, retrograde, from the brachial artery, axillary artery or femoral artery; percutaneous	Crnry athrsc1 natve vssl
99223	Initial hospital care, per day, for the evaluation and management of a patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity Counseling and/or coordination of	AMI inferior wall, init
99285	Emergency department visit for the evaluation and management of a patient, which requires these 3 key components within the constraints imposed by the urgency of the patient's clinical condition and/or mental status: A comprehensive history; A comprehensive	AMI inferior wall, init
93010	Electrocardiogram, routine ECG with at least 12 leads; interpretation and report only	Abnorm electrocardiogram
99238	Hospital discharge day management; 30 minutes or less	AMI inferior wall, init
90471	Immunization administration (includes percutaneous, intradermal, subcutaneous, or intramuscular injections); I vaccine (single or combination vaccine/toxoid)	Vaccine for influenza
90732	Pneumococcal polysaccharide vaccine, 23-valent, adult or immunosuppressed patient dosage, when administered to individuals 2 years or older, for subcutaneous or intramuscular use	Vaccine for influenza
93010	Electrocardiogram, routine ECG with at least 12 leads; interpretation and report only	Abnorm electrocardiogram

- Patient presents with chest pain to the Emergency Department (ED) and is hospitalized for acute myocardial infarction (AMI). An ICD-9 code for subendocardial infarction in the principal position of the inpatient (IP) claim opens an episode for AMI.
- While the AMI episode is triggered based upon an inpatient hospitalization, the grouper ensures that any services deemed relevant to the management and treatment of the patient's AMI leading up to the admission are assigned to the AMI episode (for an AMI episode the look-back is a fixed 3 days before

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the episode is triggered). In this example the ER visit the day before the admission (and its component services) get assigned to the open AMI episode

Table 5: AMI Hospital Course

Thru Date	ICD9PX/CPT/HCPCS Code	ICD9PX/CPT/HCPCS Label	ICD9 Label	CV-ACS
4/7/08	71020	Radiologic examination, chest, 2 views, frontal and lateral;	Chest pain NOS	X
	99223	Initial hospital care, per day, for the evaluation and management	Intermed coronary synd	X
	71020	Radiologic examination, chest, 2 views, frontal and lateral;	Chest pain NOS	X
	93510	Left heart catheterization, retrograde, from the brachial artery	Crnry athrsl natve vssl	X
	99232	Subsequent hospital care, per day, for the evaluation and management	Intermed coronary synd	X

- EGM is designed to ensure that all services during an inpatient stay are assigned to the episode that prompted the hospital stay. In this case the claims reveal that the patient underwent a cardiac catheterization, and since the hospitalization was prompted by the patient's AMI diagnosis, all of the associated catheterization services are assigned to the AMI episode. Cardiac catheterization is also an independent treatment episode in EGM, so its cost and services can be analyzed independently if desired.

Table 6: Post-Discharge Follow-up

Thru Date	Code	ICD9PX/CPT/HCPCS Label	ICD9 Label	CV-AMI
4/09/08	99214	Office or other outpatient visit for the evaluation and management	Precordial pain	X
4/09/08	79439	Other nonspecific abnormal results of function study or cardiovascular	Abn cardiovasc study NEC	X

- EGM is designed to ensure that relevant diagnoses are used to capture and assign services relevant to the open AMI episode within the appropriate time period (AMI stays open for 90 days).
- Two days following discharge the patient is seen for a follow-up office visit. Since "precordial pain" is listed as a relevant diagnosis for the AMI episode, the EGM assigns the corresponding office visit to the AMI episode (assignment)

Table 7: AMI Re-admission with PCI

Thru Date	Code	ICD9PX/CPT/HCPCS Label	ICD9 Label	CV-AMI
4/14/08	71010	Radiological examination, chest; single view, frontal	Chest pain NOS	
	92982	Percutaneous transluminal coronary balloon angioplasty	Crnry athrsl natve vssl	
	93010	Electrocardiogram, routine ECG with at least 12 leads	Subendo infarct, initial	
	93307	Echocardiography, transthoracic, real-time with imag	Crnry athrsl natve vessl	
	93320	Doppler echocardiography, pulsed wave and/or con	Crnry athrsl natve vessl	
	93510	Left hear catheterization, retrograde, from the brach	Crnry athrsl natve vessl	
	99223	Initial hospital care, per day, for the evaluation and	AMI inferior wall, init	
	99285	Emergency department visit for the evaluation and	AMI inferior wall, init	
4/16/08	A0433	Advanced life support, level 2 (als 2)	Precordial pain	
	92929	PRQ CARD STENT W/ANGIO ADDL		

- Seven days following discharge the patient returns to the ED with recurring chest pain, is readmitted and undergoes a percutaneous coronary intervention (PCI) procedure with two stents placed.
- An ICD-9 code for subendocardial infarction in the principal position of the inpatient (IP) claim again opens a condition episode for AMI.
- A CPT procedure code for percutaneous cardiac intervention opens a treatment episode for PCI.

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- EGM assigns the services from this hospitalization to the PCI episode. Since AMI is a recognized clinical indication for a PCI, EGM associates the PCI episode (and all of its assigned services) to the AMI episode for purposes of evaluation and analysis.

Table 8: PCI Hospital Course

Thru Date	Code	ICD9PX/CPT/HCPCS Label	ICD9 Label	CV-ACS	PX-cardiac-coronary-art proc-pci
4/15/08	93010	Electrocardiogram, routine ECG with at least 23 leads; interpret	Abnorm electrocardiogram		X
	99238	Hospital discharge day management; 30 minutes or less	AMI inferior wall, init		X
4/16/08	90471	Immunization administration (includes percutaneous, intraderm	Vaccin for influenza		X
	90658	Influenza virus vaccine, trivalent, split virus, when administered	Vaccin for influenza		X
	90732	Pneumococcal polysaccharide vaccine, 23-valent, adult or imm	Vaccin for influenza		X
	93010	Electrocardiogram, routing ECG with at least 12 leads; interpret	Abnorm electrocardiogram		X

- EGM ensures that any services deemed relevant to the management and treatment of the patient's PCI is assigned to the PCI episode through discharge
- In addition, as was the case with the initial admission, EGM ensures that all services during an inpatient stay are assigned to the episode that prompted the hospital stay. In this case, the claims reveal that the patient underwent a PCI and also received a few vaccines as part of her preventive care. Since the patient was hospitalized for the PCI all of the preventive care services are assigned to the PCI episode.

Table 9: UTI Re-admission

Thru Date	Code	ICD9PX/ CPT/ HCPCS Label	ICD9 Label
	71010	Radiologic examination, chest; single view, frontal	Altered mental status
	99285	Emergency department visit for the evaluation and management of a patient	Altered mental status
	A0427	Ambulance service, advanced life support, emergency transport	Fever
4/19/08	70450	Computed tomography, head or brain, without contract material	Altered mental status
4/22/08	MSDRG689	KIDNEY & URINARY TRACT INFECTIONS W MCC	Urin tract infection NOS

- EGM is designed to capture all of the sequelae or secondary results after a condition or treatment episode.
- Three days following discharge the patient develops altered mental status & a fever. She is brought by ambulance to the ER and re-admitted due to a urinary tract infection (UTI). An MSDRG code urinary tract infection NOS in the principal position of the inpatient (IP) claim triggers open an episode for UTI.
- EGM assigns the services for this hospitalization to the UTI episode. Since UTI is recognized as a sequelae of the PCI (not AMI), EGM allows for the UTI episode and all of its assigned services to be associated and linked to the PCI episode for purposes of evaluation and analysis

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APPENDIX D. EGM CONTRIBUTORS

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Responses to PTAC PRT Questions Batch 1

Overarching Questions:

1. The proposal states, “In this initial phase, we are focused on the work of general surgeons and other surgical specialties. However, we expect the model to expand over time to include both acute and chronic medical conditions as well.” Pleased confirm whether or not the model you have submitted for review and comment by PTAC is limited to a proposed model for surgical episodes, or if you are requesting PTAC review of a model for other acute and chronic condition episodes. If you are requesting review for non-surgical episodes, please indicate how non-surgical physicians and specialty societies have been involved in the development of the proposal and whether they have indicated interest and willingness to utilize the model if it is made available.

The ACS-Brandeis model is patient-centric and can be implemented by all payers, respecting the clinical work of all providers. We proposed phased implementation for practical reasons, including the finite bandwidth of the development team to this point, and the process envisioned for other medical specialties to review and refine episode specifications pertaining to their respective clinical domains.

Our initial submission makes available approximately 120 episodes. These include procedures typically performed by general surgeons, along with their common indications (conditions for which the procedures are done), and common sequelae (conditions that can arise in the context of those procedures). The initial set of 120 episodes also includes other procedures typically performed by surgical subspecialists, along with their indications and sequelae, and several other condition episodes that were developed and vetted in conjunction with EGM itself. EGM is a comprehensive system that recognizes every diagnosis and procedure code appearing in claims data, and includes metadata to interpret their meaning with respect to well over a thousand clinical concepts. The reviewing and refining process is intended to ensure validity and clinical acceptance regarding how individual services are represented in the episode system.

We have invited and received inputs from various specialties – including the American Society of Anesthesiologists and the Society of Hospital Medicine in terms of the metadata files used in the EGM logic. Our goals, with CMS’ endorsement, would be to include more of the delivery system in these initial episodes and to expand the foundational work that has occurred in the many other episodes covering Parts A & B expenditures (see attached episode list). The episodes are designed for immediate movement to an implementation effort (with the continued input and support of the specialty societies involved) in a CMS program or as a pilot. We recognize that clinicians who participate in the clinical services within an episode may phase-in over time as qualified participants in an advanced APM. This means that a surgical episode may allow for formal participation of surgeons, anesthesia and hospitalists in the initial phase. Other clinical disciplines, such as PCPs, radiology and pathology may require more work before they are willing to consider their risk-based role in this model.

In 2016 we held a series of open webinars totaling more than 10 hours in presentations and Q&A, and more than a hundred participants. The purpose of the webinars was to propose options for the model, explain various components, seek comments and suggestions, and educate a growing community of clinical and policy experts who may support the implementation of this

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model as an advanced APM. In addition to those plenary sessions, members of the ACS-Brandeis APM development team held other targeted meetings such as clinical review webinars, aimed at explaining the clinical logic and answering common questions from clinicians, and individual meetings with participating societies. We maintain a distribution list for the project with representatives from at least 30 organizations, although again, widespread or sustained outreach has not been possible to this point.¹ We appreciate the public meetings and distribution of materials carried out by PTAC.

With all that in mind, we request that PTAC review the proposal from the perspective of procedural as well as condition episodes. As indicated in the proposal, there are 54 procedural episodes, 29 acute conditions, and 38 chronic conditions ready for review and implementation. Together, the episodes describe at least \$174 billion in Medicare spending per year. We propose that implementation can proceed in stages mostly for practical reasons, and as a way to build up experience and confidence towards the longer run goal of systemic change.

2. How do you believe your proposed payment model differs from the resource-based payment adjustments under MIPS that will be based on the CMS Episode Grouper?

We agree that the CMS episode grouper is capable of providing the clinical logic and episode construction logic to support MIPS, as well as ACS-Brandeis and possibly other APMs. MIPS is a large and complex program that would be well-served by the expansive coverage and consistent logic available in EGM, as well as its ability to apportion costs among concurrent and clinically-related (e.g., nested) episodes without double-counting dollars or savings. Thus, in terms of measuring costs and savings at the episode level, our proposal needn't be different in principle from MIPS, and in fact there is virtue in having consistency of methods across the programs.

EGM operates by sorting claims data chronologically by beneficiary, identifying episodes of care during the observation period, assigning relevant services and costs, and linking episodes that are related clinically. The software forms groups of 5,000 beneficiaries at a time, and processes the groups using as many computer processors as are available, in parallel or in a cloud computing environment. Hence, even extremely large data files (e.g., the Medicare population for a year) are divided into chunks of 5,000 for the core grouper activities, and then saved in unified output files that include the original claims and all of the information necessary to analyze episodes of care. A major implication is that CMS could run national data files through EGM, and then use portions or all of the “grouped claims” for single or multiple policy purposes, such as the ACS-Brandeis model, MIPS, and reconciling accounts across APMS. This would provide CMS with an efficient mechanism for automating the “big data” tasks along with consistency and coherency across programs benefiting from the clinical logic.

However, MIPS and Advanced APMs are not intended to be identical programs. Our proposal differs from MIPS in several important respects. First, if all APM entities improve quality and

¹ AAFPRS, AAMC, AANS, AAO, AAOHNS, AAOS, ACOG, ACOS, ACP, ACS, AMA, AGA, APSA, APTA, ASA, ASBS, ASCRS, ASPS, ASTS, AUA, Bariatrics, FAH, LUGPA, NASS, Premier, SAGES, SGO, SHM, STS, and SVS.

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resource use then they all gain. The more they improve the more they gain, both individually and collectively. MIPS, in contrast, is a zero-sum game.

Second, the proposed APM measures cost and savings at the level of the APM entity, not at the level of a TIN or TIN/NPI. Our model calls for voluntary risk arrangements and opportunities that are on a larger scale than MIPS clinicians, whether measured by individual NPI or TIN, and reinforces this with multiple attribution, which acknowledges a role for each clinician who provides services to an episode. Also, the risk arrangements may include hospitals and other institutions in addition to clinicians. This will allow for better alignment of resource measurement with the organizational level at which changes and investments are needed to create improvement.

Third, in MIPS resource use is just one of four domains of measurement. Two of the other three are process domains. The proposed APM focuses on the two outcome domains, resource use and quality. Furthermore, our model acknowledges the interaction of cost and quality. In contrast, MIPS so far has treated quality and resource use as distinct, non-interacting domains.

Fourth, although more development will be required, our model calls for synergistic merging of cost and clinical information so that the latter can inform cost expectations, and allow for quantification of differential clinical outcomes in relation to incremental cost.

3. How is this proposed APM different from CMS' Bundled Payments for Care Improvement (BPCI) initiative?

Although the ACS/Brandeis APM includes episodes or bundles of care, it is a much more comprehensive, patient-centered model than BPCI. Fundamental differences between the two models include the following:

Episode construction. Episodes in EGM are triggered by ICD9/10 diagnosis or procedure codes rather than MS-DRG, which is a label and payment category pertaining to hospital reimbursement and is determined after discharge. Triggering an episode on a limited set of MS-DRGs tethers the definition of an episode to an inpatient admission, which is problematic in terms of messaging and efficiency. CMS has promoted innovations such as observation stays or ambulatory alternatives to inpatient admissions. Meanwhile, providers cannot know which patients will actually be assigned to a bundle because the MS-DRG is not known until after discharge. Bad patient trajectories, such as ICU admission, major complications, and related MS-DRGs can disqualify a patient from the bundle that would have pertained in BPCI if untoward events had not occurred. Please see the attached public comment letter from HCI3 to CMS regarding limitations of triggering based on MS-DRG, and the substantial comparative advantages to basing a model on EGM.

The ACS-Brandeis grouper allows for multiple simultaneous episodes per beneficiary, and assigns all services according to clinical relevance. The model is based on a comprehensive taxonomy with hundreds of episodes, allowing each service to find its best assignments based on timing and clinical relevance. This is in contrast to the BPCI exclusion lists, which are based on the assumption that everything is in the episode unless actively excluded.

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Risk protections. The ACS-Brandeis model can use several types of risk adjustment to calculate an expected cost for each patient for each episode, including specific comorbidities, attributes of the episode such as surgical technique, indication and anatomy, and timing (concurrent medical events versus recent or further in the past). In contrast, BPCI adjusts the target price, or even excludes patients, based on the eventual MS-DRG. Both models trim the costs of outlier cases. BPCI employs statistical adjustments that blend a site's actual cost with the average cost of all sites based on sample size and variance.

Team-based care. The ACS-Brandeis model is focused on the patient, and the clinical team, but not on the setting of care. The model assigns a role to every clinician involved in the care of a given patient for a given episode. This information can be used to support care redesign and gainsharing in ways that go well beyond inpatient or institutional care.

In addition, the ACS-Brandeis model can be scaled to cover the majority of clinical work for a clinician, group practice, or delivery system and is not limited to one episode at a time. This difference is important because it provides the financial incentive and organizational impetus to invest in system-wide care redesign.

4. What types of surgeries or conditions would be most appropriate for testing or implementing the model?

The developers have prioritized implementation based on several factors, including but not limited to, the state of development of episodes within the EGM, preferences of specialties participating in clinical review, which episodes are most likely to make it possible for physicians of a given specialty to qualify as Advanced APM participants, and episodes likely to have larger variation in outcomes or cost. Our focus begins with patient-centered Clinical Affinity Groups (CAGs) such as cardiac care, musculo-skeletal care, oncologic care, chronic conditions population management, etc. If implemented, CMS may choose to prioritize episodes within a CAG using several criteria:

- Ease of implementation
- Promote early adoption
- High variation
- High volume/high cost
- Performance measurement discernibility in low cost variation

The EGM contains a number of fully developed episodes that could be rapidly implemented and a greater number of partially developed episodes which could be implemented within a reasonable time period. (Please see the attached list of episodes in development along with those that are fully developed. The fully developed episodes could be implemented immediately pending approval from the participating specialties involved.)

5. How do you envision the episode grouper definitions and parameters being updated over time? Will that be done by CMS, by ACS, or through some other mechanism?

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The ACS-Brandeis APM is based on the software and clinical logic of the Episode Grouper for Medicare (EGM). The EGM grouper definitions and clinical logic are designed to be updatable whenever clinical practice changes. Updating will be necessary to keep up with advances in clinical knowledge, with technologic advances, and with the coding changes that such advances mandate. The EGM, as a public domain program owned and developed by CMS, will need support and infrastructure for continuous updating to maintain currency.

The Brandeis team has developed a process and software management tools to create, modify, and vet episode rules and specifications with clinical experts, including members of medical specialty societies, practicing physicians and other interested stakeholders. The process begins with a series of tables that show trigger codes, trigger rules, relevant services and diagnoses, sequelae and, for procedure episodes, indications. For refined episodes, these lists have generally gone through multiple rounds of vetting. For episodes undergoing more basic refinement, these lists are generated from associations in claims data. Either type of list can be reviewed by a group of clinicians, with comments coming back to a central group for review and final action (accept or reject the proposed change). With support, these methods and tools can be sustained and implemented to keep the episode specifications and APM algorithms up-to-date.

One theme in our proposed APM is that CMS ensure a widespread but consistent diffusion of the underlying technologies, including the EGM software itself, as well as the clinical metadata used to specify episodes. We call this the “single-grouper” solution, and it is intended to create a consistent national standard for defining clinical concepts and episodes, determining how to assign services and costs to those episodes, and communicating important clinical associations such as indications for procedures and related sequelae. Without such discipline, there is great potential for redundancy and miscommunication whereby N payers work in conjunction with M provider groups to produce $N \times M$ idiosyncratic and misaligned “groupers” that thwart aggregation and valid comparisons.

Whether the technologies are implemented as a single-grouper solution across payers, or if CMS simply supports the model as an advanced APM, the technologies will need to be updated and maintained over time. CMS owns the software and will need to make any necessary updates and specify the version used at any point. If CMS makes the software available to other payers or entities, they will need to keep track of new releases, and which version they are using for a particular purpose. Similarly, each application requires a proper and current version of the clinical metadata. We wish for a situation in which the software and metadata are licensed or at least protected by copyright so that everyone can have confidence in the contents of each designated version, and any results used for performance measurement or payment. We wish to guard against various payers or providers making idiosyncratic changes to the contents without at least stipulating nonconformance with the prevailing standard versions.

The current model is built as a business construct using the EGM developed for CMS by Brandeis. The ACS-Brandeis construct of a business model is built on this work product which represents Clinical Affinity Groups that participate in episodes, and built into clusters of episodes for contracts to a third party such as through an APM entity or payer. All copies of the clinical metadata and measurement algorithms for this APM currently reside at Brandeis. Further, ACS has created a phases-of-care quality overlay with dyads of measures that are patient-centric, CAG-centric measures with shared accountability. The IP aspect of these elements of the proposal are currently under internal review with regard to their proprietary nature. Our intent is

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for this model to be freely licensed as an APM for all payers and is not subject to change without review and approval by the ACS.

ACS is furthering its efforts in the phases-of-care measures and patient-reported outcome measures (PROMs) for MIPS. Our efforts seek a common measurement environment for MIPS, APMs and all payers so that the measurement focus is directed toward optimal care and not solely linked to a payment program. Again, it is our intent to freely license these efforts for their public use. However, development costs and maintenance costs for performance measurement require resources. To the extent payers do not support these development and maintenance expenses, we would expect licensing agreements that support a going concern in these programs.

6. Will physician participation in the model require the use of proprietary intellectual software/decision support tools?

Physician participation in the model as an advanced APM entity would not require their use of any proprietary tools. The model holds the promise of illuminating service utilization and spending patterns uniquely so that entities can understand their cost structure within and across episodes, and respecting the work of all clinicians participating in patient-centered care. Thus, it behooves CMS and other payers to generate actionable information on behalf of participating entities and providers, or to provide those entities with original data for analysis for that purpose. We presume that any tools that CMS uses to implement the model would be put into the public domain or made available to participating entities.

Questions about Risk Adjustment:

1. The risk adjustment system seems to be driven by its ability to predict current spending, rather than to ensure higher budgets for patients with higher needs? Have you considered using a clinical category system instead?

The purpose of the model's risk adjustment is to determine an expected cost, or budget, that appropriately reflects patient need. It does so by 'predicting' current spending based on patient risk factors and the assumption of 'average' efficiency. So the ability to predict current spending is how it ensures higher budgets for patients with higher needs, not an alternative. While not ideal, current spending is the most practical available measure of patient need in terms of a cost budget. We are aware of no evidence that the estimate of patients' relative need would be different if only the cost of 'appropriate' services were used.

The risk factors of the model's risk adjustment system are co-existing clinical categories, applied in a multivariate model. We considered an alternative of mutually exclusive clinical categories such as MS-DRGs or RUGs but concluded that such an approach was unwieldy and impractical for the proposed model.

2. Have you considered re-estimating the risk adjustment regression coefficients after deleting the services where you think savings opportunities exist, so that they better predict appropriate spending rather than current spending?

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No. This idea seems to presume that reducing cost is just a matter of identifying and removing specific services (identifiable by CPT code) that are always unnecessary, or that claims data has sufficient information to support algorithmic identification of when each service is appropriate and when not. We don't think this is correct, and it seems impractical in any event.

The question may also imply that budgets (independent of risk-adjustment) should be set to reflect an estimate of what is 'appropriate' rather than simply what is. Aside from practicality, we think it better to base the APM's budgets on current average costs, including inefficiencies that may be identified and removed as providers engage in care redesign. The difference between their actual cost, including those efficiencies they are able to engineer, versus the original predicted cost constitutes the estimate of savings for that episode. As part of information feedback, we have considered publishing guidance that includes differential predicted costs associated with different scenarios. For example, the expected cost for a procedure may be significantly higher in the presence of certain identified comorbidities. Similarly, the expected cost for a procedure may be significantly higher if a more expensive setting of care, or surgical technique is selected by the provider for a given patient. The guidance would inform providers about how the expected costs can vary, informing their decisions affecting eventual cost and quality outcomes.

3. How will you ensure that risk adjustment is based on accurate and current comorbidities vs. what appears on claims forms?

An initial phase risk adjustment will necessarily rely on information from claims. Our concern with this is not the accuracy or currency of claims, but rather their completeness.

Because the proposed model is retrospective, claims information will be 'current' with respect to the episode-periods. We propose not to include information from within the period as a matter of policy, not because of information constraint. To the extent that claims are inaccurate or not current, it will be incumbent on providers to ensure or learn to include accurate and current comorbidities in the claims that they submit, and the proposed model would give them incentive to do so.

Addressing the important concern of information completeness will require incorporating new sources of information. The proposal anticipates future development to incorporate more complete clinical information from registries and/or EHR systems into episode formation and risk adjustment.

4. How will patient functional status be assessed and incorporated into risk adjustment?

The work of developing additional data sources with more informational value than claims should include any measures of functional status deemed to be appropriate and necessary by the clinicians who specify the contents of such registries and EHR systems. As with any risk factor, they should be found predictive and supportive of the desired incentive structure.

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Once appropriate data are available, patient functional status could be incorporated as additional risk factor(s) in the proposed model. The episode based measure framework is ideal for testing high value, goal-based process measures which could incorporate functional status and goals for improvement. Such goal-based process measures are also ideal for inclusion in the episode based measure framework as a linked measure to dyads of related PROMs. For example, functional improvement as a goal can be linked to a PROM which assesses the level of achievement on a Likert scale.

Questions about providers:

1. Are providers grouped in a defined episode inclusive of those not participating in the risk arrangement?

Yes, some clinicians participating in the care of the patient for a given episode may not be participating in the risk arrangement. Those who do not elect to participate in this APM may continue to provide care for their patient and participate in MIPS or other APMs. The ACS-Brandeis model does not restrict beneficiaries' freedom to choose among providers or preclude providers from seeing their patients.

Importantly, the logic and calculations of value are patient-centered, and are not weakened or contorted in order to accommodate residual silos, or to preclude shared accountability across risk environments (e.g., clinicians in two separate APM entities seeing some of the same patients). All clinicians participating in the care of the patient affect the eventual cost and quality, and from a professional perspective are part of the clinical team. The performance standards do not carve out or ignore the contributions of any clinicians to the results for the patient.

The ACS-Brandeis model does not attempt to judge the contributions of individual clinicians to the results for a patient. Evaluations of quality, cost outcomes, and value are determined statistically over patient cohorts (analogous to a "flood lamp") using the patient's team-based care as the unit of analysis (a "spotlight"); whereas no conclusions can be drawn simply from the individual clinician's role (a "laser beam") apart from the patient-centered and team-based contexts.

Which is not to say that status quo conditions are optimal. Empirical evidence suggests there are many more clinicians participating in patient care, and many more services and costs than may be optimal. Strengthening the clinical teams is a part of the work of the APM entity to help improve and ensure high value.

2. What happens if a PCP is not formally part of the team? How will any shared savings or shared losses associated with the PCP be dealt with?

The fiscal attribution logic in the ACS-Brandeis model includes a role for the Primary provider(s) who see the patient over time. Their contributions to the actual results for a patient are real and important. Their contributions are counted formally as their "shares" in those results. Each clinician's shares rightfully belong to them in the evaluation of their contributions to cost and quality outcomes for their patients.

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The ACS-Brandeis model does not appropriate those shares, positive or negative, and redirect them through attribution to other clinicians. In an episode, if physicians in a particular service area do not contract with the APM entity to accept risk, regardless of whether it is a PCP, Anesthesia or other specialty, that percent of the risk is retained by CMS and can be attributed appropriately to other auspices. When clinicians are participating in care for the same patients and episodes, then their proportional contributions should follow them into consistent evaluations of value, either as part of their affiliated APM entities, or as part of their MIPS CPS.

3. What happens if a particular specialist doesn't want to participate?

The ACS-Brandeis model was developed to respect and attract specialists into formal CAGs and team-based care guided by an understandable and fair value proposition. MACRA does not force physicians into APMs, let alone into a specific APM or entity. A particular specialist may prefer to remain in MIPS, or to participate in a different APM entity. The model fully expects not all specialists will participate in all episodes and all service areas, at least at first. Over time, we would hope that with more exposure to the model, more specialists would find value in the risk arrangement and join as a participant in an A-APM. An episode might call for a PCP, a surgeon, a radiologist, anesthesiologist and more. If only the surgeon participates, then only 40% of the risk in that episode would actively apply to that entity.

A more nuanced answer would consider three aspects of the question. First, as in our answer to the prior question (#2), the financial shares attributed to the specialist as a Principal provider would be handled properly as with the Primary provider; i.e., as part of the evaluation of that provider under the auspices of his or her affiliated APM entity, or under MIPS. Second and similarly, a particular specialist may prefer to operate under different auspices (another entity or MIPS), and the model allows for that.

Third, the premise that “a particular specialist doesn’t want to participate” could convey a negative connotation, namely that he or she does not want to participate in value-based care, or secondarily to participate in efforts to achieve benchmark quality and cost outcomes. This scenario emphasizes the need for all clinicians participating in team-based care to work on behalf of the patient to achieve high value, and this includes trying to convene optimal teams, and influencing all team members to strive together for the best outcomes. This also emphasizes a premise of the ACS-Brandeis model, namely that even clinicians who prefer to hunker in silos will be held to the same standards deemed appropriate for the profession. A corollary is that such clinicians should emerge from the silos and contribute to defining and achieving appropriate standards. The ACS-Brandeis model allows physicians to choose their organizations of practice, and still separately participate actively and effectively in team-based care.

4. Who determines a particular clinician’s role in a given episode?

Fundamentally, the various providers along with the patient jointly determine the clinicians’ roles. In the ACS-Brandeis model, clinical logic is implemented through algorithms that infer

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and assign the various roles for clinicians, and corresponding percentages of risk. Clinicians' roles can change according to the needs of the patient.

The ability to infer and assign roles is facilitated by the careful articulation of episodes by the EGM. For example, a physician could enter a case to diagnose or treat sepsis that is a sequela to a prior condition, such as pneumonia. That physician could have a substantial role in the sepsis episode but no role in the prior pneumonia episode, meaning no individual responsibility for the onset of that individual case of sepsis. Having said that, if physicians who routinely deal with pneumonia and sepsis cases work under the common auspices of an ACS-Brandeis model CAG, then they will work together to identify opportunities through shared accountability and common interest generally to prevent the onset of sepsis in pneumonia cases.

We recognize that MACRA and CMS will call upon clinicians to self-report their roles in the context of episodes. Once implemented, and for quite some time, using algorithms that infer roles in conjunction with primary data may lead to optimal assignment of roles. In either case, the articulation of episodes by the EGM provides the context for interpreting the roles assigned to individual clinicians.

5. What specific specialties or practices have indicated willingness to participate in the model?

Surgical specialties, Anesthesia, and Hospitalists have all expressed interest. Our efforts have also invited PCPs and a few medical specialties. See also our answer to the first question in this document.

6. What is the minimum composition of a Clinical Affinity Group needed for the model to be successful?

We have posited CAGs to represent the multidisciplinary contributions needed to critique and to redesign care, including appropriate guidelines, and supporting technologies and service capacity. The composition of a CAG is conditional on the subject of interest. In some respects, these begin with the larger specialties whose members participate in care for a particular condition or type of episode. For example, cardiology as a clinical profession and specialty, along with others, meaningfully defines appropriate care for patients with cardiovascular conditions. Such blueprints need to be adapted and implemented to local circumstances. That speaks to the great potential for regional collaboratives to help engineer coherent delivery and referral systems in local areas. Even further, implementation must occur at the patient level, involving the rosters of professionals and numerous settings of care available to patients residing in particular locations. That is the role of the APM entity.

Thus, at the entity level the minimum composition of a CAG is reasonable representations of the multidisciplinary contributors to the care needed to succeed given the context of an episode. If the criterion for success involves quality and cost outcomes for procedural episodes, then a minimum composition might include the surgeons, medical specialists, and anesthesiologists. More generally, the idea here is to connect the major elements of the team in a context of innovation and shared accountability for the sake of optimal quality and cost. In the ACS-

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Brandeis model, the mindset of shared accountability and meaningful innovation is not constrained to new “silos” created by entities, especially if CMS and other payers extend measurement of the shared accountability to the clinicians’ respective organizations of practice, APM entities, or MIPS.

7. Is there a minimum threshold as to how many/which physicians need to be involved in the Alternative Payment Entity in order for the payment model to work?

This is a central question for all APMs. Can anyone expect consistently positive and substantial results if most of the “team” isn’t motivated or able to help? That was a death knell to the SGR. That also can be a limiting factor for population-based models with undifferentiated “networks,” and possibly for facility-based models that attempt to lasso professionals into helping the cause.

Motivation is a complicated concept. For the most part, the ACS-Brandeis model follows the premise that clinical professionals benefit from motivation to participate in systemic solutions, and not from nominal or pecuniary “rewards” for idiosyncratic solutions or individual heroics. As Daniel Pink argues, there is a mismatch between the science of motivation and common extrinsic motivators (e.g., see http://www.ted.com/talks/dan_pink_on_motivation). The ACS-Brandeis model appeals to clinicians’ intrinsic motivation for autonomy, mastery, and purpose; in contrast to micromanagement consisting of carrots and sticks. Accordingly, the work of the CAGs and APM is to make the rules simple for clinicians by clarifying professional standards and best practices, and implementing corresponding systems of support.

The minimum threshold question pertains to the critical mass required to amass sufficient numbers of cases, shared savings, and participating clinicians to enable and sustain the adoption and implementation of all the ingredients necessary for excellent care. That is a business question related to ROI. If a “million-dollar robot” or other capital investment is a cost-effective move, how large must a business be to enable and justify the move?

The ACS-Brandeis model combines the potential coverage of a population-based model with the specificity of bundle-specific ROI questions. For QPs by and large, their clinical work is included in the APM by definition via the episode clusters. Hence, their threshold of participation and interest is intrinsic to the model. And by joining into shared accountability under the auspices of an entity, the idea would be to achieve critical mass regarding care redesign, subject to adequate scale and commensurate returns sufficient to cover fixed costs associated with implementing the new clinical vision for care.

Questions about targeted patients:

1. Does the patient have complete choice as to which physicians will be involved in their care, where they will receive post-acute care, etc.? What does the phrase “we do not expect that patients will be able to opt out” (page 18 of proposal) mean?

Although the ACS-Brandeis model may eventually expand to include provider contracts with Medicare Advantage plans, the proposal is intended to start with original Medicare. As such,

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there are no limits intended on beneficiaries' freedom to choose providers. By and large, beneficiaries' choices probably first involve Primary providers managing their care over time, and Principal providers managing particular conditions over time. Those providers likely will help beneficiaries choose episodic providers in many cases, i.e., surgeons and possibly the Principal/Episodic providers during acute condition episodes.

In situations where beneficiaries choose clinicians who are participating in the APM entity, we do not expect that those patients will be able to opt out of the team-based protocols intended to improve value, or possibly even patient-reported outcome measures that may be intrinsic to evaluating performance. In other words, if the patient's providers have opted for the APM, then the patient's experience will reflect life in the APM, and not MIPS.

2. If patients will not "be able to opt out of individual bundled care arrangements of the providers from whom they seek care" does this mean that they must limit their chosen providers to those who voluntarily are part of the bundle?

No, the ACS-Brandeis model does not create a closed network of providers for beneficiaries. For example, if a beneficiary's PCP is part of the ACS-Brandeis model and functions as a Primary provider, that does not result in a closed network of potential specialists or surgeons.

Questions about the Quality/Appropriateness:

1. What kinds of quality improvements do you expect to achieve, and how will those improvements be achieved?

This proposal aims to improve quality by effecting positive change in team-based care processes. The model will focus provider attention on the drivers of excess cost during the episode period. We believe that this will lead to innovative efforts to address not only low-value resource utilization but also quality-related events such as unplanned readmission or reintervention, wound complications, hospital-acquired infections and other HACs. Indeed, in automatically capturing all plausible clinical sequelae and attributing them to the Clinical Affinity Group (CAG) or team of providers involved in care delivery, the model builds in an incentive to avoid complications that is far more sensitive than any single measure or group of measures. Effective countermeasures to each of these complications vary by practice size/type and patient characteristics. Improvements are ultimately expected on several possible axes including; patient safety, complication-free quality, functionality and quality of life (as reported by the patient), efficacy, and resource efficiency.

The model is not, and should not be, prescriptive with regard to how each provider or group approaches these efforts, as best practices are constantly evolving and there is no desire to constrain this process by mandating compliance with particular care practices. In other words, rather than trying to delineate the "ideal bundle" in each episode we have instead sought to set the stage and incentives for providing efficient, high quality care.

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APM entities and eligible clinicians are incentivized through the quality measurement framework, which reserves the highest potential financial rewards for those who achieve high performance in process and outcome measures and PROMs measured at the specific episode level. We also intend to reduce inappropriate resource use without losing ground on quality of care by linking a shared accountability model for quality to payment, making it more difficult to share in savings or avoid penalties if quality is not maintained or increased.

What constitutes high quality care may differ for each episode and involve the Donabedian aspects of structure, process and outcome. We have added PROMs and would envision appropriateness measures in future years. Furthermore, for surgical procedures, we have divided the process measures into high-value and low-value groups. The high-value process measures typically represent patient engagement such as establishing the goals of care. These high-value process measures are well-suited for pairing with PROMs, which assess the patient's satisfaction with achieving their care goals.

An example of a high-value process measure linked to a PROM might be a process measure for goals related to a surgical procedure or 2 months of tobacco cessation prior to an operation. The processes involve engaging the patient, the PCP, the anesthesiologist and the surgeon in the care plan/goals. The associated PROM would measure to what level the goals were achieved, the patient's ability to amend the goals, and the team-centered approach toward goal achievement.

These quality goals may vary by the episode. The goals are defined specific to the patient and the specific episode. The measures applied include the current CMS specialty specific measures in MIPS and the initial Surgical Phases of Care measure set previously submitted to CMS. ACS is soliciting more additions to the general surgical measure set for inclusion by working with Anesthesia, Hospitalists and other specialties who wish to engage in shared accountability.

2. Why is there no minimum standard of quality to be met?

The proposal does include a minimum quality standard which we believe is consistent with minimum requirements for other CMS payment models. The initial minimum reflects participation rather than level of performance and is intended to allow for the setting of quality performance benchmarks, consistent with CMS' historical approach at the launch of new payment models. The EPM rule selects as few as 2 measures and CAHPS for some episodes. In our model, the minimum quality standard in the initial benchmark setting phase is that participants report a minimum of 2 quality measures including at least one outcome measure. Participation at this level is sufficient to achieve "acceptable" quality and therefore be eligible to share in savings. However, in the acceptable quality tier it is either more difficult to achieve savings or the share of savings provided to the entity is reduced (depending on the payment model). Achieving higher quality tiers (at first through participation and reporting but later through performance), requires greater participation, including reporting a greater number of

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measures including PROMs and makes it less difficult to achieve savings targets or increases the share of savings received. The highest quality tier attempts to bridge the gap between participation and performance. To achieve this tier, a significant number of episode-specific measures (such as the surgical phases of care measures for surgical procedures) must be reported and performance in at least one of these measures must be in the top decile. To achieve this level of performance will require a full team effort.

3. The model proposes to measure quality in a manner that “spans all specialties” (page 5). Why are there no procedure-specific outcome measures? Is there no expectation of patient interest in procedure-specific outcomes; e.g., improved mobility / function after an orthopedic procedure?

The delivery of high quality care that results in optimal outcomes requires a team of providers focused on this goal and, in fact, this is what is referred to by the notion of quality measurement that “spans all specialties” on page 5 of the proposal.

The developers agree that patient goals and interests are important to the delivery of high quality health care. We incorporate high-value process measures and validate the level of goal achievement as an outcome using PROMs. We also strongly believe that quality should be measured as closely to the episode of care delivered as possible, be that a procedure or a chronic or acute condition. In our model, achieving the “excellent” quality tier requires measurement tied to the specific episode, including PROMs.

Procedure-specific outcome measures are achievable and should be tailored to the episode. The proposal provides a framework which can be tailored to each episode, but which is also flexible to allow as many providers to participate as possible. Measuring goals of care spans all patients, all episodes and all clinicians; and at the same time, the goals can and should fit the individual episode and patient. For example, in a chronic cancer care episode, the goals may vary depending on the stage of the cancer and the patient’s wishes. The high-value process measures for cancer related goals reflects “patient goals” measures which span all specialties and at the same time could fit the episode and the patient very specifically.

As another example, a condition episode for musculoskeletal conditions related to osteoarthritis may reflect goals to avoid early surgical care while maintaining patient functional goals for pain, lifestyle and employment. If the condition episode progresses to a surgical procedure, such as elective joint replacement, the outcomes measures should fit the patient for the procedure episode. Some patients replace joints for improved function, others for pain management, other patients seek both. The proposed measurement framework allows for high-value process measures, including patient goals, correlated with matched PROMs.

The model does not seek to limit innovation in measure development. ACS has provided an example of episode-specific measure sets in the form of the Surgical Phases of Care. The model development team has already been approached by other societies who are interested in exploring development of similar measure sets for the most common procedural episodes provided by their members. Since episodes cover a period of time, (generally 90 days for a

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procedural episode,) we believe most patients would have phases of care to consider specific for each episode, although the phases of care may vary by the type of care provided. Surgery, for example, has five phases. Other procedure or condition episodes may have 2-4 phases such as an acute phase, a subacute phase, a recovery phase and a stable chronic phase. We have specific measures for the general surgical measures and include outcomes measures in the phases of care measure sets: SSI, readmissions and PROMs. We have pledged to assist all the other surgical disciplines in using the phases of care approach and providing selective measures for their episodes.

4. The model references (in Appendix A) the use of three adverse outcome measures: 30-day unplanned hospital readmission, surgical site infection, and unplanned reoperation rate within 30 days. What is the incidence rate of these adverse events and what is the minimum patient size necessary for these measures to have discriminatory power across providers?

The proposal is not reliant on the performance characteristics of any particular measure. The measures in Appendix A are intended to serve as an example of the type of measurement expected in the Episode-Based Quality Category, initial implementation could even be transitional without measurement risk, allowing refinement of measurement over time. The important concepts of this proposal are not reliant on an existing measure.

The adverse events and minimum patient sizes necessary for discriminating among providers are problematic for almost every surgical procedure because of the lack of statistical power in small numbers. It is for this reason we have previously advised CMS that outcomes based measurement alone will not allow for accurate and meaningful discrimination between surgical care teams with an adequate C-statistic and sensible confidence intervals.

For example, for a colectomy episode to measure mortality rates as a discerning outcome, the volume of resections required for an individual surgeon to perform would be nearly 2000 a year. Similarly, and also for colectomy, which is a procedure with considerable surgical site infections (SSI), measuring a discernible level of SSI to distinguish one surgical team from another even with risk adjustment, would require a surgeon to maintain a volume of over 250 cases per year. Neither of these are reasonable case volumes.

The situation worsens for conditions where mortality, SSI and readmissions are even less common (the statistical problem of small numbers). For this reason, we have developed the EBMF with shared accountability model with phases of care, high performance, goal-based process measures linked to PROMs. This work is in its early stages but will proceed with CMS' assistance as part of a QCDR within the MIPS program.

The proposal developers do however greatly value these outcomes measures as a means of informing local improvement cycles and focusing efforts to define the high-value process measures. We encourage their use in the APM and recommend their inclusion in the weighting used to establish the quality tiers.

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5. Why are there no patient - reported outcome measures? The proposal includes the acronym “PROMs” on pages 5 and 6, but no patient-reported outcome measures are included in the Appendix A. (We further note that S-CAHPS measures patient experiences during care, but not outcomes.)

As noted above, the PROMs are part of an overall measure matrix in the phases of care. A number of PROMs are in development for the MIPS program and could be included in the proposed model. The development of these PROMs is resource intensive. Without support from the payer community, their development is tied to the limits of the clinician community developing them. The ACS is collaborating with the World Health Organization’s efforts in PROMs and continues to develop these invaluable instruments.

The ACS maintains that CAHPS surveys are of limited value, particularly in informing the early experience with episodes or bundle-based payments. The CAHPS selected for use in existing CMS programs are typically hospital based. The hospital-based CAHPS are surveys of the entire scope of care in a hospital. These samples are not representative of the episode of care. Thus, our approach has been to consider more focused episode-based patient experience with PROMs.

6. How would you assure clinical appropriateness of services performed under the model, including the decision to perform surgery and that there isn't an increase in the number of procedures for low-risk patients (page 19 suggests there is a protection, but it isn't defined)?

The proposal is not intended to resolve the challenge of clinical appropriateness measures for surgical care. We acknowledge such measures are needed and the quality framework is designed to rapidly assimilate those measures once they are reliable, valid and implementable.

Appropriateness measures are some of the most important and sophisticated measures. The Rand Appropriateness of care measure methodology has made it possible to develop appropriateness measures for diagnostic imaging. However, it is much more complicated to develop such measures in instances where procedural appropriateness and clinical decision support are required. The resources to develop and ultimately implement such measures in surgery have not been forthcoming so their availability remains limited. We strongly support federal funding for development of appropriateness clinical decision support tools. These tools should exist within clinician-patient workflows to promote their natural use in the field. In the ACS-Brandeis A-APM, our use of high-value, clinical goal-based process measures tied to short, post-op PROMs serves as a proxy for appropriateness.

To illustrate the challenge, herniorrhaphy is an appropriate operation to consider in the face of an asymptomatic hernia. The patient preferences, goals, and conditions influence the appropriateness of this procedure in a given patient’s care. Theoretically, this could be represented in the form of an appropriateness index, if one were developed and tested for validity. To continue the illustration, imagine an 18 y/o construction worker who is in perfect health except for an inguinal hernia. In this instance, it is broadly accepted that this patient is an excellent candidate for herniorrhaphy and the procedure would therefore be considered appropriate. Conversely, consider the same condition in a sedentary, diabetic patient with severe

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COPD and ischemic heart disease. This is a very different perspective on the appropriateness of a surgical repair. Many would consider surgical care in this patient less appropriate. If the same individual has a symptomatic hernia with sign of incarceration, the level of appropriateness changes. All of these efforts call for clinical judgment applied to the algorithm of care and shared decision-making with the patient and his or her family.

There are appropriateness measures emerging in diagnostics such as appropriateness of advanced imaging based on comparative effectiveness. Other appropriateness measures relate to opioid use in post-op and elderly patients. These emerging measures are easily accommodated within our quality framework and should be added when fully developed and available.

7. Will quality measures be differentiated based upon specific specialty performance in a defined episode?

Quality measurement in the model should ideally be tied closely to the episode of care. The underlying concept of clinical affinity groups reflects the complexity of the practice of medicine and its team-based nature, and reflects team-based care more than individual efforts. In the initial transition phase, available measures may reflect attributions more commonly associated with one specialty over another, however, patient care is team-based and quality measurement should reflect this fact. We will continue adding measures from participating clinical disciplines involved in the episode. These additional measures would add to the efforts for shared accountability from other providers participating in each episode.

To illustrate the model's team-based approach, measuring SSI in a surgical case depends on the urgency of the care, the preparedness of the patient (nutrition, chronic disease management, etc.), the anesthesia, the surgical judgment and technique, and the post-op care protocols. Well-controlled diabetics undergoing a surgical procedure demand pre-op, intra-op and post-op management of their diabetes if SSI reductions are to be optimized. SSI therefore serves as a measure of shared accountability for team-based care and reducing its incidence will require engaging everyone in all aspects of patient care. The status quo of silos of measures to draw distinctions among individuals rather than to measure patients has been of limited efficacy. The ultimate goal of our model is a more patient-centric, shared accountability approach for quality.

8. The "Transition" phase standard is merely to report measures, not perform well on them, except highest decile; when will the "more mature phase" occur and how does quality measurement work then?

The developers recognize the importance of ongoing efforts to tie a greater percent of Medicare payments to the quality of care provided as seen in both MACRA and the earlier HHS targets. It is our intent to move from reporting to performance as soon as possible. From the developers' prior experience with quality measure development, we have learned that it can realistically take two years or more to acquire enough data on a measure for it to be meaningfully used to distinguish between the quality of care being delivered by different providers.

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The proposal's initial focus reporting serves the dual goals of easing participation into the A-APM and allowing time to collect a baseline of data. We feel that this implementation strategy is consistent with the approach taken by CMS in the implementation of other models. That is, CMS has previously launched programs with participation standards and progressed to performance standards over time (For example, moving from PQRI to PQRS to the MIPS Quality component).

9. Why will you only report measures on 50% of patients? Why not 100%?

In PQRS, the first year of MIPS quality reporting and other current CMS payment models, the measure submission threshold has been set at 50%. The proposal has set our reporting threshold at the same level in order to avoid reduced participation due to disproportional reporting burden. The developers believe that quality measurement and reporting are important and believe that it could be encouraged through this model. For example, in future years, reporting on a higher percent of patients could provide credit in your quality score and make it more likely to achieve the good or excellent quality tiers for example.

10. What will be done to ensure that high-risk patients aren't precluded from receiving procedures?

As noted, appropriate stratification on any number of axes is feasible in this model, consistent with the concept of fracture stratification within CJR. The model design is intended to accommodate high-risk patients through its risk adjustment mechanism. In fact, the patient-specific risk adjustment and target price setting of the ACS-Brandeis model means that potential savings may actually be greater for these patients. Each patient is risk-adjusted for the episode based on their comorbidities versus similar patients with the same comorbid conditions and the same episode. If coupled with outlier policies or stop-loss provisions, the model could actually incentivize providers to take on higher-risk patients. Re-insurance at the APM-Entity to cover against extraordinary losses is another potential way to address concerns over high-risk patients. Medicare Advantage Plans have experience in these vehicles and could act as an APM-entity.

Additionally, constant attention to the validity of risk adjustment, including future validation of claims-generated projections using registry data, data on social determinants of health, and other factors will further guard against unintended exclusion of high risk patients.

11. How would the process of taking "samples" of "gaps in care" work?

Whether delayed or avoided care is, in fact, inappropriate will be determined by whether the outcomes of the care pathway for the patient are better or worse than for patients treated in another pathway. It may be that delayed and/or avoided care is in fact the best care for a patient. The trigger for looking for inappropriately delayed or avoided care would be worse outcomes. When worse outcomes are identified for one or more types of episodes cared for by an APM entity, then further investigation into the care pathways used can be triggered as a tool to identify

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the problem or problems. The EGM's completeness and precision with respect to assigning clinically relevant services to episodes can facilitate examination of possible gaps in care.

12. How would the model accommodate introduction of new technologies and evidence?

Medicine is continually evolving, with the constant development of new knowledge and new procedures for providing care. The ACS-Brandeis Advanced APM proposal is based upon the EGM, which can be continually updated to reflect current coding practices and to include current procedural approaches. For example, the procedural details associated with the surgical care of the patient with ischemic peripheral vascular disease are evolving on an almost daily basis. New techniques for revascularization of the leg are being developed constantly. The EGM will require regular updates of the clinical data and logic for both the condition episodes associated with peripheral vascular disease and the procedural episodes associated with the diagnosis and treatment of that condition. However, beyond those considerations, our APM proposal is agnostic to what specifically is done to care for a patient. As long as a care pathway results in good clinical outcomes, and at low cost, the APM methodology will reward the providers involved – regardless of what route is taken to get there.

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September 26, 2016

Andy Slavitt, Acting Administrator
Centers for Medicare and Medicaid Services
7500 Security Boulevard
Baltimore, MD 21244

RE: CMS-5519-P: Medicare Program: Advancing Care Coordination Through Episode Payment Models (EPMs); Cardiac Rehabilitation Incentive Payment Model; and Changes to the Comprehensive Care for Joint Replacement Model

Dear Acting Administrator Slavitt:

The Health Care Incentives Improvement Institute (HCI³) is a nonprofit organization with deep experience in improving health care quality and value with evidence-based incentive programs, and a fair and powerful model for payment reform. We have drawn on that experience and expertise in formulating our comments on CMS's proposed rule (CMS-5519-P) creating new Episode Payment Models and a new Incentive Payment Model, and revising the Comprehensive Care for Joint Replacement Model.

First, we commend CMS for recognizing and remedying some of the weaknesses in the earlier proposed rule (CMS-5517-P) that defined Advanced Alternative Payment Models. As we noted in our comment letter responding to that proposal, the Comprehensive Care for Joint Replacement model and Bundled Payment for Care Improvement initiative merit recognition—with some modifications—as Advanced Alternative Payment Models under CMS's Quality Payment Program.

We are pleased to see that the new proposed rule, in Section V, subsection O, recognizes CJR's risk levels and outcome measures as meeting Advanced APM criteria, and that it modifies CJR to require Certified Electronic Health Record Technology, also in accordance with Advanced APM criteria. In addition, we are encouraged that the proposal anticipates "building on the BPCI initiative...to implement a new voluntary bundled payment model for CY 2018 where the model(s) would be designed to meet the criteria to be an Advanced APM" (Section III, subsection A).

At the same time, we continue to have serious concerns about other elements of the CJR and BPCI designs, concerns that prevent us from supporting the Episode Payment Models (EPMs) outlined in the proposed rule.

The rule's revisions of BPCI and CJR do not alter those models' reliance on Medical Severity Diagnosis-Related Groups (MS-DRGs), and indeed the rule builds the new EPMs upon MS-DRGs. Making MS-DRGs the basis for identifying episodes and for calculating episode budgets is counterproductive for a number of reasons, some of which CMS acknowledges in the text of the proposed rule:

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- The MS-DRG is assigned to a patient's case upon discharge, and it may not be predictable during a patient's treatment prior to discharge. This can make it difficult for providers to implement care redesigns targeted to a patient population identified by MS-DRGs
- The MS-DRGs assigned to a patient's stay are often inaccurate or otherwise inappropriate for the patient's diagnosis, making the classification an inappropriate basis for episode triggers, budgets, quality measurement and adjusting for underlying patient illnesses
- Greater-severity diagnoses under the DRG system carry larger payments, potentially rewarding hospitals when patients develop complications during their hospitalization; payment models should *discourage* rather than reward complications
- MS-DRGs are specific to hospital stays, and therefore are not applicable to outpatient care

In addition, the new EPMs replicate other critical flaws of Medicare bundled payment programs namely:

- Only facilities and not clinicians—who are central to the task of raising care quality and improving affordability—are allowed to initiate and control the episode, making it difficult to engage clinicians in care reengineering
- The models do not include provisions to adjust for patient characteristics, including severity of illness, outside of the imperfect adjustments made by MS-DRGs (detailed above). In particular we're troubled that the proposed rule specifies the need to severity adjust for quality measurement, but includes no methods for doing so in episode budgeting

Given that BPCI and CJR models already are operating, and considering CMS's alterations to allow those models to potentially qualify as Advanced APMs, we support continuing those programs with the rule's proposed changes.

However, based on our analysis of the proposed rule and its shortcomings, it is our strong recommendation that CMS not implement the new EPMs with MS-DRGs. Instead, we suggest that the agency expand on its existing Episode Grouper for Medicare (EGM) methodology, an approach to value-based payment that avoids many of the serious shortcomings of the EPMs, and use it instead. Our detailed appendix to this letter describes, in depth, this possibility, and also answers the proposed rule's requests for comments on how to implement event- and condition-based episode payments.

Sincerely,



François de Brantes
Executive Director

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Appendix to HCI³ Comment Letter on Advancing Care Coordination Through Episode Payment Models (EPMs); Cardiac Rehabilitation Incentive Payment Model; and Changes to the Comprehensive Care for Joint Replacement Model (CMS-5519-P)

OVERVIEW

Recently, the Center for Medicare and Medicaid Services (CMS) released its proposed rule for Advancing Care Coordination Through Episode Payment Models (EPM) pursuant to section 1115A of the Social Security Act. In addition to seeking comments on the methods and processes for implementing a new set of mandated EPMs that are described in the rule, in section III, subsection 3. b. of the proposed rule—“Potential Future Condition-Specific Episode Payment Models”—CMS seeks comment on ways “condition-specific episode payment models may provide for a transition from hospital-led EPMs to physician-led accountability for episode quality and costs,” particularly in the context of acute myocardial infarction (AMI) and coronary artery bypass graft (CABG) models that include Medicare beneficiaries with coronary artery disease (CAD). In section III, subsection 3. c. of the proposed rule, CMS also seeks comments on “Potential Future Event-Based Episode Payment Models for Procedures and Medical Conditions”, with a specific regard to:

“...procedure-related clinical conditions for which the site-of-service can be inpatient or outpatient (for example, elective PCI for non-AMI beneficiaries) or hospitalization for medical conditions for which the ultimate MS-DRG assigned is less clear at the beginning of an episode (for example, hospitalization for respiratory symptoms which may lead to discharge CMS-5519-P 80 from heart failure, pneumonia, or other MS-DRGs based on reporting of ICD-CM diagnosis codes on hospital claims).”

Our analyses and recommendations respond to these requests, and we include technical details on how CMS could implement a physician-focused, event-based EPM.

Shortcomings in currently proposed EPMs for AMI, CABG, and surgical hip/femur fracture treatment

1. Lack of comprehensive adjustment for patient characteristics and severity of illness. Consistent with CMS/CMMI’s prior and current EPMs, the current rule does not include provisions to adjust for patient characteristics or severity of illness outside of the crude and imperfect adjustments offered by Diagnosis-Related Groups (DRGs). The proposed rule makes several references (e.g., section III, subsection f. 2.) to using certain audit and review functions to ensure that EPM participants don’t cherry pick patients. This approach is an acknowledgment that the current EPM designs do not include intrinsic adjustment for patient severity, and require administrative inspection and control mechanisms to prevent participants from avoiding high-cost patients.

2. Lack of diversity in EPM initiator role. Much like the Comprehensive Joint Replacement model, and different from the Bundled Payment for Care Improvement

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program, this proposed rule limits the role of EPM initiator and primary financial risk bearer to the acute care facility in which the episode is initiated. The rule, in particular in section III, subsections 3. b. and 3. c., acknowledges the significant limitations of such a policy and asks for comments and suggestions on how to design EPMs that would enable a far greater role for physicians. The proposed rule acknowledges the limits of having acute care facilities as sole initiators, and we underscore the significance of that issue.

3. Lack of incentives to reduce complications. In addition to the baked-in incentives of DRGs that reward hospitals and physicians for complications that occur during the patient's hospitalization, the introduction of an AMI EPM creates an incentive for physicians and hospitals to admit patients for a complication in the management of coronary artery disease (CAD). While the proposed rule suggests that the introduction of the AMI EPM acts as an engagement of physicians in the management of CAD, the opposite is true. AMIs are potentially avoidable complications stemming from imperfect management of CAD. A substantial body of research has shown that optimal management of CAD can significantly lower the incidence of AMI. By introducing this EPM, CMS is creating an incentive for patients who are marginally symptomatic of AMI to be admitted for an AMI, thus triggering a new episode and payment. This incentive is completely contrary to the overall goals of EPMs, which is to lower the incidence of complications. In its rule, CMS acknowledges the importance of creating condition-based EPMs instead of event-based EPMs. Not only do we recommend adopting condition-based EPMs (described in detail, below) we strongly recommend halting this event-based EPM that is, in itself, a complication from the lack of optimal management of a condition.

Potential Solution to Shortcomings in the Proposed EPMs: Deploy Episode Grouper for Medicare (EGM) to Implement EPMs

Although HCl³ has developed its own episode of care (EOC) analysis and payment software that could be used for Medicare EPMs, we note that CMS already possesses the basic tool it needs to do this. Our experience in this domain suggests to us that the Episode Grouper for Medicare (EGM)—the development of which HCl³ has contributed to, and which, to date, has only been considered for resource-use measurement—could be modified to implement APMs designed around EPMs. Working directly with EGM or an enhanced version of EGM, CMS could correct the issues enumerated above—the problems with severity adjustment, the limits who can bear risk, and the inadequate incentives against complications—and also power a comprehensive set of event- and condition-based EPMs.

In our detailed comments below, we describe the Episode Grouper for Medicare, and lay out ways it, or an equivalent, could be leveraged to create an Advanced APM. Using such a tool for Advanced APMs could not only mitigate the issues we've identified with the proposed EPMs, but also address additional issues of importance to CMS.

TECHNICAL EXPLANATION OF A NON-DRG EPM MODEL AND IMPLEMENTATION

The Episode Grouper for Medicare (EGM)

The Affordable Care Act required the Centers for Medicare and Medicaid Services (CMS) to develop a public domain episode-of-care grouper to be used for feedback to physicians on resource use. In 2012, CMS awarded a contract to Brandeis University to develop the grouper over a four-year period in association with the American Medical Association-convened Physician Consortium for Performance Improvement (AMA-PCPI), the American Board of Medical Specialties Research and Education Foundation (ABMS REF), the Health Care Incentives Improvement Institute, Inc. (HCl³), IPRO (the Medicare Quality

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Improvement Organization for New York State), and Booz Allen Hamilton. The contract directed the Brandeis-led coalition to develop the grouper methodology and software. We feel that the proposed rule's request for comment is highly relevant and an excellent avenue for building on CMS's experience with the existing Bundled Payments for Care Improvement (BPCI) and Comprehensive Care for Joint Replacement (CJR) models. An acute care bundle in the hospital setting is important, but so is managing chronic conditions in an outpatient setting (which often lead to acute inpatient episodes). In addition, contracting for condition episodes and procedure episodes separately is feasible and creates a different level of accountability, but it is even more desirable to consider contracting for the whole patient; that is, procedure episodes should be considered downstream events deeply tied to the effective management of condition episodes. The nested construction logic of the Episode Grouper for Medicare was designed with this in mind, as the recently released Health Care Payment Learning and Action Network's report *Accelerating and Aligning Clinical Episode Payment Models* emphasizes.¹

How the Episode Grouper for Medicare (EGM) could facilitate EPMs

A high-level explanation of how the EGM works is provided below. It serves to illustrate three points: 1) CMS has at its disposal an episode-definition system already paid for by the taxpayers that does not rely on DRG, and 2) EGM could be re-purposed to pay for new condition-specific EPMs that do not rely on DRGs for constructing episodes of care and have the built-in incentives for higher quality and lower price, and 3) EGM has within its system a nested methodology to create and pay for event-based episodes for procedures and medical conditions that are site-agnostic.²

The following descriptions draw heavily from documentation generated by the Brandeis University EGM development team for CMS, and can be used to describe how CMS could implement condition-specific EPMs, as well as event-based EPMs with a focus on CAD, CABG, percutaneous coronary intervention (PCI) and AMI. The same methodology could be extended to other procedures such as pacemaker and defibrillator implantation, gall bladder surgery, hysterectomy, prostate surgery, as well as to medical conditions such as diverticulitis, inflammatory bowel disease and more, where physician-led opportunities would allow the models to be identified as Advanced APMs. Holding physicians and care teams accountable for the entire budget of such an APM would shift care from acute inpatient settings to a more proactive alternative outpatient, patient-centered, coordinated management.

In the following technical recommendations, we concentrate on cardiac examples (as the proposed rule suggests), but the methods can be applied to many conditions and procedures. Much of the enumerated commentary that follows is based on the HCP LAN recommendations for clinical episode payment models. We address these aspects essential for fair, effective, clinically sound EPMs:

1. Triggering an episode of care
2. Services in the episode definition
3. Beginning and ending episodes
4. Pricing episodes, including risk-adjustment
5. Sharing of responsibility for quality and spending between primary care providers, specialty physicians, and other health care professionals

¹ <http://hcp-lan.org/workproducts/cep-whitepaper-final.pdf>

² For a full description of EGM on the CMS website, please see:

<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/Method-A-Technical.pdf>

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6. Incentivizing the engagement of physicians and other providers and suppliers in the episode care
7. Designating the accountable entity for the quality and cost of the episode, including the role of physician-led opportunities
8. Interfacing with other CMS models and programs responsible for population health and costs, such as ACOs and Primary Care Medical Homes (PCMHs)
9. Measuring quality and including quality performance and improvement in the payment methodology
10. Other considerations specific to identifying future models as Advanced APMs

1. Triggering an episode of care.

EGM examines claims data in chronological order by patient, and compares the information to specified criteria needed to trigger any given episode. Not only do the codes on the claims have to match the codes on the episode definition tables, but also the trigger rules have to be fulfilled for the episode to be triggered. For example, to trigger an episode for acute myocardial infarction (AMI), there must be one of the specified diagnosis trigger codes for that condition (e.g., acute myocardial infarction of anterolateral wall, initial episode of care) conforming to the trigger rule for that condition (i.e., trigger code in principal position on inpatient facility claim).

Condition-specific episodes are defined in terms of diagnosis codes, whereas treatment episodes are defined in terms of a combination of procedure codes and qualifying diagnosis codes. Trigger codes are used in conjunction with trigger rules to identify each instance of an episode. EGM supports a number of rules that reflect information available from different types of providers (e.g., hospital as well as physician claims) and how that information can be used to trigger an episode.

For example, a principal diagnosis of heart failure on a hospital claim can trigger acute (and chronic) heart failure episodes, whereas more than one professional evaluation and management services for heart failure can trigger a chronic heart failure episode. Triggering a chronic condition episode is not necessarily the same thing as identifying when the patient's illness began, or even when it became diagnosed for the first time. However, it is important to use the information when it becomes available, including the presence of an episode of care for the chronic condition.

EGM uses several levels of classification based on common anatomic locations or a clinical taxonomy that organizes diagnosis codes into the software's definition tables along with criteria for triggering episodes. Using CAD as an example, EGM will trigger CAD if any of the criteria listed below are observed:

- An inpatient hospital admission with a primary diagnosis of CAD
- A CABG, AMI, PCI, or coronary thrombolysis procedure with a primary or secondary diagnosis of CAD
- A cardiac catheterization, cardiac stress test, or cardiac enzyme test performed between one and 30 days prior to an evaluation and management (E&M) code with a primary or secondary diagnosis of CAD
- Two E&M services each with a primary or secondary diagnosis of CAD occurring between 30 and 450 days of one another

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2. Services in the episode definition.

Over the past decade HCl³ has worked intensively with clinical working groups to define the boundaries of episode definitions, one of which is determined by diagnosis codes that are relevant to the episode. In a similar way, available publications on the CMS website describing EGM state that all relevant services provided during the time-window of the episode are counted towards the cost of the episode.

A payment construct built on such a system leverages the trigger criteria and builds a time window around it. This makes the services included during the episode time window a measurable unit of accounting and useful for accountability. Such a system tracks services and costs related to that condition, and uses information about the presence of the condition to set cost expectations related to that condition, as well as likely other conditions that may be caused or exacerbated by the underlying condition.

In terms of episode definitions, condition-specific EPMs along with event-based EPMs for procedural and medical conditions should be broadly aligned with the EGM, and to the extent they are not, our experience building a comprehensive episode-of-care payment system suggests that a moderate number of modifications should make EGM able to implement these types of EPMs. The EGM organizes Medicare beneficiary total costs around two constructs: episodes of specific conditions and episodes for specific treatments.

Condition-specific episodes represent disease states and permit comparisons of resource use that vary depending on (a) physicians' actions or inactions, and (b) decisions whether to treat and how to treat the condition, and resulting complications (important for payment redesign). Treatment episodes permit comparisons of resource use by specialists, performing the procedure, or providing the specified treatment for a predefined period of time. Treatment episodes are contingent on providing that treatment, which can vary depending on factors such as treatment intensity, setting, and complications.

Thus, condition and treatment episodes can be viewed as continuous sequelae for every Medicare beneficiary, and the costs of treatment episodes can be packaged into the costs of managing underlying condition episodes. Stated in payment terms and incentives, outpatient cardiologists managing CAD can be rewarded for managing beneficiaries such that revascularization procedures are performed according to appropriate-use criteria for coronary revascularization and/or the appropriateness guidelines for bypass surgery developed by the Society of Thoracic Surgeons (STS). Treatment episodes can also be bundled apart from condition bundles to provide incentives to surgeons and interventional cardiologists for better surgical management when the invasive procedures are clinically indicated. In either instance, complications such as AMIs could count against the total expected cost of the event- or condition-based episode payments, creating a significant incentive for the physicians to reduce the incidence of such complications.

3. Beginning and ending episodes.

While determining if an episode is triggered, the triggering criteria also include a specification for the start date of the episode. The start date can be different from the trigger date in order to capture the tests and other services that led to the confirmation of the episode. Hence, the period between the start date and the trigger date is a "look-back" and helps to better define the condition. Episode triggers are accompanied by time criteria with each episode having its own expected course of time.

Condition-specific episodes continue through the life of the beneficiary (in most cases) and treatment episodes have defined start and end dates. For operational payment purposes we recommend patients with chronic conditions be flagged as "provisional" in the benefit year

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of diagnosis to then be included in the “management” episode at the beginning of the next benefit year for payment. This simplifies the operation of the episode with regard to quality measurement data and reconciliation of payments. Thereafter, chronic-condition patient cohorts are automatically rolled over as management episodes for each subsequent benefit year, keeping patient populations aligned with long-term care management goals.

4. Pricing episodes, including risk-adjustment;

5. Sharing of responsibility for quality and spending between primary care providers, specialty physicians, and other health care professionals; and,

6. Incentivizing the engagement of physicians and other providers and suppliers in the episode care.

The EGM examines utilization patterns and cost, performs comparative analyses for similar conditions, and identifies care-improvement opportunities. This construct could be leveraged to calculate unique severity-adjusted budgets for each triggered episode for each patient (multiple concurrent episodes for complex patients). This means that in addition to reporting, it could also be redesigned to function as an Advanced APM.

We assert this with some authority because this is how the HCI³ analytics and payment software is designed to work; namely, in addition to being a risk-adjusted episode-of-care contracting model, PROMETHEUS Analytics performs double duty as a highly refined reporting package. Since HCI³ worked with Brandeis early on in the design of EGM, we believe EGM could be trained to these purposes as well.

We propose some simple but flexible techniques to leverage the EGM tool developed by CMS, and use it to develop specialty payment models. Returning to CAD, we propose two approaches. The first, and more simple, is a treatment episode for specialty interventionists. Although it could be implemented in large, sophisticated systems, it is also geared towards subsets of specialists who are not interested in joining large systems and would want to maintain their independent practices. The second, intended for more sophisticated delivery systems, is a condition-specific episode with a treatment episode bundled as a downstream nested event.

- PCI Procedural Episode Payment

Inasmuch as PCIs are increasingly replacing the more resource-intensive CABG procedures, it's a good candidate for episode construction and to illustrate an EPM model (although the description below would work as well for CABG procedures). Additionally, since PCIs can be done both in an inpatient as well as outpatient setting, it illustrates an EPM that could be site-agnostic, and that would create an incentive to use the place of service that is best suited for the patient, given their age and comorbid conditions. In laying out these scenarios, the cost figures we'll use below are rough estimates based on our own work using claims from private payers, and should be considered as such.

In this scenario, a Medicare participating cardiologist (Specialist A) has determined that Medicare beneficiary B (Patient B) has significant narrowing of the coronary arteries (Ischemia), caused by a buildup of plaque (fatty material) within the walls of the arteries. Specialist A determines that PCI is indicated for Patient B and arranges a date for performing the outpatient procedure at Hospital C. On that date, Specialist A has a number of clinical choices to assist the PCI.

As the catheter is inserted into the artery, to better “see” the extent and sites of arterial blockage, Specialist A may resort to one of two techniques:

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- Angiography, a special type of X-ray, similar to an X-ray "movie" that assists Specialist A in the location of blockages in the coronary arteries as the contrast dye moves through the arteries, or
- Intravascular ultrasound (IVUS), a technique that uses a computer and a transducer that sends out sound waves to create images of the blood vessels. IVUS provides direct visualization and measurement of the inside of the blood vessels.

Angiography or IVUS can assist the Specialist A in selecting the appropriate size of balloons and/or stents, to ensure that a stent, if used, is properly opened, or to evaluate the use of other angioplasty instruments. Moreover, fractional flow reserve (FFR) assessment is often used during a catheterization to assist in determining the significance of a moderate coronary narrowing. The technique involves placing a pressure-transducing wire across the narrowing, and after a brief infusion of medication, measuring the pressure change in the coronary artery. This may assist the doctor in deciding whether PCI or stenting is appropriate.

Furthermore, as Patient B lies on the table, Specialist A may determine that atherectomy (removal of plaque) at the site of the narrowing of the artery is necessary. In atherectomy, tiny blades on a balloon or a rotating tip at the end of the catheter break up plaque at the narrowing of the artery. Additionally the specialist may decide if the patient needs a stent to be placed in the coronary artery that is being dilated. If a stent has been placed, tissue will begin to form over it within a few days after the procedure. The stent will be completely covered by tissue within a month or so. Therefore, as follow-up care, Specialist A may prescribe aspirin, clopidogrel (Plavix), prasugrel (Effient), or ticagrelor (Brilinta), which decrease the "stickiness" of platelets in order to prevent blood clots from forming inside the stent. Or he may place a drug-eluting stent to prevent scar tissue build up. If scar tissue does form inside the stent, a repeat procedure may be performed, either with balloon angioplasty or with a second stent, or occasionally with local radiation therapy (called brachytherapy).

After Patient B is released from Hospital C the same day as the intervention, a 30-day "look-forward" period is included as part of the episode definition, for follow-up work, to assess the functioning of the heart. These assessments may include resting or exercise electrocardiogram (ECG or EKG), chest X-ray and echocardiogram of the heart. In addition, the physician may decide to do one or more of the following procedures based on patient's signs and symptoms, his suspicion of complications, or as part of a more detailed post-procedural evaluation. These services may include but are not limited to cardiac catheterization, computed tomography (CT scan) of the chest, magnetic resonance imaging (MRI) of the heart, myocardial perfusion scans, radionuclide angiography, or a cardiac CT scan. Additional procedures such as Holter monitor, signal-averaged ECG, electrophysiological studies may be performed if the patient has palpitations or significant arrhythmias after PCI. Patient B's compliance with prescribed medications is also monitored.

We point out these procedural and pharmacological choices because each of these represents cost variation under Specialist A's control and can be bundled into the episode of care payment (i.e., IVUS is more expensive than Angiography, stenting more expensive than balloon angioplasty). It also shows why seemingly "simple" procedural episodes are not so simple, and why any grouping methodology must reflect these clinical realities and factor them into the budgeting process.

Having discussed the clinical parameters of PCI, we can now think about dollars and payment. Looking into the results of some of our own analyses, we know that, on an

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average, PCI costs about \$44,000 per patient with the median cost being about \$43,000, and a standard deviation of about \$30,000. That means that PCI costs for any CAD population are fairly tight (few large outliers). We also know that cost of complications fall into the range of 8 to 9 percent of total costs of PCI. If Specialist A performs 30 PCIs per year (the minimum threshold) for a given CAD population, we know he represents a historical baseline cost of \$1,320,000. If Specialist A performs as an average specialist, we would expect a complication rate of 9 percent, or \$118,800 towards costs of complications. The expected cost of complications (\$118,800) would be the incentive target. If he lowers the complication rate to 6 percent (\$79,200), CMS could share the savings of the difference off the baseline (\$39,600). If savings were shared equally with Specialist A, then Specialist A would receive a supplemental payment of \$19,800.

- CAD Condition Specific Episode Payment (with or without PCI or CABG) in a coordinated care setting

Under this scenario, we reconsider Patient B with the same chronic condition in an outpatient setting. Specialist A is managing her, except now, he practices in a large group setting of 100 or more physicians. Medicare already knows the size of the practice because it queried its Provider Enrollment, Chain and Ownership System (PECOS) and performed confirming claims analysis. Since we know fewer than 50 percent of stable CAD patients receive Optimal Medical Therapy (OMT), one purpose for changing specialty payment would be to bring the percentages of CAD populations up to OMT guidelines. That alone would lower costs. Moreover, the benefits of performing PCI without trying OMT in patients have been called into question. Recent research indicates that there is no benefit of PCI in preventing myocardial infarction or death in patients with CAD.

As CMS contemplates episode payment reform, staff may be comforted by the fact that American College of Cardiology Foundation (ACCF), the American Heart Association (AHA), and the Physician Consortium for Performance Improvement (PCPI) Work Group have recognized the significant gaps that exist in the care of these patients in the outpatient settings. Working in concert, they defined quality measures aimed at improving outcomes for these patients and recently updated the Chronic Stable Coronary Artery Disease Performance Measurement Set, which provides benchmarks for improving the care of patients in the outpatient setting. These should be factored into the reformed payment structure, especially in reducing the frequency of non-beneficial PCIs. According to ACC guidelines, only about 10 percent of PCIs in any given CAD population are considered clinically indicated and part of quality care (3 vessels with 90 percent blockage). In the procedural example, we did not consider comorbid conditions. But chronically ill Medicare beneficiaries are predominately complex patients. EGM takes comorbid conditions into account and calculates a risk-adjusted budget for each Condition Specific patient. We highlight this because building a condition-based payment model that only considers a simple, isolated CAD episode is not realistic. Most of the beneficiaries would fall out of the payment model, thwarting the goals of the program.

So, in addition to a primary diagnosis of CAD, Patient B has a history of type two diabetes, hyperlipidemia, and hypertension. Pulling the diagnosis codes from submitted claims, EGM calculates the expected costs for CAD adjusted for all her relevant conditions that impact CAD. We know from our own analyses that average outpatient cost for CAD patients is approximately \$6,000 per year, with median costs being \$2,200 and a standard deviation of over \$15,000. As opposed to PCI, where cost variation is tight around the mean (as it is for most procedural episodes), there is wide variation in costs for chronic heart disease

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patients. The percentage of total costs represented by avoidable complications is 36 percent for this population -- four times the rate for PCI.

Continuing with Patient B, EGM triggers a CAD condition episode with a risk-adjusted budget of \$8,700 (factoring in type two diabetes, hyperlipidemia and hypertension) for one year's worth of care. Her fellow beneficiaries triggering condition CAD episodes also have risk-adjusted budgets, and going with the population average of \$6,000, and a total group practice panel of 500 CAD patients (Specialist A with designated care team), we arrive at an aggregated population budget of \$3,000,000 and an aggregated complication costs of \$1,080,000. As we did with PCI in isolation, a reduction of, say, 6 percent complication rates is targeted. EGM calculates the reduction savings as \$64,800. With a 50 percent gain-share arrangement, the practice would receive a supplemental payment of \$32,400, over and above normal FFS billings, contingent on meeting quality measures.

Another reason for combining the condition CAD episode with PCI is that it addresses the conflict between a cardiologist acting as primary care specialist and interventionist. Bundling PCI alone provides an incentive to optimize the mix of services within the time frame of the episode, but it does not resolve the issue of reducing the incentive to order the procedure as a self-referral. Packaging the two episodes into a predicted population budget does.

Therefore, the policy advantages of operationalizing EGM for condition-specific EPMs would be:

- Ease with which assigning responsibility for episode management;
- Resolve the incentives for non-indicated PCI or CABG self-referrals, including unnecessary acute procedures;
- Bring greater numbers of CAD Medicare populations and their physicians into standard society designed guidelines;
- Reduce baseline frequencies of avoidable complications;
- Enhance physician engagement and encourage physician practice re-engineering to make them active recipients of cost-sharing arrangements

At the very least, these policies will reverse the downward percentage of physician compensation as a function of total episode reimbursement, and make it profitable to re-engineer care.

7. Designating the accountable entity for the quality and cost of the episode, including the role of physician-led opportunities; and, 8. Interfacing with other CMS models and programs responsible for population health and costs, such as ACOs and Primary Care Medical Homes (PCMHs)

We believe that CMS should be expansive in its view of organized provider models qualifying for condition-specific EPMs. Willing organizations dedicated to integrating and coordinating the work of practicing physicians and health care providers across the care continuum should be deemed appropriate for assuming risk and managing a bundled payment program so that innovation and market-based arrangements dedicated to EPM are encourage to come forth. CMS should promote flexible collaboration so that care teams for each chronic condition, whether hospital-based or not, may share the risks and rewards associated with creating seamless, efficient, patient-centered care processes. These would include ACO, PCMH, IPA, PHO and other models, some perhaps yet to be conceived, so long as these organizations are totally committed to coordinated care planning, shared

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decision-making, comparative quality information, chronic disease management processes, transparency of payment information, and care transition coaching and support.

Creating such an atmosphere for change may allow new models to emerge where post-acute care providers, physician group practices and even non-physician care coordination coaches may assume financial responsibility for costs of the episode care and use hospitals and physician as consultants for clinical outreach, as is happening in the Minnesota Birthing Centers for maternity care.

9. Measuring quality and including quality performance and improvement in the payment methodology

In addition to the quality performance and measurement instruments we mentioned in previous sections, there are additional considerations CMS may explore. These might potentially include:

- ACCF/AHA/AMA-recommended measures for CAD and hypertension;
- The Seattle Angina Questionnaire for patient-reported outcomes;
- Quality / outcome measures as validated by the National Quality Forum.

Through its management of Bridges to Excellence and PROMETHEUS Payment programs, HCI³ has consistently maintained that quality improvement programs should focus less on process of care measures and more on episode of care outcomes, particularly on lowering rates of potentially avoidable complications such as avoidable readmissions, emergency room visits, and specific adverse events highlighting overuse, misuse and underuse of services. We believe CMS should adopt a similar position as it considers condition-specific EPMs and event-based procedural models.

10. Other considerations specific to identifying future models as Advanced APMs; and any other issues of importance for the design of such an EPM

Current claims adjudication systems are structured to accept and process fee-for-service claims but cannot create budgets or process payments for an advanced EPM. An updated claims adjudication system is the urgent need of the hour to move towards true value-based arrangements. Further, contracting tools that would help divide up payments amongst downstream providers would encourage participation and assumption of financial responsibility. Participating providers including those in post-acute care settings would be encouraged to improve their care pathways to create winning arrangements and would steer towards wider adoption of EMRs and care-coordination tools. Providers holding joint responsibility for the patient's clinical and financial outcomes would create seamless data channels to integrate care across the entire care continuum. As we speak, there are a handful of companies pushing in this direction. An RFI from CMS/CMMI would spur innovation and be electric, and would pump considerable energy into what is now only a nascent entrepreneurial movement.

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ACS-Brandeis Condition and Procedure Episodes

Key blue = episode for profiling; green = procedure episode

Clinical Chapter	EGM Condition Name		
BEHAV HTH	Adjustment Ds Affective Ds Other (Acute) Affective Ds Other (Chronic) Anxiety Ds (Acute) Anxiety Ds (Chronic) Bipolar Ds Acute - Single Manic Episode Bipolar Ds Chronic Bipolar Ds Chronic (Acute) Conduct Ds (Acute) Conduct Ds (Chronic) Major Depression Acute - Single Episode Major Depression Chronic Major Depression Chronic (Acute)	Mental Retardation Obsessive Compulsive Hyperactive Ds Personality Ds Phobias Psychotic Ds Other (Acute) Psychotic Ds Other (Chronic) Psychotic Ds Schizophrenia Acute Psychotic Ds Schizophrenia Chronic (Acute) Psychotic Ds Schizophrenia Chronic (Chronic) Stress Ds Substance Abuse Alcohol Substance Abuse Other Tobacco Use	
Chest	Abscess of Lung Acute URI Complicated Acute URI Simple Airway Burn Airway Injury/Foreign Body Airway Lung Neoplasm - Benign Airway Lung Neoplasm - in Situ/Uncertain Behvr Airway Lung Neoplasm - Malignant Alveolar/Interstitial Chronic Ds Asthma/COPD Acute Asthma/COPD Chronic Benign Neoplasm Chest Wall Benign Neoplasm Mediastinum Benign Neoplasm Thymus Bronchiectasis Bronchitis, Bronchiolitis nos Bronchopulm Dysplasia Related Chest Wall Injury Complicated Severe Chest Wall Injury Simple Mild-Mod	Chronic Pulmonary Embolism Chronic Resp Failure Diaphragm Injury Empyema Extrinsic Allergic Alveolitis Hydro- and/or Pneumo-Thorax Idiopathic Pulmonary Fibrosis Lung Contusion-Laceration-Other Malignant Neoplasm Chest Wall Malignant Neoplasm Thymus Meconium Aspiration Mediastinitis/Mediastinal Abscess Mesothelioma and Related Metastatic Neoplasm Chest Obesity Hypoventilation Syndrome Pleural Ds Effusion Pleural Neoplasm - Benign Pneumoconiosis and Related Pneumonia	Pneumonia Aspiration Primary Pulmonary HTN Pulmonary Eosinophilia Radiation Pneumonitis Resp Cmplctns Acute Resp Distress Syndrome Resp Failure Septic Pulmonary Embolism Subcut Emphysema Thorax (Not Lung/Pleura) Neoplasm Thorax Pulmonary Injury Thymus Ds (Not Neoplasm) Tietze's Disease Ventilator Associated Pneumonia Lung resection

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Clinical Chapter	Condition Name		
CVAS	Abdomen/Pelvis Vessel Injury	Hypertension Essential (Chronic)	Valve Ds Aortic & Mitral (Acute)
	Abdominal Aortic Aneurysm	Heart Failure (Acute)	Valve Ds Aortic & Mitral (Chronic)
	Abdominal Ruptured Aortic Aneurysm	Heart Failure (Chronic)	Post-Op Hemorrhage/Hematoma
	ACS Other Than AMI	Heart Injury Include Hemopericardium	Postoperative Shock
	Acute DVT Extremity/nOS	Heart Neoplasm	Prinzmetal Angina
	Acute Myocardial Infarction	Heart Transplant CAD	Pulmonary Valve Atresia/Stenosis - Congenital
	Acute Pulmonary Embolism	Heart Transplant Cmplctns Acute	Raynaud's Syndrome
	Aortic Dissection Thoracic/Abdominal	Hereditary Hemorrhagic Telangiectasia	Renal Artery Ds
	Aortic Valve Insufficiency - Congenital	Hypersensitivity Angiitis	Sick Sinus Syndrome
	Arrhythmias Other/Unspecified (Acute)	Hypertension Secondary (Acute)	Stricture of Artery
	Arrhythmias Other/Unspecified (Chronic)	Hypertension Secondary (Chronic)	Valve Ds Aortic (Acute)
	Arrhythmias Sudden Death	Iliac Artery Aneurysm/Dissection	Valve Ds Aortic (Chronic)
	Arterial Thromboembolism	Ischemic Heart Disease	Valve Ds Mitral (Acute)
	Arteritis	Lower Extremity Aneurysm	Valve Ds Mitral (Chronic)
	Atherosclerosis Aorta	Lower Extremity Vessel Injury	Valve Ds Right (Acute)
	Atrial Fibrillation/Flutter (Acute)	Lower Limb Vessel Anomaly	Valve Ds Right (Chronic)
	Atrial Fibrillation/Flutter (Chronic)	Lymphangioma nos	Valve Replacement Comp/Malfnctn
	Atrial Premature Beats (Acute)	Lymphedema	Varices nos
	Atrial Premature Beats (Chronic)	Myocarditis	Vasc Device or Graft Comp/Malfnctn
	Card Device or Graft Comp/Malfnctn	Neck Artery Dissection/Aneurysm	Vascular Cmplctns Acute
	Cardiac Aneurysm	Non-Operative Shock	Vein Disease Thoracic and Abdominal
	Cardiac Tamponade	Pacer/AICD Comp/Malfnctn	Venous Insufficiency Varicosities
	Cardiomyopathy	Paroxysmal Supraventricular Tachycardia (Acute)	Ventricular Premature Beats (Acute)
	Carotid/Aortic Body Neoplasm	Paroxysmal Supraventricular Tachycardia (Chronic)	Ventricular Premature Beats (Chronic)
	Chordae/Papillary Rupture and Related	Pericarditis, Inflammatory	Ventricular Tachycardia
	Chronic Embolism/Thrombosis	Pericarditis, Other	Vf/Cardiac Arrest Vfibr/Vflutr
	Cor Pulmonale (Acute)	Peripheral ASVD	Cardiac catheterization
	Cor Pulmonale (Chronic)	Phlebitis/Thrombophlebitis	CABG
	Coronary Bypass Graft Mlfnctn	Polyarteritis	Percutaneous cardiac intervention
	Endocarditis	Post MI Syndrome and Related	Insertion of permanent pacemaker/AICD
	Fluid Ds Hypo/Hyper-Volemia	Thoracic Aortic Aneurysm	Open heart valve surgery
	Gangrene	Thoracic Ruptured Aortic Aneurysm	Aortic repair
	Heart Block	Thorax Vessel Injury	Leg vein ablation
	Hypertension Complic, Malig (Acute)	Thrombotic Microangiopathy	Leg revascularization
	Hypertension Complic, Malig (Chronic)	Upper Extremity Aneurysm	Leg vein angioplasty
	Hypertension Essential (Acute)	Upper Extremity Vessel Injury	

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Clinical Chapter	Condition Name		
Dermatology	1st/2nd Degree Burn, Extremity	Dermatophytosis Foot, Nail	Poly/Dermatmyositis
	1st/2nd Degree Burn, Head And Neck	Dermatophytosis Other	Psoriasis
	1st/2nd Degree Burn, Trunk	Epidermal Necrolysis	Pyoderma Gangrenosum
	1st/2nd Degree Burn, Whole Body	Erythema Multiforme	Rosacea
	3rd Degree Burn, Extremity	Extremity Contusion/Abrasion/FB	Scabies
	3rd Degree Burn, Head And Neck	Extremity Open Wound	Sebaceous Cyst
	3rd Degree Burn, Trunk	Extrinsic/Contact Dermatitis (also Sun/Radiation)	Seborrhea
	3rd Degree Burn, Whole Body	Head Face Neck Contusion/Abrasion/FB	Shingles
	Allergic Dermatitis Urticaria	Head Face Neck Unspecified Burn	Skin Graft Complctn
	Cellulitis Face & Neck	Herpes Simplex	Skin Neoplasm - Benign
	Cellulitis, Trunk and Extremities	Kaposi's Sarcoma Soft Tissue nos	Skin Neoplasm - in Situ/Uncrtn
	Chronic Cutaneous Ulcer	Keratosi Actinic/Seborrheic	Skin Neoplasm - Malignant (Not Melanoma)
	Decubitus Ulcer	Late Effects of Burn	Skin Neoplasm - Melanoma
	Deep 3rd Degree Burn, Extremity	Metastatic Neoplasm Skin/Subq	Trunk Open Wound
	Deep 3rd Degree Burn, Trunk	Molluscum Contagiosum	Viral Warts
Deep 3rd Degree Burn, Whole Body Nos	Pediculosis		
ENDO/MET	Acid-Base Ds	Diabetes Type II (Acute)	Malignant Neoplsm Endo nos
	Adrenal Insufficiency	Diabetes Type II (Chronic)	Malignant Neoplsm Parathyroid
	Benign Neoplsm Adrenal	Diabetic Ketoacidosis DKA	Malnutrition
	Benign Neoplsm Endo Nos	Disaccharidase Deficiency	Neoplsm Uncertn Behvr Adrenal
	Benign Neoplsm Parathyroid	Electrolyte Ds	Neoplsm Uncertn Behvr Endo Other
	Benign Neoplsm Thyroid	Goiter +/- Thyrotoxicosis	Obesity
	Calcium Ds nec/nos	Gout	Parathyroid Ds
	Carcinoid Syndrome	Hemochromatosis	Pituitary Ds
	Cushings Syndrome	Hyperaldosteronism	Polyglandular Dysfctn
	Diabetes Hyperosm/Coma	Hypercalcemia	Thyroid Neoplasm Malignant
	Diabetes I/II Complicated (Acute)	Hypocalcemia	Thyroiditis
	Diabetes I/II Complicated (Chronic)	Hypoglycemia	Thyrotoxicosis w/o Goiter
	Diabetes Secondary (Acute)	Hypothyroidism	Vitamin A/Thiamin Deficiency
	Diabetes Secondary (Chronic)	Insulin Pump Care/Complication	Vitamin B Deficiency
	Diabetes Type I (Acute)	Lipid Ds	Vitamin D Deficiency
	Diabetes Type I (Chronic)	Malignant Neoplsm Adrenal	Parathyroidectomy

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Clinical Chapter	Condition Name		
ENTD	Acute Tonsilitis Peritonsillar Abscess	Larynx Cellulitis	Oral Thrush
	Barotrauma Ear/Sinus	Larynx Neoplasm - Benign	Oral/Pharynx Neoplasm - Malignant
	Benign Neoplsm Cranium/Facial Bones	Larynx Neoplasm - Malignant	Oropharynx Cellulitis/Abscess
	Benign Neoplsm Head/Neck	Larynx/Trachea Open Wound	Otitis Externa
	Benign Neoplsm Jaw	Larynx/Trachea Other Injury	Otitis Media Acute
	Cleft Lip w/ or w/o Cleft Palate	Lip Neoplasm - Malignant	Otitis Media Chronic
	Cranium/Facial Bones Neoplasm - Malignant	Lip/Oral/Pharynx Neoplasm - Benign	Palate/Uvula Neoplasm - Malignant
	Deviated Nasal Septum	Malignant Neoplasm Jaw	Perforated Eardrum
	Ear Ds Other, Foreign Body	Mandible Fx	Salivary Gland Ds
	Ear Neoplasm - Malignant	Mastoiditis Acute/Chronic	Salivary Gland Neoplasm - Benign
	Ear/Auditory Structures Open Wound	Mouth/Palate Open Wound	Salivary Gland Neoplasm - Malignant
	Epiglottitis/Supraglottitis	Mouth/Pharynx Foreign Body	Sinus Open Wound
	Face Fx Maxilla/Zygoma	Mouth/Pharynx Open Wound	Sinusitis Acute
	Face Open Wound	Mouth/Pharynx/Salivary Neoplasm - Uncertain Behvr	Sinusitis Chronic
	Face Orbital Floor Fx	Nasal Bone Fx	Stomatitis/Mucositis
	Face/Neck/Scalp Crushing Injury	Nasal Ds Other	Strep Throat
	Face/Neck/Scalp Other Injury	Nasal Ds Polyps	Thyroid Gland Open Wound
	Facial Bones Fx Other	Nasal Injury Other	Tonsil Neoplasm - Benign
	Head/Neck Infection	Nasal/Sinus Neoplasm - Malignant	Tonsil Neoplasm - Malignant
	Head/Neck Nos Neoplasm - Malignant	Nasopharyngitis Allergic/Chronic	Tonsils/Adenoids Chronic Ds
Herpangina	Neck Open Wound	Endoscopic sinus surgery	
Jaw Sprain	Nose/Sinus Neoplasm - Benign	Thyroidectomy	
Laryngitis Chronic	Oral Soft Tissues Ds		
EYE	Cataract	Inflammation Eyelid	Retinal Ds Vascular Occlusion
	Conjunctival Hemorrhage	Lens Ds Other	Visual Impairment/Blind
	Conjunctivitis	Macular Degeneration	Vitreous Opacities/Degeneration
	Corneal Ulcer	Macular Ds Other	Vitrious Hemorrhage
	Diabetic Retinopathy	Optic Atrophy	Cataract surgery IOL
	Eye Neoplasm - Benign	Optic Nerve/Pathways Injury	Cataract surgery sec mem
	Eye Neoplasm - Malignant	Other Keratitis	Glaucoma surgery
	Eyelid Neoplasm - Malignant (Not Melanoma)	Post-Cataract Ds	Retina and vitreous procedures
	Glaucoma	Pterygium	Retina/choroid destructive therapy
	Hypertensive Retinopathy	Retinal Detachment	

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Clinical Chapter	Condition Name		
F-GEN	Bartholin's Cyst/Abscess		
	Benign Fibrocystic/Dysplastic Breast Dis		
	Breast Implant Complctn	Gyn nos Neoplasm - Malignant	Uterus Neoplasm - Malignant
	Breast Neoplasm - Malignant	Leiomyoma Uterus	Vagina/Vulva Neoplasm - Benign
	Breast Neoplasm - Uncertn Behav	Menopausal Sx	Vagina/Vulva Neoplasm - in-Situ
	Cervical Dysplasia	Ovarian Cyst	Vagina/Vulva Neoplasm - Malignant
	Cervix Neoplasm - Benign	Ovarian Failure	Vulvovaginitis
	Cervix Neoplasm - Malignant	Ovary/Adnex Neoplasm - Benign	Mammoplasty
	Complications Gyn Surgery	Ovary/Adnex Neoplasm - Malignant	Mastectomy
	Endometrial Hyperplasia/Polyp	Pelvic Floor Relaxation/Prolapse	Breast reconstruction
	Endometriosis	PID & Related	Colpopexy
	Female Genital Tract Fistula	Polycystic Ovaries and Other Ds	Colporrhaphy
	Gyn Neoplasm - Benign	Uterine Neoplasm - in Situ/Uncrtn	Hysterectomy
	Gyn Nos Neoplasm - in Situ/Uncrtn	Uterine Neoplasm - Malignant	
GEN/UNSP	Amyloidosis	Lupus (SLE)	Reattached Body Part Complctn
	Back Crushing Injury	Lyme Ds	Retroperitoneum Injury
	Behcet's Syndrome	Malignant Neoplsm nos	Rheumatoid Arthritis
	Benign Neoplsm nos	Maltreatment, Abuse, Neglect	RSV Infection nos
	Candida Infection nos	Measles Infection nos	Rubella Infection nos
	Carcinoid Tumor (not GI)	Medication Adverse Effect - Therapeutic Use	Scleroderma
	Chronic Pain Cancer	Merkel Cell Carcinoma nos	Sepsis, SIRS
	Cystic Fibrosis	Metastatic Neoplasm Kidney	Sicca Syndrome
	Cytomegalovirus Infection nos	Metastatic Neoplasm non-Nodal	Staph Infection nos
	Device/Graft nos Complctn	Neoplasm Uncertn Behvr nos	Strep Infection nos
	Down's Syndrome	Non-Healing Surgical Wound	Surgical Complctn nos
	Erythema Infectiosum	Other Mycoses Infection nos	Syphilis General
	FB From Procedure	Other Viral nec/nos	Transplant nos Complctn
	Herpes Simplex Infection nos	Other/nos - Juvenile Idiopathic Arthritis	Tuberculosis General
	HIV Infection	Other/nos - Sepsis, SIRS Other	Unspecified Arthropathies
	Human Papilloma Virus	Pelvic Organ Injury	Varicella Infection nos
	Immune Ds Anaphylaxis	Peritoneum Injury	Wegener's Granulomatosis
	Infectious Mononucleosis	Polio Infection nos	
	Kaposi's Sarcoma nos	Post-Op Wound Disrupt	

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Clinical Chapter	Condition Name		
Q	Anal Fistula	Esophagitis (Chronic)	Liver Transplant Complications
	Anal/Rectal Abscess	Esophagus Foreign Body	Malignant Neoplsm Spleen
	Anal/Rectal Polyp	Esophagus Neoplasm - in-Situ	Meckel's Diverticulum
	Anal/Rectal Ulcer Fistula	Esophagus Neoplasm - Malignant	Metastatic Neoplasm to GI Organs
	Angiodysplasia - Vascular Lesions of Intestine(Acute)	Femoral Hernia	Mucositis
	Angiodysplasia - Vascular Lesions Of Intestine(Chronic)	Gallbladder Ds, Other	Other GI Neopasm - Malignant
	Appendicitis	Gallbladder Stones	Other GI Neopasm - Uncertn Behav
	Atrophic Gastritis Achlorhydria Related	Gastroduodenitis(Acute)	Other GI Neoplasm - Benign
	Bariatric Surgery Complications	Gastroduodenitis(Chronic)	Pancreas Transplant Complications
	Biliary Stones +/- Obstruction (Acute)	Gastroenteritis	Pancreatic Ds- nec/nos
	Biliary Stones +/- Obstruction (Chronic)	Gastroparesis Dilation of Stomach	Pancreatic Neoplasm - Benign
	Biliary Tract Disease nos	Gastrostomy Complications	Pancreatic Neoplasm - Malignant
	Biliary Tract Obstruction not Stones	GI Hemorrhage	Pancreatitis Acute
	Carcinoid Tumor GI Tract	GI Solid Organ Injury	Pancreatitis Chronic
	Carcinoma in Situ GI nos	GI Tract Foreign Body	Peptic Ulcer(Acute)
	Carcinoma in Situ Lower GI nos	Hemorrhoids(Acute)	Peptic Ulcer(Chronic)
	C-Difficile Colitis	Hemorrhoids(Chronic)	Perinatal Jaundice
	Cholecystitis (Acute)	Hepatic Encephalopathy	Peritoneal Dialysis Cath Complctn
	Cholecystitis (Chronic)	Hepatitis A, Acute	Peritonitis
	Cirrhosis	Hepatitis B (Acute)	Pyloric Stenosis
	Cirrhosis Billiary	Hepatitis B (Chronic)	Small Bowel Neoplasm - Benign
	Cirrhosis EtOH	Hepatitis C (Acute)	Small Bowel Neoplasm - Malignant
	Cirrhosis Other	Hepatitis C (Chronic)	Stomach Neoplasm - Benign
	Colorectal Neoplasm - Benign	Hepatitis EtOH	Stomach Neoplasm - in Situ
	Colorectal Neoplasm - in-Situ/Uncertn	Hepatitis Other	Stomach Neoplasm - Malignant
	Colorectal Neoplasm - Malignant	Hepatobiliary Neoplasm - Benign	Upper GI Bleeding - Other(Acute)
	Colostomy/Enterostomy Complication	Hepatobiliary Neoplasm - in-Situ/Uncertn	Upper GI Bleeding - Other(Chronic)
	Complications Esophagostomy	Hepatobiliary Neoplasm - Malignant	Vascular Insuff Intestines Acute
	Complications GI Other	Hernia Diaphragmatic	Vascular Insuff Intestines Chronic
	Complications Other GI Surgery	Hernia Other nec/nos	Appendectomy
	Diverticular Ds Diverticulitis, Small Bowel	Hernia Other Umbilical Ventral	Cholecystectomy
	Diverticulitis of Colon	Inflamm Bowel Ds Ulcerative Colitis	Colonoscopy
	Diverticulosis of Intestine(Acute)	Inguinal Hernia	Colectomy
	Diverticulosis of Intestine(Chronic)	Intestinal Abscess	EGD endoscopy
	Ds of the Spleen, Neoplasm	Intestinal Obstruction	ERCP
	Enteritis	Intestinal Obstruction, Congenital	Esophagectomy
	Esophageal Atresia/Tracheoesoph fistula	Intestinal Transplant Complications	Bariatric surgery
	Esophageal Dyskinesia	Intestine Fistula	Foregut Procedures
	Esophageal Perf, Fistula, Stricture	Intestine Perforation	Repair inguinal hernia
	Esophageal Varices(Acute)	Irritable Bowel and Related	Repair ventral hernia

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Esophageal Varices(Chronic)	Liver Abscess	Pancreatectomy
Esophagitis (Acute)	Liver Disease Chronic Other	Liver transplant

Clinical Chapter	Condition Name		
HEM/LYMPH	Anemia Acute	Hypercoagulable State	Myelodysplasia
	Anemia Chronic	Immune Deficiency Disease	Neutropenia
	Aplastic Anemia	Kaposi's Sarcoma Lymph Nodes	Other Blood and Lymphatic Ds
	Blood Transfn Reaction	Leukemia Acute	Plasma Protein Ds Alpha-1 Antitrypsin Deficiency
	Bone Marrow Trnsplt Complctn	Leukemia Chronic	Plasma Protein Ds Macroglobulinemia
	Coagulopathy Acquired	Lymphadenitis	Plasma Protein Ds Other
	Coagulopathy Hemophilia/Related	Lymphoma Hodgkin	Polycythemia
	Complication - Blood Transfn Rxn Incompatibility Acute	Lymphoma Mycosis Fungoides	Purpura and Thrombocytopenia
	Erythremia	Lymphoma Other non-Hodgkin	Sarcoidosis
	Essential Thrombocythemia	Mast Cell Tumor	Serum Reactions
	Graft vs. Host Dis	Metastatic Neoplasm to Lymph Nodes	Sickle Cell Disease
	Heparin-Induced Thrombocytopenia	Mucocut Lymph Node Syndrome	Thalassemias and Other Hemoglobinopathies
	Histiocytosis	Multiple Myeloma	
	M-GEN	Benign Prostatic Hypertrophy	Penis Neoplasm - in Situ/Uncrtn
Hydrocele		Penis Neoplasm - Malignant	Scrotum/Contents Neoplasm - in Situ/Uncrtn
Hypospadias/Epispadias		Peyronie's Disease	Scrotum/Contents Neoplasm - Malignant
Lipoma Spermatic Cord		Prostate Abscess	Testicular Dysfunction
Male Breast Neoplasm - Malignant		Prostate Neoplasm - Benign	Testicular Torsion
Male Repro Neoplasm nos - Uncrtn Behavior		Prostate Neoplasm - in Situ/Uncrtn	Undescended Testicle
Orchitis/Epididymitis		Prostate Neoplasm - Malignant	Prostatectomy
Penis Neoplasm - Benign		Prostatitis Acute	TURP
		Prostatitis Chronic Other	

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Clinical Chapter	Condition Name		
MSK	Achilles Bursitis or Tendinitis	Hip Fracture	Spine Cervical Fx/Dislocation
	Amputation	Hip Other Arthropathy	Spine Deformity
	Ankl/Foot Contusion/Laceration	Hip Sprain/Strain Other	Spine Lower Fx/Dislocation
	Ankle/Foot Arthropathy nos	Infectious Tenosynovitis	Spine Lower Sprn/Strn
	Ankle/Foot Fx/Dislocation	Joint nos Ganglion/Cyst	Spine Post-Laminectomy Syndrome
	Ankle/Foot Sprain/Strain	Joint Replace Complcn	Spine Stenosis/Spondylosis Cervical
	Aseptic Necrosis	Knee Bursitis Various	Spine Stenosis/Spondylosis Lumbar
	Bone nos Aseptic Necrosis	Knee Fx/Disloc	Spine Stenosis/Spondylosis Thoracic
	Bone nos Fx Malunion/Nonunion	Low Back Pain	Spine Stenosis/Spondylosis/Spondylolisthesis nos
	Bone nos Fx Stress	Lower Extremity Compartment Syndrome	Spondylolsthesis
	Bone/Cartilage Ds Other	Lower Extremity Dislocation Other	Synovitis/Tenosynovitis Location nos
	Carpal Tunnel & Related Syndromes	Lower Extremity Infectious Arthritis	Tenosynovitis Ankle/Foot
	Clavicle Fracture	Lower Extremity nos Injury nos	Tibia/Fibula Fx
	Elbow Dislocation	Lower Extremity Osteomyelitis	Upper Arm Fx Humerus
	Elbow Joint Derangmnt	Lower Extremity Tendon Rupture	Upper Extremity Enthesopathy
	Elbow Lateral Epicondylitis	Lower Extremity/nos Fx	Upper Extremity Fx nos
	Elbow Medial Epicondylitis	Metastatic Neoplasm Bone	Upper Extremity Infectious Arthritis
	Elbow Olecranon Bursitis	MSK nos Neoplasm - Malignant	Upper Extremity Joint Derangmnt Other
	Elbow Sprain/Strain	MSK nos Neoplasm - Uncertn Behav	Upper Extremity nos Other Inj
	Extremity Arthropathy Arm/Elbow	Myositis	Upper Extremity Osteomyelitis
	Extremity Arthropathy Forearm/Wrist	Orthopedic Dvc/Grft Complcn/Malfnctn	Wrist Fracture/Dislocation
	Extremity nos Infectious Arthritis	Osteoarthritis	Wrist Sprain/Strain
	Extremity nos Neoplasm	Osteomyelitis nos	leg amputation
	Femur Fx	Osteoporosis	Knee arthroscopy
	Finger/Wrist/Hand Synvtis/Tensyn	Pelvic Fracture	Hip replacement
	Foot Juvenile Osteochondrosis	Periostitis nos	Knee replacement
	Foot Plantar Fascitis	Psoas Abscess	Shoulder arthroscopy / rotator cuff repair
	Forearm Fx	Renal Osteodystrophy	Shoulder total arthroplasty
	Hand Fracture/Dislocation	Rhabdomyolysis	Lumbar and sacral spine surgery
	Hand Sprain/Strain	Shoulder Dislocation	Fracture/dislocation treatment arm/wrist/hand
	Hand/Wrist/Forearm Contracture	Shoulder Fx Prox Humerus	Fracture/dislocation treatment knee
	Hip Aseptic Necrosis	Shoulder Fx Scapula	Fracture/dislocation treatment lower leg/ankle/foot
	Hip Dislocation	Shoulder Tendon Ds Rotator Cuff & Soft Tissue	Fracture/dislocation treatment pelvis/hip/femur

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Clinical Chapter	Condition Name		
NEURO	Acute Ischemic Stroke	Head Trauma Closed Intracranial Hemorrhg	Neuro Device/Graft Complctn
	ALS/Related	Head Trauma Closed Subdural Hematoma	Neurofibromatosis
	Anoxic Brain Injury	Head Trauma nos w Intracranial Inj	Other Dystonia
	Bell's Palsy	Head Trauma nos w/Hemorrhg w/o Intracranial Inj	Paraplegia
	Cauda Equina Syndrome	Head/Neck Blood Vessels Inj	Parkinsons Ds
	Cerebral Aneurysm, Nonruptured	Head/Neck Peripheral Nerve Inj	Peripheral Nerve Inj
	Cerebral Degeneration	Head/Neck Vessel Inj Late Effects	Polyneuropathy EtOH/Cancer/Other
	Cerebral Degeneration - nos Pediatric	Headache Migraine	Polyneuropathy Hereditary
	Cerebral Edema/Compression	Headache Tension	Post-Op Stroke
	Cerebral Palsy/Related	Hemangioma Brain/Meninges	Prion/Slow Virus Infection
	Cerebrovascular Disease, Occlusive/nos	Hydrocephalus Acquired	Pseudobulbar Palsy and Related
	Chronic Progressive Dystonia	Hydrocephalus Congenital	Pseudotumor Cerebri
	CNS Hemorrhg	Ill-Defined Cerebrovascular Ds - Acute	Quadriplegia
	CNS Lymphoma	Ill-Defined Cerebrovascular Ds - Chronic	Reflex Sympathetic Dystrophy
	CNS Neoplasm	Insomnia	Seizures Convulsions Epilipsy (Acute)
	CNS nos Neoplasm - Malignant	Intracranial and/or Intraspinal Abscess	Seizures Convulsions Epilipsy (Chronic)
	Coma	Lumbar Punct Reactn	Sleep Apnea
	Cranial Nerve Inj	Meningial Neoplasm - Malignant	Spina Bifida
	Crervical Post Laminectomy Syndrome	Meningioma and Related	Spinal-Muscular Atrophy
	Dementia	Meningitis	Spinocerebellar Ds
	Diabetic Polyneuropathy	Microcephalus	Surgical - CNS Complctn
	Drug-Induced Dystonia	Mononeuritis Multiplex and Related	Thoracic Postlaminectomy Syndrome
	Early Onset Dystonia	Multiple Sclerosis	Transient Ischemic Attack
	Encephalitis	Myasthenia Gravis/Related	Transient Organic Psychosis/Delirium
	Encephalopathy	Myelitis	Trigeminal Neuralgia/Related
	Head Injury	Myopathy	Carotid Revascularization
URO/GEN	Acute Kidney Failure	Cystostomy Complications	Renal Vascular Ds
	Anomaly of Bladder and Urethra	Gu Device/Catheter Complication	Renovascular Injury
	Bladder Ds nec/nos	Hemorrhage Into Bladder Wall	Small Kidney(s)
	Bladder Dysfunction nos	Kidney Anomaly	Trichimonas
	Bladder Fistula	Kidney Neoplasm - Benign	Urethral Stricture/Other Ds
	Bladder Neoplasm - Benign	Kidney Neoplasm - Malignant	Urinary Obstruction
	Bladder Neoplasm - in Situ/Uncrtn Beh	Kidney Transplant Complication	Urinary Stone Disease
	Bladder Neoplasm - Malignant	Nephritis and Nephropathy	Urinary Tract nos Neoplasm - Benign
	Bladder/Urethra Foreign Body	Polycystic Kidney Ds	Urinary Tract nos Neoplasm - Malignant
	Chronic Kidney Disease	Pyeloureteritis Cystica	Urinary Tract nos Neoplasm - Uncrtn Beh
	Cystic Kidney nos	Renal Cyst	UTI
	Cystitis	Renal Dial Graft Complication	Kidney transplant
	Cystitis Irradiation	Renal Failure Effects Nephrogenic DI	Urinary endoscopy
			Nephrectomy

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Responses to PTAC PRT Questions Batch 2

Questions about Payment Approach:

1. There are no changes proposed in the current payment system for any providers -- physicians, hospitals, or post-acute care providers. Does that mean you believe they will all continue to deliver essentially the same services as they do today and that the current payment rates for those services are adequate?

Implementing the ACS-Brandeis model would not require CMS to modify its prevailing payment systems or authorize payment for newly covered services. We acknowledge there are other forums for addressing coverage rules and payment rates (e.g., the RVS Update Committee). Implementation of this model does not preclude expanding the menu of covered services or modifying payment rates where appropriate, but the model is not dependent on such changes.

However, the ACS-Brandeis model does propose changes affecting payment to advanced APM entities that are beyond the FFS transactions occurring with professionals, suppliers, and facilities. In this model, the current payments such as FFS continue but occur within risk environments. Those entities delivering excessive services would be at risk of a penalty.

The model is not strictly limited to original Medicare FFS and could be retro-fitted into an ACO-like model. Currently, our efforts with large ACOs include targeted research focusing on the Clinical Affinity Group (CAG) activity inside the ACO. Lacking the structure and tools like those provided within our proposal, it can be difficult for ACOs to define and to specify meaningful benchmarks for episodes or bundles of care. The methods integral to the ACS-Brandeis model would offer that ability to population-based, risk environments such as ACOs, medical homes, and even Medicare Advantage plans.¹

2. Are there any services you expect will be delivered that are not currently paid for? How will those providers be compensated?

The ACS-Brandeis model does not include requests for new covered services. We understand that CMS has in the past, and may again, test hypotheses regarding the cost-effectiveness of new covered services such as for care coordination. To the extent those tests are confirmatory, and new covered services become available, they could help to facilitate new utilization patterns in our proposed model as well. We also understand the implicit advantages of prospective payments (e.g., capitation) that can permit plans to cover services that are not reimbursed under Medicare's prevailing coverage rules. Later, we discuss how CMS may use the ACS-Brandeis model as a bridge to prospective payment, but we are not proposing that for the first stages of implementation.

We expect the CAGs and APM entities to identify potential investments in care redesign, guidelines and protocols, and supporting structures. And, we do anticipate new services and care pathways in the ACS-Brandeis APM, including the investment in new technology, such as telemedicine or cross-setting EHRs. For the most part, we expect the APM to reward new

¹ CMS requires MA plans to submit "encounter data," which have record formats similar to original Medicare.

APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

technology that improves efficiency and to discourage investment in technology that provides insufficient improvements in cost or quality. For this to happen, APM entities need confidence in the model's stability so they can get a return on their investment, and working capital to finance novel structures and pathways.

To date, most CMS demonstration participants have made relatively low-risk investments, such as re-deploying staff. Longer term investments, such as an EHR or quality monitoring systems, may be in the works, but can take years to pay off. With a small portion of business in the APM (e.g., a handful of bundles in BPCI), it can be hard to justify larger, systemic investments. As providers shift larger portions of their business into the ACS-Brandeis APM, the opportunities for larger investments with positive returns also should increase.

All new business models, especially those based on value, require some retooling, new workflows and new resources. In a value-based arrangement within a payer risk environment, there are many factors to consider. First, the fiscal risks are all interrelated. Do the providers understand the actuarial risks associated with the clinical affinity groups and episodes in their population? Is this a well-controlled diabetic population with a history of controlled HbA 1Cs, or is this a poorly controlled population? It will be important for QP to have feedback for the conditions and episodes under consideration for risk based payments. Second, does the care delivery team have the operational infrastructure to take risk? Is the culture ready for a risk arrangement and a competitive market? The QPs need to understand their position in the market in order to stimulate the clinical transformations essential to performing against benchmark. Third, do the providers have a fiscal ability to cover any losses so that the practice remains, corrects, and recovers? The operational risks require clinical alignment, care delivery, information technology, data management and analytics, contract planning and management.

In order for any team to assume risks, the QPs must work with the payers to understand their current status relative to benchmarks. Small and rural communities may need support services to build the teams, create the operational framework and provide the data essential to population management for a given condition or episode of care. These small and rural communities may benefit from a capital partner and an operational consultant to bring together the essential elements of care within a CAG. Is this front-loaded by the payer? Is it a joint partnership with the payer? Do large delivery systems extend services to these communities for tertiary referrals? Does the payer use market levers to force movement based on incentives/disincentives?

For smaller entities, capitalization could remain an issue. It is not clear if the private market will solve this problem, such as regional collaboratives designed for joint purchasing of technology. If there is a market failure, as may be the case with rural or critical access facilities, CMS will need to decide if and how to finance care redesign. The ACO Investment Model (AIM) is one example of CMS experimenting with financing care redesign. The relatively low uptake beyond a few large convener groups suggests the terms of the financing may need further work.

3. What will happen as the expected costs of episodes decrease over time? Won't savings bonuses decrease and won't physicians have higher risks of experiencing costs higher than budgets? How will new/different services be paid for if there are no longer large shared savings payments?

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The essence of the ACS-Brandeis model is to respect the body of work performed by each clinician, and to articulate fiscal attribution and the value proposition within a consistent and comprehensive episode framework. The premise of the question is actually the goal to which we aspire, namely that excellent care is provided routinely and reimbursed adequately. Given that the production function for healthcare is so complex and largely not understood, we do not attempt to specify the inputs to production and their budget requirements.

In our proposal to PTAC, we discussed how CMS and other payers may consider one or more payment approaches, which we believe could be compatible with the ACS-Brandeis model while representing different perspectives on care management and determination of savings to Medicare. To the extent that savings are defined in terms of a provider's performance compared to the average, then general convergence toward the average will reduce and possibly eliminate those savings. And to the extent that such convergence answers the question about resources required for excellent care, then it can serve as input into prospective payments – i.e., budgets.

The staged implementation we proposed for the ACS-Brandeis model reflects a starting point and then expansion into larger frontiers for improvement. Initial focus on procedures can help CAGs and delivery systems to implement uniformly excellent care with respect to all phases of surgical care. Expanding to condition episodes can engage other CAG members and help to tip delivery systems toward higher value. Expanding to chronic conditions also helps to intervene earlier with beneficiaries with prevention and slowing of disease progression. All stages of implementation maintain the focus on team-based, patient-centered care.

The problem of unsustainable growth in health care costs is not limited to, or even primarily a function of cross-sectional variation in utilization patterns. In other words, even compressing production processes and costs into a narrow band reflecting optimal utilization patterns will not necessarily or by itself slow the long-term growth in healthcare costs. That will require “bending” the long-run demand curve for healthcare (e.g., prevention and better “cures”) and/or the long-run supply curve. Over the long-term, we understand that all inputs into healthcare production are “variable,” including the mix of healthcare professionals, the types of technologies (chemical, electronic, devices, information), and physical capacity by type of setting.

For the time-being, i.e., over the short- and medium-term, much of healthcare inputs are fixed to one degree or another. That includes the number and mix of healthcare professionals, available technologies, the physical capacity (e.g., number of inpatient beds, and outpatient alternatives), as well as the prevailing “culture” of how to provide healthcare.

Using the terminology of the ACS-Brandeis model, we propose that the locus of decision-making should include the respective CAGs who have the knowledge and hands-on opportunity to envision and then implement transformations to healthcare production. In the short-term, we intend to empower CAGs as a cognitive catalyst for change, and their member-clinicians participating in patient care for each type and family of episodes, to begin modifying utilization patterns by redirecting patients toward efficient substitutions of inputs to production, and pressing toward improvement in quality outcomes via shared accountability in team-based care.

Supporting the premise of the question, that should compress variation toward production of excellent care. Hopefully, it will commoditize tomorrow what is exceptional care today. And

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continuing to agree with the question, removing inefficiencies in normative care will lower the expected cost of production, and the savings defined by relative efficiency.

After several years of success, some considerations include:

- As the practices that have honed and demonstrated the success and high value in Medicare, they can seek competitive rewards from other payers, which generally are much abler than Medicare to shift patient volume toward efficient providers. This could involve attention to patient experience (“customer service”) and price.
- The CAGs can continue to guide transformation. For example, diligent attention to high value can inform the adoption, diffusion, and utilization of new technologies. With interest in the natural history of various conditions, increasing attention can be given to prevention and early interventions that could slow the progression of illness, avoid costly and damaging acute exacerbations and sequelae.

Anticipating these dynamics, we have proposed compatible “payment models” for the ACS-Brandeis model that can be implemented flexibly in order to communicate needed incentives and to permit workable budgets, beginning in 2018 and continuing over the long-run. How long those payment models remain viable would depend on the rate at which entities could continue to generate new savings over time by emulating current best performers, and eventually surpassing them by redefining the efficiency frontier. Also important would be how frequently or completely CMS would “rebase” the targets through updated data versus trending forward historical target amounts.

4. Will the episode "budget" be the same as the current expected average spending level, or will there be a "discount" in setting the target, and how big will that discount be?

In the ACS-Brandeis model, the expected cost per episode is derived from EGM using representative claims data to produce normative (average) cost, and adjusted according to appropriate risk factors. CMS can request applications for entities to enter risk arrangements in which the true expected cost is “discounted” as a means of ensuring savings to Medicare, whether or not the entity truly generated savings, with the percentages conditional on the quality performance of the entity. Alternatively, CMS could seek participation from entities willing to operate under risk arrangements that specify budgets equal to the undiscounted expected cost, and call for some allocation or split of actual (positive or negative) savings between Medicare and the entity based on quality performance.

The difference between the approaches would depend on the amount of savings that an entity would perceive as achievable, and the amount of risk-taking the entity would consider in pursuit of those savings. For example, CMS has proposed discounts of around one percent or perhaps three percent of the expected average spending level, depending on quality performance. If savings are potentially a much larger proportion of the expected cost, then a two percent discount could be a “small price to pay” for the opportunity to keep and invest much more than that in return. However, since entities also would face equivalent risk for losses under the discount

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model, the entity would need to have confidence and comparatively more financial backing to enter such contracts.

Alternatively, under scenarios in which anticipated savings are more modest, and hence closer to three percent of the expected cost, then a discount of up to three percent could wipe out expectations for shared savings. This problem can be worse as the model is scaled to include many services and costs that may not be targeted at a given time. For example, an entity that is managing cost for a population will have targets of opportunity, but expected savings from those may be a fairly small percentage of the entire population budget. This has been a problem in the ACO world in which two-percent savings per year (from bending the cost curve) are considered within the margin of error.

5. How will the hospital and post-acute care providers be paid? Will savings only be shared with physicians, not hospitals or post-acute care providers?

The ACS-Brandeis model consists of several layers affecting compensation. The first layer consists of the prevailing payment systems used by Medicare for professionals, suppliers, and facilities; the model does not disturb or modify those systems.

The second layer consists of the fiscal attribution logic, which is guided by clinicians' episode clusters and corresponding shares of the positive or negative savings. In the proposal model, there are no shares attributed to facilities or suppliers. However, the fiscal attribution culminates in budgets and financial determinations occurring for the advanced APM entity operating under the terms of its contract. This second layer applies to CMS and the entity as a whole, and not the constituent elements of the delivery system or affiliated components of the entity.

The relationship between the APM entity and the components of the delivery system are matters for its internal governance and network contracting. These include teaming arrangements and compensation systems comprising the third payment layer, which could include arrangements with hospitals and post-acute facilities.

6. How would monetary rewards and penalties be calculated and allocated among clinical participants?

CMS will specify how MIPS-eligible clinicians are deemed to be qualified participants in an advanced APM entity, which determines their reporting requirements and eligibility for the 5% bonus in professional fees. The APM entity accepts the risks for all its affiliated clinicians who participate within the designated episodes, which are used to calculate the rewards and penalties according to the entity's contract with the payer. The intrinsic logic of the model stops there.

Separately, the APM entity also can specify its own risk relationships with professionals, suppliers, and facilities. It is possible that the APM entity will impose a minimum risk on the individual clinician, which translates into an asymmetric risk between the APM entity and the clinician. If a health system or convener organization were to serve as an APM entity, it could assume more of the downside risk and share the upside risk with the clinicians. The APM entity could also provide the risk-based capital and the operational elements needed to create the

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alignment around a CAG. We imagine advanced delivery systems, insurance companies or other third-party conveners working with community physicians to build APM entities, analogous to Independent Practice Associations, to provide a CAG with operational management, actuarial analysis, data management, risk-based capital, and so forth.

7. Expected savings:
 - a. How much savings do you expect to achieve?

Savings that are achievable from the model are a function of several factors. The ACS-Brandeis model is based on the CMS EGM, which supports potentially several hundred types of episodes accounting for approximately three-fourths of Medicare Part A and Part B spending. The amount of savings achievable depends first on the opportunities made available to APM entities in the form of supported episodes. On implementation, a second factor is the number of entities and the number and mix of episodes that are included in their risk-based contracts.

A third factor is the ability of entities to identify opportunities for cost savings. EGM is able to track every dollar spent on the supported episodes, provide standardized comparisons of actual to expected costs, and with the attribution logic proposed in the model, identify all clinicians participating in the care. Information shared with CAGs and providers involved in team-based care can include the cost implications of different treatment pathways, including the choice of surgical approach and setting of care. Hence, a related fourth factor is the clinical strategies adopted by entities individually. The savings here will depend on the extent there is “room for improvement” with respect to the entities’ historical performance relative to benchmarks, and the extent to which entities are able to achieve improvement in those areas.

Finally, there are two additional factors that are as “cultural” as they are technical. More specifically, a fifth factor is the extent to which the APM entity is able to garner a critical mass among its QPs toward a general mindset of cost-consciousness, allowing for more sweeping changes in the delivery system. The ACS-Brandeis model is not intended to isolate a small fraction of a clinician’s work for clinical redesign, meaning exclusive focus on a small number of episodes and corresponding indifference to other episodes. By analogy, Medicare did not implement DRGs one at a time, but rather swept in a new incentive structure and mindset that was largely inclusive of all lines of service. The ACS-Brandeis model aspires to move quickly beyond the tipping point for QPs and their locations of service, replacing the FFS “RVU productivity” mindset with a transformative value proposition.

A sixth factor is the extent to which clinical strategies emerge from the collective work across entities and are able to transform the community standards of care. This is the much sought after “bending the cost curve” that could result from adoption of new community standards, including regional or national adoption of cost-saving technologies, and similarly, cessation of the technological “arms race” involving widespread and often profligate adoption of expensive and duplicative technologies within markets, which can hinder or lower, rather than raise, net value in the population.

In a test sample of approximately 5 million Medicare beneficiaries there were 21 million EGM chronic condition episodes totaling \$18 billion in Part A and B expenditures. One substantial opportunity for cost saving would be reducing inpatient hospital admissions for acute

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exacerbations. Another opportunity for entities at risk for the cost of managing conditions would be to lower the incidence of procedural episodes. In the test sample, there were approximately \$2.6 billion in hospital admissions for acute exacerbations and other sequelae, and another \$3.7 billion for procedural episodes. Not all of these events can be prevented, but these estimates begin to point toward the tremendous opportunity for cost savings.

There are also saving opportunities within the remaining \$11 billion of spending for these episodes, including changes in the setting and intensity of care. Each type of episode has its own opportunities to improve efficiency. Rather than attempting a full simulation and accounting of all the factors listed above, we merely illustrate the nature and potential magnitude of some of the savings in section c below.

- b. How would you expect the model to achieve savings / What changes in care delivery will produce those savings?

To address this question, initially we will use two points of reference, which are two types of models already implemented by CMS, namely, hospital-based payment bundles, and population-based ACOs or medical homes. Some of the episodes supported by EGM can capture many of the same hospital admissions that are included in the roster of MS-DRGs that define models such as BPCI and CJR. As such, the ACS-Brandeis model could support or induce similar savings that are anticipated for those models, such as redirection of beneficiaries after discharge toward less expensive post-acute service patterns.

Models based on MS-DRGs could be viewed as constrained subsets of the savings opportunities available through the ACS-Brandeis model, which for example, could unleash savings from avoidance of the inpatient admission and MS-DRG payment. In addition, the proposed model can be more inclusive with respect to the inpatient admissions that do occur, allowing high-performing sites to exhibit savings by avoiding adverse consequences associated with ICU admissions and a range of possible MS-DRGs representing untoward events and worse outcomes.

Moving beyond BPCI, CJR and other CMS bundle models, the underlying clinical logic of EGM can trigger procedural episodes that are site-agnostic. Thus, entities can perform against cost benchmarks that represent an historical mix of settings, and can generate savings by shifting volume away from more expensive settings and toward clinically-appropriate but less expensive settings. This means, for example, shifting surgeries from the inpatient to the outpatient setting. A similar and sometimes related consideration is the historical tendency to use particular surgical or treatment approaches, which can drive cost outcomes and often determine the setting of care. This could include laparoscopic versus open surgery, single versus multiple surgeries for bilateral treatment, or the use of lower cost technology, such as high-cost versus low-cost clotting factors in emergency medicine.

More expansive implementation of the ACS-Brandeis model could provide savings opportunities that are otherwise associated with population-based approaches. By using a wide array of episodes that cut across clinical domains, the model is able to track actual versus expected costs by condition, and convey opportunities and incentives involving broad lines of service and ultimately the care of the whole patient. Unlike the ACO and medical home models, the ACS-

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Brandeis model is able to retain a sharp focus on the particular episodes and clinicians' roles within the larger picture of the patient population and delivery system. Figuratively, the flood lamp that is cast upon the patient and provider populations is enhanced by spotlights aimed at the team-based care for each episode and for each patient, and further, a laser beam focused on each clinician according to his or her respective role in the patient-centered outcomes.

Similarly, condition episodes represent opportunities to avoid expensive settings of care. Proactive medical management can help to delay, avoid, or lessen the severity of acute illnesses and acute exacerbation of chronic illnesses. It is widely recognized that chronic conditions contribute substantially to total Medicare expenditures, and it is often the case that a significant portion of those expenditures are for the treatment of acute exacerbations. This is shown in the table below for six chronic condition episodes where we see acute exacerbations accounting for 30 to 60 percent of the total expenditures within the episodes in a single year. Thus, an entity working under risk arrangements to manage patient cohorts with various combinations of chronic illnesses may generate considerable savings by avoiding such acute exacerbations, or secondarily, reducing their severity and investing in capacity to handle acute events outside of the hospital inpatient setting.

Condition episode	Total episodes	Actual costs (Winsorized)	Epi with sequelae	Total costs sequelae	Percent episodes with sequelae	Percent dollars spent on sequelae
Asthma/COPD	63,236	67,959,444	4,224	40,665,922	7%	60%
Heart failure	39,407	81,498,043	6,924	50,892,397	18%	62%
IHD	74,537	113,783,003	7,084	49,629,020	10%	44%
Aortic valve disease	16,842	14,885,576	467	9,018,654	3%	61%
Cholecystitis	987	12,398,743	474	3,776,339	48%	30%
Esophagitis	45,797	10,430,674	2,617	3,761,721	6%	36%

c. Would any specific areas of utilization be reduced, and if so, what are they?

The ACS-Brandeis APM is designed to induce systemic change across a number of different episodes making it difficult to point to specific utilization that would be reduced. However, we can give some examples of how cost savings and service reductions may play out for specific conditions.

Savings can be achieved in an existing care pathway, without significant care redesign, through several mechanisms. For APMs narrowly construed as applying to a single procedure or a single provider organization, similar to the existing BPCI bundles, savings can be expected through eliminating unnecessary care and through improved care coordination and communication through the existing care pathway. For example, in an ACS/Brandeis APM focused on colectomy, the EGM captures all relevant services before the surgical procedure in the “look-back” period, and both services and outcomes after the procedure. The financial incentives inherent in our APM would encourage providers to manage and eliminate unnecessary services

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performed throughout the care period. Improved communication and care coordination between the providers participating in the APM will result in better preoperative preparation and improved operative and perioperative care for the patient, improved outcomes after the procedure, and thus lower ICU and hospital lengths of stay, decreased rates of readmission and increased rates of discharge to home compared to other less favorable destinations. Finally, all other considerations being equal, and unlike in the BPCI program, the incentives in the ACS-Brandeis APM would encourage surgeons to move care from the inpatient to the outpatient setting. In our Medicare data set, the risk-adjusted costs for inpatient and outpatient cholecystectomy were \$ 12,971 and \$ 6,575, respectively.

The potential for savings increases for APM entities organized to manage the continuum of care for a patient population, and taking fiscal responsibility for acute and chronic condition episodes. The mechanisms outlined above will still apply. However, in these more comprehensive APM entities, the possibility exists for both improved care and additional savings through care redesign. For example, in an APM focused on gastrointestinal disease, the potential exists for care redesign resulting in both significant upstream and downstream savings through improved care. Appropriate aggressive screening for colon cancer, using colonoscopy or various visualization techniques, can result in earlier and more effective identification and treatment of polyps before they become cancerous, and thus lead to lower rates of colectomy for cancer, improved care with fewer complications for those patients proceeding to colectomy, lower rates of colon cancer overall, and multiple downstream savings opportunities. In our Medicare data set the risk-adjusted cost of a colectomy episode is dramatically affected by the presence or absence of significant postoperative sequelae. Patients with low actual-to-expected cost ratios had 1/3 the number of sequela compared to patients with high actual-to-expected cost ratios. Those patients who never need a colectomy avoid all of the surgical complications.

This approach could also work for chronic medical conditions. For example, an APM entity might be organized to provide enhanced care for patients with chronic medical conditions such as chronic obstructive pulmonary disease (COPD), diabetes, hypertension and congestive heart failure. Improved medical care for the patient with COPD might include innovative care coordination between patient and providers using mobile and internet technology developed or purchased by the APM entity. Improved care coordination for these patients would result in improved early care for the patient suffering an acute COPD exacerbation, including care acceleration while the patient is still at home, leading to fewer emergency room visits, fewer hospital admissions, and shorter lengths of stay and improved outcomes for those patients who do end up being admitted. For APMs that develop innovative care pathways, using innovative means of care coordination and focused on underlying chronic condition episodes as well as any acute condition and procedure episodes that the patient may experience, the savings will come through reductions in unnecessary services, through fewer inpatient admissions and ultimately through improved patient outcomes.

- d. What data do you have showing the potential for savings for the episodes you are proposing to use?

Thus far there have been no real world tests of the ACS-Brandeis APM so we do not have evaluation data to help assess the potential behavioral response to the model. We are starting to conduct empirical simulations to get a better understanding of the upper and lower bounds of

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savings and losses at the entity and market level.

8. Are there any data available that would indicate, either directly or indirectly, how the model would be expected to perform?

The ACS-Brandeis team has been using a developmental data set of 4.8 million Medicare beneficiaries that was purchased with private funding to refine clinical specifications, and develop other aspects of the proposed model including the fiscal attribution algorithms. The data include all Part A and B claims from 2012-2014 for beneficiaries residing in any of 18 market areas sampled from across the country.

The database is sufficiently large and diverse to specify risk-adjustment models for all supported episodes. Also, the large database can be used to illustrate instances of episodes that are stratified by selected attributes. EGM is able to configure episodes that are limited to certain attributes, such as a particular type of surgical technique, or surgeries for one type of indication (e.g., cancer) separated from other indications. These attributes are also stored as potential risk factors to adjust expected costs during implementation of the model. Thus, the enhanced capabilities of the EGM to configure episodes according to the needs of a particular use case also provide capabilities that readily format results in order to monitor performance or pose “what if?” questions.

The ACS-Brandeis model has not been implemented as a payment model; hence, we do not have experimental data showing results from this model post-implementation. However, the model is able to construct incentives systems that can emulate most models that have been implemented, ranging from defined segments of care (e.g., acute or post-acute bundles), or comprehensive, population-based models for all covered services. Our answers to question 7 above illustrate how Medicare spending can be framed as attributable and potentially avoidable.

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Responses to PRT questions from review of American College of Surgeons' responses to questions on:

ACS-Brandeis Advanced Alternative Payment Model

Overarching Comment: The PTAC Preliminary Review Team notes that in many instances, the proposal appears to leave many implementation decisions to CMS. Wherever possible, the PTAC would like to know how you believe the various aspects of the models should be implemented by CMS. This will enable PTAC to more fully understand how the model would likely work so it can be evaluated against the Secretary's regulatory criteria under MACRA.

Questions:

1. The name of the proposal is the ACS-Brandeis proposal, but the proposal includes no letter or statement from Brandeis. Please provide a letter from Brandeis clarifying its level of support for and anticipated involvement in the proposed model, if implemented.

Please see the attached letter of support.

2. We understand that you view the ACS-Brandeis model as applicable to a broad range of conditions and procedures, that care changes and potential savings will differ for every condition and procedure, and that different approaches may be used in different organizations and communities. While it has been helpful to understand the breadth and flexibility you have designed in the model, we are having difficulty understanding exactly how you envision the model would work in any individual case. We believe that the most effective way to address this would be for you to provide two detailed examples of how all aspects of the model might be implemented for one procedure (e.g., colectomy) and for one condition (e.g., stable ischemic heart disease). We understand that various aspects of the example you give would reflect only one of several possible ways that physicians could implement care or distribute funds under the payment model, but we want to see at least one complete example of how you believe the model would be likely to be implemented for a procedure and a condition by the physicians who have expressed interest to you in implementing the model. Include in each of your illustrative examples the following:

Redesigning care

- a) How the alternative payment entity would be structured, including the nature of the financial participation and decision-making involvement of physicians (you are welcome to provide several alternative options if you wish, but please make sure that there is at least one example with adequate detail);

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First, it may help to consider how CMS may qualify APM entities, recognizing that many aspects are required by MACRA or stipulated in regulations. These entities must enter risk-based contracting arrangements with the payer (in this case, Medicare). The risk-based (APM) contracting involves risks for the episodes selected by the APM entity, which we refer to as the entity's episode library. The library would include episodes associated with the eligible clinician (EC) who would consider a risk relationship with the APM entity. Generally, across most or all of the options:

- The performance period will be the calendar year (12 months), although an entity could enter the program midway through the first calendar year of performance, such as July 1
- An entity must be registered prior to the start of its performance period
- Each EC must enter a business associate agreement with the entity. The ECs may act independently or based on a group decision (i.e., a common TIN, or a group practice). These ECs become the QPs (or partial QPs) affiliated with the entity.
- An entity will select which types of episodes, such as colectomy or IHD, are in its episode library, i.e., covered in the risk-based contract. The instances of those episodes (i.e., the patients) that are included in the risk-based contract are those in which one or more affiliated QPs participate.
- Performance expectations for the entity are specified according to each of the episode types covered in its APM contract. These include risk-adjusted target expenditures for each type of episode, as well as relevant quality measures.
- Each entity will need formal agreement regarding shared governance, such as for adding or removing affiliated QPs, and a legal structure to disperse payments to QPs or other components of the delivery system (e.g., facilities) based on its share of savings. Similarly, the entity will need a legal structure to make payments owed to the payer (CMS).
- The BAA for each QP must stipulate the applicable risk/reward parameters, i.e., the circumstances and extent to which a QP is compensated or at risk for the financial results pertaining to episodes in which he or she participated (or not), and their respective clinical roles in those episodes (e.g., episodic or supporting provider). The parameters can refer to absolute dollar amounts (e.g., caps on amounts owed) or percentages (e.g., 10 percent of positive savings or 5 percent of losses).
- The entity and QPs also must agree to support the mission to improve value, such as an agreement to share data appropriately, agreements to use technology as required for an advanced APM, and agreement on working toward common clinical outcomes and cost results.

The APM entity could be a surgical or medical practice, a delivery system consisting of clinicians and one or more facilities, or several groups who assemble to manage a specified episode library. Any of these APM entities may elect to bring local hospitals into their APM partnership. CMS is undoubtedly determining general principles and specific requirements for Advanced APMs generally and in relation to different types of models; e.g., population-based or bundled segments of care. The ACS-Brandeis model might fit well onto an emerging chassis such as the Next Generation ACO with regard to ownership, capital requirements, and the intersection with state insurance laws. However, especially in the early years, APM participants are likely to have scope of responsibility that is much less than an entire beneficiary population, perhaps allowing for requirements that are more streamlined.

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As an example, colectomy could be one of the episodes included in the APM entity's episode library and included in the episode clusters for QPs who participate in the care for patients undergoing colectomy. As another example, a primary care group may wish to employ IHD and the top 10 chronic condition episodes in their APM entity. The EGM logic assigns services to all episodes based on their direct clinical relevance, and distinguishes (excludes) all other services, some of which may be assigned to nested or different concurrent episodes. More details about service assignment are provided in our answer to 2.b.

At the conclusion of the year, a retrospective analysis would evaluate the services provided to the patient who had the episode of interest and establish a patient-specific, risk-adjusted target by comparing this patient to similar patients. If a patient undergoing colectomy had a cost profile that saved \$1000, the quality of care would then affect how much of the savings would be shared with the team. Excellent care receives the full shared-savings opportunity. The affiliated QPs' shares would extend to the APM entity from CMS. The APM entity would reconcile all the other episodes in each provider's cluster of episodes. The individual surgeon may have several more colectomy episodes that also would be reconciled. The surgeon also may have 25-50% of his or her clinical practice in other episodes. If the surgeon is due a reward in shared savings for this colectomy, the funds are added to the surgeon's overall pool of dollars for all the episodes. The net of all losses or gains will establish the level of reward or penalty the surgeon will have. The sum would be held at the APM for final reconciliation.

- b) What services would be included in the episode, and what, if any, services (that might be considered to be related to the procedure or condition) would be excluded (you can provide the detailed methodology and codes from the grouper if you wish).

Generally, procedure episodes such as colectomy are defined by trigger codes (i.e., CPT procedure codes) that represent the definitive surgery or other treatment of interest, such as the following:

- removal of colon, ileostomy
- partial colectomy with anastomosis
- laparoscopic left hemicolectomy
- Open and other multiple segmental resection of large intestine.

Once criteria are met to trigger an episode for a patient, EGM creates an "episode shell" for that type of episode with start and end dates. Services billed during the episode time window are eligible for assignment to the episode according to their clinical relevance. Services that include trigger codes for an episode, such as any of the various specific diagnosis codes for IHD, are generally assigned to that episode. This is one of the most common ways a service is assigned to an episode.

Clinical specifications for episodes in EGM also contain relevant services, which are procedure codes deemed to have plausible clinical purpose related to that episode. These are assigned to the episode based on a combination of the procedure and diagnosis code. For colectomy, these include:

- Anesthesia for anorectal procedure

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- Intubation, endotracheal, emergency procedure
- Suture of small intestine (enterorrhaphy) for perforated ulcer, diverticulum, wound, injury or rupture
- Closure of enterostomy, large or small intestine
- Magnetic resonance (e.g., proton) imaging, abdomen
- Ostomy skin barrier, with flange (solid, flexible, or accordion)

Clinical specifications for episodes in EGM also contain codes for relevant diagnoses that are considered plausible findings, symptoms, or various presentations that often occur in relation to a given episode.

Examples for colectomy include:

- abdominal pain, right lower quadrant
- abdominal or pelvic swelling, mass, or lump, epigastric
- personal history of malignant neoplasm of large intestine
- aftercare following surgery for neoplasm.

Including relevant diagnoses for each episode helps to capture the range of services and costs that are related to an episode even when diagnoses that are more specific are not included on the claim. This has the additional advantage of comparing the efficiency of providers more fairly by including services and costs that reflect non-specific diagnoses, which may partly be a reflection of variation in coding practices.

Clinical specifications for episodes in EGM also contain assertions about the relationships among a patient's episodes. One such relationship is that of sequelae, which are aftereffects or secondary results that can occur from a parent or causal episode. With colectomy, for example, potential sequelae include cellulitis, pneumonia, and electrolyte disorders.

Another relationship among episodes recognized by EGM is the indication, or in other words, the condition being treated by the surgery. Examples for colectomy include intestinal blockage or neoplasm. Identifying the indication allows the procedural episode to be nested within the appropriate condition episode, creating a fuller picture of the cost of treating the cancer or intestinal blockage. In turn, for the procedural episode, its indication can be used to stratify episodes (e.g., restrict comparisons only to colectomies done to treat benign colorectal neoplasm), or to risk-adjust cost models according to specific characteristics of each patient.

For condition episodes, the episode construction process is similar. Both ischemic heart disease (IHD) and acute myocardial infarction (AMI) are triggered by specific diagnosis codes on an inpatient (in the case of AMI or IHD) or outpatient (in the case of IHD) claims. Examples of diagnostic trigger codes for IHD include:

- chronic ischemic heart disease, unspecified
- coronary atherosclerosis due to calcified coronary lesion
- coronary atherosclerosis of artery bypass graft
- coronary atherosclerosis of native coronary artery.

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For AMI, trigger codes include:

- acute myocardial infarction of other lateral wall,
- acute myocardial infarction of anterolateral wall
- acute myocardial infarction of inferoposterior wall.

Procedural episodes and acute condition episode include sub-categories that can be used to stratify or select episodes that are more narrowly defined, or for risk-adjusting costs. Sub-categories for AMI include: STEMI, NSTEMI and acute coronary syndrome (unstable angina w/o AMI).

As with procedural episodes, condition episodes also have relevant services and diagnoses that are used to assign claims to a specific episode. For IHD, these include:

- Myocardial imaging
- Lipid panel
- Electrocardiogram
- Computed tomography, heart.

For AMI, relevant services include many of the same imaging and blood tests as IHD. Additional relevant services include:

- Creatine kinase
- Troponin, quantitative,
- Injection, eptifibatide, 5 mg.

Relevant diagnoses are symptoms and other clinical indicators that can be assigned to episodes. For IHD examples include:

- abnormal cardiovascular function study
- chest pain, unspecified
- long-term (current) use of antiplatelet/antithrombotic.

Relevant diagnoses for AMI include:

- hypotension
- shortness of breath
- tachypnea.

Finally, condition episodes also have sequelae. AMI, in fact, is a sequela of IHD. Other sequelae for IHD include acute ischemic stroke and acute heart failure. In terms of AMI, potential sequelae include acute pulmonary embolism, non-operative shock, and respiratory failure.

- c) How the target price for the episode would be established, when and how the determination would be made as to whether actual episode spending was above or below the target price, and

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in what circumstances would a patient case with spending above or below the target price be excluded from the calculations;

In our response here, and generally for the APM, all instances of colectomy episodes would be included in the calculations except for one type of situation involving assignment of the inpatient hospital claim to some other episode. In EGM, procedure episodes that are triggered during an inpatient hospitalization that is assigned to a different episode are excluded from cost comparisons involving other instances of that type of episode. That is because the DRG payment lumps together all of the facility-based services, including parallel or incidental procedures, and distorts or obscures their distinctive cost for a patient. Thus, cases with facility payments assigned to the episode of interest are not comparable to cases with facility payments that are assigned to some other episode.

Calculating the expected value or the target price for colectomy episodes for an APM Entity will involve two components:

- Determine parameters for the payment model using data for all colectomy episodes nationwide during a base period, except those excluded from the APM model as discussed above.
- Apply those parameters to compute the target price for each colectomy episode attributed to a particular APM Entity.

Payment model parameters

Payment model parameters will be determined using data for episodes starting during the one-year base period prior to the performance period for which a price is to be set. After processing with the EGM software, claims data will include both the actual allowed amounts for each service assigned to each episode and a price-standardized amount that removes pass-through amounts (e.g., IME) and geographic variations in price (e.g., wage adjustments). These amounts will be summed to give both actual and price-standardized costs separately for each episode.

The parameters to be computed for colectomy (and each other type of episode) are:

- Winsorization threshold (i.e., the dollar amount at which each case is capped)
- Average Winsorized price-standardized cost¹
- Patient risk factors
- Entity adjustment factors
- Entity price indices²

Patient risk factors and the entity adjustment factors will be estimated from a hierarchical linear model with instances of the colectomy episode as the unit of observation. The dependent variable will be the

¹ The Winsorized price-standardized cost for each episode is the lower of (a) the total price-standardized cost for the episode, or (b) the Winsorization threshold, which is the average price-standardized cost over all episodes plus twice the standard deviation of the price-standardized episode costs.

² The entity price index is the ratio of its average actual cost per episode to its average price standardized cost per episode.

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Winsorized price-standardized cost. The fixed factors will be patient and episode attributes, which are discussed further below. The second-level random intercepts will be the TIN of the episodic provider, or a contracted APM entity other than a TIN if applicable.

Computing target prices

The base rate for each colectomy episode with an episodic provider who participates in a particular Entity³ will be (a) the sum of the average Winsorized price-standardized cost for the base period plus the that Entity's adjustment factor, times (b) 1 + the average national price change between the base period and the reconciliation period to which the target price will apply, times (c) 1 + the Entity's price index)

The target price for each colectomy episode will be the product of (a) this base rate, times (b) the episode's risk index. The risk index of an episode will be (a) the expected cost of an episode with the subject episode's risk factors with an episodic provider in an 'average' entity (i.e., an entity with an adjustment factor of zero), divided by (b) the average of such expected cost amounts over all included colectomy episodes.

Reconciliation

Reconciliation is the process of comparing expected costs (target prices) with Winsorized actual episode costs to determine what if any payments are due from the Entity to CMS, or vice versa. This will likely occur quarterly, 3 months after the end of each quarter, although annual reconciliation is also a possibility. While this example uses colectomy, all episodes in the Entity's library will be reconciled together.

The Winsorized actual cost will be the lower of (a) the allowed amount of all services assigned to the episode, or (b) the Winsorization threshold for colectomy, times the entity price index for the TIN or entity of the episodic provider.

The Entity's attributed savings (over/under target price) for each colectomy episode will be (a) the Winsorized actual cost minus the target price, times (b) the Entity's attributed share of the colectomy episode. The sum of this amount over all episodes included in the Entity's library (not only colectomy) will be the total over/under amount. If this number is positive, then the Entity will pay a specified amount to CMS; if it is negative, then CMS will pay a specified amount to the Entity.

- d) What factors would be used to risk adjust actual spending. Please provide a few patient examples and show how much the adjustment would be for each.

³ Note that some of the colectomy episodes attributed to a particular Entity may have an episodic provider who is not an affiliated QP in that Entity. In such a case, the target price will be computed using the base rate for the TIN or applicable APM entity of the episodic provider.

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The risk factors used to compute the risk index described above are:

- Patient demographics: These are age, gender and Medicare eligibility status.
- Attributes of the episode: These are specific to the episode. Examples are laterality, sub-category (e.g., STEMI or non-STEMI AMI), and indication.
- Patient clinical history as described by other EGM episodes, either already open at the time the subject episode is triggered, or that occurred in the (relatively) recent past. The episodes used are specific to the subject episode.

Table W shows the risk factors applicable to four illustrative colectomy patients, with the resulting risk index for each patient. Each row is a risk factor applicable to one or more of the four patients. These are identified by the first two columns. The last four columns show the parameters applicable to the four patients, respectively. An empty cell means the factor value is not applicable to that patient. The first three rows show the resulting expected cost (excluding the entity adjustment factor) and risk index. The four patients range in their risk index from 0.4 for Patient A to 2.3 for Patient D based on differences in demographics, reason for Medicare eligibility, indication for the surgery, aspects of anatomy or surgical approach, concurrent comorbidities, or interactions with other contemporaneous procedures.

Tables X, Y, and Z show similar results for the condition episode IHD, and two of its nested procedural episodes, PCI and CABG, respectively.

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Table _W: Illustrative Risk-Adjusted Expected Costs for Four Patients (Colectomy)

Risk factor	Factor category	Applicable parameters for illustrative patients			
		Patient A	Patient B	Patient C	Patient D
risk_index		0.4	0.91	1.1	2.3
pred_fixed_only		\$ 9,910	\$ 22,263	\$ 26,949	\$ 56,185
avg_pred_fixed_only		\$ 24,337	\$ 24,337	\$ 24,337	\$ 24,337
Intercept		\$ 43,347	\$ 43,347	\$ 43,347	\$ 43,347
bene_gender_age	F55-59			\$ 1,481	
bene_gender_age	F80-84	\$ 2,354	\$ 2,354		
bene_gender_age	M70-74				\$ 1,467
bene_mdcr_status	Aged without ESRD	\$ (17,241)	\$ (17,241)		\$ (17,241)
bene_mdcr_status	Disabled with ESRD			\$ (14,748)	
primary_indication	diverticulitis of colon				\$ (4,470)
primary_indication	colorectal neoplasm malignant		\$ (4,539)		
primary_indication	GI hemorrhage	\$ (5,461)			
primary_indication	diverticulosis of intestine(chronic)			\$ (3,476)	
sub_cat	Anastomosis			\$ (3,892)	\$ (3,892)
sub_cat	unspecified	\$ -	\$ -		
combined_tx	none	\$ (2,644)			\$ (2,644)
combined_tx	colonoscopy			\$ 328	
combined_tx	cystoscopy		\$ -		
Trig cd approach: Laparoscopic				\$ (4,768)	
Trig cd detail: Anastomosis				\$ 5,427	\$ 5,427
Trig cd anatomy: Partial colon				\$ 1,250	\$ 1,250
Trig cd approach: Open		\$ (1,420)			\$ (1,420)
Trig cd detail: Ostomy					\$ 11,389
Trig cd anatomy: Rectum		\$ (5,604)			
Open sepsis, SIRS					\$ 5,423
Open resp failure					\$ 7,163
Open peritonitis					\$ 4,190
Open colorectal neoplasm malignant			\$ 1,762		\$ 1,762
Open intestinal obstruction					\$ 234
Open intestine perforation					\$ 4,201
Open anemia chronic				\$ 2,000	
Open Colonoscopy		\$ (3,421)	\$ (3,421)		

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Table _X: Illustrative Risk-Adjusted Expected Costs for Four Patients (IHD)

Risk factor	Factor category	Applicable parameters for illustrative patients			
		Patient A	Patient B	Patient C	Patient D
risk_index		0.4	0.9	1.1	2.1
pred_fixed_only		\$ 298	\$ 671	\$ 820	\$ 1,566
avg_pred_fixed_only		\$ 746	\$ 746	\$ 746	\$ 746
Intercept		\$ 1,142	\$ 1,142	\$ 1,142	\$ 1,142
bene_gender_age	F75-79		\$ (166)		
bene_gender_age	F95-GT			\$ (105)	
bene_gender_age	M75-79	\$ (150)			
bene_gender_age	M90-94				\$ (107)
bene_mdcr_status	Aged without ESRD	\$ (603)	\$ (603)	\$ (603)	\$ (603)
period_category					\$ (503)
Open benign prostatic hypertrophy		\$ (15)			
Open cerebrovascular disease, occlusive/nos		\$ 68		\$ 68	
Open acute myocardial infarction					\$ 1,389
Open heart failure (chronic)					\$ 338
Open atrial fibrillation/flutter (chronic)					\$ (27)
Open hypertension essential (chronic)		\$ 56	\$ 56	\$ 56	\$ 56
Open Diabetes Type II (chronic)		\$ 90			\$ 90
Open lipid ds		\$ (62)	\$ (62)	\$ (62)	\$ (62)
Open esophagitis (chronic)					\$ 39
Recent acute myocardial infarction			\$ 164		
Trig cd:old myocardial infarction		\$ 26	\$ 26		\$ 26
Trig cd:coronary atherosclerosis of unspecified type of vessel, native or graft		\$ (189)		\$ (189)	\$ (189)
Trig cd:coronary atherosclerosis of native coronary artery		\$ 49	\$ 49		\$ 49
Old Percutaneous cardiac intervention			\$ 148		

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Table _Y: Illustrative Risk-Adjusted Expected Costs for Four Patients (PCI)

Risk factor	Factor category	Applicable parameters for illustrative patients			
		Patient A	Patient B	Patient C	Patient D
risk_index		0.41	0.9	1.1	2.1
pred_fixed_only		\$ 7,367.00	\$ 15,975.00	\$ 19,490.00	\$ 37,312.00
avg_pred_fixed_only		\$ 17,716.00	\$ 17,716.00	\$ 17,716.00	\$ 17,716.00
Intercept		\$ 28,403.00	\$ 28,403.00	\$ 28,403.00	\$ 28,403.00
bene_gender_age	F75-79				\$ (2,982.00)
bene_gender_age	M55-59			\$ (3,841.00)	
bene_gender_age	M60-64		\$ (3,298.00)		
bene_gender_age	M70-74	\$ (4,293.00)			
bene_mdcr_status	Aged without ESRD	\$ (3,360.00)			\$ (3,360.00)
bene_mdcr_status	Disabled without ESRD		\$ (4,992.00)	\$ (4,992.00)	
primary_indication	acute myocardial infarction		\$ (643.00)		
primary_indication	ischemic heart disease	\$ (880.00)		\$ (880.00)	\$ (880.00)
sub_cat	Angioplasty	\$ (1,298.00)			
sub_cat	Revascularization		\$ (1,926.00)	\$ (1,926.00)	
sub_cat	Stent				\$ (898.00)
combined_tx	none	\$ (13,113.00)			
combined_tx	cardiac cath		\$ (11,120.00)	\$ (11,120.00)	
combined_tx	insert perm pacemaker/AICD and cath				\$ -
Trig cd approach: Angioplasty		\$ 3,275.00			
Trig cd anatomy: Single vessel		\$ (164.00)	\$ (164.00)	\$ (164.00)	\$ (164.00)
Trig cd approach: Revascularization			\$ 5,734.00	\$ 5,734.00	
Trig cd approach: Stent					\$ 5,206.00
Open acute kidney failure					\$ 2,715.00
Open acs subsequent/other				\$ 819.00	
Open acute myocardial infarction			\$ 3,981.00		
Open card device or graft comp/malfnctn				\$ 3,042.00	
Open cardiomyopathy				\$ 515.00	
Open heart failure (chronic)				\$ 3,025.00	\$ 3,025.00
Open ischemic heart disease		\$ 876.00		\$ 876.00	\$ 876.00
Open valve ds aortic (chronic)					\$ 352.00
Open resp failure					\$ 5,021.00
Open Cardiac catheterization		\$ (1,237.00)			
Open CABG		\$ (841.00)			

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Table _Z: Illustrative Risk-Adjusted Expected Costs for Four Patients (CABG)

Risk factor	Factor category	Applicable parameters for illustrative patients			
		Patient A	Patient B	Patient C	Patient D
risk_index		0.4	0.9	1.09	2.1
pred_fixed_only		\$ 17,529.00	\$ 38,498.00	\$ 47,002.00	\$ 89,893.00
avg_pred_fixed_only		\$ 42,771.00	\$ 42,771.00	\$ 42,771.00	\$ 42,771.00
Intercept		\$ 54,084.00	\$ 54,084.00	\$ 54,084.00	\$ 54,084.00
bene_gender_age	F70-74			\$ 10,030.00	\$ 10,030.00
bene_gender_age	F75-79		\$ 11,642.00		
bene_gender_age	M65-69	\$ 7,486.00			
bene_mdcr_status	Aged without ESRD	\$ (6,793.00)	\$ (6,793.00)	\$ (6,793.00)	\$ (6,793.00)
primary_indication	acs other than ami	\$ (7,743.00)			
primary_indication	ischemic heart disease		\$ (4,425.00)	\$ (4,425.00)	\$ (4,425.00)
sub_cat	1 vessel	\$ 2,369.00	\$ 2,369.00	\$ 2,369.00	\$ 2,369.00
combined_tx	none	\$ (25,951.00)	\$ (25,951.00)		
combined_tx	cardiac cath				\$ (14,043.00)
combined_tx	open heart valve surg			\$ (14,673.00)	
Trig cd anatomy: 1 vessel		\$ (6,563.00)	\$ (6,563.00)	\$ (6,563.00)	\$ (6,563.00)
Trig cd detail: Arterial graft		\$ 4,566.00	\$ 4,566.00	\$ 4,566.00	\$ 4,566.00
Open acute ischemic stroke					\$ 8,997.00
Open acute kidney failure					\$ 6,384.00
Open acute myocardial infarction					\$ 2,106.00
Open heart failure (chronic)			\$ 6,269.00	\$ 6,269.00	\$ 6,269.00
Open atrial fibrillation/flutter (chronic)			\$ 3,485.00		
Open malnutrition					\$ 19,354.00
Open resp failure				\$ 6,136.00	\$ 6,136.00
Open Cardiac catheterization			\$ (185.00)	\$ (185.00)	
Open Percutaneous cardiac intervention		\$ (3,925.00)			
Open EGD endoscopy					\$ 1,423.00
Open Leg revascularization				\$ (3,812.00)	

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- e) How the roles for various clinicians in care related to the procedure or condition would be determined and assigned;

Sorting out (or assigning) clinical roles in relation to patient care is a complicated undertaking that involves a number of principles and steps. Our answer here is a summary of those principles and steps; Appendix X discusses the specific steps in more detail.

Algorithms are applied to the data in order to infer from service patterns the logical role each clinician has with respect to the patient and episode. The algorithms attribute each episode for a patient to a set of providers according to patient relationship categories (PRCs) inspired by MACRA, as shown in our proposal to PTAC, and again in Appendix X. The names we have given to the clinical roles are Principal, Primary, Supporting, Ancillary, and Episodic.

Many Medicare beneficiaries have one or more chronic conditions. EGM episodes for chronic conditions can remain open indefinitely, spanning many months or years. EGM refreshes calculations for each chronic condition episode every 90 days, including factors used for risk adjustment, and estimates of future costs (i.e., the next 90 days). The ACS-Brandeis model's fiscal attribution logic piggybacks on that structure by inferring clinical roles for providers from the pattern of services observed over 90-day periods.

The ACS-Brandeis model is intended to focus accountability on events and consequences that have not yet occurred, such as potential future acute exacerbations, or discretionary or avoidable services, and sequelae (including complications). Thus, participation in the care for a patient during one time-period activates accountability and incentives that anticipate future costs. Lowering actual cost below the estimated expected cost generates savings, which translate into incentive payments that acknowledge and reward the relative efficiency. Hence, the structure of accountability observes service patterns in one or more quarters, and continues accountability into the next quarter. Even if a provider does not provide a service in the subsequent quarter, the accountability continues for that long, which we call a "warranty" period to reflect the responsibility for consequences that would take time to manifest.

In each successive quarter, a clinician's services for that chronic condition episode (e.g., IHD) are categorized into ancillary, E&M, or non-E&M. Ancillary services are limited to a defined set such as reading test results, which would be expected by specialties like general radiology or pathology.

- Any clinician who provides only ancillary services will be assigned the role of Ancillary provider in the current and subsequent (warranty) quarter.
- Any clinician who provides only non-E&M (beyond any ancillary) services will be assigned the role of Supporting provider in the current and subsequent (warranty) quarter.
- Any clinician who provides any E&M (beyond any other) services for two consecutive quarters will be assigned the role of Principal provider starting in the second such quarter, and will continue as Principal provider in the subsequent (warranty) quarter.

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- Any clinician who qualifies for the role of Principal provider for two or more chronic condition episodes that reflect different clinical domains (e.g., cardiovascular and muscular-skeletal), and whose specialty is general (e.g., internist) will be assigned the role of Primary provider for the patient instead of Principal provider for that condition episode.

Episodes that are for acute conditions or defined procedures can occur at any time, and begin and end within 90 days. In contrast to chronic condition episodes, for acute conditions and procedural episodes there is an Episodic provider in addition to clinicians with other roles.

- For procedural episodes, the Episodic provider is the surgeon who conducts (bills for) the definitive procedure for that episode.
- For acute condition episodes, the Episodic provider is determined based on claims patterns related to diagnosis codes and timing. Specifically, for an acute condition, the Episodic provider is the clinician with the most E&M services on the date on which the episode is triggered.

In addition to the Episodic provider, fiscal attribution for acute conditions and procedural episodes includes other clinical roles. Ancillary and Supporting providers are defined with algorithms similar to chronic condition episodes: Ancillary providers bill only for ancillary services. Supporting providers bill for services beyond ancillary.

The clinical roles of Principal provider and Primary provider for acute episodes borrow from the established roles that are determined over time from chronic condition episodes. If the patient has a Primary provider during the quarter in which the acute episode begins, that provider is assigned the Primary provider role for the acute condition or procedural episode of interest. For acute condition episodes, there is a Principal provider if the acute condition is an exacerbation or other sequela of a chronic condition episode for which there is a Principal provider. Similarly for procedural episodes, there is a Principal provider if the condition episode for which the procedure is indicated is a chronic condition or an acute condition that is an exacerbation or other sequela of a chronic condition episode for which there is a Principal provider.

The EGM attribution logic uses the services provided and timing of care to determine each provider's role in the case. The table below shows all of the providers associated with a single colectomy and the services provided. As shown in the table, the primary provider has a relationship with the patient over time, managing a number of different conditions. In this particular case, the primary provider is involved in chronic conditions like COPD, affective disorder and hypertension, along with having a role in an endoscopy and the colectomy.

The principal provider is a medical specialist focused on gastroenterology related issues. This provider primarily bills for evaluation and management care, including services related to the colectomy episode. The Episodic provider is a general surgeon who does the definitive treatment (pxdef) which, in this case, is a colectomy.

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The supporting providers include a nurse anesthetist and physician anesthesiologist, a physician assistant, a nurse practitioner and medical generalists. Each of those providers either billed for supporting services related to the surgery or evaluation and management care, most likely after the surgery. Finally, there are a small number of Ancillary providers including a radiologist and pathologist.

	Start of services	End of Services	Payments	Service type	Service count	Episode
Primary						
PROV 1: Physician/Internal Medicine	4/26/2012	7/31/2013	775.23	em	2	affective ds other (chronic)
				em	6	asthma/copd chronic
				em, tst/lab	17	atrial fibrillation/flutter (chronic)
				em	2	bone/cartlg ds ne
				tst/lab	1	EGD endoscopy
				text/lab	9	Colectomy
				em, test/img	20	hypertension essential (chronic)
				em	13	lipid ds
				em, tst/lab	9	low back pain
				em, therapy	4	other
Principal						
PROV 2: Physician/Gastroenterology	4/25/2012	5/1/2013	664.88			
				pxdef	7	Colonoscopy
				em	5	colorectal neoplasm benign
				em	3	EGD endoscopy
				em	1	Colectomy
				em	2	other
Episodic						
PROV 3: Physician/General Surgery	4/22/2013	5/9/2013	108.38	em, pxdef	3	Colectomy
Supporting						
PROV 4: Physician/Gastroenterology	5/1/2013	5/1/2013	75.06	em	1	Colectomy
PROV 5: Certified Registered Nurse Anesthetist (CRNA)	5/9/2013	5/9/2013	163.68	pxsup	1	Colectomy
Prov 6: Physician/Anesthesiology	5/9/2013	5/9/2013	163.68	pxsup	1	Colectomy
PROV 7: Physician assistant	5/17/2013	5/17/2013	115.04	em	1	Colectomy
PROV 8: Physician/Family Practice	5/16/2013	5/16/2013	164.78	em	1	Colectomy
PROV 9: Nurse Practitioner	5/16/2013	5/16/2013	142.20	em	1	Colectomy
Ancillary						
PROV 10: Physician/Diagnostic Radiology	7/11/2013	7/11/2013	9.00	img	1	Colectomy
PROV 11: Pathology	5/9/2013	5/9/2013	84.06	tst/lab	1	Colectomy
PROV 12: Physician/Internal Medicine	4/26/2013	7/11/2013	10.69	tst/lab,testing/img	10	Colectomy

- f) The percentage of financial responsibility that would be assigned to each physician/provider type and whether it was dictated by the model or whether it was chosen by the participating physicians;

This is where the ACS-Brandeis model has a major pivot point. On the one hand, CMS and other payers will need to determine standard rules by which the financial outcomes are attributed to clinicians

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participating in patient care. On the other hand, the participating entities will need to establish ground rules and specific business relationships with clinicians who are affiliated QPs. We interpret this question (2.f) as pertaining mainly to the relationship between the payer and providers/entities; and later questions (2.g. and 2.h below) as pertaining mainly to the relationships occurring within entities and among providers.

An important intrinsic ability of the ACS-Brandeis model is to serve simultaneously as a budget tool and incentive system. Many APMs are developed to change incentives, and many attempt to quantify “budgets” for providers and health systems, often defined as target prices. Additionally, a major concern for the payer is keeping track of its own budget, across payment systems including APMs, and the source of savings attributable to any of those APMs. Hence, it could be problematic to include the same dollars in more than one of the attributed “budgets” and savings estimates. For each dollar that is truly saved, the payer would not want to count it twice, but would want to attribute the savings to the provider or entity that was induced by the APM (or MIPS) to generate the savings.

This problem could manifest in situations where the respective budgets pertaining to the same patient(s) are nested, such as a procedure within a condition, or an acute condition within a chronic condition, or other overlapping procedures and conditions. Within the ACS-Brandeis model, EGM can handle these situations by apportioning dollars for the same services across episodes without double-counting dollars, and by “rolling up” budgets within budgets without double-counting savings.

Layered onto EGM in the ACS-Brandeis model is the fiscal attribution logic. The problem of double-counting dollars or savings could occur if not for the logical structure that includes fixed percentages of fiscal responsibility across the clinical roles. Consider what could happen if the percentages were free to vary by episode or entity. For example, suppose in a procedural episode the surgeon (episodic provider) “negotiates” an allocation of 60%, and at the same time, the anesthesiologist also negotiates an allocation of 60%. If an episode within that context had \$1,000 in savings, obviously CMS would not provide incentive payments for the individual efforts by double-counting the savings and paying an entity on the basis of more than 100% of the \$1000: 60% plus 60% plus X% of for other clinicians.

A similar problem could occur across APM entities. Suppose the surgeon and the anesthesiologist in the example were affiliated with different entities. Entity 1 might “claim” more than 60% of the \$1,000 because the surgeon and other QPs participated in the care; while Entity 2 might also claim more than 60% of the \$1,000 because the anesthesiologist and other QPs participated in the care. Would CMS maintain budget integrity by making incentive payments that exceeded 120% of the actual savings? No, CMS would want the sum of the percentages for each episode to equal 100. That is the purpose and benefit of having fixed percentages for each type of episode. *

A different issue entirely is how the fixed percentages are determined. Nothing intrinsic to the ACS-Brandeis model dictates that 40% is the perfect or only possible allocation for the Episodic provider. Our proposal suggests that 40% might be acceptable. All of our webinars and project materials throughout the process have used 40% as a working example without serious disagreement. Various participants have asked where the number came from, or whether any of the percentages could be changed, should

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there be a potential reason to do so. We believe that any serious alternatives should be considered, and determined by consensus or by policy leadership as necessary. The model starts with the premise that the whole team, and every member of the team, makes incremental contributions to the overall results. The percentages are intended to respect the likely degree to which participants in care might tend to affect the overall performance of team-based care considering all instances of an episode.

- g) How individual physicians would be paid for their services, including those who are part of the Clinical Affinity Group and those who are not, and also how hospitals, skilled nursing facilities, laboratories, etc. would be paid;

Medicare would pay all providers and facilities in the first instance according to the applicable payment system. Within the APM entity, there would be rules for gainsharing among team members, or to contribute to entity costs of business such as capital investments or reserves.

- h) How monetary rewards and penalties would be calculated and allocated among clinical participants;

Once CMS and the APM entity have settled all the episodes for all the clinicians, the APM entity must reconcile the risks with the clinicians and other elements of the delivery system. The APM entity may elect several ways to reconcile or distribute its risk as earnings or penalties. The APM entity could consider the same data and logic used by CMS for the team-based fiscal attribution as input for criteria to determine how it invests or distributes internally its end-of-year balance from the payments made by CMS to the APM entity. APM entities might choose to distribute risk asymmetrically to its clinical members. For example, the hospitals could take more downside risk than the clinicians, or vice versa. These are local market forces that the ACS-Brandeis proposal has established as flexibility within the model.

Some of the logic that entities could consider include categories of savings attributed to certain components of the delivery system or scenarios. For example, facilities may be recognized for increasing urgent care or observation stays and thereby reducing index admissions or rapid readmissions. Extended office hours may account for reduced urgent or emergent care services. Radiology appropriateness criteria and decision-support could lead to fewer or less intensive imaging studies. In general, internal protocols and assessments could steer rewards to attributable clinicians, facilities, and QI programs.

- i) The sources of funds that would be used to repay Medicare if total spending on the episodes exceeded the target spending amount, including the amounts that would come from the participating physicians, either directly or indirectly, and how those amounts would be determined.

What happens when the APM entity has a loss due to CMS based on the patients and the teams in all the episodes deployed from its episode library? CMS could implement payback mechanisms such as reduced payment amounts for services to the entity and QPs in the following year. CMS also or

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alternatively could qualify APM entities with risk-based capital requirements. Such requirements would involve reinsurance and capital reserves. Industry standards consistent with other programs in CMS would establish the criteria CMS uses to qualify the fiscal readiness of the APM entity. In the event of a fiscal loss with accounts payable due to CMS, the APM entity can agree to reduced fees and/or use its reserves in risk-based capital or assess its members to cover the losses. It is possible that CMS could also move the accounts payable forward into the following year. An appeal process typically involves risk-based payments to assure audit-based payments are valid.

- j) How the care delivered for the procedure or condition would differ from the care that is routinely delivered today, how the payment model would make that change in care more feasible for the physicians to implement than the current payment system, what benefits the change in care would produce for the patient, and what savings the care change would create for Medicare. (We understand that the care changes, benefits, and savings would likely vary from provider site to provider site, but we would like to see a description of a specific example of how care delivery might be changed and what implications that would have under the payment model.)

One objective of the ACS-Brandeis APM is to align the incentives of medical specialists with the goals of increased efficiency and higher quality care. The existing fee-for-service infrastructure rewards volume of care provided and encourages providers to consider only their own part of the care continuum. By adjusting the provider incentives, the APM encourages providers to consider the entire episode of care and thus every patient's long-term goals for health and function. Stated differently, an objective is to encourage providers to redesign care for optimal quality and efficiency.

In traditional fee-for-service healthcare, the analytic space is the professional service provided by the caregiver, care design is centered around that service, and the metrics evaluating the provider are also centered at that service. At the other end of the spectrum is traditional managed care, in which the analytic space is the overall care provided to a defined population, care design is center around population health, and the metrics evaluating providers are also centered around this global service to the population. Incentives in fee-for-service care encourage unnecessarily high volumes of care, while incentives in fully- or partially-capitated managed care encourage potentially inappropriate restrictions on the provision of care. One of the unique advantages of the ACS-Brandeis APM is the analytic capability of the Brandeis grouper, combined with the clinical logic encoded into the grouper databases, that allows accurate accounting of both the quality and costs associated with an episode of care. This engine allows the ACS-Brandeis APM to function reliably and with high validity in the episode analytic space, and will encourage APM entity organizations to innovate in care design within the episode space. With evaluation metrics concentrated on the episode of care, our APM will encourage providers and delivery systems to design care pathways, care coordination, care transitions, and communication between providers in ways not seen before.

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For surgical episodes, the initial opportunities for care redesign extend from the pre-op period (usually 30 days before surgery) through 90 days after the procedure. The narrow emphasis here is on getting the patient through the surgical procedure efficiently and with good outcomes. When condition episodes are implemented, the performance metrics will reflect broader efficiencies including possibly lower rates of procedures, different procedures to attain the same outcomes, and novel care pathways to treat the condition. The ACS-Brandeis model envisions the clinical affinity groups working together to optimize patient health across the spectrum of medical, surgical, and allied health services.

Some of the episodes available in the ACS-Brandeis APM can resemble the existing CMS bundles, and have most of the cost savings potential hypothesized for BPCI, CJR, AMI, or similar bundled payment APMs. Participants in the BPCI demonstration focused primarily on the low-hanging fruit of reducing readmissions and the use of skilled nursing facilities in the post-discharge period. The evaluation for Year 2 of BPCI showed that, for several types of bundles, outcomes included decreased lengths of stay and less use of skilled nursing facilities (SNF) by participating providers as compared to non-participants, although this did not always result in cost savings. The most significant finding across all sites and all 48 bundles was that a reduction in SNF services provided drove the reductions in mean episode costs for major joint replacement of the lower extremity.

The ACS-Brandeis model can engage and activate entire clinical departments and diverse specialties toward care improvement for entire clinical domains: not just hips, but most musculoskeletal conditions; not just AMI, but most cardiovascular conditions, not just acute diabetic ketoacidosis but chronic care of the diabetic patient etc. For procedural episodes there are often varying levels of care redesign that an APM Entity or CAG could directly affect. These could include the development of risk criteria for the appropriate selection of patients for surgery and decisions about the particular procedure appropriate for the patient, choice of setting for care (e.g., inpatient versus ambulatory surgery center), innovative protocols for perioperative care to minimize complications, and new options for post-acute and aftercare. Team-based clinicians also can influence the use of unnecessary services such as excess or repeat imaging, the size and composition of the clinical team including innovative roles for existing members and entirely new members, and the coordination of post-discharge care. There are a number of patient considerations that can affect a patient's trajectory during an episode of care, such as nutrition and substance abuse and mobility/frailty. Typically, these are evaluated and treated, if at all, by separate departments of a facility. Under the ACS-Brandeis model, CAGs can work across departments to implement more optimal approaches to care, starting at the pre-op phase with home visits or pre-operative nutrition and physical therapy, all the way through post-discharge planning and maintenance care. This approach can apply to surgical episodes, acute medical condition episodes and the management of chronic condition episodes.

The possibilities of care redesign in an episode environment can be demonstrated in a commonly performed surgical procedure. In colorectal surgery, the stapled gastrointestinal anastomosis has become the dominant technique over hand sewing, growing from 46 to 80 percent between 2004 and

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2011 (Amri et al, 2014).⁴ Laparoscopic colectomy using this technique is rapidly supplanting traditional open colectomy, and is associated with less pain, more rapid recovery, lower complication rates, shorter lengths of stay and quicker return to work. This care redesign has occurred within the traditional fee-for-service environment. However, if the entire episode of colon cancer is considered, there may be many other ways to improve efficiency and quality beyond those associated with the procedure itself. Given that surgical outcomes often depend upon the condition of the patient when he or she presents for the procedure, more aggressive assessment and preoperative optimization for select populations of patients, by medicine members of the gastrointestinal cancer team guided by advanced clinical support and communications technology, could lead to better outcomes through less complications. Real time perioperative risk stratification (as is being developed to recognize and prevent complications such as acute kidney injury, and that requires close coordination between the surgeon, the anesthesiologist, and the hospital information technology and data processing experts as well as significant investment in resources,) is an example of a technology that will provide a return on investment for the team caring for the entire episode of care. Process redesign, as surgeons have begun to develop in ‘fast track pathways’ and “Enhanced Recovery After Surgery” protocols, will be enhanced as a well-coordinated team, responsible for the patient throughout the entire episode, works to find optimal pathways and technologies. Aggressive preoperative preparation, close coordination between anesthesia and surgery and critical care in the perioperative period, multi-modal pain management coordinated with early feeding and early ambulation in the postoperative period, and close coordination and communication after the patient is discharged from the hospital are examples of an optimized episode of surgical care. In our own data analysis of risk-adjusted cost of colectomy episodes, we see large differences in episode cost depending upon the presence or absence of significant postoperative sequelae. Patients with low actual-to-expected cost ratios had 1/3 the number of sequelae compared to patients with high actual-to-expected cost ratios, suggesting that efforts to reduce sequelae could lead to significant cost savings. Over time, the ACS-Brandeis APM should instill a generalized mindset of cost-consciousness alongside clinical excellence, leading to optimal approaches and technologies emerging and diffusing.

The possibilities for care redesign associated with condition episodes have both similarities and differences compared to procedure episodes. Congestive heart failure (CHF), a common sequela of poorly treated or untreated ischemic heart disease (IHD), affects 5.7 million people in the U.S with approximately 670,000 new cases annually⁵. Care redesign in the managed care environment has focused mainly upon preventing one of the biggest drivers of cost in these patients: the frequent and/or preventable hospital admission for an acute exacerbation. Care coordination, telemonitoring, and ambulatory care managers have been used to lower hospital readmission rates with varying, but overall minimal, success. In an environment where quality of care and outcomes for the episode are being

⁴ Amri R, Bordeianou LG, Sylla P, Berger DL (2014). Renewed assessment of the stapled anastomosis with the increasing role of laparoscopic colectomy for colon cancer. *Surg Endosc.* 29 (9): 2675-2082.

⁵ Ambrosy, A. P., Fonarow, G., Butler, J., Chioncel, O., Greene, S., Vaduganathan, M., . . . Gheorghiade, M. (2014). The global health and economic burden of hospitalizations for heart failure. *Journal of the American College of Cardiology*, 63(12), 1123–1133. doi:10.1016/j.jacc.2013.11.053

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evaluated and which then determine reimbursement, investment in techniques to change the trajectory of the condition, rather than just optimally deal with the condition when it happens, will become common.

The development of personalized medicine, including the ability to predict disease before it happens and then act to prevent and mitigate it, is in its infancy. In episodic care using a personalized medicine approach for IHD and CHF including genomics and deep learning approaches to the assessment of the social determinants of health for a patient, primary care providers will be able to identify the risks of developing IHD, healthful behaviors will be promoted, and disease will be either prevented or treated early and aggressively. For the patient who develops IHD, a team-based approach will emphasize placing each patient within the optimal pathway towards best outcomes so that, for example, the patient with single vessel coronary artery disease will always be treated by the interventional cardiologist rather than the cardiac surgeon, while the surgeon only operates on the patients with multi-vessel disease. For the patient who develops CHF, ambulatory care will be optimized by care coordination and communication technologies, perhaps using smart phones and remote monitoring, that are not utilized in a reimbursement environment where unbillable services are an investment that pays no dividend. If the patient is admitted to the hospital, and the hospital is a partner in the APM entity focused on the care of patients with IHD and CHF, the hospital can be expected to invest in resources to achieve economies of scale, smart scheduling algorithms, and robust modeling for predicting resource and performance requirements for these patients. Hospitals will combine clinical insights from practitioners with operations research and analytics expertise from within the institution to optimize care for these complicated and costly patients.

The ACS-Brandeis APM provides incentives to encourage providers to consider the entire episode of care and thus every patient's long-term goals for health and function. These incentives will encourage APM entities to invest in care redesign that will move the healthcare system towards optimal quality and efficiency.

- k) How patients would be informed about the care the Clinical Affinity Group plans to deliver and what choices of providers would be available to the patients. In particular, please describe how the following practice from page 12 would be implemented: "In situations where beneficiaries **choose clinicians** [all, some or just one?] who are participating in the APM entity, we do not expect that those patients will be able to opt out of the team based protocols intended to improve value . . . In other words, if the **patient's providers** [again: all, some or just one?] have opted for the APM, then the patient's experience will reflect **life in the APM**, and not MIPS." [Emphasis added]

It is generally the case that demonstration sites inform beneficiaries about the nature and purpose of the demonstration. This information may or may not affect beneficiaries' choices with regard to providers or treatment options. This is similar to the Belmont principle of "respect" for individuals and

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disclosure of information that might affect key decisions.⁶ At the same time, it is important to structure and monitor the APM to ensure beneficence,⁷ i.e., net improvement for beneficiaries who participate.

Whether an Advanced APM is pilot-tested or implemented straightaway, it departs from original Medicare as commonly understood by beneficiaries. Thus, CMS may wish to educate beneficiaries about the nature and purpose of an APM. In demonstration contexts, some provider organizations have attempted to go beyond simple notification in order to engage beneficiaries in the improvement process. For example, in the early phases of BPCI, participating providers needed to make a concerted effort to let beneficiaries know they were receiving care under a demonstration. This posed some challenges because the DRG that defines a bundle is not determined until after the inpatient stay. However, there are organizations that took this as an opportunity to engage people in their own care, creating a patient compact that included action items such as “call the practice before you call an ambulance.”

We are not proposing a patient compact be a formal component in the model, but we do suggest that patient notification can be a form of engagement. This could start, for example, with the surgeon and patient planning surgery. The ACS-Brandeis model emphasizes team-based care and shared accountability. The surgeon will want to identify the other clinicians on the team, including for example, the patient’s PCP and regular medical specialist (the Primary and Principal Providers, respectively). All clinicians who are already functioning within the APM will be accumulating their respective shares in the quality and cost outcomes, and implicitly will want any other clinicians participating in the patient’s care also to strive for excellent outcomes.

The point here is to guide improvement and not to ensure the status quo. In some cases, the “teams” are too large and include redundant or unnecessary consultations and tests. In other cases, the setting of care is suboptimal because it is more expensive than necessary or has lower quality than available alternatives. Planning by providers and patients could include such topics as which setting is most appropriate for the given surgery options, or what additional medical specialists, if any, to engage in the patient’s care. Disclosing the options and rationale is a potential tool for building trust and managing patient expectations.

There might be providers who participate in the care but are not in the APM. The model allows non-participating providers to continue to be paid on a traditional fee-for-service basis without the obligations or consequences that are special to the APM. Patients are not “locked into” specific providers or locations of care.

A related consideration, however, is the length of time for which the Entity maintains fiscal responsibility even after a beneficiary has switched to providers outside of the Entity. For example, a patient with IHD may be seen by Primary and Principal providers within an Entity during the first two

⁶ <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/#xrespect>

⁷ <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/#xbenefit>

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quarters of a calendar year, but then switch to clinicians who are not affiliated with the entity or possibly the APM at all. Our proposal suggests a policy parameter that would continue fiscal attribution to those QPs and the Entity during the third quarter as well, which we call a warranty period. Is one quarter long enough? Should it be two quarters, or “the remainder of the year?” In any case, the ACS-Brandeis model does not prevent beneficiaries from seeking care from any given provider.

- l) The process and outcome measures that would be used and any other mechanisms that would be used to ensure quality of care, appropriateness of care, etc.;

The APM entity would work with all the shared accountable providers to agree upon the episode-specific measures from the measure sets. In the instance of colectomy, the surgical phases of care measures contain high-value process measures, outcomes, care coordination, and patient-reported outcomes (in development). The APM entity or the clinicians themselves would select measures to fulfill the requirements related to the four tiers of quality (Excellent, Good, Acceptable, and Unacceptable). We believe these measures will mature, and the requirements to achieve higher rankings will progress from levels of participation to levels to performance.

To illustrate the colectomy episode, the care team would select from the pre-operative phase to include 1. Surgical plans and goals of care (appropriateness); 2. Tobacco screening and cessation (preventive); 3. Surgical Risk Calculator and communicate risk (Appropriateness and Informed Consent/Shared Decision Making).

Other measures would come from other phases of care such as 4. Postop plan and communicate (Shared decision-making); 5. Surgical CAHPS assessment (Patient Experience of Care); and finally from the post-discharge phase of care, the measure under consideration might be 6. Unplanned readmission within 30 days (Outcomes).

- m) If you can provide any estimated cost savings for either or both of the examples, please provide this data and the estimation methodology.

There are many different ways to estimate a behavioral response and potential cost savings in the ACS-Brandeis APM. We have written previously to PTAC that savings can be achieved in the short-term by reducing unnecessary utilization, or by shifting services to less intensive settings or approaches. Also, savings over the long-term relate to lowering the long-run demand and/or supply curves, for example, through prevention, medical management, and adoption of cost-lowering technologies. It would be a considerable undertaking to articulate a detailed inventory of how clinicians, delivery systems, and researchers could plan or implement the nearly countless options. From a common short-term “bundle” mindset, the ACS-Brandeis model can induce and quantify many types of savings often mentioned in relation to those models, such as reducing SNF or hospital admission following discharge for an acute event. Similarly, for savings commonly sought in a medical home or ACO, the ACS-Brandeis model operating with condition episodes in the library encourages savings related to care setting and avoiding acute events.

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In our last round of responses to PTAC we quantified some sequelae expenses, suggesting these are indicative of unnecessary or potentially avoidable costs. For this round of questions, we are focusing on provider level variation within a single, mid-sized market with approximately half a million Medicare beneficiaries and a few hundred TINs (our proxy for provider group/organization). As shown below, the number of episodes varies by type with approximately 1,500 CABG procedure episodes and 4,000 PCIs in a year. For the chronic condition of IHD we see many more episodes, in part because these episodes remain open as long as the beneficiary continues receiving care for the condition. In our example market, this results in approximately 127,000 IHD episodes in 2013.

For the cost savings estimate, we start with the observed and expected episode expenditure for each case within a given TIN. As shown in the table below, there is wide variation in expenditures by episode. Focusing specifically on procedures, we see almost a \$25,000 difference between the 75th and 25th percentile for CABG, a relatively high-cost procedure. PCI is less costly on average, but still has a \$20,000 difference between the values at the 25th and 75th percentiles.

Procedure	25% Percentile	50% Percentile (Median)	75% Percentile
CABG	\$ 35,435	\$ 45,333	\$ 60,698
Colectomy	\$ 16,113	\$ 22,893	\$ 36,666
PCI	\$ 13,633	\$ 17,072	\$ 23,956

In the table below, we show the average observed and expected costs for the whole market. The final column in the table shows the expected cost. This is calculated for each case and represents the target price for that particular episode, given the patient's demographic and risk profile. When the difference between the expected and observed expenditure is negative this represents an opportunity for improved efficiency. In other words, the observed costs for a given provider are higher than the risk adjusted target prices, suggesting there are ways the TIN could lower costs.

Episode Name	Episode length	Average Observed	Average Expected
CABG	90 days	\$ 48,182	\$ 48,166
PCI	90 days	\$ 19,467	\$ 19,173

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Colectomy	90 days	\$ 27,252	\$ 27,630
AMI	90 days	\$ 10,354	\$ 10,354
IHD	on-going	\$ 1,750	\$ 1,836

Drawing on this logic, the table below aggregates the observed and expected costs for all TINs in the market. Looking at PCI, for example, the total observed costs in the market were \$79.2 million dollars and the total expected costs were \$78 million. Across individual TINs in the market there is a wide range of negative and positive deviations from the targets. Aggregating the amounts where the observed cost is higher than the expected cost results in \$3 million of potential savings for PCI episodes in a single market. This approach is extended in the table to show potential savings for CABG, colectomy, AMI and IHD.

Episode Name	Episode Count	Sum TIN Observed	Sum TIN Expected	Estimated Savings
CABG	1,548	\$ 74,621,631	\$ 74,595,842	\$ 2,857,076
PCI	4,069	\$ 79,213,869	\$ 78,019,484	\$ 3,045,381
Colectomy	2,169	\$ 59,117,270	\$ 59,937,864	\$ 2,049,881
AMI *	1,401	\$ 14,508,186	\$ 14,508,277	\$ 1,065,940
IHD	127,099	\$ 187,575,621	\$ 196,803,303	\$ 12,043,308

* AMI episodes are undercounted in this illustration.

3. We could not understand from your previous answers whether there would be any minimum number or types of physicians that would be required to participate in the APM. Please provide a one-sentence statement as to what would be required and what would not be required.

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In order for a clinical affinity group to form, typically a minimum of two groups of physicians would be involved in an episode but more are preferred. In a surgical case, a surgeon and anesthesia team or a surgeon and a post-acute care team would represent two minimum groups.

4. Please identify the individual types of physicians, specialty societies, or provider groups that have provided input into your proposed payment model as opposed to providing input only into the definitions of episodes in the EGM episode grouper.

Except in the EGM design report (Appendix C in the proposal to PTAC), which acknowledges contributions from many clinical experts into EGM itself, our references to input and support for the ACS-Brandeis model refer to subsequent and additional contributions.

While the ACS-Brandeis Advanced APM was initiated by ACS, the product as submitted is built on the input of the larger physician community. In addition to the direct input from specialty societies in the form of clinical data review in the episode definitions, over the last year we have held a robust series of online and in-person meetings. These meetings, totaling more than 10 hours, were all interactive and provided opportunities for questions and feedback from any interested in participation. These sessions were critical in shaping the proposal and covered a wide range of topics including, attribution, quality measurement, payment systems, risk, and episode formation among others. Representatives from the following societies and organizations participated in one or more of these sessions: AAFPRS, AAMC, AANS, AAO, AAOHNS, AAOS, ACOG, ACOS, ACP, AMA, AGA, APSA, APTA, ASA, ASBS, ASCRS, ASPS, ASTS, AUA, ASMBS, FAH, LUGPA, NASS, Premier, SAGES, SGO, SHM, STS, SVS. It is our understanding that several of the aforementioned organizations provided positive comment letters to the PTAC during the public comment period. In addition to these sessions, ACS has presented on our proposal at meetings of several other groups, including the AMA's APM Workgroup, which is typically attended by representatives of a wide variety of physician specialties.

5. Would there be any provisions in the model to avoid adversely affecting hospitals?

There are no provisions specifically aimed at hospitals in the proposal, and it is not our intention to affect them or other health facilities adversely. We recognize that certain metrics for success in the model such as reduced readmissions or complications could reduce hospital revenues, albeit because of providing higher quality care to the patient. Similar dynamics could occur for clinical professionals or other inputs to care, with potentially fewer consults, tests, or medical supplies.

We welcome hospitals to participate in, or to form and own APM entities under the model. Unlike other bundled payment proposals, we do not *require* hospital participation. Hospital participation could have benefits such as sharing ownership of risk, optimizing care pathways, team-building efforts across departments, facilitating care coordination during patient transfers, and so forth. Hospitals are more likely to have the financial resources necessary to meet financial risk requirements conditional on the methods CMS might adopt to collect on losses. Entities that formally include hospitals (or other facilities) would need to negotiate the facilities' shares in the risks and rewards of the model, along with the affiliated QPs. The proposal developers have already received interest from hospital organizations for this type of engagement.

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The inclusion of hospitals in the APM entity is also a good example of the distinction between our proposed framework for fiscal attribution by the payer based on clinical role, and the assignment of financial risk and reward by the entity under the model. Our Physician-Focused Payment Model is premised on the concept that physicians manage the patients, conditions, and procedures; and their decisions influence the utilization of most types of services.

Under MACRA law and regulations, the APM entity itself must take on greater than nominal fiscal risk. An APM entity that includes a hospital would go at risk for the amount required by CMS, but would have the ability to share any repayments or shared savings with the affiliated participants under the entity. The entity is not required to share that upside/downside risk among participants in percentages equal to the fiscal attribution framework. The hospital could retain a portion of shared savings (e.g., 15 percent) to offset changes in practice patterns that result in reduced revenues, or to build up reserves to offset future risks, while passing through the rest to the APM participants based on any agreement they have made with the entity.

Some physicians, particularly those in ancillary roles, may wish to participate in the Advanced APM in the early years mostly for the initial 5 percent incentive, the higher updates after 2026, or to be free from MIPS reporting requirements. Some could contribute to team-base care and yet continue to receive Medicare reimbursements or operate under terms similar to a traditional employment contract without taking on the additional risk of the APM, or sharing in any rewards.

6. The response to question 5 states:

“One theme in our proposed APM is that CMS ensure a widespread but consistent diffusion of the underlying technologies, including the EGM software itself, as well as the clinical metadata used to specify episodes. We call this the “single-grouper” solution, and it is intended to create a consistent national standard for defining clinical concepts and episodes, determining how to assign services and cost to those episodes, and communicating important clinical associations such as indications for procedures and related sequelae

CMS owns the software . . . We wish for a situation in which the software and metadata are licensed or at least copyright protected.

The current model is built as a business construct using the EGM developed for CMS by Brandeis. The ACS-Brandeis construct of a business model is built on **this work product** which represents Clinical Affinity Groups that participate in episodes, and built into clusters of episodes for contracts to a third party such as through an APM entity or payer. All copies of the clinical metadata and measurement algorithms for this APM currently reside at Brandeis. Further, ACS has created a phases-of-care quality overlay with dyads of measures that are patient-centric, CAG-centric measures with shared accountability. The IP aspect of these elements of the proposal are currently under internal review with regard to their proprietary nature. Our intent is for this model to be freely licensed as an APM for all payers and is not subject to change without review and approval by the ACS. . . However, development costs and maintenance cost for performance measurement require resources. To the extent that payers

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do not support these development and maintenance expenses, we would expect licensing agreements that support a going concern in these programs.”

We have several questions about this portion of the proposal:

- a) We are aware that in 2012, CMS awarded a contract to Brandeis to develop a public domain episode grouper for Medicare (National Quality Forum, Evaluating Episode Groupers, 2014). Are you proposing that the new EGM software should no longer be in the public domain, but instead be licensed?

Our understanding is that CMS has considered putting EGM into the public domain, and possibly under the auspices of a licensing arrangement between CMS and the user. We are not proposing that CMS refrain from making EGM software available. We defer completely to CMS regarding any licensing arrangements that CMS may choose to have with users.

- b) With respect to, “CMS owns the software . . . We wish for a situation in which the software and metadata are licensed or at least copyright protected,” who are you proposing should hold the license for the software? CMS, ACS, Brandeis, some other party?

Please consider our language as meant to be practical considerations and not legal opinions. See our answer to the prior question (6.a) regarding the software and any licensing arrangements. The software and the metadata must work together properly, and any changes to either will affect results. Part of our intention in the proposal is that the clinical specifications and episode construction logic in EGM can become reference standards for our model; additionally, CMS, other payers, and providers could use the same reference standards for other APMs, and MIPS or similar VBPs. We call this the single-grouper solution, and is intended to preclude the alternative, in which all results are qualified and distinguished according to their idiosyncratic logic, specifications, or other parameters. To the extent that APMs, payers, and providers can embrace the single grouper as they enter risk arrangements, and evaluate and compare their results, then everyone can proceed with the real work of improving care. A practical benefit here is to pool the cognitive and administrative resources required to maintain the system over time. With so many benefits accruing to payers and providers, such investments would seem to be more than worthwhile.

The references to copyrighted materials were to emphasize the need for discipline with respect to maintaining identical copies of the software and metadata when making comparison or inferences across providers, regions, payers, episodes, etc. An example to make the point could be assertions about sequelae for a given type of episode. If somebody deleted some assertions in the metadata, such as heart failure can result from AMI, then the total costs calculated for AMI episodes would appear lower because they would omit spending for heart failure following AMI. It isn't our intention to forbid changes to metadata that are available in the public domain, but to make sure that all stakeholders could be sure that results were based on an identical and specified version of EGM/metadata.

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Neither Brandeis nor ACS is seeking (or refusing necessarily) to hold copyrights on materials related to the grouper, but would again defer to CMS for implementing and maintaining standard versions.

- c) With respect to, “The IP aspect of **these elements** of the proposal are currently under internal review with regard to their propriety nature,” please clarify:
 - a. To what does “these elements” refer?

The proposal's elements developed or adapted by ACS-Brandeis include: the APM entity; configurations and specifications for EGM; episode clusters for individual physicians (including no dollars accounted more than once); the clinical/fiscal attribution model; the episode-based tiered quality model; the episode-based measure framework with shared accountability; the phases-of-care measure framework; and the high-value process measure in a dyad with linked PROs.

The ACS-Brandeis proposal carries the ACS and Brandeis brands. Since this is a risk model tied to payment, ACS & Brandeis wish to be prudent about the impact of branding a model used in the public domain. As a CMS proposal, we have intended this model to be freely available to CMS for use in the A-APM and MIPS-APM program. We also realize the model may be modified by CMS prior to its implementation. ACS and Brandeis may accept those modifications as improvements to the model. If ACS or Brandeis does not accept the improvements, we expect CMS may elect to implement the model with their own modifications. However, in the instance where ACS or Brandeis do not agree with the modified model, we would seek to identify the CMS model separately from ACS or Brandeis.

We also seek to implement the model with private health insurers in their payment models. Again, these entities may wish to modify the ACS-Brandeis model. We accept these modifications in the spirit of alternative payment innovation. However, given the risk-based nature, we are interested in how modifications may be branded. Controlling the IP may be the most rational method for doing so.

- b. Who is conducting the internal review, what is the scope and question(s) being addressed by the internal review, and when will the results of the internal review be available to the PTAC?

ACS legal review is underway. The ACS executive director and the executive officers have provided ACS legal counsel with the entire submission. The A-APM project team provided the legal counsel with the elements noted above in 6(c)a. The ACS leadership provided guidance to the legal counsel review team to protect the proposal from plagiarism and to identify the extent to which the ACS & Brandeis brand for the original proposal would be protected if modifications are applied to the model. The guidance to the legal review included that we expect CMS to consider modifications and improvements. We also wish to protect against private payer modifications without oversight by ACS and Brandeis. ACS has also sought guidance from legal counsel about the mix of elements, some of which were developed prior to and outside of this proposal before being incorporated. Other elements were developed within the scope of

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innovation for this proposal (fiscal attribution models, tiered quality models, episode-based measure framework, phases of care measure sets, and process-PRO dyads).

- d) With respect to, “To the extent that payers do not support these development and maintenance expenses, we would expect licensing agreements that support a going concern in these programs,” do you mean that unless multiple payers financially pay for the cost of measure development that the party holding the license will only provide a license for a fee?
ACS

The proposal contemplates several specific focus areas that will require governance and management over time. As a payment model, these are typically operational expenses of an insurer within one of their payment programs. Some of the examples of ongoing maintenance and operational refinements include updates to the metadata files used in the EGM logic, clinical fiscal attribution rules, and refinements to the quality tiers and the episode based measure framework. Typically, insurers would contract with advisory panels and experts to support their administrative efforts.

Additional advances in risk adjustment have been proposed by specialties with clinical registries. Ongoing work in the next phase of this model would seek to compare the current risk adjustment model for target pricing to adjustments that would come from clinical registry-based risk-adjustment. One specialty that supports the model has already stepped forward to begin this next phase of work.

In all these instances, the operational, maintenance and further developmental costs require a business model for the payer to consider. We have considered many mechanisms for parsing the work and gaining the fiscal support to accomplish the task. Government contracts with entities such as the HCP-LAN could be a resource to greatly aid in a multi-stakeholder set of inputs over some of the aspects of the model, such as metadata file updates, risk adjustment models, and clinical fiscal risk attribution. The National Quality Forum and the Measures Application Partnership would be an excellent resource for the episode-based measure framework, the phases-of-care measurement, and the HVPM/PRO dyads.

Separately from each payer modifying the model, the entire program could be moved into a non-profit collaborative with control over licensure of the elements of the program. A licensing fee to all users would support the infrastructure needed to maintain the overall program. ACS-Brandeis has limited development of sustaining business models until further understanding of the value of the model to CMS. By no means do we propose a single solution. Our intent is rather simple, that these are critical maintenance functions that have fiscal impacts in supporting the program and require a business model that will assure the integrity of the program.

- e) With respect to, “ACS has created a phases-of-care quality overlay with **dyads of measures** that are patient-centric, CAG-centric measures with shared accountability,” measure dyads were not discussed in the initial proposal submission. Please explain and provide some examples of the “dyads of measures.” ACS

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The ACS has many dimensions to its efforts to support the programs in MACRA. These efforts, just to name a few, include our efforts to improve quality measurement with the phases-of-care model, the creation of high-value process measures, our work in developing PROs, the creation of HVP/PRO dyads, our national clinical registries, ACS support of interoperability, our work on the national cancer database and the Vice President's Cancer Moonshot, and our efforts with DOD and VA for enhancing overall battlefield and post-battlefield medicine.

Part of our overall strategy in MACRA creates a transition from MIPS to APMs. We believe this includes quality measurement as well as risk-based payment models. To achieve a smooth transition, we have tried to foster a consistent measurement model that is meaningful to surgeons and patients and would work in both the MIPS environment and transitions well to APMs.

Creating measures that are more meaningful to patients and surgeons is less about a CMS payment program and more about overall outcome and improvement. We have introduced the phases-of-care and HVPM/PRO dyad concept to CMS and a multi-stakeholder group for review. CMS sought them for inclusion in the MIPS MUC list, which CMS shares with the NQF's MAP for comment. We continue to work with CMS by adding these to the A-APM in the episode-based quality framework. Given CMS' interest in outcome measures and in PROs in our conversations, we have added the dyad of high-value process measures (HVPM) combined with a focused, narrow PRO. CMS asked ACS to add these to the MUC list, prior to ACS full development and testing, representing support for the concept and a desire to receive review and feedback from the MAP. ACS sought to remove these from the MUC list until initial testing in a QCDR had occurred but ACS supported presentation to the MAP. We presented to the MAP and received overwhelming support for further development and advancing of the episode-based quality measure framework and the dyads.

The dyad development has begun with our development team headed by Dr. Andrea Pusic, MD and Larissa Temple, MD. Both are recognized international experts in PROs. The initial scope of PRO work for 2017 focuses on identifying the general surgical episodes and their high value process measures. The HVPM + PROs as a dyad may be cross-cutting, and work for many surgical and non-surgical disciplines.

It is premature to provide PTAC with explicit measures while these measures are in their developmental phase. Perhaps a measure concept would help to illustrate the dyad. One concept would be a HVPM for the goal of surgical care and include confirmation that the patient/family, surgeon(s), anesthesia, and PCP have reviewed and concur with the treatment plan. The elements of the treatment plan must address specific goals such as relief from a condition, establish a diagnosis, and improve QOL. The team members may asynchronously agree to the plan using shared HIT resources. The dyad is completed when the patient submits a PRO for surgical goals at 30 days or beyond in their post procedural care. The PRO would focus on how well the patient was informed and the level of goal attainment, and would assess the satisfaction with their overall care.

- f) Does the phrase "this work product" refer to the EGM developed for CMS by Brandeis?

This work product refers to the proposal submitted to PTAC.

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7. Pages 10-11 and Exhibit 5 in the initial submission state, “Each clinical role is allocated a fixed proportion of the savings amount (Exhibit 5):

Exhibit 5: Percentage Shares for Fiscal Attribution by Clinical Role

Class of Episode	Clinical Role				
	Primary	Principal	Episodic	Supporting	Ancillary
Procedural	10%	15%	40%	30%	5%
Acute Condition	10%	15%	40%	30%	5%
Chronic Condition	40%	35%	N/A	20%	5%

We could not understand from your previous answers whether the percentage allocations among physicians that you described would be required by the payer or whether they would be under the control of the physicians. Please provide a one-sentence statement as to whether the allocations are required or not. Then please explain how you would envision the percent allocations being determined. Are the categories labeled “primary, principal, episodic, supporting or ancillary” formal and required elements of the model, or are they merely illustrative of how physicians might choose to make allocations? [PRC] If they are formal/required elements, how are physicians assigned to these categories? Are the assignments based on their CMS specialty designations? Can a physician’s designation change depending on the actual care they deliver? How often and when can the designations change?

The percentage allocations must be the same across APM entities for purposes of allocating provider responsibility but are not necessarily equivalent to the share of potential savings or repayments required to the physician. Please see the responses to questions 2.e and 5 above, as well as the Appendix for more on this.

In August, we held a webinar where we discussed this issue and took questions from participants but did not hear significant push back on the proposed percentages. Obviously, not all physician specialties were included in this discussion, and we would be open to additional clarifications or adjustments to the percentages, provided the percentages remain the same across entities and payers.

8. If the model does not require all physicians to share in the risk, have surgeons indicated to you that they will participate in this model for surgical episodes if they are the only ones accepting the financial risk, and if not, what other physicians would need to participate?

MACRA seemingly intends that the Medicare program as a whole instill cost- and quality-consciousness generally for all providers, whether their work is done under MIPS, an APM, or some combination. A truly coherent solution for Medicare would be to measure cost and quality similarly across that spectrum of participation, so that staying in MIPS or moving partially or completely to the APM does not mean changing the definition of value. Thus, whether a particular provider was practicing at nominal risk or more than nominal risk, he or she would realize shared accountability and understand that true success depends on team-based care, regardless.

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The question here is accentuated to the extent that avoidance of the ACS-Brandeis model signals to providers and avoidance of accountability, such as through lack of structure to evaluate performance precisely in a general medical home or ACO, or for lack of meaningful measures in MIPS.

The ACS-Brandeis model is intended to appeal to the professional interest in excellent care. The team-based accountability coincides with the team-based care. Each specialty, and ultimately each potential participant needs to see the value proposition, and the vision for a win-win. That should follow from further details about how their engagement can manifest.

We have not formalized market research to test surgeon or physician level of interest. Rather, we have relied on specialty society level of engagement in the overall project. Almost all surgical disciplines have been involved and remain very engaged in building out the elements of the overall episodes. Specifically, they have participated in the metadata assessments for plausible inclusions and exclusions. They have shown keen interest in risk adjustment comparatives with their clinical registries. They have requested to develop new episodes to add to the mix. And, they are engaging in the episode based measure framework. In addition, medical specialties and other societies are seeking to engage.

Achieving adoption at the surgeon level will include an education program befitting this A-APM. Also, physicians and surgeons are no different than most people; they are risk averse. Building a risk model may require adjustments to gain initial uptake. Subsequently, the risk models and levels or depth of asymmetry of risk may be modified.

9. Do you anticipate that the model will have any implications for the application of “safe harbor” regulations or need for waivers of the Physician Self-Referral law or the Federal Anti-Kickback statute?

We do not believe that elements of our submission raise Physician-Self Referral (Stark) and Anti-Kickback Statute (AKS) concerns beyond those that already exist for other programs that CMS has implemented that include a gainsharing component. We believe all APM entities that engage in risk-sharing arrangements with physicians and other providers would be expected to comply with all fraud and abuse prevention laws and regulations (including Stark and AKS). As HHS and CMS indicated in its *Report to Congress: Fraud and Abuse Laws Regarding Gainsharing or Similar Arrangements between Physicians and Hospitals As Required by Section 512(b) of the Medicare Access and CHIP Reauthorization Act of 2015*,⁸ the Secretary retains the authority to waive certain fraud and abuse laws in testing models under the authority of CMMI, and as such the Secretary and the OIG have issued waivers for several programs. We believe that the previously issued waivers will serve as a resource for future waivers necessary to provide the APM entities participating under the model included in this submission with the flexibility needed to improve care delivery and reduce resource utilization without risk to patients or risk of program abuse.

⁸ <https://www.cms.gov/Medicare/Fraud-and-Abuse/PhysicianSelfReferral/Downloads/Report-to-Congress-2015.pdf>

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10. Please clarify what is in the table you submitted titled, *ACS- Brandeis Condition and Procedure Episodes*. The key to this table states, “Key blue = episode for profiling; green = procedure episode.”

- a) If green items are procedures, what are “episodes for profiling?” Are they condition episodes? If so, why is “TURP” blue?

Episodes for profiling are fully developed with trigger codes, trigger rules, relevant services and diagnoses, sequelae and, for procedures, indications. Each of these episodes also has a customized risk adjustment model that includes co-morbidities and severity markers. These are the episodes that have undergone expert review and are most appropriate for use in the alternative payment model.

The remaining episodes play a support role, absorbing services based on trigger codes only. Over time, many of these can and should be developed into fuller episodes.

TURP should be green since this is a procedure episode. This was an error.

- b) Are these the procedure episodes the model proposes for initial implementation? If not, what are they? If so, why were these procedures chosen?

The 54 procedure episodes shown in green in the appendix are all fully developed and ready for additional clinical review and use in the APM.

- c) Which of these episodes will be fully ready for implementation by January 2018?

All episodes shown in green are ready for implementation in 2018, and the condition episodes listed in blue could be made ready.

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February 3, 2017

Physician-Focused Payment Model Technical Advisory Committee
c/o U.S. DHHS Asst. Sec. of Planning and Evaluation Office of Health Policy 200 Independence Avenue
S.W. Washington, D.C. 20201

Letter of Support – Brandeis University, ACS-Brandeis Advanced Alternative Payment Model

We can imagine many scenarios in which various reforms under MACRA sputter, stall, or splinter, and ultimately disappoint. The “whole” may be less than the sum of the parts under scenarios of duplicative and misaligned efforts, with many working at cross-purposes. In contrast, we believe that the ACS-Brandeis model could help to establish and leverage an information and incentive platform that not only succeeds for its “part,” but also helps to shape and guide others’ efforts ultimately toward greater success.

Many small groups or even large companies have endeavored to create their own episode groupers, each representing one of a potentially infinite number of very different or slightly different ways to make inferences from claims data. That scenario can take us to the Tower of Babel, where multiple languages divide payers and providers into so many idiosyncratic conversations about how to measure cost and performance, but which fail to make reasonable, apples-to-apples comparisons and judgments.

A key aspect of the envisioned ACS-Brandeis platform is embodied in EGM, which is integral to our proposed strategy that calls upon CMS to lead national reforms via a “single-grouper solution.” EGM is a robust tool that recognizes every diagnosis and procedure code in relation to meaningful clinical concepts that can inform cost drivers and fiscal incentives. CMS can support EGM as a national resource that invites and rewards review and input from all medical and surgical specialties. Everybody benefits from others’ contributions within and across all clinical domains, so the benefits from all contributions are multiplied, rather than divided.

Historically, attempts at reform have tried carrots and sticks but few have succeeded in engaging the professionals with respect to their specific clinical work and the need for collaboration toward more excellent patient care. We believe that the ACS-Brandeis model will provide the missing hook, or impetus to engage, because it establishes a comprehensive yet clinically precise episode framework that is amenable to the merging of cost and clinical data, and to the most serious analysis in support of team-based care and shared accountability.

Brandeis University was the first-ever, and remains the most enduring external research and development partner for CMS. Our novel contributions to the field include diagnosis-based risk-adjustment for cost, the shared-savings payment model, hospital value-based purchasing, and the Episode Grouper for Medicare. We welcome opportunities to continue supporting CMS and the ACS-Brandeis model. At this point, we are uniquely qualified to configure, modify, and optimize the logic and specifications comprising the model, and to help educate others who can support and benefit from the model.

Sincerely,

A handwritten signature in cursive script that reads "Christopher P. Tompkins".

Christopher P. Tompkins, PhD
Associate Professor
Director, Institute on Healthcare Systems

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Appendix X

Clinicians and Roles: Patient Relationship Categories

The specific services assigned directly to each episode can identify each clinician participating in a specific patient's episode of care. Each clinician who bills Part B for a clinically relevant service for that patient and for that episode, i.e., a service that is assigned directly to the episode,⁹ is a member of the "team," i.e., the set of caregivers for that episode. Each clinician participating in the patient's caregiver "team" for that episode will have a proportion of the overall accountability for that episode, defined and gauged according to his or her relationship to the patient and the episode.

Algorithms are applied to the data in order to infer from service patterns the logical role each clinician has with respect to the patient and episode.¹⁰ The algorithms attribute each episode for a patient to a set of providers according to patient relationship categories (PRCs) inspired by MACRA, as shown in Exhibit A-1.

For each type of episode that begins and ends within 90 days (i.e., an acute condition or procedure), there is a single Episodic provider. For procedural episodes, the Episodic provider is the surgeon who conducts (bills for) the definitive procedure for that episode. For acute condition episodes, the Episodic provider is determined based on billing patterns related to diagnosis codes and timing. Specifically, for an acute condition treated in a hospital inpatient setting, the Episodic provider is the clinician with the most E&M services on the date on which the episode is triggered. For example, if a patient enters the hospital for a pneumonia episode, the Episodic provider is determined based on billing for pneumonia on the first day of admission. This approach emphasizes timing over volume criteria such as the most E&M visits or most dollars over the course of the inpatient stay or the whole episode. The purpose for that is to avoid defining responsibility after the patient's trajectory has ensued. For example, using service volume alone, the designation of Episodic provider might often fall upon clinicians who entered the case only after untoward events such as complications or deterioration. Instead, the locus of responsibility should be upstream for events and consequences yet to come, acknowledging that in some cases those events are potentially avoidable, and framing accountability and incentives to avoid them whenever possible.

⁹ Assigned "directly" means the service is clinically relevant to that episode versus all open episodes for that patient. Direct assignment is distinguished from indirect assignment, where the latter refers to services included in the episode through an associated sequela. For example, the services assigned directly to a surgical infection episode are assigned indirectly to the causal procedural episode by way of a sequela relationship.

¹⁰ The point here is not that all of the clinicians function as though they were part of a coordinated team, or even that they all know or are aware of each other. Furthermore, it need not be the case that all caregivers are affiliated with the same, or any Medicare APM. The narrower point here is that each clinician is contributing to the care, and to the cost and other outcomes of the episode.

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Exhibit A-1: Patient Relationship Categories (Patterned after MACRA)

Relationship to Patient/Episode	Description	Examples
Primary Provider	Primary care role Manages patient over time	<ul style="list-style-type: none"> • Internist • Pediatrician • Family practitioner
Principal Provider	Manages specific condition(s) over time; specialist	<ul style="list-style-type: none"> • Psychiatrist • Nephrologist • Cardiologist
Episodic Provider	Manages an acute condition episode Manages a procedural episode	<ul style="list-style-type: none"> • Surgeon • Hospital medicine • Specialist
Supporting Provider	Supporting role during an episode	<ul style="list-style-type: none"> • Anesthesiologist • Radiation oncologist • Consulting specialist
Ancillary Provider	Focused role during a single service	<ul style="list-style-type: none"> • Diagnostic radiologist • Pathologist • Cardiologist (reading ECG)

Also part of the team-based approach to accountability are the Primary and Principal providers. Identifying clinicians in these roles continues the logic of identifying providers who are involved early or already in a patient’s episode(s) of care, in advance of potential downstream events and outcomes. Hence, the approach is to identify providers who are involved with a patient and episode before the performance period of interest; i.e., from which there will be estimates of savings. This means identifying a patient’s caregivers in order to reward effective patient management, and before the onset of a procedural episode, or an acute exacerbation or other sequela to a pre-existing condition.

Clinicians who are seeing and treating a patient in one time-period are seen as having opportunity and responsibility regarding ensuing events and trajectories, as opposed to a provider who becomes involved only after important decisions and events have occurred that shaped the trajectories. As such, acute events comprise part of the responsibility and accountability attributed to primary and relevant principal providers.

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For many patients there will be one or more providers who serves in a primary role. This is a provider managing the patient over time, or, in the context of episodes of care, someone who is participating in episodes that could be dissimilar with respect to clinical topics (e.g., cardiovascular, orthopedic, neurological, psychiatric, and so on). In many cases, there will also be one or more principal providers who help manage a patient's condition(s) within their respective specialty areas. The logic for the two categorical roles is similar, but identification of Principal providers is restricted to clinicians billing clinically relevant services to one or more conditions within a clinical chapter or condition family over time. For example, Internists, Cardiologists, or other clinicians could provide E&M services for the conditions such as IHD, hypertension, and cardiac arrhythmia. The attribution logic looks at patterns of care, as well as physician specialty, to determine who qualifies as principal and who qualifies as primary.

More details about these definitions are as follows:

- Identification of episodic, supporting, and ancillary providers for a procedural or acute condition episode is limited to service patterns within the time window of that particular episode (90 days).
- In contrast, identification of principal and primary providers is based on service patterns observed for chronic conditions over time. Principal providers participate in care for one or more conditions over time (i.e., specialty care); and primary providers participate in care for a patient over time, including a diversity of clinical conditions (i.e., general care).
- Hence, those categories are identified based on historical patterns and applied as of the beginning of the episode or performance period of interest.¹¹ EGM processes and updates attributes of chronic condition episodes every 90 days. For example, risk factors are updated in order to predict expected cost for that patient in the upcoming 90 days. For each patient, service patterns are examined each quarter to determine the clinicians who are providing services for each open chronic condition episode. Thus, for each 90-day period there is a list of zero, one, or more clinicians who have billed services for that patient's open episode(s).¹² This results in the roster of clinicians participating in care for that patient and the episode of interest.

¹¹¹¹ For the APM entity, the period of performance will likely be a calendar year. Meanwhile, episodes are constructed for a patient based on service dates. EGM can translate episode results into calendar dates conforming to formal periods of performance.

¹² It is fairly common for beneficiaries with open chronic condition episodes to have no relevant services during a given 90-day period.

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- Each clinician participating in care for that 90-day period is assigned to one of the four patient-relationship categories applicable to chronic conditions (episodic provider is N/A for chronic conditions).
 - A clinician who provides only ancillary services in one period, or multiple periods, will be an ancillary provider during each such period.
 - All providers who provide E&M or any other services beyond or in addition to any ancillary services will be assigned to one of the three remaining categories (principal, primary, or supporting).
 - The assignment of a provider to one category versus the others is determined by a combination of billing patterns during the current period of interest, and the billing patterns and category assignments in recent periods.
 - Again, some information is accumulated over time and used to assign clinicians into roles going forward. This reflects the accountability for downstream consequences and to promote continuity of interest over time.
- The first quarter in which a physician bills a relevant service for that episode, he or she is either an Ancillary Provider (if all bills are for ancillary services) or a Supporting Provider with respect to that episode. This is intended to reflect limited responsibility and accountability corresponding to the first instance (period) that a clinician becomes involved with the patient's care. The logic does not make clinicians who are new to the case accountable for consequences that are rooted in the past.
- The attribution logic distinguishes between E&M services (patient encounters involving evaluation and management) and all other (non-E&M) professional services billed under Part B. Specifically, billing for E&M services can qualify a clinician to be a principal or primary provider, whereas other Part B services cannot. Consequently, a clinician who bills only for non-E&M services will not qualify to be the principal or primary provider for that patient or episode.
- A clinician who is a supporting provider in one quarter and who bills again as a supporting provider in the subsequent quarter (non-E&M services) will again be a supporting (or ancillary) provider in that second quarter. This reflects the continuing status as supporting provider. During that second quarter, that clinician is held accountable with respect to cost for that episode.
- A clinician who is a supporting provider in one quarter, and whose services in the subsequent quarter would not qualify the clinician as supporting provider, nevertheless will automatically be assigned supporting status in the subsequent quarter. This reflects conveyance of responsibility and accountability for consequences partially rooted in the past. During that second quarter, that clinician is held accountable with respect to cost for that episode.

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- We refer to this feature as a “warranty” because participants in team-based patient care continue to bear some responsibility for outcomes even for a period after their last observed service for that patient.
- A clinician who is a supporting provider in one quarter and whose claims included E&M services for that episode may qualify to become a principal or primary provider for that episode and patient. Again, this determination is made partially with respect to continuity of care for the patient, and partially with the type of services provided by that clinician. Specifically, a clinician bills for E&M services with respect to the same chronic condition episode in two successive quarters will be assigned the role of principal provider for that episode as of the beginning of the latter quarter. During that second quarter, that clinician is held accountable as a primary provider with respect to cost for that episode.
- A clinician who is a principal provider in one quarter and who bills for any E&M services for that episode in the subsequent quarter will again be a principal provider for that episode. This reflects the continuing status as principal provider.
- A clinician who is a principal provider in one quarter, and whose services in the subsequent quarter would not qualify the clinician as principal provider (no E&M services), nevertheless will automatically be assigned principal status in the subsequent quarter. This reflects conveyance of responsibility and accountability for consequences rooted in the past (i.e., the warranty). During that second quarter, that clinician is held accountable with respect to cost for that episode.
- The logic for assigning roles distinguishes between a principal provider and a primary provider in the following way.
 - The role of principal provider is determined within each chronic condition episode. The principal provider is one who manages that condition over time, and often will be a medical or surgical specialist.
 - A primary provider, in contrast to a principal provider, is said to manage the patient over time. In other words, the management is not in reference to a single chronic condition episode, but instead to any number of chronic conditions that may be present for the patient. Thus, the attribution logic observes whether a clinician is eligible to be a principal provider with respect to each open chronic condition episode, and then looks across all such episodes and qualifying status as principal provider, in order to determine whether to reassign that clinician to primary provider with respect to the whole patient.
 - In the situation where a clinician qualifies to be a principal provider in more than one chronic condition for a patient, the attribution logic applies to additional tests to determine whether that clinician instead should be designated a primary provider.

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- The first of these tests compares the chronic conditions themselves. If all chronic conditions for which a clinician qualifies to be principal provider fall into the same clinical domain (clinical chapter in EGM), then the clinician remains principal provider for each of those episodes. If any of those episodes fall into different clinical domains (chapters), then the clinician is assigned status as primary provider for that patient, and is not assigned status as principal provider for any of those chronic conditions.
- The second test refers to the specialty of the clinician. There is a designated list of clinical specialties that alone can qualify a principal provider to be reassigned as primary provider. These are general medical specialties including internal medicine, family medicine, geriatrics, general medicine, and ob-gyn. Only clinicians with one of those designated specialties are considered to become primary providers; clinicians of any other specialty are excluded as primary providers, and would remain principal providers for the respective episodes.
- It may be that some other specialists (not on the short list of specialties) truly manage some patients over time. However, it is common for many professional claims to include a wide range of diagnosis codes because they are accurate for the patient, even though the particular specialist is not managing those conditions. For example, a claim from an orthopedist for the management of knee arthritis may include a reference to glaucoma, this should not lead to an inference that the orthopedist is managing the glaucoma, or by extension, the whole patient. In contrast, a PCP may monitor glaucoma as an aspect of total patient management.
- The pattern of assignment continues over successive quarters: each quarter with a qualifying service renews the status of that clinician in that role, and any quarter that lacks such qualifying services nevertheless will continue the role assignment for one subsequent quarter in order to fulfill accountability for costs that may be partially rooted in the past.

Exhibit A-2 illustrates how these concepts are implemented in relation to distinguishing the roles of primary, ancillary, or principal in relation to chronic condition episodes.

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- Shown are eight 90-day quarters (1 through 8) with the first four quarters representing the prior year, and quarter 5 through 8 representing a performance year.¹³
- Each set of rows represents a physician (A, B, etc.) who bills for clinically relevant services for the patient with regard to a specific chronic condition.
- The columns represent quarterly periods for that patient in relation to that episode.
- The cells represent the clinician’s particular billing patterns and the resulting roles assigned based on the attribution logic.

Exhibit A-2: Illustrations of Clinical Roles Derived from a Chronic Condition Episode

Period	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Service pattern A	E&M	E&M	non-E&M	E&M	E&M	E&M	E&M	non-E&M
Clinical Role	Supporting	Principal	Principal (warranty)	Supporting	Principal	Principal	Principal	Principal (warranty)
Service pattern B	E&M	non-E&M	none	E&M	none	E&M	E&M	E&M
Clinical Role	Supporting	Supporting	Supporting (warranty)	Supporting	Supporting (warranty)	Supporting	Principal	Principal
Service pattern C	non-E&M	E&M	none	non-E&M	E&M	none	E&M	none
Clinical Role	Supporting	Supporting	Supporting (warranty)	Supporting	Supporting	Supporting (warranty)	Supporting	Supporting (warranty)
Service pattern D	ancillary	non-E&M	none	none	ancillary	none	E&M	none
Clinical Role	Ancillary	Supporting	Supporting (warranty)	none	Ancillary	Ancillary (warranty)	Supporting	Supporting (warranty)

In each of those quarters, the clinician’s services for that episode are categorized into ancillary, E&M, or non-E&M. The first rows in the table show a service pattern (A) for a clinician over the span of eight quarters serving a patient for a given chronic condition episode.

- Service pattern A. In the first quarter shown here, this clinician billed clinically relevant services for this patient and chronic condition episode, which included at least one E&M service. Because this is the first indication we have that this clinician is participating in the care of this episode, the clinical role assigned is supporting

¹³¹³ To simplify the illustration, we merge the concepts of calendar quarters within and across performance years for the APM, and 90-day episode-periods, which are linked to service dates affecting the timing of a given patient’s episodes. In other words, we assume for simplicity that a patient’s chronic condition episode coincides with calendar quarters: January 1; April 1; etc. Relaxing this assumption is not a technical barrier to implementing the APM because EGM includes several methods for summarizing patient-level episodes within calendar periods.

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provider. Given that the clinician billed for at least one E&M service again in the second quarter, the clinical role assigned is principal provider. The role of principal provider continues in the third quarter as a “warranty,” because the clinician did not bill for any E&M service that quarter. Because this clinician had not provided an E&M service during Q3, and the principal warranty period lasted only through Q3, the occurrence of an E&M service in Q4 reestablishes the supporting provider role. This is elevated to principal provider for the remaining quarters in this illustration by way of E&M services and warranty.

- Service pattern B. This clinician bills for at least one E&M service in Q1, which establishes a supporting provider role. Given only non-E&M services in Q2, the clinician retains the supporting role, which continues by warranty through Q3. The E&M service in Q4 reestablishes a supporting role, which again continues by warranty in Q5. The clinician bills for at least one E&M service during each of the remaining three quarters shown here, which establish supporting followed by principal provider roles in those respective quarters.
- Service pattern C. This clinician shows a billing pattern over the eight quarters that results in a consistent assignment of supporting provider. E&M services are observed occasionally but interspersed with quarters with only non-E&M services, or no professional services at all. The warranty period for supporting providers helps to maintain continuity of role.
- Service pattern D. This clinician shows a billing pattern that includes only ancillary services in some quarters (Q1 and Q5), which lead to an assignment of ancillary provider during those quarters. Because there are no professional services observed for this episode in Q6, and ancillary warranty maintains that assignment during that quarter. The combination of non-E&M services only in Q2, and no services in Q3, leads to an assignment of supporting provider during those quarters. Similarly, the combination of at least one E&M service in Q7, and no services in Q8, lead to the assignment of supporting provider.
- The members and assignments of the team-based care for a patient’s chronic condition episode would result from such determinations for each clinician in turn. If the table reflected some of the care for one patient and episode, then for example, the results in Q6 would be one principal provider (A); two supporting providers (B and C); and one ancillary provider (D).
- After determinations are made with respect to each chronic condition episode for a patient, a clinician whose assignment is that of principal provider for any one condition might have that assignment replaced with that of primary provider. That would happen for any clinician with a general specialty who qualifies as principal provider for more than one chronic condition, if and only if those chronic conditions are diverse with respect to clinical domains. For example, a clinician would be

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primary provider for a patient (i.e., manages the patient over time) rather than simultaneously principal provider for a combination of ischemic heart disease, hypertension, osteoarthritis, diabetes, and COPD.

- The primary provider for a patient is someone looking across a set of episodes for the patient. Not all Medicare beneficiaries will have a primary provider, or even principal providers, according to these definitions.

Except for the definition of Episodic provider for procedural episodes, the other patient relationship categories involve algorithms that could identify multiple clinicians fitting the category. The graphs shown previously about Supporting and Ancillary providers for procedural episodes illustrate that point. The situation is similar for Primary and Principal providers: empirically, there often is no clear pattern of single clinicians serving consistently or regularly, even if this is considered an ideal state. Over periods such as two years, individual clinicians appear to “come and go,” appear once and then either much later or not at all. In other cases, multiple providers may appear often over time.

The discussion here presents a base case for clinical roles leading to fiscal attribution. Clinicians will be accountable for the outcomes of the chronic conditions via their assigned clinical roles. Also, during each quarter for which a chronic condition is an indication for a procedural episode, or gives rise to a sequela (e.g., acute exacerbation), the clinicians’ roles for that chronic condition will be used in the fiscal attribution for those acute and procedural episodes.

These rules are subject to reconsideration, debate, modification, and eventual final determination for implementation. Perhaps periodically, the rules and parameters can be refined or reaffirmed. For example, the implied “warranty” for principal, primary, supporting, or ancillary providers could be lengthened.

These observations reinforce the nature of the episode construction for the APM, which is to be highly inclusive. This reflects reality under status quo conditions, and sets the stage for the APM Entity to improve efficiency over time by **avoiding unnecessary and duplicative relevant services**, and to **streamline the composition of the team of caregivers** in order to improve efficiency overall for patients.

The episode framework can provide similar ways of organizing quality information. Outcomes are inherently tied to the patient by episode. Quality process measures are the “responsibility of” certain clinicians, while that implies and corresponds to their respective role in the episode and for the patient. Hence, episodes can be used to link quality outcomes and process measures to resource use, and to enable accountability and analyses that consider the respective levels and trade-offs.

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PHYSICIAN-FOCUSED PAYMENT MODEL
TECHNICAL ADVISORY COMMITTEE (PTAC)

PRELIMINARY REVIEW TEAM (PRT)
CONFERENCE CALL

Monday, February 27, 2017
10:02 a.m.

PRESENT:

GRACE TERRELL, M.D., PTAC Committee Member
HAROLD MILLER, PTAC Committee Member
BRUCE STEINWALD, PTAC Committee Member
CHRISTOPHER TOMPKINS, Ph.D. Brandeis
JENNIFER PERLOFF, Ph.D. Brandeis
CHUCK HOBSON, M.D., American College of Surgeons
MATT COFFRON, American College of Surgeons
FRANK OPELKA, M.D., American College of Surgeons
VINITA OLLAPALLY, J.D., American College of Surgeons
MARY ELLEN STAHLMAN, ASPE PTAC Staff Director
ANN PAGE, ASPE Designated Federal Official
JANET PAGAN-SUTTON, Ph.D. Social & Scientific Systems, Inc.

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1 P R O C E E D I N G S

2 [10:02 a.m.]

3 DR. TERRELL: Hi. This is Grace Terrell.
4 Who else is on the phone?

5 MR. MILLER: Hi. It's Harold Miller.

6 MR. STEINWALD: Bruce Steinwald.

7 MS. PAGE: Ann Page.

8 DR. PAGAN SUTTON: This is Janet Sutton
9 from SSS.

10 DR. TERRELL: Who else is on the call?

11 DR. TOMPKINS: Chris Tompkins from
12 Brandeis.

13 MR. COFFRON: Matt Coffron.

14 DR. HOBSON: Sorry. Go ahead, Jen.

15 DR. PERLOFF: Jennifer from Brandeis.

16 DR. HOBSON: Chuck Hobson from Brandeis.

17 MR. COFFRON: Matt Coffron from the
18 College of Surgeons.

19 DR. OLLAPALLY: Vinita Ollapally, College
20 of Surgeons.

21 DR. OPELKA: Frank Opelka has joined.
22 College of Surgeons.

23 DR. TERRELL: Has everybody identified
24 themselves?

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1 MS. PAGE: Grace, this is Ann. I wanted
2 to let everybody know, we are having this
3 transcribed. I think, as we have mentioned, as we
4 the PTAC PRT have mentioned in the past, we need to
5 capture responses to the PRT's questions, which
6 will be posted, and so if it is possible -- I don't
7 want to unduly burdensome the conversation here,
8 but if when people ask questions and comments, if
9 you can just say who is speaking, that will help.

10 DR. TERRELL: Great. Okay. Well, I am
11 going to go ahead and get started with the phone
12 call this morning. We have another call that the
13 Committee needs to take at 11:15, so in theory,
14 we've got up to an hour and 15 minutes, if need be.
15 But we certainly appreciate having the opportunity
16 to talk with you all about this.

17 So, for those of you that are not aware, I
18 am Grace Terrell, and I am the chairman of the
19 subcommittee that is actually evaluating the ACS-
20 Brandeis proposal. My two colleagues on the
21 subcommittee are Harold Miller and Bruce Steinwald,
22 who are on the call, and then we have ASPE on the
23 call, who is supporting us with this.

24 So to give you all just a quick sort of

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1 summary of what's going on so far with the PRT
2 process, we received your application. In fact, it
3 was the first one to come in back in, I believe,
4 December, and we have had several meetings since
5 then, phone call meetings, among those of us that
6 are on the committee, where we fleshed out our
7 initial thoughts on it and then asked some
8 clarifying questions that you all have kindly
9 provided the answers back to us and have met again
10 since then with respect to our thoughts on that.

11 This morning, we actually also spoke to
12 CMS and CMMI about some questions we had with
13 respect to the process that they had in developing
14 with Brandeis, the grouper that we thought would be
15 helpful in having us understand certain, more
16 technical aspects with respect to the methodology.

17 So what we're hoping to do today is spend
18 the next hour or so in what we hope will be a
19 useful but somewhat, possibly, clarifying informal
20 conversation in order to sort of clarify some final
21 questions that we have, and if we are able to do
22 so, our hopes are that we will be able to provide
23 our report back to the full committee in time for
24 the April PRT meeting in D.C., to be when the

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1 proposal would go to the full committee for
2 consideration.

3 So, based on that, we have a series of
4 questions, some of which are just more specific to
5 some of the concerns that we brought up that we are
6 hoping that you'll be able to help us with today.
7 I am going to go ahead, and essentially, I think we
8 can have you all respond to those questions that we
9 sort of come up with and then let the conversation
10 get as informal as we need to after that to
11 continue on.

12 Is that okay with everybody? Does that
13 sound like a reasonable approach?

14 PARTICIPANT: Yes, indeed.

15 DR. TERRELL: So our first question is one
16 that has to do with, as much as possible, can you
17 detail how your proposed payment model actually
18 drives changes in provider behavior. We dug into
19 your answers about the groupers and the risk that
20 individuals would take, but we couldn't get our
21 arms around how that actually created specific
22 changes in the care delivery planned and to what
23 extent would the changes in provider affect quality
24 and cost, not just spending, and having data to

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1 support these changes.

2 So many of our questions were about more
3 detail as to how you actually think this would
4 actually change behavior with respect to cost and
5 quality. Could you all give us some of your
6 thoughts on that, please?

7 DR. TOMPKINS: Sure. I will start. This
8 is Chris Tompkins from Brandeis, and others can
9 jump in, and maybe we can make this somewhat
10 interactive, right?

11 DR. TERRELL: Yes.

12 DR. TOMPKINS: Rather than a big question
13 with a big answer, you can start off with a big
14 question. We can give a big answer, and then we
15 can drill down as much as you want to.

16 DR. TERRELL: Please.

17 DR. TOMPKINS: Well, let's take three
18 comparators. We have the current fee-for-service
19 system as it is or even as it's amended by MIPS.
20 We will call that the baseline. I think nobody
21 thinks that, necessarily, that's going to drive
22 towards optimality. And then we have two large
23 types of APMs kind of already established and
24 working -- one population-based or ACOs and the

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1 other kind of the acute segments like BPCI.

2 We think that our model goes, then all,
3 one better at least. I mean, we all, I think,
4 agree that the APM world is an opportunity to set
5 up things that are better than the baseline fee-
6 for-service, but if you think about the ACO world,
7 the population-based, where there the emphasis is
8 on managing patients over time, and then the BPCI
9 world, where you take a segment that has a start
10 and a stop time, in a sense, our model can
11 encompass both of those possibilities.

12 We're suggesting that it starts off with
13 more of a BPCI style. We did derive this with the
14 College of Surgeons. And if you believe -- so just
15 sort of a rhetorical answer is if you believe that
16 there are opportunities for savings and compared to
17 fee-for-service, we think that our model can,
18 number one, identify them better than the others
19 can and, B, motivate or mobilize people to do
20 something better.

21 The "identify them better" comes natively,
22 shall we say, from the grouper because instead of,
23 for example, in the ACO world where you're given
24 rules about how beneficiaries are assigned and then

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1 you're given batches of raw data once in a while,
2 what our model does is it organizes all that claims
3 information into clinical context that has meaning
4 that clinicians can understand. It uses the
5 episode framework -- an NQF, for example, has
6 espoused -- and creates context, where now the
7 spending can be interpreted, and the quality of
8 care can be interpreted. And the roles that the
9 various providers are playing with respect to the
10 patients in the episodes can be understood and
11 interpreted, and so we have an information platform
12 that doesn't exist already and doesn't exist
13 anywhere else.

14 And we think in terms of mobilizing the
15 change, we are putting the accent on team-based
16 care because now that we don't have the obscurity
17 or the anonymity of fee-for-service or the sort of
18 lack of accountability, the information platform
19 organizes that, and now the information about
20 what's going on is available.

21 Now, the APM world generally talks about
22 more than nominal risk and quality measurement and
23 so forth, and those are very integral to the
24 proposal that we've made. So we contemplate that

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1 APM entities could operate under this advanced APM,
2 where this rich information is provided to them,
3 and then we have team-based care with shared
4 accountability both on the quality side and the
5 cost side. And it's all illuminated. Everybody
6 can see what's happening. They can identify the
7 savings, and the incentives that are now collective
8 and quite different from the raw baseline fee-for-
9 service can mobilize people to act on that
10 information and to generate savings, which I think
11 is a premise of this call, that those savings can
12 exist if people can identify them and then are
13 motivated not towards maintaining or, you know, the
14 fee-for-service world, but actually motivated to
15 change those.

16 DR. HOBSON: This is Chuck Hobson. I want
17 to give a specific example of the view that Chris
18 Tompkins just outlined.

19 I am a clinician. I am a surgical
20 intensivist. I work in the VA, where these issues,
21 the issues with the perverse incentives in fee-for-
22 service medicine are much less applicable because
23 of the way that providers work together in an
24 integrated delivery system.

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1 But, for example, the patient who has
2 single-vessel coronary artery disease, in the VA,
3 those patients are treated by the cardiac surgeon
4 or a cardiologist working in concert, whereas in a
5 lot of the fee-for-service world, those patients,
6 if they go to a cardiologist, will be managed by
7 that cardiologist under the fee-for-service
8 incentives. Similarly, that patient, if they end
9 up in the cardiac surgeon, will be managed
10 according to -- or influence, not according to, but
11 influenced by the fee-for-service incentives.

12 If an incentive world exists where
13 cardiologists, cardiac surgeons, anesthesiologists,
14 intensivists, internists see the opportunity to
15 work together to optimize care for those patients
16 and, thus, receive the financial benefits of
17 providing optimal care in an episode-based
18 accounting system and an episode-based environment,
19 that single-vessel coronary disease patient will be
20 treated by the cardiologist, preferentially, and
21 the multi-vessel coronary artery disease patient
22 will be treated optimally by the cardiac surgeon.
23 And both provider groups in which the risks and
24 sequelae of treating a patient with single-vessel

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1 disease are optimized, and the risks and financial
2 incentives for the multi-vessel disease patient are
3 optimized by those providers working together and
4 redesigning care within their community, within
5 their hospital, within their practice region,
6 provides a care pathway for those patients in --
7 that is optimized, and it provides financial
8 incentives for this clinical affinity group to
9 provide the best care.

10 So that's a single clinical example of the
11 world view that Chris Tompkins held.

12 MR. MILLER: So, Chuck, this is Harold
13 Miller. So just to sort of build on that, so you
14 would argue then that in order for this to work,
15 the clinical affinity group would need to have the
16 cardiologist and the surgeon both included, and
17 that it would need to have both the single-vessel
18 and the multi-vessel patients involved, so that
19 that group could essentially re-sort out what the
20 appropriate pathways for care would be.

21 And then I guess part two of the question
22 is I wonder if you all have actually looked at your
23 data with that particular clinical scenario in mind
24 to see how often you think that is not happening

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1 today and what the potential impact would be of
2 creating the model.

3 DR. HOBSON: So I'll answer the first part
4 of the question. I think my colleagues at Brandeis
5 who know the data better than I do may be able to
6 answer the second.

7 But yes, we would expect clinicians to
8 sort themselves, to organize themselves into
9 natural clinical affinity groups to deal with the
10 problems that they see. There are clinical
11 relationships between cardiologists and cardiac
12 surgeons even in the most atomized fee-for-service
13 regions of this country. I mean, there are
14 referral patterns. There are informal working
15 relationships, but in a world where the incentives
16 are to do the most of whatever they do, there is
17 not the financial incentive to create the kind of
18 care redesign that we are envisioning in the
19 clinical affinity groups with its --

20 MR. MILLER: Well, I understand that. The
21 question I was asking was that I think one of the
22 things that was a little perplexing to us was the
23 clinical affinity group idea makes a lot of sense,
24 but it seemed when we were asking, "So what's the

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1 minimum composition of the clinical affinity
2 group?" it seemed that there wasn't one. So I was
3 asking, in this particular case, it would seem that
4 in order to be able to achieve the kind of result
5 that you're talking about, you would need to have
6 the cardiologist and the surgeon both involved. It
7 couldn't just be the surgeon and just be the
8 cardiologist.

9 DR. HOBSON: Absolutely. That's true.
10 Yes.

11 DR. TOMPKINS: Harold this is Chris.

12 But there are two ways to answer that, and
13 they're both true. Mathematically, it isn't
14 necessary that all of the providers raise their
15 hand and all the providers wear the same color
16 shirt and all the providers are cheering.

17 Mathematically, we can sort it out to know the
18 difference, so that if one provider is not part of
19 the entity, then that share doesn't go to the
20 entity.

21 But the care design side of the question,
22 the model isn't just a simple mathematical model.
23 If there were any number of surgical practices that
24 normally use certain facilities and normally came

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1 across their medical colleagues and so forth, the
2 formation of the entity would reflect the
3 willingness, the necessity, and the desire to work
4 together for better care for their patients.

5 MR. MILLER: Well, I understand that,
6 Chris. The question that Grace is asking was we
7 were trying to get at kind of what exactly is it
8 that you actually expect to be the result of this.
9 What's the change? So what I was saying was in
10 Chuck's example, which is a good example, you would
11 really need to have those folks involved.

12 I understand the issue that kind of
13 mathematically if some people weren't involved that
14 you could figure out what to do in terms of the
15 allocation, but it wouldn't change necessarily that
16 structure because if mathematically the people -- I
17 mean, whatever, the cardiologist wasn't in the
18 clinical affinity group, then their behavior is
19 really not going to change because they are not
20 being paid differently. So you would really want
21 to have them both in there because the premise is
22 that they both have to essentially change together
23 what they're doing, which again is the whole -- I
24 think the merit of the concept of the clinical

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1 affinity group.

2 The question was, how does one assure that
3 you don't end up with overly small or clinical
4 affinity groups are ones that are missing key
5 players that are needed to achieve the real result?

6 DR. TOMPKINS: Well, again --

7 DR. OPELKA: Harold?

8 MR. MILLER: Okay. Go ahead, please.

9 DR. OPELKA: This is Frank Opelka with the
10 American College of Surgeons.

11 I think that's a really good question. I
12 think what we try to do with this model is to give
13 CMS the ability to create within the model the
14 various aspects of incentives that draw as many of
15 the different groups together who would not
16 necessarily be aligned in a fee-for-service world,
17 and those levers that exist are actually extremely
18 flexible. It could be at the APM entity. It could
19 be at CMS's entity. It could be at how the risk
20 fiscal attribution is assigned in one episode
21 versus another episode. It could vary in regions
22 where there is high variation in the market, where
23 this allows the payer to look at this and say,
24 "We're not getting movement here. Why aren't we

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1 getting movement?" and they've got all the
2 necessary levers to seek the kind of alignment that
3 is optimal for optimal savings.

4 But if you don't have the full alignment,
5 it doesn't mean you don't appreciate some savings.
6 It just means you might not appreciate the optimal
7 opportunity.

8 DR. TERRELL: So this leads to our next
9 question. Do you have any providers lined up at
10 this point or provider groups that are ready to
11 participate in this model now?

12 DR. OPELKA: So we have not been
13 specifically trying to market this. We designed
14 this for CMS -- this is Frank again, by the way --
15 for CMS to put into an alternative payment model.

16 We have had some large integrated delivery
17 systems to also run ACOs who recognize this kind of
18 technology would be significantly helpful to them
19 to break down the component parts of their ACO to
20 see how they are at variation and where they would
21 want to put in their efforts to optimize ACO care.

22 We have gotten permission from CMS to use
23 the Medicare data in those ACOs for this modeling,
24 and we had a breakthrough with one commercial payer

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1 who is very interested in a large market with one
2 of these integrated delivery systems to further
3 make that data available in the ACO environment, to
4 take it to the next level. But those are cautious
5 steps that everyone -- no one wants to invest in
6 all of these activities without really getting kind
7 of the buy-in that CMS is interested. So those are
8 the steps we have today.

9 But we are getting more and more of the
10 other medical specialties who are coming in trying
11 to figure out the fiscal attribution and the
12 rolling and how the educational framework would
13 roll out for their different specialty areas within
14 the model. There's a high level of interest there.

15 DR. TERRELL: Okay. You mentioned the
16 large health systems, large integrated system being
17 interested, and one of the things that we wanted
18 some clarification on, simply because this model
19 has -- as opposed to some of the others that have
20 come forth, this one has got the significant
21 breadth of possible influence across specialties
22 and conditions, as it was described. Is there any
23 analysis that's been out there as to how this might
24 involve and impact others, besides physicians, such

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1 as hospitals, skilled nursing facilities, or others
2 with respect to care?

3 DR. OPELKA: This is Frank again, and
4 others may want to chime in.

5 We've had several meetings with Premier,
6 who is very interested in the model and sees a real
7 opportunity to play a significant role with all
8 their Premier hospitals, and our discussion with
9 them is that whether it's a small community
10 hospital or a large fully integrated hospital, the
11 hospital could create or partner with the physician
12 community in creating an APM entity. And they
13 could play a very significant role in the risk
14 modeling and the data aggregation and in the
15 ability to get the alignment you need in the
16 specific clinical affinity groups for which those
17 groups, those clinical experts come together to
18 share risk.

19 DR. TERRELL: So another question we had
20 is related to -- is there any special concerns
21 related to how someone may game the system and how
22 they might be remediated? I mean, this is one of
23 the things that is true in any system is that there
24 may be the ability to game the system. If it's in

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1 the fee-for-service world, it may be providing
2 services that are not necessary. If it's in the
3 world of accountable care, as it's currently
4 construed, sometimes it has to do with
5 falsification of data with respect to risk
6 adjustment or quality measures, et cetera. So
7 because there's a lot of data that is driving this
8 with respect to an information system approach, has
9 there been any work done on your part to think
10 about how people might game the system and how that
11 would be remediated?

12 DR. TOMPKINS: Well, I remember I was
13 lecturing a roomful of surgeons many months ago,
14 and one of them finally said, "No one has ever done
15 this before. I feel like I'm the subject of an x-
16 ray machine."

17 Sort of another anecdotal way to answer
18 this, I remember talking about health plan
19 incentives back in the 1980s. It was a meeting at
20 CMS, and somebody finally said, "Okay. We can all
21 agree that 2 percent of the population is crooks,
22 but that doesn't mean we have to treat everybody as
23 if everybody is a crook."

24 DR. TERRELL: No, you don't. The question

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1 just becomes -- sometimes it makes a great deal of
2 difference in terms of the ability to get
3 acceptance of it --

4 DR. OPELKA: Right.

5 DR. TERRELL: -- or that it doesn't get
6 overregulated. The last thing we want is a really
7 promising idea that the crooks mess up for
8 everybody else, so that is part of --

9 DR. TOMPKINS: Well, maybe interactively,
10 we can talk about some of those ways to gaming, but
11 I would just say this. I mean, in general, if you
12 think of the way MACRA frames the upcoming
13 reimbursement world, where there's MIPS and there's
14 the APM, if you're really trying to get away with
15 something, I don't think you would step into this
16 bright light. That's sort of what I meant.

17 DR. TERRELL: Okay.

18 DR. TOMPKINS: The information system that
19 runs under this APM looks at every dollar for every
20 episode, at every patient, and every provider who
21 participates, and it's not the kind of environment
22 that somebody would be attracted to if you're
23 trying to individually game the system. So that's
24 one way to cut your question is whether it's

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1 individuals who are trying to do something or get
2 away with something or whether it's the entity
3 itself because, again, with the collective
4 incentives for shared accountability, with a lot of
5 illumination at the entity level, and everybody has
6 a stake in what everybody else is doing, this model
7 kind of like really revs up peer review and shared
8 awareness and so forth.

9 Now, I suppose we could theorize about an
10 entity that's organized in order to try to do all
11 that and game the system at the same time, but, I
12 mean, whenever you step away from fee-for-service,
13 you're stepping into a place where you're making
14 estimates, and you're comparing actuals to
15 estimates. And you're relying on the integrity of
16 the data that people are reporting and that you're
17 making inferences about, so yes. I mean, if we
18 said -- if everybody adopted a completely different
19 coding system that didn't affect clinical reality,
20 would that affect the way that the information is
21 set up and how to interpret it? Yes, it would.

22 I don't know if you want to get to it, but
23 later in your questions, you talked about avoiding
24 high-need patients and so forth --

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1 DR. TERRELL: Yeah.

2 DR. TOMPKINS: -- and then the
3 consequences. You said increasing --

4 MR. STEINWALD: This is Bruce Steinwald.

5 I'd like to go back to what you said about
6 hospitals and institutional providers for a second.
7 You mentioned Premier and their interest. My
8 question has to do maybe with the whole of
9 institutional providers and the consequences of
10 success of the model on their bottom lines.

11 Since so much of the expected savings come
12 from the reduction of the inpatient hospital and
13 emergency rooms and maybe home health and others,
14 how do you see the model working when the
15 institutional providers are not a party to the
16 model and, in fact, they're the ones that are being
17 most affected, and yet they're not necessarily
18 participants in the model?

19 DR. OPELKA: So --

20 DR. TOMPKINS: Go ahead, Frank.

21 DR. OPELKA: Could we just be clear? When
22 you say institutional providers, I can think of a
23 couple different ways to define that. It could be
24 all those physicians who are employed by a health

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1 system, or it just could be the anesthesia,
2 radiologist, pathologist, and so it would help if I
3 understood what your reference is.

4 MR. STEINWALD: Well, let's just take, for
5 example, a hospital that does not have employed
6 physicians but whose physicians comprise a clinical
7 affinity group, and they implement the model, and
8 they obtain savings through the reduced use of the
9 hospital's resources, and yet the hospital is not a
10 participant either in the savings or in any other
11 fashion in the exercise or model.

12 DR. OPELKA: Well, first of all, the goal
13 is that we're reducing the waste that's in the
14 system. So if there is wasteful care that comes
15 from any source, whether it's a hospital or home
16 health or skilled nursing or clinical services,
17 we're trying to reduce the waste and optimize care
18 in the process. So somebody is going to feel
19 they're going to have to change their business
20 model if they're relying on resources that are
21 generated from wasteful services. So that
22 hospital, if that is the instance, would be faced
23 with reviewing what its lines of services are, and
24 if those lines of services are excessive, how are

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1 they going to adjust their business model to be a
2 sustainable enterprise once those wasteful services
3 are removed?

4 Partnering with clinicians, we think is
5 actually going to happen. Because of the levels of
6 risks that are involved, physicians have trouble --
7 are facing significant risk-based capital needs if
8 they're going to go at risk, and they don't always
9 have all the informatics. And they also don't tend
10 to have all the common linkages for the entire
11 clinical affinity group, particularly in a setting
12 where those clinicians are independent
13 practitioners working with a hospital in a
14 community.

15 So we think that there are incentives that
16 try to bring alignment, but where you don't have
17 alignment and you do have savings, if those are
18 wasteful savings, that is what the model is
19 intended to do.

20 MR. MILLER: Frank, it's Harold Miller.

21 Just to sort of pick up on that, though, I
22 think one of the challenges is that you're
23 providing information about spending based on
24 current payment rates for things, but there isn't -

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1 - inherently, because you don't have it, you don't
2 have information on cost. And one of the
3 challenges the hospitals will face is that there
4 may be wasteful utilization, people are getting
5 cardiac testing or surgical procedures or whatever
6 that aren't necessary, but the hospital still has
7 to be able to cover the cost, its cost for the
8 patients who do need it, which will generate some
9 level of savings, but it may not be the amount of
10 savings that are achieved by simply reducing the
11 spending at the current spending rates, because the
12 average cost may go up.

13 And one of the difficulties that
14 physicians have faced in a lot of these models is
15 that they don't really have good information
16 because they needed to get it from the hospital in
17 terms of what those costs are, and there has been a
18 lot of problems in a lot of the bundled payment
19 models in terms of lack of trust about that,
20 because the hospital says, "Well, guess what? Our
21 costs went up somehow, and the savings that we
22 anticipated really didn't materialize," and there
23 is no real basis for the physicians to be able to
24 determine that.

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1 So I think one of the things that will
2 come up in the implementation of it -- it's just a
3 challenge; it's not something that your model, per
4 se, can solve -- is that the savings will be coming
5 by reducing cost, but someone has to actually
6 understand what those costs are and what the new
7 costs will be at the newer lower volume levels.

8 DR. OPELKA: I think that's right, Harold.
9 I don't think we disagree. I think that is a
10 challenge, and the indirect costs that hospitals
11 bear are real, and we recognize that. As those
12 direct costs go away, those indirects get
13 redistributed, and as they do, all of that needs to
14 be relooked at, right?

15 MR. MILLER: Right. And it may take time
16 to do that.

17 I think Bruce's question was there didn't
18 seem to be in any of the materials that we got any
19 recognition of that. There was no discussion of
20 it. There was no explanation as to how it would be
21 addressed. There was no explanation of how -- if,
22 in fact, an alternative service that's currently
23 not payable by Medicare.

24 So let's suppose that some new, more

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1 intensive, home-based rehab program would be
2 developed. That might actually lead people to --
3 patients to be able to go home sooner, wouldn't
4 have to go to a SNF or whatever, but it would
5 require costs, and those costs wouldn't be
6 reimbursable. There was no discussion as to how
7 that would actually happen.

8 I mean, I can imagine, as you can, how
9 that might take place, but the issue would be it's
10 not really addressed in there, and it's not clear.
11 One of the concerns overall, I think, is going to
12 be for all of these models, since you have
13 basically a retrospective model, would be if, in
14 fact, somebody really innovates, develops a new
15 kind of service to implement through this model,
16 they could potentially be paid for it
17 retrospectively in the short run, but there's going
18 to have to be some way of tracking that service, so
19 that whenever you decide how to reprice the episode
20 down the road, you haven't lost the information
21 about the fact that there's some whole new service
22 being developed under the model -- or being
23 delivered under the model that isn't being reported
24 and isn't counting as spending right now, but it is

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1 critical to being able to achieve the savings that
2 are being achieved.

3 DR. OPELKA: Well, I'm going to be very
4 brief, and perhaps Chris may want to jump in on
5 this because we have talked about this in the
6 evolution of this model. We don't think this model
7 stands alone for all time. If it does what we
8 expect it would do and you race to the bottom, so
9 to speak, we would envision that this model can
10 become supportive in a prospective environment and
11 move to that transition. It is not limited to case
12 rates and episodes. It can move to conditions. It
13 can move to conditions summing up to a bigger top
14 health payment, but let me stop there because those
15 are discussions Chris and I have had with the team.

16 DR. TOMPKINS: Well, Harold, your point is
17 well taken. If it's considered -- if this model
18 really is sort of a Petri dish for tremendous
19 innovation that involves the formation of programs
20 and currently non-covered services and so forth,
21 then we would want to capture that. In the
22 information stream, we'd want to capture that.

23 So I would say that to the extent that CMS
24 overlays the basic model itself with information

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1 feeds, close monitoring, detailed evaluation and so
2 forth, you'd want to capture those lessons, and
3 you'd want to replicate those lessons. And the way
4 to replicate it using the same engine would be to
5 identify those services, quantify their input
6 value, and cover them in the future. As long as
7 you're tracking those things -- and maybe some sort
8 of data collection protocol would be worthwhile to
9 be implemented with this model in order for that
10 very purpose -- then that would illuminate the
11 future, in a sense, and allow Medicare to adjust
12 the way it pays for things in even the fee-for-
13 service retrospective model or turning a corner, as
14 Frank started to allude to, other ways to add to
15 the budget, so to speak, on the expectation that
16 those services are appropriate and ought to be
17 recognized as legitimate costs that help to arrive
18 at the optimal solution.

19 MR. MILLER: Just to be clear, you have
20 not really anticipated and have not planned at this
21 point to be able to create any mechanism for
22 capturing that information right now as part of the
23 model.

24 DR. TOMPKINS: Correct. I mean, we

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1 actually -- well, no. That's right. We've talked
2 about it. It's not part of our written proposal.

3 In terms of going from design to pre-
4 implementation to implementation, such a data
5 protocol, I can see where it could fit, and it
6 could certainly be added on without subtracting
7 anything else for the model.

8 DR. TERRELL: We are at 10:39. I'm going
9 to keep moving through some of the questions that
10 we had sort of thought about ahead of time, just so
11 that we get through those, and then we could open
12 it up for more conversation.

13 I don't know if any of you had in front of
14 you, some of your prepared answers. Some of these
15 were very specific questions we had. One was on
16 page 15 of the most recent set of proposals. We
17 gave an example related to colectomy, and there was
18 some interest in understanding why the surgeon
19 received the smallest payment because we were
20 trying to understand and walk through the model.
21 Do any of you have that in front of you?

22 MR. MILLER: It looks like you were
23 dismissing the actual surgical fee, but I wasn't
24 quite clear what was going on there.

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1 DR. OPELKA: I don't have the model in
2 front of me that you're referring to. This is
3 Frank again.

4 The surgeon's fee is not dismissed. I
5 think this was the savings model?

6 DR. TERRELL: Yes.

7 DR. OPELKA: And the surgeon's fiscal
8 attribution is 40 percent, and they would be
9 eligible for 40 percent of the savings model or 40
10 percent of the loss, if that were the case, to the
11 APM entity, which is the risk-bearing entity. How
12 the APM entity reconciles with the surgeon is a
13 separate piece of all this, but the surgeon's fees,
14 anesthesia fees, all the physician fees are
15 separately paid, and then this reconciliation is
16 the retrospective reconciliation based on the
17 savings or the loss. And the surgeon in the
18 colectomy model has the highest percentage of risk.
19 Anesthesia has the second highest.

20 MR. MILLER: What we had been hoping to
21 get, which I don't think we still got, was a
22 worked-out example showing how you would imagine
23 that working for an example.

24 I mean, there was a table in here that had

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1 kind of what the current payments were for a
2 colectomy episode inside, basically, an overall
3 management of by a gastroenterologist and a primary
4 care physicians and what their current payments
5 were, but there wasn't an example showing how you
6 would actually -- then what the change in care
7 might be, what that would actually -- what the 40
8 percent would represent, how people would actually
9 come out of it.

10 We were trying to divine as much as we
11 could from what we got, and when we were looking at
12 it, we were then a little bit confused by the
13 table. That was the one Grace was referring to on
14 page 15, which listed all of the current payments
15 for them. There was no actual surgeon. The
16 surgical fee was not there, and we were just a
17 little confused as to whether that was just an
18 error or whether or not that was trying to tell us
19 something that we didn't understand.

20 DR. PERLOFF: So, Frank, I can help, and I
21 can also send around the table. On page 15, this
22 is something we called the "provider vignette." So
23 we were trying to think of different ways to
24 display information. This is focused on as you're

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1 talking about the patient relationship categories
2 and how providers and episodes sort of link to each
3 other, and so this is real data-based findings.
4 And it's showing all of the services that occurred
5 in the course of this episode and which one sort of
6 landed with which provider, so just context.

7 Frank, I don't know if that helps you
8 remember what the table is, but I can send it
9 around to folks.

10 MR. MILLER: And the specific issue was,
11 if you look in the middle of that table where it
12 says episodic physician general surgery, it lists
13 what's basically an E&M payment, but there's no
14 actual surgical fee, which would be significant
15 compared to all of the other payments here. Again,
16 it may simply be that that line got dropped, but we
17 weren't sure exactly why, whether that was supposed
18 to have been dropped or whether it was just an
19 error.

20 DR. PERLOFF: No. So our code service
21 type "PX def" is procedure definitive, and that's
22 actually the surgical fee. The way the data is
23 rolled and summarized, you can't actually see that
24 it's in the line, so it's --

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1 MR. MILLER: But it shows \$108 payment.

2 DR. PERLOFF: Shows payment. Maybe I'm
3 looking at the wrong -- oh, oh. That \$108 payment.

4 MR. MILLER: I would hope that the surgeon
5 got a little bit more than \$108 to do the
6 colectomy.

7 DR. TOMPKINS: So this is what we
8 envisioned the surgeon gets under the APM, Harold.
9 No. I'm sorry.

10 MR. MILLER: Well, that was the question,
11 Chris. That was exactly the question, right? It
12 was so, you know, did Frank decide to take a very
13 big discount to make the episode work here.

14 DR. TOMPKINS: On the one hand, it's great
15 credit to look at this so closely in that way. The
16 table could be expanded, I think, to have more than
17 \$108. I don't know why -- it's an artifact. I
18 don't know what it's from. So you're pointing it
19 out, it's a good point.

20 The purpose of the table was to show a
21 tracing of the way in which these various providers
22 were involved with a patient --

23 MR. MILLER: Right. And that was helpful.
24 I would just say what we were trying to get was one

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1 really complete example to make sure that we
2 understood what you were thinking of the same way
3 you were thinking of it. I mean a complete example
4 that basically said, "Here's what's happening
5 today," similar to the example Chuck gave earlier,
6 but with colectomy or whatever. Here is what is
7 happening today. Here is what we might imagine
8 happening tomorrow under this model. Here is what
9 might change in terms of maybe the surgery isn't
10 done. Maybe the complications get reduced, maybe
11 whatever, and then here is how the payment would --
12 what would happen under the payment model to
13 everyone, given that particular scenario about the
14 change and the way care was being delivered. We
15 were really honestly, desperately trying to get a
16 completely worked out example like that, and we
17 just never got one. And this was the closest we
18 got, and then we didn't even understand what the
19 data was saying.

20 DR. TOMPKINS: Right.

21 MR. MILLER: So it would be really,
22 helpful, I would just say, if you could really give
23 us an example like that. We understand it's just
24 an example. I mean, it's just a hypothetical, but

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1 it would be really helpful to see a realistic
2 hypothetical as to what kind of a care change you
3 might imagine happening and how you would see that
4 all playing out in the model, and ultimately, it
5 gets to some of the issues, like what Bruce was
6 raising earlier. If in fact if the savings
7 opportunity is that the patient doesn't get the
8 colectomy at all or some proportion of the patients
9 don't get a colectomy at all, where does the
10 savings come from? Well, a lot of it presumably
11 comes from the hospital because even though the
12 surgeon gets paid more than \$108, the hospital gets
13 paid a lot more than \$108. And that would
14 potentially sort of -- if you don't care about the
15 hospital, it could be a lot of money for everybody,
16 from the PCP to the gastroenterologist to the
17 surgeon to the nurse anesthetist or whatever. But
18 the issue would be, well, that wouldn't make the
19 hospital very happy. So how that might work out in
20 practice would be really useful to see how you
21 thought that through.

22 DR. TOMPKINS: And somewhere in there --

23 MR. MILLER: Grace, am I characterizing
24 accurately what we had hoped to get?

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1 DR. TERRELL: Yes. I think that from our
2 point of view, getting a -- the way you started
3 this conversation is exactly what we hoped, which
4 is that there will be a model out there that can be
5 broadly applied to many specialties that would
6 allow an alternative payment model that would
7 incentivize appropriate behavior.

8 And because this particular proposal has
9 such potential breadth relative to some of the
10 others that we're getting so far, we really believe
11 it's important to understand at a very granular
12 level for a particular example exactly how this
13 would work, because we need to make sure we
14 understand it, because understanding it for 102
15 different episodes and chronic diseases and 62
16 specialties or whatever may not be possible unless
17 we understand a really, really, at a granular
18 level, good example.

19 Now, having said that, we understand that
20 we put limitations such as your application could
21 only be 20 pages, and then we added back some
22 clarifying questions. So part of what we're doing
23 in our own process is understanding how we can best
24 evaluate these things, and we believe that for this

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1 particular proposal, having a very detailed
2 granular example is to do exactly what you said,
3 which is if I'm a clinician, what is going to
4 basically -- in this model, the payment methodology
5 associated with the bundled process, change my
6 behavior such that I want to work in teams, and
7 that good things happen for patients by virtue of
8 improving the cost and quality. So that's what
9 we're trying to get at.

10 It's really important. You guys are doing
11 some very important work.

12 MR. MILLER: And let me just add one more
13 feature to it, which is, Chris, you started out
14 basically saying it was improving on the BPCI as
15 well as ACOs, et cetera, but it would really be
16 important to understand an example, which I think
17 you have here, the page 15 example, that shows how
18 this would be different than BPCI, because -- and,
19 again, back to the earlier points, at least the way
20 you've answered the questions, it seems -- you tell
21 me if I'm wrong -- it seems as though the model
22 could be activated by CMS, but the only people who
23 would sign up might be the surgeon and the
24 anesthesiologist, who would simply figure out how

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1 to reduce post-acute care utilization. In those
2 circumstances, it really wouldn't seem to be any
3 different than BPCI.

4 If, in fact, the gastroenterologist and
5 the PCPs and everybody else signed up and said,
6 "Okay. We're really going to figure out how to
7 manage patients at risk of colon cancer more
8 effectively," et cetera, et cetera, et cetera, that
9 would be very different, but we need to sort of see
10 how that might actually work, or if you have
11 something in the middle that says we're going to
12 start doing hip surgeries in an ambulatory surgery
13 center or something like that, which also isn't
14 contemplated under BPCI, how would that all work
15 out? So that's kind of what we were trying to do
16 because one of our criteria -- no, it's not one of
17 -- it's one of the CMS criteria in the regulations
18 is that this has to expand the CMS portfolio. So
19 understanding clearly when and how this is
20 different than their existing episode models is
21 going to be essential to us in terms of being able
22 to evaluate that criteria properly.

23 DR. TOMPKINS: Yeah. Well, okay. So a
24 couple things, maybe several. First of all, it's

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1 not just one person raising his hand and another
2 person raising her hand and let's wing it. The
3 formation of the entity would have to make sense.
4 The model itself begins by respecting the work of
5 the individual specialist, and that work is
6 conveyed to the entity because those providers were
7 involved with those patients. So there is a
8 natural bringing, to the entity, the work of the
9 clinicians, and we talked about that earlier in the
10 call about how that might come about.

11 One of the ways that this contrasts with
12 BPCI -- and, Harold, I remember -- I don't know how
13 many years ago. I think it was when we first met.
14 You provided a slide presentation to a small group
15 of us about how bad quality is incentivized,
16 talking about the upgrade in the DRGs and so forth
17 when complications arise.

18 MR. MILLER: Oh, yeah. It's still there.
19 It still exists.

20 DR. TOMPKINS: One of the things that is
21 very different about our model as compared to BPCI
22 is that it doesn't trigger on DRGs. So, as you
23 would be the first to appreciate, given so many
24 years ago you had that insight, that we would

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1 trigger on the definitive surgery --

2 MR. MILLER: Yes, yes.

3 DR. TOMPKINS: -- or we would trigger on
4 the reason, the original condition for the -- and
5 if things go awry and somebody ends up in the ICU
6 and somebody ends up respiratory failure and all
7 the rest, the model calls those sequelae extra
8 costs, and the entity is not just given a pass for
9 that.

10 So from a logical standpoint, it's a
11 better starting point than BPCI, and it creates
12 incentives that BPCI can't imagine, because under
13 our model, people would know whether the patient
14 was part of their entity or not.

15 MR. MILLER: Chris, that would be a
16 wonderful example to see you work out because it's
17 not clear. I mean, we're kind of all talking at a
18 very high level here. The model somehow captures
19 that, and I understand that in theory, it captures
20 it, but how it actually would work -- and so the
21 patient ends up there getting a colectomy. They
22 end up becoming septic, and they end up on a trach
23 or whatever. You're absolutely right. That would
24 sort of bump them out of the episode in BPCI. But

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1 how would that work here, I think it would be very
2 useful to see because then that would help all of
3 the members of the PTAC say, "Oh, that is actually
4 very different," and, "Oh, it actually would seem
5 to create a different structure."

6 But without an example or two of that --
7 and that's why we asked to sort of pick one. So
8 colectomy could well be the one, or maybe you pick
9 something else, but you could actually give several
10 examples of here's two or three different kinds of
11 clinical improvements. One might be reducing
12 infection rates, one might be reducing post-acute
13 care, one might be avoiding the colectomy
14 altogether, and then saying here's how the model
15 would work in all of those things, which would then
16 help to show the power of it.

17 DR. TOMPKINS: Okay. We could do that.

18 PRT MEMBER: So if we could get that, I
19 think it's going to be very, very helpful.

20 I'm going to give another example. It's
21 the last thing we hadn't sort of -- I think if it
22 was written down ahead of time, and then we'll
23 maybe get at how that would be helpful to get in
24 more detail.

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1 So on page 24, you explain that there is a
2 wide variation in expenditures by episode, and you
3 provide a supporting table showing a large gap
4 between the 25th and 75th percentiles for certain
5 procedures. Then you have a second table showing
6 the average observed and average expected cost for
7 an episode, giving the patient's demographic and
8 risk profile.

9 But one of the things that wasn't entirely
10 clear to us is how much of the variation
11 demonstrated in the first table is accounted for by
12 differences in the patient demographics and the
13 risk as opposed to just unexplained variation and
14 cost, if you will. This is the type of detail.

15 I think because, as we said before, this
16 is broad and could be a very big deal for many,
17 many clinicians, we're really wanting the type of
18 detail where we can get into this in a great deal
19 of understanding, so that we can make sure that
20 we're appropriately responding to your proposal.

21 DR. TOMPKINS: Okay. I think this could
22 be another request, right?

23 DR. TERRELL: Yes.

24 DR. TOMPKINS: You are framing this

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1 possibly as another request for additional
2 information from us, and if so, then let me see if
3 I can repeat what you're asking. What you're
4 saying is if you show the cost distribution for the
5 type of episode according to the provider averages,
6 then the provider at the 25th percentile might be
7 quite a bit lower than the provider of the 75th
8 percentile, and the way you interpret that
9 difference would be very different if the 25th
10 percentile provider was exactly as expected and the
11 75th percentile was exactly as expected, because
12 most or all the difference was actually explainable
13 by patient risk factors.

14 DR. TERRELL: Yep.

15 DR. TOMPKINS: Was that your point?

16 DR. TERRELL: Yeah, that was our point, so
17 how much of the variation in what you are showing
18 us is actually related to just unexplained
19 variation in behaviors and providers.

20 DR. TOMPKINS: If we framed the dependent
21 variable, such as the difference between the actual
22 and expected, summarize at the provider level, and
23 then show the distribution of that dependent
24 variable.

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1 DR. TERRELL: Yep.

2 MR. MILLER: Well, I would just say again
3 it would be probably most helpful to do it in the
4 context -- if you want to provide more, that's
5 fine, but to do it in the context of the example we
6 were talking about.

7 DR. TERRELL: Yep.

8 MR. MILLER: So if, in fact, you said
9 we're -- again, up to you, but if you're doing this
10 kind of colectomy, colon cancer screening, or
11 whatever you want to call the example, then say
12 let's look at the variation there. You could
13 actually say, given the kind of data you have,
14 something about what you actually think is causing
15 the variation. So what is it that makes some
16 colectomies only 16,000 and some 36,000? Is that,
17 in fact, intra-hospital complications? Is that
18 post-acute care differences? Whatever that is, and
19 then, again, to Grace's point, how much of that is
20 explained? Because when you go from the first
21 table to the second table on page 24, you would
22 kind -- I mean, the model, in a sense, probably is
23 designed to have the same average expected as the
24 same average observed. The key issue is really

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1 kind of how much of the total variation gets
2 removed by the model, and how much is left as
3 unexplained variation. And what's the nature of
4 that unexplained variation? What's causing it?

5 DR. TOMPKINS: I'm just taking notes.

6 DR. TERRELL: Sure.

7 MR. MILLER: No, that's fine.

8 DR. TERRELL: Yeah.

9 MR. MILLER: One other suggestion -- it's
10 really in response to your earlier question -- it's
11 back to this issue of who is in the clinical
12 affinity group -- would be that it would be -- I
13 think if you can detail the example and multiple
14 examples of where the clinical improvement
15 opportunities might be, it would then potentially
16 help to clarify to say that, well, if only the
17 following people participated in the clinical
18 affinity group, then you'd be able to get this
19 particular opportunity for savings built in. If
20 more people participated and you sort of went
21 further upstream, you could get these additional
22 opportunities, and then that would help to clarify
23 what those opportunities are, because I think, to
24 me, if you do want to recruit people to

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1 participate, they are going to have to understand
2 the "What's in it for me?" So what's in it for me,
3 the PCP, to be part of this clinical affinity group
4 for colon cancer screening or whatever it is as
5 opposed to what's in it for the surgeon? And I
6 think those are the kind of things that would be
7 helpful to see that in a couple of different
8 examples, some examples for the same basic concept.

9 DR. TERRELL: Are you all understanding
10 what we're asking, do you think?

11 DR. TOMPKINS: Yes.

12 DR. TERRELL: Okay.

13 DR. PERLOFF: This is Jen with a
14 clarifying question. To show both, it sounds like
15 it's sort of a case study or a narrative and also
16 the empirical part as well, how the dollars would
17 fall out.

18 DR. TERRELL: Yes.

19 DR. PERLOFF: Okay.

20 MR. MILLER: Well, I guess, again, I would
21 just say if you have some real data based on your
22 analyses to support it, that would be certainly
23 desirable, but even if it's just a hypothetical
24 example worked through -- because I think those are

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1 two different concepts. One is in the hypothetical
2 example of there's a clinical improvement
3 opportunity, how would the model work, is one kind
4 of thing that we want to make sure we understand.
5 The second issue is, based on your data analyses,
6 what do you seem to see as being the clinical
7 improvement opportunities out there, so that it
8 would be clear, for example, that the opportunities
9 are more than just reducing post-acute care use,
10 which one would argue is already being captured by
11 some of the existing CMS models.

12 But, Chris, to your earlier point, it
13 clearly doesn't capture the DRG bump-up issue
14 inside the model, and if you'd be able to clarify
15 if you have any data as to how often you think that
16 may be happening, that would help to say here's
17 something that if you did this rather than BPCI,
18 what some of the potential opportunities would be.

19 DR. OPELKA: This is Frank.

20 I mean, we can answer all of these
21 questions. In fact, we've been asked many of these
22 questions by the many, many specialties who are
23 anxious and willing to participate. I think you're
24 going to find that there are a million scenarios,

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1 and colectomy will have several hundred. And there
2 are many opportunities that have not been leveraged
3 because the clinical teams haven't been
4 incentivized to leverage them.

5 Classic example we give all the time is we
6 know from a quality standpoint that tobacco
7 cessation prior to surgery has an enormous impact
8 on reducing sequelae and other resources needed to
9 deal with those sequelae, and yet there's no
10 coordinated incentive plan that pulls all that
11 together.

12 We envision that this kind of model can
13 put together PCP and anesthesia team with a
14 reference from the surgeon to optimize
15 perioperative tobacco use and reduce subsequent
16 sequelae related to tobacco, and that is broad-
17 reaching across numerous different types of
18 patients.

19 There's nothing in the current environment
20 that incentivizes those kinds of activities under
21 its hypertension management, COPD management,
22 diabetes management, and this is just the surgical
23 environment care coordinating with the primary care
24 environment, now in a shared savings model and in a

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1 shared quality metrics model where the measures are
2 on the patient, and so the team is being measured
3 to cooperate.

4 MR. MILLER: Well, I would say, Frank --

5 DR. OPELKA: The incentives are in play,
6 and how those markets are going to respond to those
7 incentives are going to vary all across the
8 country. So we can speculate and give you a
9 hypothetical and walk you through how it plays out,
10 but there are many different ways --

11 MR. MILLER: We understand that.

12 DR. OPELKA: -- it plays out.

13 MR. MILLER: We are looking for some
14 hypotheticals for some things like that. So that
15 would be a good example.

16 The question is we have to have some way
17 of being able to say, "Yes. In fact, this model
18 would, in fact, incentivize that," rather than just
19 saying it would, to be able to show that it would.
20 We recognize there may be a million opportunities
21 out there, but just pick two or three good ones and
22 show that and then say, "And guess what? Those are
23 only just two or three examples."

24 We understand that whatever you pick is

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1 not going to represent the whole universe, and
2 we're not going to say we don't think those three
3 things you picked are important enough. What we're
4 trying to understand is how in any given example of
5 an improvement opportunity, the model would work,
6 so that we can clearly say, "Yes, the model
7 actually does, in fact, enable, encourage,
8 whatever, that particular kind of an improvement."
9 That's what we're trying to get at.

10 DR. OPELKA: I'm clear on that. I just
11 want everyone on your end to realize these
12 hypotheticals are that speculative, and we've
13 already created it and modeled it, and we have an
14 idea about it, but it by no means is reality.
15 Until we get out there and see the behavior, we're
16 not going to know whether we have the right
17 incentive to move the behavior.

18 DR. TOMPKINS: We think that this is a
19 conversation that will be happening with many of
20 the models because people are just in this state of
21 innovation right now where they've got some really
22 good ideas, but you're exactly right. Because the
23 payment system hasn't been out there to allow all
24 the innovation to happen, it's hard to actually

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1 imagine all the potential that's out there.

2 But we need something that's concrete
3 enough that there can be an aha, if you will, at a
4 level that people see those possibilities, and for
5 us, we think that needs to be sort of a walked-out
6 concrete example: Here is the way the money flows.
7 Here is the way people's behavior changes because
8 of this new incentive. Does that make sense to
9 you?

10 MR. MILLER: The distinction, I guess, I
11 would make, Frank, is that some of the other
12 proposals that we're getting -- I mean, it's not
13 that there is anything right about this or wrong,
14 but those other proposals are very focused on a
15 specific thing. They're saying, "Here is the
16 opportunity. Here is the improvement thing that we
17 are trying to do. Here is the barrier in the
18 current payment system, and here is how the
19 alternative payment model specifically will remove
20 that barrier to enable us to do this thing. It's
21 not kind of a vague incentive notion. It's
22 basically they are identifying those kinds of
23 improvements. So we want to be able to see, in
24 fact, whether how this model would do similar kinds

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1 of things, if you have a specific improvement
2 opportunity identified.

3 DR. OPELKA: I'm good. I appreciate that.
4 I think those are all helpful, and we can give you
5 some hypotheticals.

6 DR. TERRELL: Good.

7 It's 11:07. We've got about eight more
8 minutes, so I'm going to just open it up for any --
9 Bruce, you've asked one question. I've sort of
10 gone through the list we had, and Harold has
11 provided some detail. Are there things that others
12 on the phone either from ASPE or otherwise or from
13 Brandeis or ACS wants to get clarification on?

14 MR. STEINWALD: This is Bruce.

15 I have no more questions, Grace.

16 DR. TERRELL: Okay.

17 MS. PAGE: Grace, this is Ann.

18 I do have one. This is ASPE. I would
19 like you to talk a little bit about a link between
20 the grouper and the quality measures. So, in
21 several of the questions we've asked and then we've
22 seen your responses, you have linked these two
23 things together somewhat. We understand the
24 freedom that you want to afford CMS to take the

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1 grouper and use it and modify it and implement it.

2 But then there was this sentence in one of
3 the responses about development costs and
4 maintenance costs for performance measurement
5 requires resources, and it was unclear whether you
6 were seeing the quality measurement piece that
7 might be derived from the grouper as separate from
8 the grouper software and were you wanting to have
9 different treatment of those two parts.

10 DR. OPELKA: So this is Frank again.

11 The quality measurement is for the most
12 part separate. It is a measurement system we've
13 introduced to CMS -- I guess it was almost a year
14 ago -- that we think is more patient-centric. It
15 is based on what we refer to as the phases of care,
16 and in this instance for us, the surgical phases of
17 care. And there are high-value process measures
18 that we link to PROs.

19 There were some questions about
20 appropriateness measures, and to the extent those
21 high-value process measures are patient goals
22 related to PRO in terms of achieving those goals,
23 we get, I think, some baseline levels of
24 appropriateness. But formal appropriateness

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1 science is much more complicated, and if that was
2 the goal, it's going to take resources to develop
3 those richer appropriateness measures.

4 I think this first round of PROs linked to
5 high-value process measures tied to patient goals
6 will give you a new look at appropriateness that we
7 have only seen in a few instances of care, and
8 we're working with all the specialties right now to
9 set up meetings to explain how to walk through this
10 and for them to develop their own version of phases
11 of care measures with high-value process linked to
12 PROs. So that's the basis of this.

13 MS. PAGE: So the quality measures, then,
14 would not rely on the grouper software for their
15 calculation, but the calculation would come through
16 sort of a separate analysis of claims or other data
17 sources?

18 DR. OPELKA: Yes. We're envisioning for
19 these episodes that we put forward that they are
20 part of a registry-based system that provides the
21 current thresholds for the different four levels.

22 MS. PAGE: Thank you.

23 MR. MILLER: Grace, this is Harold. One
24 more question I had, if you don't mind.

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1 Frank and Chris, could you just say a word
2 about how you came up with the percentage
3 allocations amongst the clinicians and how you
4 would see those potentially being updated or
5 evolved over time? Because I understand that you
6 sort of said that you came up with them and nobody
7 has objected to them, but you didn't explain how
8 you came up with them, and you didn't explain how
9 they might evolve over time.

10 DR. OPELKA: Well, I'll take the first
11 half, and Chris may want to comment.

12 Inferentially, just looking at the
13 clinical courses of care, we assigned these risks
14 in alignment with the CMS five categories of
15 attribution, which have been subsequently minimally
16 modified by CMS.

17 We've had conversations with the AMA as a
18 larger convener of the rest of medicine to talk
19 about how to actually govern these attributions
20 over time, because we think we'll learn more, and
21 we'll learn from the different markets. We don't
22 have the kind of hard data that actually gives us a
23 clean enough picture, and we also think that if the
24 model does what we believe it will do that these

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1 attributions should shift and change. So it needs
2 ongoing processes for governing the fiscal
3 attributions beyond our initial starting point,
4 just put a stake in the ground and say,
5 "Inferentially, we'll begin here, but we recognize
6 this will move, and it ought to be more broadly
7 managed cooperatively between the government and an
8 entity like the AMA."

9 MR. MILLER: Well, fair point, and I
10 understand where the categories came from. I just
11 wanted -- so where -- take 40 percent surgeon.
12 Where does 40 percent come from? How did you come
13 up with that number? Throw at a dartboard or some
14 methodology?

15 DR. OPELKA: Chris, do you want to jump in
16 here?

17 DR. TOMPKINS: Well, I don't have much to
18 say because I'm tempted to say dartboard.

19 No, it's not algorithmically driven, if
20 that's what you mean. It wasn't like let's apply
21 this --

22 MR. MILLER: So you're saying it was
23 judgment on the part of all of you? Kind of in
24 thinking about it, that sort of felt right?

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1 DR. TOMPKINS: Yeah. I mean, I don't
2 object to that characterization, but, Frank, if you
3 wanted to say something --

4 DR. OPELKA: Yeah. I think everyone
5 realized there was a starting point, and of course,
6 whenever I first show this to surgeons, they say,
7 "Well, why aren't I 90 percent?" Then when I tell
8 them about the downside risk, they want to know why
9 they're not 30 percent, so --

10 MR. MILLER: And the PCPs want 90 percent
11 unless there's a downside risk problem.

12 DR. TERRELL: I'm shocked. I'm shocked at
13 this.

14 DR. OPELKA: Yeah.

15 DR. TOMPKINS: It's a zero-sum game, and
16 it's a question of influence and judgment.

17 MR. MILLER: Okay. Well, that's all I
18 wanted to try to understand was kind of was this
19 just a -- because, I mean, if it is, in fact, kind
20 of initial judgment, then updating it over time,
21 the process becomes more important to think about
22 that, because you don't know whether it will
23 actually turn out to be the right basis. But if
24 there were some data that said whatever, that we've

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1 attributed 40 percent of the sequelae to surgeons
2 based on our methodology and whatever, that would
3 be a more quantitative thing. But you're saying
4 you didn't do that, which is okay.

5 DR. TERRELL: Okay. So we are going to
6 have to get off the phone now, but I thank you for
7 your kind attention this morning.

8 I think what we're left with right now is
9 that we're hoping to have this ready for the April
10 meeting. There's some time limitations on us where
11 we have to -- actually, what is it? Ten days or
12 two weeks that we actually have to get the report
13 out in public prior to the meeting. So there is
14 going to be the need for you all to give the
15 specific example that we've asked for, if you can
16 and will, back to us by a particular date, so we
17 can then evaluate and get that done.

18 MR. MILLER: And if you can't do that,
19 that's up to you. I mean, we would just then have
20 to delay the process of finalizing our action on
21 it, so it's entirely up to you as to whether you
22 want to try to stick with that time table or not.

23 DR. TERRELL: Yeah. We're just trying to
24 --

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1 DR. TOMPKINS: We are going to go to work
2 on this, so tell us what the date is. I mean,
3 you're not going to mind if you get it this week.
4 On a day-by-day basis, is there any strong
5 preference or sort of like critical juncture where
6 it's no longer useful?

7 DR. TERRELL: I don't think that's the
8 case other than just we won't prepare our final
9 report.

10 DR. TOMPKINS: No, I mean without slowing
11 down your timetable is my question. If we had it
12 for you today, it wouldn't slow down your time
13 table.

14 MR. MILLER: Oh, no. No. I mean, I think
15 this week, anytime this week would be fine.

16 DR. TERRELL: Yes, this week would work.

17 DR. TOMPKINS: Okay. All right. That's
18 what I was wondering. Good. Very good.

19 DR. TERRELL: All right. Well, thanks,
20 everybody, and for those of you that we have been
21 talking all morning long to different folks, I'll
22 talk to you again in a minute on another line.
23 Thank you.

24 [Whereupon, at 11:16 a.m., the conference

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1 call concluded.]

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Supplemental Material on the ACS-Brandeis model

I. Development of Innovative Services

An assumption of the ACS-Brandeis model is that successful APM entities would be motivated to implement innovative services that would reduce costs, increase quality, or improve patient experience, yet might not be payable by CMS under prevailing fee schedules. Instead, an entity could pay for those services (e.g. coordination of care, care management, social services, home visits, and so on) out of current or expected (future) savings. Hopefully and eventually, this is not a sustainable payment model because an expected product of success would be that waste is squeezed out of the expected cost or price of each episode.

There are several ways to think about this question. One way is to help CMS identify high-value services and build them into their fee-for-service (FFS) framework for all providers. Another way of thinking about this question is as an evaluation question. An evaluator might ask, “What are the non-reimbursable services that successful APM entities provide and how can those services be rapidly disseminated in a learning collaborative?” Additionally, our model could identify innovative quality improving or cost-reducing services, with the goal of eventually building the cost of those services into a fairer, stable price for the episode based on excellent care.

The ACS-Brandeis model is built on the CMS FFS chassis of bill payment. Therefore, CMS does not routinely collect information on services that are not payable. However, CMS does collect non-billable information on quality of care. It is possible that a condition of participation for this model could be to require APM entities to report on innovative services as described above, and potentially on internal evaluations with respect to ROI. CMS could then use this information to consider adding such services to the baseline prices.

II. Steady State versus Start-up

When a model as comprehensive as the ACS-Brandeis model initiates, it will evolve. We envision the model gives CMS the necessary levers needed to attract entry or start-up enterprises into APM entities to assume levels of risk and evolve their ability to manage the risks. We also believe the model offers an opportunity for phased participation of the various physician types and specialties. Risk aversion will keep some adopters out of the risk pool until they are more comfortable with the risk management. We also feel that the episode based quality framework can make quality improvements both more apparent and understandable to providers and patients.

As these evolutions continue, we would move to promote more comprehensive adoption and move from retrospective payment models to prospective payments. In the steady state, virtually all Medicare services, beneficiaries, and providers could be included within a coherent system that tracks and reconciles all accounting, and links clinical information with cost to drive a fully

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empirical value-based payment system. The ACS-Brandeis model can support that vision of the steady state, and facilitate a stepwise approach to getting there.

For example, consider the clinical domain of gastroenterology, which includes the gastrointestinal (GI) system and its disorders. Figure 1 shows procedural episodes that pertain to that clinical affinity group (CAG). A surgical practice along with anesthesia and key supporting and ancillary providers could manage these procedures within the context of an APM entity that did not necessarily engage the broader team of clinicians who may know the patient. For example, the Principal Shares can be calculated and set aside for now, or set to blank (as depicted), and reallocated to the Episodic or other categories. Either option allows for CMS to start-up the model without requiring full coverage.

Figure 2 continues to illustrate the implementation pathway using examples of acute conditions that reflect the clinical work of GI specialists. The ACS-Brandeis model can include acute conditions such as common indications for procedural episodes, frequent reasons for hospitalization or acute exacerbations of chronic conditions. An APM entity that engaged general surgeons and gastroenterology could manage acute episodes in this clinical domain as Episodic providers and supporting team, without necessarily including “the whole team” participating in the patient’s care. As before, the longer-term primary and principal roles can be added as implementation proceeds toward the steady state. Figure 2 illustrates optional reweighting and reallocation of the fiscal attribution along these lines.

Figure 3 gets one step closer to the steady state by adding chronic condition episodes and establishing the role of Principal provider (medical specialist) who manages the GI condition(s) over time. As condition episodes are added to the entity’s episode library, the medical specialists (e.g., gastroenterologists) would easily meet MACRA thresholds for qualifying as QPs. Including conditions from among all of the clinical domains also would allow generalists to qualify easily for QP status in the ACS-Brandeis model.

Thus, generally as the episodes available to entities grow in number, the conceptual advantages of the ACS-Brandeis model continue to blossom, including shared accountability in patient-centered, team-based care; and fulfillment of thresholds for being QPs in the APM. EGM can manage the contemporaneous and nested episodes for precise accountability across the clinical spectrum.

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Figure 1: Procedural Episodes Pertaining to GI (an example of one TIN selected from claims data)

	All Episodes	Total Shares	Episodic Shares	Principal Shares	Supporting Shares	Ancillary Shares	Sum of Actual	Sum of Expected	Net Savings
Colonoscopy	8,029	6,055	3,595		850	1,609	\$ 5,491,255.82	\$ 5,169,323.16	\$ (321,932.66)
EGD endoscopy	5,906	3,618	1,750		752	1,115	\$ 3,915,063.04	\$ 3,997,562.12	\$ 82,499.08
Colectomy	478	291	126		77	88	\$ 5,164,963.76	\$ 5,364,642.66	\$ 199,678.90
Cholecystectomy	431	263	100		86	77	\$ 1,948,601.57	\$ 1,988,356.25	\$ 39,754.68
all procedural episodes									TBD

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Figure 2: Acute Condition Episodes Pertaining to GI (an example of one TIN selected from claims data)

	All Episodes	Total Shares	Episodic Shares	Principal Shares	Supporting Shares	Ancillary Shares	Sum of Actual	Sum of Expected	Net Savings
lower gi bleeding	831	647	449		180	18	\$ 458,387.40	\$ 616,216.35	\$ 157,828.95
intestinal obstruction	537	430	244		116	71	\$ 1,553,235.72	\$ 1,492,069.39	\$ (61,166.33)
c-difficile colitis	444	310	172		87	52	\$ 688,926.58	\$ 684,294.26	\$ (4,632.32)
gastroenteritis	329	279	210		63	6	\$ 292,760.75	\$ 283,738.57	\$ (9,022.17)
diverticulitis of colon	297	194	94		50	50	\$ 660,927.00	\$ 626,733.37	\$ (34,193.63)
pancreatitis acute	197	152	96		45	11	\$ 359,624.06	\$ 397,819.75	\$ 38,195.69
peritonitis	169	143	88		44	11	\$ 211,736.67	\$ 186,979.21	\$ (24,757.46)
upper gi bleeding	141	120	94		23	3	\$ 200,272.68	\$ 227,395.93	\$ 27,123.25
biliary tract disease nos	136	108	70		28	10	\$ 132,893.85	\$ 106,381.28	\$ (26,512.57)
gastrostomy complications	67	57	29		28	0	\$ 126,710.49	\$ 127,120.44	\$ 409.94
biliary tract obstruction not	60	48	29		14	5	\$ 59,940.02	\$ 39,454.31	\$ (20,485.71)
appendicitis	52	38	15		12	10	\$ 223,812.68	\$ 238,850.30	\$ 15,037.62
colostomy/enterostomy	46	39	26		10	4	\$ 140,414.36	\$ 138,594.68	\$ (1,819.68)
complications GI other	40	36	28		7	1	\$ 56,354.87	\$ 77,787.03	\$ 21,432.16
cholecystitis (acute)	40	27	14		10	4	\$ 6,107.55	\$ 6,986.43	\$ 878.88
anal/rectal abscess	37	25	14		10	2	\$ 64,352.05	\$ 48,395.97	\$ (15,956.08)
vascular insuff intestines	27	25	14		8	2	\$ 143,594.42	\$ 67,149.87	\$ (76,444.55)
anal/rectal ulcer fistula	20	16	13		2	0	\$ 6,274.78	\$ 14,901.73	\$ 8,626.94
esophagus foreign body	8	4	3		1	0	\$ 2,398.42	\$ 7,855.50	\$ 5,457.08
all acute condition episodes									TBD

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Figure 3: Chronic Condition Episodes Pertaining to GI (an example of one TIN selected from claims data)

	All Episodes	Total Shares	Episodic Shares	Principal Shares	Supporting Shares	Ancillary Shares	Sum of Actual	Sum of Expected	Net Savings
esophagitis (chronic)	2,952	2,646		2,429	158	59	\$ 194,736.00	\$ 362,700.95	\$ 167,964.95
colorectal neoplasm malignant	1,897	1,290		521	239	531	\$ 3,464,405.78	\$ 4,140,864.58	\$ 676,458.80
cirrhosis other	1,028	797		484	143	170	\$ 379,486.47	\$ 224,087.44	\$ (155,399.04)
hepatitis c (chronic)	837	681		568	91	22	\$ 128,030.32	\$ 186,745.02	\$ 58,714.70
metastatic neoplasm to gi organs	758	466		140	81	246	\$ 728,379.69	\$ 543,091.93	\$ (185,287.76)
hepatobiliary neoplasm malignant	754	447		157	131	159	\$ 1,679,077.97	\$ 1,045,907.99	\$ (633,169.99)
irritable bowel and related enteritis	583	539		513	24	2	\$ 67,434.84	\$ 53,918.07	\$ (13,516.77)
pancreatic neoplasm malignant	470	280		129	74	77	\$ 1,243,765.65	\$ 1,273,401.71	\$ 29,636.06
liver disease chronic other	460	419		335	44	39	\$ 127,956.64	\$ 78,370.53	\$ (49,586.11)
esophagus neoplasm malignant	349	206		119	47	40	\$ 443,762.85	\$ 601,863.63	\$ 158,100.79
inflamm bowel ds ulcerative colitis	345	310		288	19	2	\$ 72,928.30	\$ 87,521.46	\$ 14,593.16
pancreatitis chronic	267	225		186	22	17	\$ 68,208.49	\$ 94,563.82	\$ 26,355.33
hepatitis other	266	242		196	24	21	\$ 50,996.44	\$ 25,752.45	\$ (25,243.99)
hernia other nec/nos	254	223		167	51	6	\$ 413,922.91	\$ 423,512.18	\$ 9,589.27
cirrhosis etoh	223	192		155	25	12	\$ 185,019.78	\$ 154,260.42	\$ (30,759.36)
inguinal hernia	207	174		140	26	7	\$ 163,407.68	\$ 169,713.80	\$ 6,306.12
colorectal neoplasm benign	190	181		169	7	5	\$ 53,469.76	\$ 79,266.41	\$ 25,796.65
other gi neopasm malignant	182	130		42	19	70	\$ 76,958.46	\$ 71,737.86	\$ (5,220.60)
hernia other umbilical ventral	180	140		89	34	18	\$ 214,381.66	\$ 137,931.14	\$ (76,450.51)
gallbladder stones	165	137		81	17	38	\$ 63,856.55	\$ 64,311.19	\$ 454.64
hepatitis b (chronic)	153	130		113	10	8	\$ 15,356.09	\$ 23,775.44	\$ 8,419.35
stomach neoplasm malignant	140	81		32	19	30	\$ 343,004.92	\$ 271,067.98	\$ (71,936.94)
vascular insuff intestines chronic	138	124		101	15	8	\$ 235,726.45	\$ 319,022.95	\$ 83,296.50
cholecystitis (chronic)	129	101		51	21	30	\$ 871,720.54	\$ 1,059,915.60	\$ 188,195.06
cirrhosis billiary	129	103		87	11	4	\$ 22,499.02	\$ 10,652.54	\$ (11,846.49)
liver disease nec	126	101		49	20	32	\$ 140,264.44	\$ 64,347.35	\$ (75,917.10)
hernia diaphragmatic	125	104		66	13	25	\$ 129,759.98	\$ 57,938.77	\$ (71,821.21)
all chronic condition									TBD

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I. Illustrative Case Study

The ACS-Brandeis model is intended to take advantage of the clinical efforts of care that are currently reimbursed in FFS silos and, instead, push for team-based incentives that more closely mirrors the clinical intent of care. The model attempts to achieve this by defining an episode with its cost and measuring quality across that episode framework at the patient level with shared accountability with upside and downside risk. To illustrate this let's look at two scenarios.

Figure 4 shows compares scenarios for managing a CABG episode. The beneficiary in the illustration has diabetes and ischemic heart disease and is undergoing a CABG. Scenario 1 features a cardiac Clinical Affinity Group (CAG, the medical team in a service line of care) that has extensive experience with patients that have hypertension, diabetes and chronic kidney disease. As a result, they take a number of steps to avoid acute kidney injury during and after the surgery. Scenario 2 represents typical care, with providers working in traditional silos, often in different TINs, and includes costs associated with a kidney injury.

Scenario 1: The episode begins with a referral to the surgeon and a surgical evaluation of the patient. The referring physician may be in the CAG or may be referring to the CAG. Once the patient has been identified as a surgical patient, the surgeon consults with the anesthesiologist prior to the surgery to review comorbidities. In this discussion, they determine that acute kidney injury is a possibility during the surgery and implement a series of activities to reduce this risk. The pre-operative consultation is a new, non-reimbursable service, but key to the beneficiary's outcome.

During the surgery, the team implements a new screening test for early detection of acute kidney injury. A positive finding prompts the anesthesiologist to institute more aggressive monitoring, some changes in the cardiac perfusion, and convinces the surgeon to shorten the pump run by foregoing a bypass that was not considered necessary but could have been done if the risk was low. The screening test for acute kidney injury is likely reimbursable. In the ICU the higher level of hemodynamic monitoring is continued, and nephrotoxic medications are absolutely avoided. After discharge to the floor the patient is pushed toward early ambulation with the help of a physical therapy consult. This is not a directly reimbursable service, but a low cost way to avoid or reduce post-operative institutional costs. The CAG has implemented a number of step to promote physical activity and reduce loss of muscle tone during recovery, including the use of cardiac rehabilitation post-surgery. Before discharge to home the surgeon consults a nephrologist within the CAG to optimized care of the patient with a now resolving acute kidney injury.

Scenario 2: The episode begins with a referral to the surgeon and a surgical evaluation of the patient. The risk of kidney injury is not a particular focus of the clinicians involved in the case. The surgery proceeds uneventfully, with standard hemodynamic monitoring, and the surgeon decides to do all possible bypasses and the patient has a long pump run. The patient is transferred to the ICU post-operatively and is given both acetaminophen and ketorolac for pain relief. On postoperative day 1 the patient develops stage 3 acute kidney injury that progresses to renal failure and the need for temporary dialysis. This requires more testing, invasive procedures within the ICU, specialty consultation, and both a longer ICU length of stay and a longer total hospital length of stay which is reflected in the final DRG which is 'with MCC'. This beneficiary

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is discharged to a skilled nursing facility given the need to monitor and treat the kidney injury as well as get the patient physically able to function independently at home. During the post-operative period, one of the medical specialists seeing this patient orders angiography, a potentially low value test, and which exacerbates the acute kidney injury. Given lack of a referral, the beneficiary does not go to cardiac rehabilitation. Given ongoing issues related to the cardiovascular disease and acute kidney injury, this patient is readmitted twice from the skilled nursing facility.

As shown in the table, the cost profile of these two cases is quite different. The costs shown here are derived from claims-based clinical vignettes from 2014. Figure 5 shows how the dollars for this single episode would be distributed to the team based on role. The third panel plays out an extreme scenario where all of the patient for one APM entity are scenario 1 patients and the second practice only has scenario 2 patients. This shows that the APM entity is successful in the model through the accumulation of high quality, efficient care. The scenario 2 APM entity is not successful under status quo conditions, although the losses are capped in the model.

These two scenarios focus specifically on the surgical procedure episode. However, within the ACS-Brandeis APM, the CAG can be expanded to include medical specialists and cover chronic conditions like hypertension, IHD, diabetes and kidney disease. In this more inclusive group, the benefits of aggressive management of the hypertension can also contribute to better surgical outcomes and fewer acute exacerbations for the beneficiary. In fact, over time, the CAG may come to specialize in patients with this particular mix of co-morbidities, working out communication pathways, primary and secondary prevention protocols and the appropriate mix of new technologies to optimize care for this and similar populations of patients at the condition episode level. By optimizing the care of the hypertensive and diabetic patient, this CAG does not just optimize the patients who eventually present for CABG and optimize their perioperative care, but reduces the development of chronic kidney disease and cardiovascular disease so that there is less chance that they need the surgery in the first place.

In the scenarios shown, the clinicians within the APM entity may vary. If the surgeon and anesthesiologist are the only two participating in the APM entity, for example, a larger portion of the savings will still accrue to the APM entity. Supporting and ancillary providers will continue to be paid their share outside of the APM entity. This does not dilute the gains of the surgeon and anesthesiologist, but does make it harder at the APM entity level to accumulate larger enough gains to support more significant care redesign activities. This creates an incentive to include key provider specialties inside the CAG, potentially buying some services, such as imaging, outside of the CAG. The benefits of a comprehensive CAG get even larger at the condition episode level where the group can adjust and optimize team size, reduce the use of low value services and increase the use of high value, sometime non-reimbursable services, internalize the financial benefits of avoiding surgery, or changing the site of surgery among other things.

These scenarios do not explicitly focus on the differences between the ACS-Brandeis APM and BPCI, but can be used to highlight some key differences. In the second scenario, for example, if the surgery had major complications the patient may have ended up on a ventilator and a different DRG, which would have bumped the case out of BPCI. Nesting the CABG within the related condition episodes allows for broader participation of medical specialists and can result in savings for events like avoided or delayed surgery. The ACS-Brandeis model can also

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internalize the benefits of better post-operative management through the condition episodes. For example, the post-operative visit with a nephrologist may be cost increasing within the 90-day CABG window, but much more cost decreasing for the CABG and chronic kidney disease episodes. The examples also focus on complex patients with a mix of cardiac and kidney disease, requiring coordination across medical specialists. The ACS-Brandeis model, because it is designed to address multiple services that make up a large proportion of any clinician's work, is better able to address and capitalize care redesign that cuts across departments and even organizations by allowing clinicians to focus on common clusters of episodes, not just one episode type at a time.

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Figure 4: Illustrate Scenarios for Managing CABG

CABG Procedure Episode			Scenario 1	Scenario 2	Comments - what makes scenario 1 and 2 different?
Service	Service Type	Provider Role	No kidney injury	Kidney injury	
Referral from Primary Care to Surgeon	e&m	Primary	72.77	72.77	
Surgical evaluation of the patient	e&m	Episodic	142.22	142.22	
Surgeon & anesthesiologist meet to plan approach	---	Episodic and Supporting	Y	N	Non-billable care coordination
Pre-op testing	text/lab	Ancillary	78	78	
Pre-operative imaging	img	Ancillary	84	84	
Surgery	pxdef	Episodic	2,500	2,500	
Supporting procedures	pxsup	Supporting	2,320	3,230	More unanticipated problems during the surgery
Testing for early identification of kidney injury	text/lab	Ancillary	153		New test for early detection of kidney injury
Surgical ICU	e&m	Supporting	750	750	
Post-op testing	text/lab	Ancillary	78	250	More post-operative testing given complications during and after surgery
Early ambulation/PT while INP	---	Supporting	Y	N	Early ambulation to reduce muscle loss
Post-operative imaging	img	Ancillary		250	More post-operative testing given complications related to kidney injury
Inpatient facility charges	INST	INSTITUTIONAL	20,000	22,000	Higher DRG and greater facility changes
Skilled nursing facility	INST	INSTITUTIONAL		3,200	Need skilled nursing rather than home with support
Home health	hh	INSTITUTIONAL	1,200		Home health for 2 weeks rather than skilled nursing facility stay
Angiography (low value test)	text/lab	Ancillary		148	Low value test
Follow up - primary care	e&m	Principal	84	84	
Follow up - nephrologist	e&m	Principal	125		Including a medical specialist on the team to monitor kidney health
Cardiac rehabilitation	therapy	Supporting	623		Cost effective rehabilitation to improve function in frail elders
Readmission	INST	INSTITUTIONAL		5,423	Readmissions due to complications
TOTAL (observed)			28,210	38,212	

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Figure 5: An Example of Reconciliation

Expected Cost: \$35,250	Scenario 1	Scenario 2
Savings/Loss (observed-expected)	7,040	-2,962
Quality Score	Excellent	Unacceptable
Primary (10%)	489	-296
Principal (15%)	734	-444
Episodic (40%)	1,956	-1,185
Supporting (30%)	1,467	-889
Ancillary (5%)	245	-148
Cap on Risk	15% Upside	8% Downside
Reconciled Savings/Loss	5,287	-2,820
Maximum risk		
Primary (10%)	529	-282
Principal (15%)	793	-423
Episodic (40%)	2,115	-1,128
Supporting (30%)	1,586	-846
Ancillary (5%)	264	-141
Expected Cost: \$35,250		
APM Entity Cases: 250	Scenario 1	Scenario 2
Expected Cost	8,812,500	8,812,500
Observed Cost	7,052,498	9,552,998
Over/Under	1,760,003	-740,498
Variation in participating providers	CABG Revenue	CABG Revenue
Principal and episodic in APM Entity	672,375	-407,274
Principal, episodic and half the supporting in APM Entity	855,750	-518,348
All providers in APM	1,760,003	-740,498

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April 7, 2017

Physician-Focused Payment Model Technical Advisory Committee
C/o U.S. DHHS Asst. Sec. of Planning and Evaluation Office of Health Policy
200 Independence Avenue S.W.
Washington, D.C. 20201
PTAC@hhs.gov

Dear Members of the Physician-Focused Payment Model Technical Advisory Committee (PTAC),

The ACS-Brandeis Advanced Alternative Payment Model (A-APM) project team appreciates the opportunity to share our reaction to the Preliminary Review Team's (PRT) report. The PTAC has been given a difficult task to digest and evaluate multiple diverse proposals, each with its own context. We recognize the complexity of developing a review process that could evaluate many different approaches. The general PTAC criteria are likely well-suited for a range of simpler models; however, we believe that a few sub-criteria were applied in the preliminary review to the disadvantage of our unique APM. These sub-criteria include a requirement to predetermine and prescribe care redesign for every type of episode in advance; reward or punish quality performance in the model potentially without regard to financial performance; establish empirical benchmarks for quality metrics before launching a test of the model; any of which would lead the PRT to favor narrowly focused models over the comprehensive ACS-Brandeis model. It is our hope that the responses and clarifications in this letter will enrich the PTAC deliberations, and allow for the PTAC to recommend the ACS-Brandeis A-APM proposal for implementation or staged, limited-scale testing.

Most models that have been submitted to date are limited in scope and targeted to a defined specialty, patient population, condition or procedure, and are therefore well-suited for a narrow review. In contrast, the ACS-Brandeis proposal sets forth a comprehensive yet clinically precise model that is ambitious in scope, encompassing a broad range of providers and payers. The ACS-Brandeis model is also flexible by design, and provides entities and participating physicians with new tools and incentives to find innovative ways to improve care pathways and

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reduce unwarranted variation. The quality framework included in the model sets a high bar. It uses the quality measurement design in existing approved APM models as a minimum quality baseline, and proceeds to incorporate measures tied directly to the care delivered and to meaningful patient-reported outcomes to ensure that quality is maintained or improved (and therefore patients are protected) while striving for efficiency.

Our model will provide CMS and other payers with an adaptable framework that begins with an initial set of well-developed episodes, with a planned transition to larger sets of interrelated episodes that represent disease-specific and population-based care.

The PRT states two of the ten criteria did not meet the standard they wished to see for the model. Those two criteria were #2. Quality and Cost and #4. Value over Volume. Our responses to the PRT perspectives are below:

Criterion 2. Quality and Cost

- a. PRT critiqued our proposal for a lack of explicit plans for improving quality and reducing costs for each episode. We believe this conclusion by the PRT stems from an apparent presumption of the preliminary reviewers that care redesign must precede and dictate modifications to the payment system. The PRT report states, "...the submitter did not provide adequate information describing (1) the ways in which care delivery would change in order to improve quality and/or reduce costs and (2) the reasons those changes could not occur under current payment systems." (PRT Report, page 6)

Other models could focus on a single episode and require a prescriptive care pathway or a cookbook approach to value optimization within that episode. However, the ACS-Brandeis model does not begin with predetermined care redesign, or formulate in advance the strategies or mechanisms of change. We designed the model to allow providers and provider groups to find their own way towards high quality and high value care. The model can provide opportunities for numerous specialties, in diverse settings, to participate in an APM.

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- b. Instead of laying out a prescriptive care pathway, the ACS-Brandeis model provides new incentives for the delivery team to evaluate each episode-of-care individually for variation in quality or cost and then drive innovation, acknowledging that care redesign is fundamentally local and context specific. Participating providers and entities will be provided with tools and data to enable them to identify unwarranted variation and target it. We wish to drive value from multiple directions, and not create restrictive pathways or a single distinct formula. We propose to provide the care delivery team with reports detailing variation in care, to which they can apply clinical logic for appropriate and efficient care. We are concerned that there may be a presumption on the part of the preliminary reviewers that a quality measurement framework comparable to MIPS (and more stringent than those of certain existing CMS models) is not acceptable for the APM, or that the APM is not the appropriate context for advancing the science of quality performance metrics. We disagree, and believe that not only will the proposed model protect patients by assuring quality, it will be an important impetus to further the accuracy and validity of quality measurement in health care.

It is important to clarify that the ACS-Brandeis model provides CMMI with two distinct quality frameworks to choose from for each episode: the Episode-based Quality Category, and the All Patient-based Quality Category. Both quality categories require an outcome measure if available. We strongly believe that both categories are comparable to, or exceed, the requirements of MIPS and existing CMS APMs.

CMMI may elect to accept the episode-based measure framework, and/or the all-patient MIPS specialty measure sets approved by CMS, possibly allowing clinicians to select which measure set applies best to their local situation. It is our preference that entities use the Episode-based Quality Category and the associated measure framework, which is tied to the specific episodes of care provided. That approach would help to galvanize the model with respect to shared accountability in team-based care, and for evaluating cost and quality simultaneously within the same clinical episode context. However, due to the fact that quality measures and patient-reported outcomes (PROs) may not be available immediately for all episodes, we have provided the All-patient

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Quality Category as an alternative for those who unable to use the Episode-based Quality Category, in order to be more inclusive for all interested parties.

CMS appears to share our interest in measuring quality and cost over a defined episode. For example, Deputy Administrator for Innovation and Quality, Patrick Conway, MD, promoted the episode-based measure framework and PROs in his address to an AMA APM workshop on March 20, 2017. Our model aligns with his efforts to promote this measurement environment to the physician community. In our episodes, we propose high-value process measures and PROs because they capture what is truly important to patients. We rely less on typical clinical outcomes because of their inferior statistical reliability to discern differences in care due to large confidence intervals and small effect sizes. We prefer our PROs to be episode-specific and linked to key processes of care, such as functional and pain assessments matched to treatment goals.

ACS has proposed to CMS' CCSQ a set of measures in an episode-based measure framework with inclusion of PROs. CCSQ sought inclusion of the ACS measure sets in the MIPS program and asked us to introduce these measures to the NQF MAP in 2017, a request that has been fulfilled. We have also noted the PRO developmental work currently underway uses the CMS-endorsed Surgical CAHPS instrument as a resource for the PRO questions. These questions have been adopted by CMS and are psychometrically sound.

In their report, "...the PRT concludes that the proposal contains insufficient information to assure that there would be adequate quality protections to offset the financial incentives for lower spending in the wide range of conditions and procedures proposed." (PRT Report, page 7) Our conclusion differs from the PRT report. Our measures serve as new and innovative episode-specific measure sets. These measures represent the assurance needed to secure quality in an episode-based APM by exceeding the level of measurement in the MIPS program.

As noted above, we have included in our proposal an alternative measurement system, which can be used as a flexible part of implementation especially

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when episode-based measures are awaiting CMS approval. The All Patient-based Quality Category uses the CCSQ-approved MIPS measures or specialty measure sets. These measures can be used at the individual provider level although they are not necessarily episode-specific. So, at a minimum, this measure set provides the APM proposal with a MIPS-comparable set of measures. We prefer the episode-based measure framework over the MIPS measures because they are episode-specific and are intended to foster shared accountability.

Criterion 4. Value over Volume

- a. The PRT report asserts that "...there are insufficient mechanisms in the model to...encourage or reward quality even with no change in spending, which are essential elements of a truly value-based approach." (PRT Report, page 10) Separately, the PRT report concluded unanimously that our proposal met the high-priority Criterion 3: Payment Methodology.

Our proposed payment method follows a standard template commonly referred to as the "benchmark" approach, which defines risk and accountability in terms of shared savings and losses in reference to specific benchmarks. Whether the benchmarks refer to episodes (or bundles as in CJR), or to expenditures per beneficiary (e.g., ACOs), this approach does not reward or punish quality outcomes separately and without regard to the financial outcomes. If a site or entity breaks-even at reconciliation, there are no further rewards (no positive savings to share) or penalties (no losses to extract).

There is at least one template, often called discounted price (e.g., the BPCI demonstration), that does adjust the target price according to observed levels of quality, which in turn affects the financial reconciliation. However, that example does not support an evaluation criterion that defines such *a priori* adjustments as "essential elements of a truly value-based approach."

Although the initial transition phase of quality measurement would be largely reporting-based (as in other CMS models), we fully intend that the model move to performance-based measurement once benchmarks can be

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established. Furthermore, participants with lower achievement in relation to quality standards would have lesser upside potential and greater downside risk.

The model effectively prohibits participating providers from benefiting financially from reductions in care that lead to poor performance in quality. In fact, quality performance influences reimbursement in both upside and downside risk. In the instance of losses, the quality score influences the level of risk associated with the loss. Unacceptable quality scores result in assumption of greater downside financial risk. Excellence in quality reduces or eliminates any losses. Thus, we disagree with the PRT and believe quality influences both the upside benefits and the downside losses.

- b. The PRT raises legitimate concerns over assessing the appropriateness of surgical procedures. In most cases, these measures simply do not exist, are the most complex measures to create, and will take considerable investment for their development. Patient risk factors, clinical options and complexity, neural networks and machine learning all offer promise to enhance the opportunity for appropriateness measures.

However, we believe these measures are beyond the scope of this proposal and their absence should not preclude initial implementation of the model. These represent future work and would easily fit into the quality and value matrix. We would welcome inclusion of suitable appropriateness measures in the Episode-based Quality Category of any particular episode for which evaluation of appropriateness has attained this level of sophistication. A benefit to basing the APM and performance measurement on the episode framework is that it facilitates logical linking of cost and clinical data, including potentially indicators of appropriateness. Furthermore, as the PRT noted, our larger framework nests procedures within condition episodes, providing for risk arrangements that encompass metrics related to the value of all treatment pathways within a condition, including but not limited to surgery.

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Until such time as these measures are developed and become available, the Episode-based Quality framework can serve as a proxy for appropriateness measures through linked dyads of high-value process measures related to goals of care paired with related PROs which catalog the effectiveness of care toward achieving the goals. For example, a goal of care to reduce pain or improve function will pair with a PRO that measures the degree of reduction in pain or return of function.

The model also calls for assessment of variation in volume of services relative to patient needs and quality scores. Reducing unwarranted care as noted above is a foundational component to promoting value and reducing volume. In this context, maintaining or improving quality adds to the value. Where quality is worse there is a loss in value that will generate losses. Prime areas of focus are assessments of the use of various services relative to an episode of care. These include redundant or overuse of diagnostic services, labs, imaging or consultations and greater use of home and community based care.

The PRT report states that: “Initial implementation is proposed to focus on 75 procedures in 10 clinical areas involving 75 separate medical specialties. Expansion into acute and chronic conditions increases the scope of the model to potentially impact \$1.5 trillion in Medicare expenditures annually, with the potential for over half of all clinicians in the country to have greater than 75% of their professional fees covered by this methodology.” That captures our vision. The steady state will involve passing the tipping point toward a new value-proposition encompassing clinicians’ full body of work, as well as transforming organizational cultures and community standards of practice. We recognize that staged implementation and stepwise expansion is prudent, but our model anticipates scaling over time to achieve the wide application noted above. Substituting a narrowly constrained APM or APMs, that would fill only a small portion of the APM void faced by surgeons and other specialists, would terminally limit the APM program.

In conclusion, we believe that the PRT has accurately pointed out that the APM will require substantive inputs from CMS for its implementation. Each of the rules we have applied in building the model will require review and input from CMS’ implementation team. We believe the model reaches the PTAC’s criteria for

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consideration as a model worthy of pilot-testing or phased-implementation with refinements toward expansion and wider implementation, and we seek to continue our work with CMMI. We encourage PTAC to help move this project forward.

Sincerely,

A handwritten signature in black ink that reads "David B. Hoyt".

David B. Hoyt, MD, FACS
Executive Director

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APPENDIX 5. ADDITIONAL INFORMATION FROM THE SUBMITTER

Testing the ACS-Brandeis Advanced APM

MACRA is modifying how Medicare will pay physicians for the remainder of their careers. MACRA represents a once-in-a-generation opportunity to transform the healthcare system by leveraging decisions and efforts led by physicians, other clinicians, and their respective practice environments. Does MACRA expect the system to “turn on a dime,” or “change overnight?” No. MACRA allows for transition phases, interim policies, and appropriate testing and development. However, MACRA sets forth a clear vision for healthcare purchasing by Medicare and other payers to reflect a clear value proposition, with an explicit time line for the process of transformation.

Towards this end, we recommend testing and implementing by phase the ACS-Brandeis model which would lead predictably to a national model that entails reconciliation by design across all entities. This stands in contrast to alternatives that would have any number of clinical domains and specialties “reinvent” logic and develop fiscal models that won’t mesh regionally or nationally.

A clear value proposition is a tall order. It requires valid and consistent tracking of inputs affecting value, most importantly, the benefits achieved in relation to spending. This is done, in part, by leveraging the Episode Grouper for Medicare (EGM). More specifically:

- The ACS-Brandeis model offers an unprecedented opportunity to establish measures, incentives, and accountability for such a value proposition.
- The ACS-Brandeis model would allow CMS and other payers to track virtually every dollar spent and every dollar saved, attribute every one of those dollars to the clinicians and entities participating in patient care, and to link patient-related outcomes or other quality indicators in every case within a common episode framework.
- The ACS-Brandeis model is designed to operate at a national scale, allowing all of the clinical domains and specialties to manage within a coherent framework guided by a consistent clinical logic and system of fiscal accountability.

Since this model is new and potentially far reaching, CMS will need to articulate phases of implementation that define the scope of supported activities; i.e., the episode libraries and their corresponding quality metrics. CMS will need to specify criteria for entities to participate, such as corporate governance and minimum case volumes. Clinicians, organizations of practice, facilities and conveners will need to huddle and consider their best options, and then formulate a response to the relevant RFA.

With that in mind, here are options that may guide staged implementation of the ACS-Brandeis model:

- 1) **Participation.** It is unknown at this time how many and which entities would enter risk arrangements under the ACS-Brandeis model, the terms and conditions for which do not yet exist. Similar to the BPCI demonstration, CMS could issue an RFA that describes the scope and logic of the model, provides for data support, and elicits applications to participate.

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A possible scenario would be:

- a. Round I: Issue an RFA for all interested stakeholders (January 2108)
 - b. Select a pre-implementation set of potential entities that would use data reports to support efforts to submit a complete application to participate. The reports could be customized to reflect the anticipated “identity” of the entity, such as lists of TINs, NPIs, and facilities.
 - c. From among those potential entities that wish to complete the application process to become advanced-APM entities, CMS could select the right number and mix of entities to begin testing operational phases of the model.
 - d. Successful applicants would enter 5-year agreements that begin with initial episode libraries, which could be expanded as CMS brings more episodes into the model. Sufficient duration of the contract is important to create a sense of financial continuity, encouraging innovation and investment. (October 2018)
 - e. Round II: re-open the process for a second round of applications. Repeat steps above for this second round. (January 2019)
- 2) **Information protocols.** The ACS-Brandeis model is intended to increase greatly the utility of information that supports improvement.
- a. EGM is able to convey all services and their costs assigned to each episode, which can be summarized to any level of aggregation while preserving the ability to drill down to each service and each dollar.
 - b. Participants in the first round can form a learning network that includes consideration of the optimal timing and levels of detail included in information reports and/or distribution of grouped claims (i.e., claims data with embedded episode information). These are a source of cost-driver information that is not available in any other APM.
 - c. Participants in early rounds will be responsible for reporting quality metrics attached to episodes in their respective libraries. That will involve certain preparation, logistics, and QC. Merging the quality and cost information for entities will test the systems for reconciliation after performance periods.
- 3) **Beta test results.** Running the model for the first round of entities will constitute a beta test of the model, including behavioral responses and feedback from entities. Other potential advanced APMs have had the advantage of formal demonstrations operating for several years. The results will be the first glimpse of the model’s effectiveness.
- a. It will be important to see which episodes were selected by entities, and why.
 - b. Results by episode can be assessed, which can inform learning networks as well as episode specifications.