Environmental Scan on Telehealth in the Context of Alternative Payment Models (APMs) and Physician-Focused Payment Models (PFPMs)
September 9, 2020

To assist the Physician-Focused Payment Model Technical Advisory Committee (PTAC) in preparing for a theme-based discussion that is designed to give Committee members information about current perspectives on the role telehealth can play in optimizing health care delivery and value-based transformation in the context of alternative payment models (APMs) and Physician-Focused Payment Models (PFPMs) specifically, the Office of the Assistant Secretary for Planning and Evaluation (ASPE) requested the development of a brief environmental scan.[i] This environmental scan is intended to provide background information for Committee members based on information that was available relating to this topic in the literature and from discussions with subject matter experts at the time that the analysis was completed.

[i] This analysis was prepared under contract #HHSP233201500048IHHSP23337014T between the Department of Health and Human Services' Office of Health Policy of the Assistant Secretary for Planning and Evaluation (ASPE) and NORC at the University of Chicago. The opinions and views expressed in this analysis are those of the authors. They do not reflect the views of the Department of Health and Human Services, the contractor, or any other funding organizations. This analysis was completed on September 9, 2020.

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Introduction

Under the bipartisan Medicare Access and CHIP Reauthorization Act (MACRA) of 2015, Congress significantly changed Medicare fee-for-service (FFS) physician payment methods. The law also specifically encouraged development of alternative payment models (APMs) known as physician-focused payment models (PFPMs) and created the Physician-Focused Payment Model Technical Advisory Committee (PTAC) to review stakeholder-submitted PFPM proposals and make comments and recommendations on them to the Secretary of Health and Human Services (HHS).

Since its inception, PTAC has received 36 proposals for PFPMs from a diverse set of physician and payment stakeholders, including associations, health systems, academic groups, public health agencies, and individual providers. Many of the proposed models identified a number of care delivery and payment gaps in the current Medicare FFS program, including several that addressed issues relating to telehealth.

The purpose of this environmental scan is to provide members of PTAC with background information and context about current perspectives on the role telehealth can play in optimizing health care delivery and value-based transformation in the context of APMs and PFPMs. The next section will summarize some key highlights of the findings from the environmental scan. The following sections will discuss the research approach, a definition of telehealth, and description of telehealth modalities; an overview of information on telehealth coverage, reimbursement and billing, trends in utilization and spending, and effectiveness of telehealth-based interventions; the role that telehealth has played in Center for Medicare & Medicaid Innovation (CMMI) APMs to date; characteristics of proposed models that have been submitted to PTAC model with a telehealth component; and issues and opportunities for optimizing telehealth in the context of APMs and PFPMs.

In addition to summarizing materials from PTAC's review of proposals from past submitters, this environmental scan synthesizes findings from relevant literature and highlights themes from discussions with past PTAC submitters and subject matter experts. This review has been conducted while acknowledging emerging opportunities to learn during a period of increased reliance on telehealth due to the COVID-19 Public Health Emergency (PHE).

Key Highlights

The following is a summary of some key findings from this environmental scan.

Definition of Telehealth

- The Health Resources & Services Administration's (HRSA) Office for the Advancement of Telehealth (OAT) defines telehealth as "the use of electronic information and telecommunication technologies to support long-distance clinical health care; patient and professional health-related education; public health; and health administration."[1]
- Telehealth services may use "live" or synchronous exchange of information; use a store-and-forward or asynchronous approach; or use a continuous data feed for ongoing analysis.[2]

Coverage and Reimbursement for Telehealth

- Until recently, Medicare FFS limited coverage for mainly synchronous telehealth visits, delivered for a subset of procedures and services for patients in geographic locations with specific characteristics (originating sites), provided by a specific set of provider types.[3] [4] Due to the recent PHE, the Centers for Medicare & Medicaid Services (CMS) expanded coverage of telehealth under Medicare FFS. The expansions in the waiver included increased flexibility for Medicare telehealth services, including additional eligible practitioners, delivery modalities, and locations of care.[5] See Exhibits 2 and 3 for definitions of modalities, services, and temporary changes under the PHE.
- One important question moving forward relates to whether Medicare continues to allow coverage of telehealth services without use of a health care facility as the originating service site (e.g., from beneficiaries' home) following the end of the PHE.
- Reimbursement levels for telehealth services under Medicare FFS vary depending on the nature of telehealth used, settings of care, provider characteristics, and other factors.[6] [7] [8] [9] [10]
    - Some subject matter experts have indicated that in some cases, the complexity required for billing some types of telehealth services may discourage adoption and use, and have led many providers to avoid investing in the revenue-cycle management infrastructure necessary to bill for telehealth.
    - While post-PHE waivers relax some requirements, many of these requirements remain and can potentially pose a barrier to billing.
    - Virtual brief check-ins or other telehealth or telecommunications encounters that supplement in-person visits may pose a particular challenge in terms of setting reimbursement.
- Medicaid telehealth coverage policies vary from state to state.
    - As of February 2020, Medicaid programs in 50 states and the District of Columbia reimburse for some telehealth services, including some form of live video.[11] [12]
    - In response to the PHE, the main changes under Medicaid have been the expansion of originating sites, provider types, and services, including telephonic/audio-only services, which are reimbursed for telehealth.[13]
- In most states, providers must hold an active license in the same state where the patient receiving telehealth services resides.[14]
    - Some experts believe this poses a barrier to delivering telehealth.
    - Some states address this challenge through flexible application of licensure and certification requirements.[15] [16]
- Since 2010, 42 states and the District of Columbia have passed private payer parity laws, which align coverage and reimbursement for telehealth services with coverage and reimbursement for in-person services provided within the state along specific parameters. These laws vary widely in scope. [17]
    - A study of commercial claims found that telehealth visits are 30 percent more likely to occur in a state with parity legislation. [18]
    - Without a parity law, commercial insurers may reimburse telehealth services at a fraction of the rate for an equivalent in-person service. [19] [20]
- Many commercial payers cover specific subsets of telehealth services, often including virtual video visits with patients. [21]
    - Commercial insurers commonly cover many of the services billable under Medicare FFS. [22]

- Some commercial payers covered telehealth visits originating from the patient's home, even prior to the PHE. [23]
- Insurers have also taken steps to assist providers that are experiencing financial difficulties during the PHE, including accelerating payments or making payments on value-based contracts regardless of initial targets. [24]
- Commercial insurers continue to debate whether the expanded telehealth coverage will become permanent, citing the many unknowns about the ability to manage cost and quality. [25]

- Since the relaxation of public and private sector rules restricting use of telehealth following the PHE, national reliance on telehealth has expanded. [26] [27]
- Decreases in in-person care have, to some degree, been offset by rapid increases in virtual care, particularly for specific subspecialties such as psychiatry.
  - A recent study by ASPE found that following the start of the PHE in March 2020, Medicare FFS in-person primary care visits decreased precipitously, and this reduction was partially offset by a substantial increase in telehealth visits. [28]
  - A recent survey shows that providers expect reliance on telehealth to diminish after the PHE, but that it will remain higher than it was pre-pandemic.[29]

Effectiveness of Telehealth Interventions

- The availability of robust evidence regarding the effect of Medicare telehealth services on quality, cost, and access is mixed.
- While the effects of telehealth interventions vary widely by setting and condition, telehealth consultations generally produce either better outcomes or no difference when compared to similar settings and clinical indications.
  - In outpatient settings, using remote consultations as part of outpatient care can improve patient outcomes in some clinical disciplines.[30]
  - Studies of the impact of home telemonitoring on health outcomes for individuals with heart failure show decreases in both hospital readmissions and mortality.[31] [32]
  - Research demonstrates that specialty telehealth consultants lead to reduced patient time in the emergency department (ED). Additionally, telehealth consultations in emergency services are associated with reductions in heart attack mortality.[33]
  - A systematic review of interventions using telehealth to provide inpatient specialty consultations found no difference in clinical outcomes relative to a comparison group.[34]
  - Some researchers suggest that expanding telehealth access could have negative impacts on the quality of care – for example, by potentially creating gaps in patient medical records if not integrated with electronic health records (EHRs).[35] [36] [37]
  - The potential for adverse impacts or unintended consequences resulting from telehealth interventions has not been widely studied in the literature.[38]
  - A systematic review found no overall association between remote consultations and improved rates of patient satisfaction.[39] [40] However, the literature shows that Medicare FFS telehealth has positive effects on beneficiary engagement.[41]
- The evidence on the impact of telehealth on cost and utilization across conditions, settings, and provider types is limited and requires additional research and evaluation.[42]
  - Some research shows savings associated with telehealth in other health care systems; for example, the U.S. Department of Veterans Affairs (VA) reported reductions in hospitalizations

for chronic conditions after introducing telehealth to provide routine care and monitor chronic conditions.[43]
    - However, some researchers have suggested that the increased use of telehealth has the potential to increase service utilization by beneficiaries and related health care costs if telehealth services are used to supplement and expand the use of medical services overall, rather than substituting for more expensive care.[44] The overall impact is unclear if telehealth services supplement in-person care, but allow for timely intervention that can reduce the need for future inpatient care.[45]
- Telehealth consultations can improve access to care by reducing wait times, increasing the number of appropriate referrals, and helping patients to receive necessary diagnostic tests or treatment – particularly in underserved areas.[46]
    - Through telehealth, patients in rural areas can connect with health care providers when in-person visits are not feasible, and rural providers can be connected with specialists for clinical decision-making.[47] [48] [49]
    - Research also demonstrates telehealth-related improvements in access to care outside of rural settings, such as reducing unnecessary emergency room visits.[50]
- However, barriers to telehealth access persist in many settings.
    - Prior to the PHE, some studies indicated that there was considerably more willingness to use telehealth among patients and providers in comparison to the actual accessibility of these services.[51]

Telehealth and APMs

- Several CMMI models offer opportunities for telehealth waivers and more flexible payments that can incorporate telehealth, but do not include telehealth-specific payments.[52] [53] [54] [55] [56] [57] [58] [59] Limited published information is available regarding the effectiveness and impact of telehealth in these models.
- Between December 2016 and March 2020, stakeholders submitted 36 proposed PFPMs to PTAC, including 18 proposals that included telehealth as a component of their models – either as a central feature of the model (five proposals); an aspect of the care delivery and/or payment model (nine proposals); or as an optional component and/or the potential for adoption under the model (four proposals).
    - The PTAC proposal submissions with a telehealth component varied by populations served and settings of care.
    - The PTAC telehealth-related proposal submissions reflected the different technical platforms and modalities used in telehealth, with many of the proposals incorporating more than one telehealth modality.
    - The proposed models identified telehealth as a tool to address care delivery issues clustered around several broad themes related to improving access to care and improving quality of care.
    - The PTAC telehealth-related proposals also proposed a variety of payment models. Most of the proposed payment models did not specify telehealth-specific payments, but instead included flexible payments that could cover the costs of telehealth services and technology. However, a few of the proposed payment models included specific payments for telehealth services.
    - PTAC's assessment of these proposals included positive remarks about the inclusion of telehealth services. PTAC emphasized the data-sharing opportunities created by health

information technology (HIT) and telehealth; and noted the potential use of telehealth to create efficiencies for providers, support higher quality care, allow for earlier intervention, and support reductions in ED visits, hospitalizations, and mortality.
    - PTAC has also made comments regarding the need to more clearly articulate and specify the element of telementoring in one of the proposals; and how the use of proprietary software could impact the scalability of some of the proposed models.
    - Several past submitters, subject matter expert (SME) discussions, as well as recent publications suggest the important role that APMs can play in understanding the best approaches for incorporating telehealth into care delivery to produce value.[60]

Issues and Opportunities for Optimizing Telehealth

- Technical platforms and modalities used in telehealth have rapidly advanced. However, some experts note that incentives have not yet aligned to produce optimal use of telehealth. The following are highlights of several key issues and opportunities for optimizing telehealth:
    - Understanding services for which telehealth can substitute for in-person care while maintaining standard of care;
    - Provider readiness and costs associated with telehealth adoption;
    - Care integration and interoperability;
    - Telehealth-specific quality measures;
    - Liability and patient consent;
    - Challenges with billing and reimbursement;
    - Opportunities for using telehealth to improve patient-centeredness of care;
    - Accessibility of telehealth technologies for patients;
    - Internet or communications access;
    - Awareness and availability of services;
    - Unintended consequences related to program integrity; and
    - Potential role of APMs in helping to optimize the use of telehealth.

Research Approach

The following is a brief review of the research questions and methods that were used in developing this environmental scan.

Research Questions

Working closely with staff from ASPE, the following high-level list of research questions were developed to inform this environmental scan.

- What are the federal, state, and private sector policies (including payer coverage and reimbursement) relevant to the use of telehealth?
- To what extent have stakeholders adopted telehealth? What is known regarding barriers and enablers to telehealth implementation and use?
- What is the current evidence on the effectiveness of telehealth relating to access, quality, patient experience, safety, and cost?
- How can APMs support appropriate telehealth use in a way that improves quality and reduces cost? In particular, what insights can be learned from the vision and insights of previous PTAC proposal submitters that included telehealth in their PFPMs? What is known about telehealth from previous models supported by the CMS Innovation Center?
- What are the key issues and opportunities facing stakeholders that are at the intersection of telehealth and APMs?

Research Methods

This environmental scan includes a literature review, document review, and content analyses of discussions conducted with past submitters and subject matter experts (SMEs).

We conducted the literature review in two phases. First, we searched Google Scholar, PubMed, and Cochrane databases using the following search strings, all beginning with the term “Telehealth”:

- AND “definition” AND “technologies”
- AND “Medicare” AND “payment” AND “reimbursement” OR “services” OR “supports” OR “coverage”
- AND “barriers” OR “challenges” OR “facilitators”
- AND “Medicare” AND “APM” OR “innovation model” AND “outcomes”
- AND “APM” AND “population health”
- AND “care setting” OR “unintended consequences” OR “specialty” OR “gaps” OR “metrics” OR “data requirements”
- AND “Medicaid” AND “APM”

The inclusion criteria included literature pertaining to the research questions, published between 2015 and present, English language, U.S.-based studies and scholarship, peer-reviewed, meta-analysis or systematic reviews, and the references in previously cited sources. We reviewed the first 50 abstracts for each search string result and the full text of all articles included in the literature review. In editing the

literature review, we conducted a chain search, a method where the references within a search result lead to additional connected sources to expand on several topics.

The second phase of the literature search addressed the limitation of focusing only on peer-reviewed sources. We wanted to include very recent or newly developing work critical to the review given the PHE. Therefore, the second phase focused on recent changes to telehealth policy, regulations, and telehealth activity through government sources, and news articles.

The analysis of past PTAC proposal submissions that contained telehealth components included a thorough review of past proposals, Reports to the Secretary (where available), Secretary's Responses (where available), and Preliminary Review Team Reports; and a targeted search of content available in other PTAC process documents (e.g., Additional Information from Submitter, and Additional Information or Analyses). Finally, discussions were conducted with previous PTAC proposal submitters, as well as subject matter experts. A senior staff member conducted each discussion, while a junior team member took notes. The notes were analyzed thematically for inclusion in the findings. A list of past PTAC submitters and subject matter experts who were consulted for this environmental scan is provided in Appendix A.

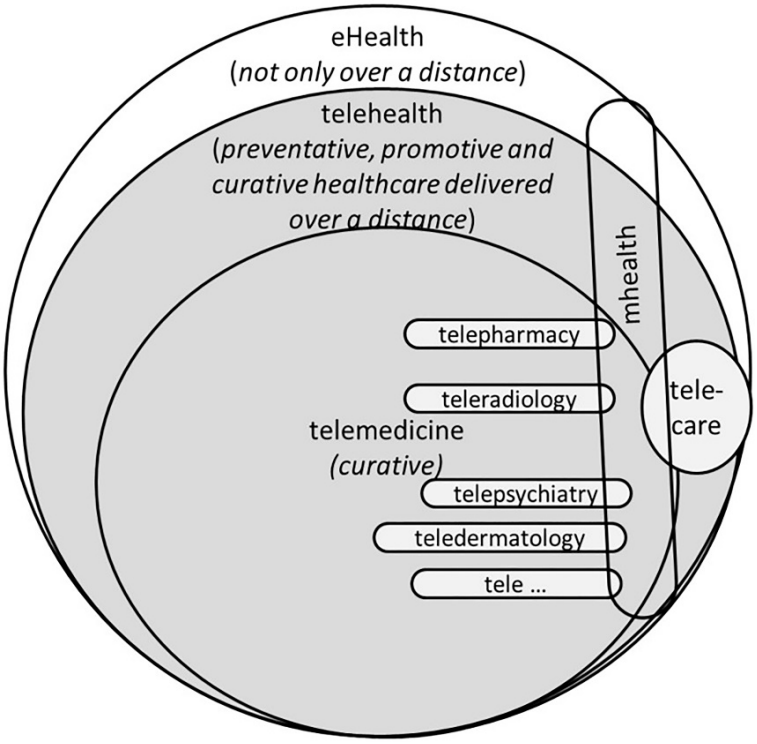
Background: Definition of Telehealth and Description of Telehealth Modalities

This section describes the scope of activities considered as part of telehealth for the purpose of this environmental scan.

Definition of Telehealth and Modalities for Delivering Telehealth Services

This environmental scan adopts the U. S. Health Resources & Services Administration (HRSA) Office for the Advancement of Telehealth (OAT) definition of telehealth as "the use of electronic information and telecommunication technologies to support long-distance clinical health care; patient and professional health-related education; public health; and health administration." [61] This definition emphasizes that telehealth is more than one kind of service. Instead, it covers multiple services and intervention types, which may be referred to by more specific subcategory terminology. Stakeholders may use various terms, including telemedicine, often interchangeably to refer to forms of electronic communication regarding health. Exhibit 1 reflects how telehealth is a broader term that encompasses many related terms that are associated with the concept. For more information on telehealth-related definitions as defined by major organizations, see Appendix B.

Exhibit 1. Relationship of Telehealth Terms per van Dyk [62]



The HRSA OAT definition also encompasses different technical platforms and provider workflows. Information may be transmitted using a telephone, the internet (e.g., voice-over-IP and streaming video), or wireless communication infrastructure and mobile devices (mHealth).[63] This definition encompasses services provided under Medicare section 1834(m), and recent statutory and regulatory expansions.

Telehealth services, including those authorized through Medicare as telehealth or telecommunications, may include "live" or synchronous exchange of information (e.g., conducting an e-visit via a video call); use a store-and-forward or asynchronous approach (e.g., forwarding an electronic image to a queue for diagnostic services provided by a specialist or allowing for a patient inquiry and response using secure messaging); or create a continuous data feed for ongoing analysis (e.g., remote patient monitoring).[64] Exhibit 2 expands upon each of these approaches for delivering telehealth.

Exhibit 2. A Common Approach to Characterizing Telehealth Modalities [65] [66] [67] [68]

Approach to Telehealth	Description
Live (Synchronous)	The service is provided in real time. Providers and patients see each other audiovisually.[69] This modality may be used for live telehealth visits (e-visits using videoconferencing platforms), virtual check-ins, or interprofessional consultations (provider to provider).[70] Additionally, audio-only services may be used for evaluation and management services.[71]
Store-and-forward (Asynchronous)	The patient's information is stored in the form of images, health records, videos, x-rays, or other scans and forwarded to the provider.[72] Asynchronous approaches are often used for specialist consults.[73] [74] This modality may be used for virtual check-in visits using recorded video or e-visits (secure messages being exchanged between patient and provider) through a patient portal or interprofessional consultations (provider to provider).
Remote Monitoring	The patient's information is transmitted electronically for tracking purposes, and can be used for monitoring chronic conditions, symptoms, or psychologic conditions.[75] [76] This modality may contribute to the information reviewed in a telehealth visit, virtual check-in, or e-visit. This approach has features of synchronous and asynchronous exchange, because data are not received by providers in real time, but they may be alerted in real time if monitored measures reach specified thresholds.
Mobile Health (mHealth)	Refers to use of health care and public health information via a mobile application ("app") platform on devices such as smart phones and tablets.[77] This modality may be used for a virtual check-in via telecommunications (i.e., SMS) or e-visits through a patient portal.

Technical platforms and modalities used in telehealth have rapidly advanced. However, some experts note that incentives have not yet aligned to produce optimal use of telehealth. For example, despite the potential for telehealth to improve access to care and address challenges such as workforce shortages, until recently many providers outside of rural areas did not widely use telehealth. The following sections review public and private policies related to telehealth and trends in telehealth adoption.

Overview of Telehealth Coverage, Reimbursement, Trends in Utilization and Spending, and Effectiveness

This section provides background information on telehealth-related policies, experience with telehealth to date, and evidence regarding the effectiveness of telehealth interventions.

Public and Private Policies Related to Telehealth

State and federal policies, including those governing payment, affect how stakeholders use the different approaches to telehealth outlined above. Given that Medicare accounts for approximately 20 percent of health care expenditures in the United States, and other payers often adopt Medicare coverage and

reimbursement policies, this discussion of telehealth policy begins with a discussion of Medicare FFS reimbursement.[78]

Telehealth Coverage under Medicare

Telehealth coverage under Medicare has evolved significantly over the past five years. This section summarizes information regarding Medicare coverage for telehealth under both FFS and Medicare Advantage (MA).

Medicare FFS Coverage. Medicare coverage for telehealth dates back to the Balanced Budget Act of 1997. Medicare limits coverage for telehealth services to a subset of the tools included in the telehealth definition.[79] Until recently, Medicare FFS limited coverage for conducting a medical visit using synchronous telehealth to a subset of procedures and services delivered to patients in geographic locations with specific characteristics (originating sites). This policy restricted many forms of virtual care to beneficiaries residing outside of Metropolitan Statistical Areas (MSAs) or within Health Professional Shortage Areas (HPSAs). Furthermore, coverage for many forms of real-time virtual care required beneficiaries to be present in health care facilities.[80] [81] Finally, Medicare only approved coverage for telehealth for a specific set of services provided by a specific set of provider types.

Recent statutes have expanded Medicare FFS coverage to synchronous telehealth originating from a broader set of sites and expanded coverage to specific types of asynchronous telehealth.[82] For example, the Bipartisan Budget Act of 2018 expanded coverage for telehealth services for diagnosing stroke to all geographies.[83] Additionally, the Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities (SUPPORT) Act expanded the types of providers who can treat substance use disorder (SUD) using telehealth. Also, Medicare covers specific telehealth services for beneficiaries with end-stage renal disease (ESRD) without regard to geography and allows coverage for treating beneficiaries with ESRD from their homes. [84] [85]

Medicare coverage of telehealth again expanded through changes to the 2019 Medicare physician fee schedule. The key changes included coverage of a brief communication technology-based service (e.g., virtual check-in), asynchronous remote evaluation of pre-recorded patient information and interprofessional internet consultation. These services are not labeled as telehealth services under Medicare, and therefore are not subject to existing restrictions. Additional changes, which are subject to telehealth restrictions, included incorporating changes from the Bipartisan Budget Act of 2018, creating and finalizing reimbursement codes for remote physiological monitoring, adding Healthcare Common Procedure Coding System (HCPCS) codes to be reimbursed if telehealth is used, and adding a new reimbursement code for chronic care management.[86]

Due to the recent PHE, CMS expanded coverage of telehealth under Medicare FFS further through the 1135 waiver authority and the Coronavirus Preparedness and Response Supplemental Appropriations Act. The expansions in the waiver included increased flexibility for Medicare telehealth services, including additional eligible practitioners, delivery modalities, and locations of care.[87] In Exhibit 3, we provide a comparison across coverage requirements, including originating site, included providers, and privacy and security requirements.

Exhibit 3. Telehealth Coverage under Medicare FFS

Topic	Coverage Prior to March 2020	Temporary Coverage Response to COVID
Location of Patient	Patient must be at an originating site that is a rural medical facility, a facility in a county located outside of a MSA, or a facility located in a HPSA in a rural Census tract as defined by HRSA, community mental health centers, a patient's home (in rural or urban area) in the case of an ESRD diagnosis or co-occurring substance abuse and mental health disorder diagnoses[ii], a renal dialysis facility, acute stroke services in hospitals, critical access hospitals, or mobile stroke units in any geographic region.[88] [89] [90] [91]	No geographic requirements that restrict coverage to rural locations or Health Professional Shortage Areas. No restrictions on settings for the patient (providing services to patient at home is covered).[92] [93]
Location of Provider	Provider must be at the facility listed as the point of service, known as the distant site. Federally Qualified Health Centers (FQHCs) and Rural Health Clinics (RHCs) may bill as the originating site for telehealth services, but not as distant sites.[94]	No geographic restrictions, allows providers to provide services from their home.[95] [96] FQHCs and RHCs with telehealth capabilities may now serve as distant sites for telehealth services. [97]
Services	Approximately 100 codes available for telehealth services.[98]	CMS added approximately 80 new services.[99] [100] 135 billing codes are currently marked as temporary additions for the PHE.[101]
Modality	Services can be provided through live video (synchronous).[102] [103]Pre-recorded patient information can be provided for established patients. [104]	Audio-only (i.e., telephone) services are allowed for specific services (evaluation and management, behavioral health counseling, or educational services).[105]
Provider Type	Physicians, nurse practitioners, physician assistants, nurse-midwives, clinical nurse specialists, certified registered nurse anesthetists, clinical psychologists and clinical social workers (only for established patients), and registered dietitians or nutrition professionals.[106] [107]	No restrictions. All health care professionals who are eligible to bill Medicare are able to provide telehealth services.[108] Any practitioner working at FQHCs and RHCs acting within their scope (subject to state law) may provide telehealth services. [109]

[ii] The Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities (SUPPORT) Act allows for additional providers to implement medication-assisted treatment services. For more information: https://www.samhsa.gov/medication-assisted-treatment/statutes-regulations-guidelines/support-act

Topic	Coverage Prior to March 2020	Temporary Coverage Response to COVID
Technology and Security	Telehealth technology required to have interactive two-way audio/video capabilities. All modalities must be secure and Health Insurance Portability and Accountability Act (HIPAA) compliant to protect patient privacy.[110] [111]	Telehealth technology must be interactive, but may be audio-only for certain services. The HIPAA compliance is not currently being enforced, which allows platforms such as Skype, FaceTime, or Zoom to be used.[112] [113]

An important question moving forward is whether Medicare continues to allow coverage of telehealth visits without a health care facility as the originating service site (e.g., from beneficiaries' home) following the end of the PHE. Experts suggest that this practice has not only worked well under the PHE, but also has the potential to achieve future savings.[114] HHS leadership has indicated that the Department is examining which temporary changes could be permanent.[115] [116] An Executive Order (EO) signed by President Trump on August 3, 2020, asks the HHS Secretary to review temporary changes associated with telehealth related to the PHE and propose within 60 days extending these changes as appropriate.[117] [118]

Role of reimbursement and billing. In addition to issues relating to coverage, prior to the PHE, providers expressed concern regarding telehealth billing and reimbursement.[119] [120] Reimbursement levels for telehealth services under Medicare FFS vary depending on the nature of telehealth used, settings of care, provider characteristics, and other factors. In addition, prior to the PHE waiver, CMS considered telehealth services to be a substitute for in-person services; therefore reimbursement is set at the same rate as an in-person service. The telecommunication services (i.e., virtual check-ins, remote evaluation, and interprofessional consultation) are considered additive due to the expected brevity of the services, and are therefore not reimbursed at payment parity.[121] Post-PHE waivers relaxed some telehealth billing requirements (see Exhibit 4).

Exhibit 4. Billing and Reimbursement under Medicare FFS

Topic	Reimbursement Prior to March 2020	Temporary Reimbursement Response to COVID
Originating Site	Submit billing for the facility fee using Healthcare Common Procedure Coding System (HCPCS) code Q3014.[122] Medicare reimburses a lower facility rate for Place of Service (POS 02) codes.[123]	FQHCs and RHCs that serve as originating telehealth service sites are reimbursed $92.03. [124] FQHCs and RHCs will not receive prospective payment system (PPS) or all-inclusive rate (AIR) payments.[125]
Distant Site	Critical Access Hospitals (CAH) billing an institutional claim must use the modifier GT to bill under the CAH Optional Method II. This makes CAH eligible for the 80 percent of the Professional Fee Service rate.[126] FQHCs and RHCs cannot serve as distant sites.	For visits between January 27 and June 30, 2020, that are also FQHC qualifying visits, claims should include the PPS specific payment code (G0466, G0467, G0468, G0469, G0470), the service code with a modifier of 95, and G2025 with modifier 95.[127] Beginning July 1, 2020, FQHCs and RHCs no longer need to use the CG modifier, therefore submitting only G2025.[128]
Modality		
Audiovisual	Services delivered through audiovisual modalities are reimbursed at equal rates to in-person services.[129]	Services, including audio-only, are reimbursed at equal rates to in-person services.[130] [131] [132]
Audio-only	Audio-only services are reimbursed at a lower rate than comparable in-person services.[133]	Audio-only services are reimbursed at equal rates to in-person services.[134] [135]
Services		
Synchronous E-Visit	The Current Procedural Terminology (CPT) codes are 99201-99215. May only bill for established patients at eligible originating sites and geographic locations. [136] In addition to the billing codes, must add the Place of Service code (POS 02).[137]	Services are reimbursed at the same amount as in-person visits, when using synchronous audio/audio-video. Providers may be reimbursed for new or established patients. Billing codes must include the Place of Service code that would have indicated an in-person service (POS 11) and modifier 95.[138] [139]

Topic	Reimbursement Prior to March 2020	Temporary Reimbursement Response to COVID
Asynchronous E-Visit	The applicable CPT codes are 99421-3, with the exact code depending on the time spent over a seven-day period.[140] [141] The HCPCS codes are G2061-G2063. [142] Providers may only bill for established patients in eligible originating sites and geographic locations. In addition to the billing codes, must add the Place of Service code (POS 02).[143] The modifier GQ should be added to all asynchronous CPT codes.[144]	The CPT codes remain the same. [145] Providers may be reimbursed for new or established patients. Billing codes must include the Place of Service code that would have indicated an in-person service (POS 11) and modifier 95.[146] [147]
Interprofessional internet consultation (provider to provider)	The applicable CPT codes are 99446-99452, depending on if they are the requesting or consulting provider. Requesting providers may only bill the CPT code a maximum of once every 14 days, while consulting provide may bill once every seven days.[148] Providers may bill for synchronous, asynchronous, or audio-only. Patients may be new or established. In addition to the billing codes, must add the Place of Service code (POS 11).[149]	Billing codes must include the Place of Service code that would have indicated an in-person service (POS 11) and modifier 95.[150] [151]
Virtual Check-in	The applicable CPT codes depend on the modality. Synchronous check-ins HCPCS codes are G2012 and asynchronous check-ins are G2010. [152] Both codes need the Place of Service code (POS 02). Reimbursement is limited based on if the service is patient initiated and lasts for 5-10 minutes. This service cannot result from an evaluation and management (E/M) service in the past seven days nor lead to an E/M service in the next 24 hours.[153] [154]	The CPT and HCPCS codes remain the same. [155] Providers may be reimbursed for new or established patients. Billing codes must include the Place of Service code that would have indicated an in-person service (POS 11) and modifier 95.[156] [157]

According to subject matter experts, in some cases, the complexity required for billing some types of telehealth services may discourage adoption and use. Billing for telehealth services under Medicare often requires use of modifiers in addition to Level 1 or Level 2 codes under the HCPCS.[158] [159] Certain providers, such as FQHCs, RHCs, and home health agencies are not eligible to submit under telehealth inter-professional consultation codes. However, these providers may claim the services as an expense through the special care management codes.[160]

Some subject matter experts consulted for this environmental scan perceive that the level of reimbursement available for telehealth services does not cover the costs associated with the work for documenting and billing these services. One expert also noted prior research empirically documenting provider-level costs associated with billing. [161]

Because coverage rules restrict the types of services reimbursable through telehealth, there were "gaps" in services that most providers could provide in-person versus virtually, and CMS reimbursed many services at different levels than equivalent in-person services prior to the PHE.[162] This raises the question of whether greater reliance on telehealth after the PHE would result in telehealth encounters that substitute for in-person sessions or telehealth encounters that supplement in-person care and result in more overall billable health care encounters. Some research based on the pre-PHE experience suggests that the majority of telehealth encounters supplement rather than replace in-person care.[163]

The added administrative burden for documenting telehealth encounters may create financial barriers for some providers. Pre-PHE, to bill for telehealth, providers are required to demonstrate an appropriate origination site (both geographic and facility-level); that the service was approved for billing under telehealth; that the coding reflects necessary modifiers; that the treating provider was licensed in the beneficiary's state; that the encounter was properly documented; that the technology being used complied with HIPAA requirements; and that, beyond Medicare rules, relevant state rules were also followed. While PHE waivers relax some requirements, many of these requirements remain and can pose billing burdens.

Subject matter experts note that these factors have led many providers to avoid investing in the revenue-cycle management infrastructure necessary to bill for telehealth. They believe this lack of telehealth billing infrastructure continues to pose challenges for providers seeking to bill for telehealth services even after the coverage expansion and temporary easing of rules following the PHE.

Virtual check-ins, as under the telecommunications services, or other telehealth encounters that supplement in-person visits may pose a particular challenge in terms of setting reimbursement. In these situations, reimbursement is lower, and providers may perceive the cost of producing documentation needed to successfully bill Medicare to be prohibitive. At the same time, allowing beneficiaries to connect with providers from home rather than traveling to an office potentially increases beneficiary interest in this kind of virtual care, and Medicare may need the more detailed documentation of each encounter to support audits and program integrity. One subject matter expert identified this as a reason why some telehealth services may not be amenable to coverage under a FFS model.

Experience with telehealth under Medicare Advantage. Close to one-third of Medicare beneficiaries are enrolled in Medicare Advantage plans.[164] As of 2018, the penetration of Medicare Advantage is lower (24 percent) in rural areas. Medicare Advantage plans are not available in approximately 150 counties across the country, with most of those counties being rural.[165] Medicare Advantage plans are required to offer the same telehealth benefits that would be available to beneficiaries under Medicare FFS.[166] Medicare Advantage plans may offer additional services, such as in-home equipment and telecommunication technology, as supplemental benefits and, starting in 2020, were able to offer even more telehealth services.[167] [168]

State Policies Affecting Telehealth

State policies related to Medicaid and other payers can affect telehealth coverage, billing, reimbursement, and use. Historically, telehealth adoption in Medicare has often correlated with state-level policies through Medicaid or commercial payers that expanded telehealth.[169] Importantly, many state-level policy considerations apply to use of telehealth in the context of APMs.

Medicaid coverage and reimbursement. Medicaid telehealth coverage policies vary by state. As of February 2020, Medicaid programs in 50 states and the District of Columbia reimburse for some telehealth services, including some form of live video.[170] [171] Medicaid programs that use managed care may have differing telehealth offerings from plan to plan.[172] Through Medicaid, states reimburse different types of telehealth, including synchronous, asynchronous, and remote patient monitoring.

All 50 states and the District of Columbia cover some form of synchronous (live) video services, and 16 Medicaid programs reimburse for asynchronous services. Twenty-three states provide coverage for remote patient monitoring services. Only 10 states provide coverage for synchronous, asynchronous, and remote patient monitoring services.[173] States may expand coverage and reimbursement for telehealth through home and community based (HCBS) waivers for eligible beneficiaries.[174]

Statewide professional requirements. In addition to Medicaid reimbursement policies, states impose professional requirements on provision of health care services. In most states, providers must hold an active license in the same state where the patient receiving telehealth services resides. This poses a barrier to delivering telehealth according to some experts. Some states address this challenge through flexible application of licensure and certification requirements.

Eight state medical boards have telehealth-specific licensure or certifications, which may allow an out-of-state provider to practice telehealth within the state. [175] Twenty-four states and one territory participate in the Interstate Medical Licensure Compact, which allows providers to practice telehealth across state lines.[176] [177] Three other licensure compacts allow for cross-state practice:

- Nurse Licensure Compact – 34 member states [178] [179]
- Physical Therapy Compact – 28 member states
- Psychology Interjurisdictional Compact – 12 member states 180

State telehealth PHE response. In response to the PHE, states and Medicaid programs have taken a variety of policy actions. Statewide changes have included waiving or easing requirements regarding providers who can prescribe medications using telehealth and how providers can obtain informed consent for telehealth services. Additionally, action has been taken to increase cross-state licensing. The main changes under Medicaid have been the expansion of originating sites, provider types, and services, including telephonic/audio-only services, which are reimbursed for telehealth (see Exhibit 5).[181]

Exhibit 5. Telehealth Coverage under Medicaid

Coverage Before PHE	Response to PHE
Medicaid coverage policies vary based on the state. Within a state, policies may differ between managed care plans.[182]	The response is still developing, although states have the authority to utilize telehealth services when conditions are met. State licensure requirements are currently waived by the federal government for Medicaid, although state requirements may still be in place.[183]

State Policy Affecting Private Payer Coverage and Reimbursement for Telehealth

State parity laws may require consistent coverage for equivalent services delivered in different ways (e.g., in-person vs. virtually) from health insurance plans and issuers. Since 2010, a majority of states have passed private payer parity laws, which require telehealth services to match in-person services provided within the state along specific parameters. These laws vary widely in scope. Some require coverage of equivalent benefits, while others require parity in reimbursement for virtual and in-person services deemed equivalent, and still others allow each insurer to decide independently.[184] [185]

Forty-two states and the District of Columbia have some form of parity law to govern private payer reimbursement of telehealth services.[186] In only a few states (e.g., California), parity laws require commercial insurers to cover the equivalent telehealth analog to services covered in-person.[187] Importantly, coverage for a specific form of telehealth does not necessarily lead to its adoption and use by providers and patients. In some cases, parity laws require commercial insurers to cover a broader set of telehealth services than are covered under Medicare FFS.[188]

Commercial Payer Coverage for Telehealth Services

Many commercial payers cover specific subsets of telehealth services, often including virtual video visits with patients. Commercial insurers commonly cover many of the services billable under Medicare FFS. Some commercial payers covered telehealth visits originating from the patient's home, prior to the PHE.[189] Each private payer has responded to the PHE differently. Many health plans have made announcements that they plan to expand telehealth coverage, or potentially offer telehealth services with no copay for a period (see Exhibit 6).[190]

Exhibit 6. Snapshot of Telehealth Services Covered by Commercial Plans (As of August 28, 2020) [191]

Payer	Response to PHE
Aetna	Until September 30, 2020, Aetna is waiving member cost-sharing for covered in-network, audiovisual, or audio visits for outpatient and mental health counseling. For general or behavioral health visits, audiovisual modality is required, but for minor acute evaluation and management services, audio visits are allowed. Providers are able to use Teladoc or non-public facing synchronous video chat platforms. Telemedicine services will be reimbursed at in-person office visit rates, with exception of audio-only services.
Anthem	Until September 30, 2020, Anthem is waiving cost-sharing for audiovisual or audio visits. Members must use Anthem's authorized telemedicine service, LiveHealth Online or the Sydney Care app. Self-insured plans are able to opt-out of the program.
BCBSA*	For 90 days, beginning March 19, 2020, BCBSA expanded telehealth offerings and provider hotlines. Additional covered services may be available depending on the state.
Cigna	Until December 31, 2020, Cigna is waiving cost-sharing for audiovisual and audio telehealth visits with in-network providers, using the virtual vendors Amwell or MDLive. Until October 31, 2020, telehealth visits unrelated to COVID-19 are available, and out-of-pocket costs may apply. Providers will be reimbursed at the in-network or Medicare rates consistent with in-person rates.
Humana	Through the end of 2020, Humana is waiving member cost-sharing for audiovisual or audio services related to COVID-19 that are done by participating/in-network providers. Providers will be reimbursed for audiovisual and audio-only services at the in-network rates consistent with in-person rates.
United Healthcare	Until September 30, 2020, United Healthcare is waiving cost-sharing for audiovisual or audio-only visits that are done with in-network providers for non-COVID-19-related visits. For physical, occupational, or speech therapy; and chiropractic, home health, and hospice visits, services must be conducted with an audiovisual modality. Technologies include publicly available platforms or telehealth applications. Additionally, urgent care virtual visits are available through Teladoc, Amwell, Doctor on Demand, and others. Services must be provided through live and interactive modalities, to be reimbursed based on national determinations and contracted rates.

*This includes all independent BCBS companies and BCBS Federal Employee Program (FEP).

Insurers have also taken steps to assist providers that are experiencing financial difficulties during the PHE, including accelerating payments or making payments on value-based contracts regardless of initial targets.[192] Commercial insurers continue to debate whether the expanded telehealth coverage should become permanent, citing the many unknowns about the ability to manage cost and quality. As insurers continue to learn from the period of increased reliance on telehealth, many anticipate they will create telehealth coverage and reimbursement guidelines specific to different modalities, specialties, or provider types.[193]

Trends in Telehealth Use and Spending

This section summarizes review trends in the use and spending associated with telehealth. Available data reveal that the adoption and use of telehealth prior to the PHE has remained low, with limited information in many cases. For Medicare, most of the available information relates to FFS utilization and spending. This section also includes discussions of the trend information that is available for Medicaid and commercially insured groups.

Historical Trends in Spending on Medicare Telehealth Services and Utilization

In 2016, far less than 1 percent of all Medicare FFS beneficiaries used any telehealth services, as reflected in Medicare claims.[194] In 2019, the overall percentage of beneficiaries receiving telehealth services billed to Medicare FFS increased, but still included less than half of 1 percent of all beneficiaries.[195] The most commonly utilized telehealth service was psychotherapy.[196] Of the very small group of FFS beneficiaries receiving telehealth, that year 85 percent had at least one mental health diagnosis.

The limited use of telehealth in the recent past may have been due to the pre-PHE coverage policy that limited the subset of beneficiaries who could receive telehealth services.[197] As would be expected given coverage rules, Medicare FFS beneficiaries using telehealth have been concentrated in states with rural areas. Most telehealth utilization under Medicare FFS occurred in Texas, Iowa, California, Missouri, Michigan, Minnesota, Wisconsin, Georgia, Virginia, and Kentucky.[198] One study showed that the telehealth visit rate was over 25 visits per 100 rural beneficiaries with a diagnosis of serious mental illness in nine states, while four other states and the District of Columbia had no telehealth visits.[199]

In 2016, there were 300,000 telehealth visits, which accounted for $27 million in Medicare spending. This spending accounted for 0.3 percent of Medicare Physician Fee Schedule spending for the year. In 2018, 12 percent of Medicare telehealth FFS spending was on Physician Fee Schedule. All other telehealth in traditional Medicare, which include Medicare Inpatient Prospective Payment System (IPPS), Outpatient Prospective Payment System (OPPS), inpatient rehabilitation facility (IRF), long-term care hospital, ESRD, ambulatory surgery center (ASC), skilled nursing facility (SNF), and home health, accounted for 46 percent of Medicare telehealth FFS spending. In the same year, 29 percent of Medicare telehealth spending was from Medicare Advantage. Information on Medicare telehealth spending in Accountable Care Organizations (ACOs) was not available, and spending in Medicare Part D was not shown in the analysis.[200]

Historical Trends in State Level Telehealth Utilization

Historically, utilization of telehealth services by Medicaid beneficiaries has remained low, although rural Medicaid beneficiaries have been more likely to use telehealth services than their urban counterparts.[201] The beneficiary characteristics associated with greater likelihood of using Medicaid telehealth services prior to the PHE were age between 45 and 64, white, male, rural, managed care plan enrollee, and individual categorized as aged, blind, and disabled.[202] As with Medicare coverage, the most commonly provided telehealth services in Medicaid are for mental health, including for management of psychotropic medication and behavioral health problems.[203] [204] [205]

Historical Trends in Commercial and Private Plan Telehealth Utilization

Commercial insurers have supported telehealth using different models. In some cases, providers themselves may purchase and implement technology that enables telehealth-related services. In other cases, the insurer may provide software platforms used for telehealth encounters through a third party. The inclusion of platform-as-a-service telehealth may be responsible for an increase in commercial telehealth adoption from 2014 to 2017.[206]

Insurers may also select a hybrid model somewhere along the spectrum of outsourcing all telehealth resources (i.e., software, hardware, provider network) or alternatively outsourcing only a portion of the technology (i.e., software or hardware) while maintaining an internal provider network.[207] Subject matter experts consulted for this environmental scan emphasized the importance of having an existing patient-provider relationship prior to engaging in telehealth to support quality and continuity of care. The experts noted concerns over the use of outsourcing telehealth care to different physicians as potentially disrupting this relationship.

Information about use of telehealth services among the commercially insured population is limited. In March and April of 2019, providers billed approximately $60 million for telehealth visits to private health insurance claims.[208] In a study of commercial ACOs and bundled payment models, results suggested that these models encourage efficient use of specialty care.[209]

In 2018, hospital participation in an ACO or bundled payment risk arrangement was significantly associated with whether the hospital provided telehealth services. Eighty-two percent of ACO hospitals and 89 percent of bundled payment hospitals provided telehealth services.[210] Preliminary evidence shows that hospitals participating in an ACO may pursue telehealth to manage increased patient volume.[211]

A 2019 representative study of commercial claims from 2010-2015 found that states with telehealth parity legislation increased rates of telehealth utilization and that telehealth visits are 30 percent more likely to occur in a state with parity legislation.[212] Without a parity law, commercial insurers may reimburse telehealth services at a fraction of the rate for an equivalent in-person service.[213]

Recent Trends in Telehealth Utilization Post-PHE

As expected since the relaxation of public and private sector rules restricting use of telehealth following the PHE, national reliance on telehealth has expanded. Decreases in in-person care have, to some degree, been offset by rapid increases in virtual care, particularly for specific subspecialties such as psychiatry. A recent survey shows that providers expect reliance on telehealth to diminish after the PHE, but that it will remain higher than it was pre-pandemic.[214]

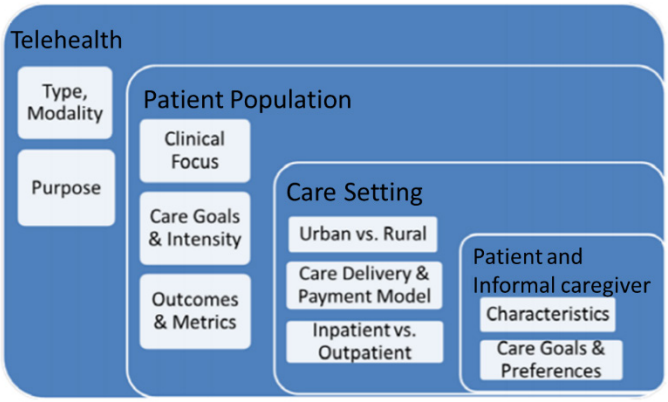
A recent study by ASPE found that following the start of the PHE in March 2020, Medicare FFS in-person primary care visits decreased precipitously, and this reduction was partially offset by a substantial increase in telehealth visits as facilitated by the new flexibilities. For example, approximately 44 percent of Medicare primary care visits billed in April 2020 used telehealth services.[215] By comparison, only 1 percent of all Medicare primary care visits in February 2020 occurred using telehealth. The ASPE study also found that while there were reductions in the volume of primary care telehealth encounters from

mid-April through May 2020, Medicare beneficiaries continued to rely on telehealth for primary care significantly more than they did prior to the PHE.[216]

Evidence of Effectiveness of Telehealth Interventions

The availability of robust evidence regarding the effect of Medicare telehealth services on quality, cost, and access is mixed. A recent research study sponsored by the Agency for Healthcare Research and Quality (AHRQ) demonstrates how different contextual factors influence the use and evaluation of telehealth interventions (Exhibit 7).

Exhibit 7. AHRQ's Proposed Levels of Context Influencing Telehealth Use and Evaluation



These factors include the modality of the telehealth intervention, the nature of services provided, the characteristics of the patient population, and the setting of care.[217] As a result, many telehealth studies focus on a specific specialty, setting, payer, or patient population.[218] For some topics and settings, robust evidence exists in the literature. In other areas, such as applications of telehealth in acute care, preliminary studies may present contradictory findings.[219] The sections below summarize the available evidence on the effects of telehealth on access, quality, patient safety, utilization, and cost of care, with a primary focus on Medicare FFS populations.

Impact on Quality of Care

A large systematic review found that the effects of telehealth interventions vary widely by setting and condition. Overall, the review found that telehealth consultations generally produce either better outcomes or no difference when compared to similar settings and clinical indications.[220]

Telehealth outcomes for outpatient services. In outpatient settings, using remote consultations as part of outpatient care can improve patient outcomes in some clinical disciplines. One review showed moderate strength of evidence of the benefits of telehealth for healing in wound care, response to treatment in psychiatry, and improved chronic condition outcomes.[221] The same review found that there was no difference in clinical outcomes in dermatology, but that the strength of evidence was low.[222]

Telemonitoring for populations with chronic health conditions. Studies of the impact of home telemonitoring on health outcomes for individuals with heart failure show decreases in both hospital readmissions and mortality.[223] [224] A review and meta-analysis of telemonitoring or structured telephone support programs for patients with chronic heart failure found these programs reduced rates of hospital admission by 21 percent, and all-cause mortality by 20 percent.[225] A second study found that a telehealth program at Partners HealthCare, which provided in-home biometric monitoring (e.g., weight,

blood pressure, pulse oximetry) of over 3,000 chronic heart failure patients, reduced hospital readmissions by 44 percent.[226]

Access to specialty care. Researchers have investigated the value of telehealth for delivering specialty medical care in time-sensitive situations. Research demonstrates that specialty telehealth consultants lead to reduced patient time in the ED. Furthermore, telehealth consultations in emergency services are associated with reductions in heart attack mortality.[227]

A study of older adults found that patients with dementia residing in a senior living community enrolled in a high-intensity telemedicine program found a 24 percent decrease in ED visits. The intervention included use of a facilitator working directly with the patient and robust exchange of clinical data with the distant site provider.[228] Telestroke interventions are the most frequently studied application of telehealth for specialty consultation in emergency care. Evidence shows that telestroke consultations that occur in lieu of patient transfers do not increase mortality, patient harm, or adverse events.[229]

The Project Extension for Community Healthcare Outcomes (ECHO) uses tele-education to connect specialists and remote primary care providers (PCPs).[230] [231] The Project ECHO model has been replicated in the United States and internationally to address provider education for a range of health conditions. Models based on Project ECHO have shown substantial uptake, with 585 ECHO-like models identified worldwide in a 2019 report. Some evidence suggests ECHO-like models can improve provider and patient outcomes. Project ECHO and ECHO-like models have shown a variety of promising outcomes, primarily increased PCP knowledge and perceived self-efficacy. A systematic review of 52 articles with empirical results on the effects of such models found consistently positive effects in the areas measured, including cost and quality outcomes. However, the quality of the evidence was generally rated as "low" or "very low," and the authors concluded that additional evidence was required before conclusions could be drawn about the impact of ECHO-like models related to patient outcomes.[232]

Use of telehealth in inpatient settings. A systematic review of interventions using telehealth to provide inpatient specialty consultations found no difference in clinical outcomes relative to a nontelehealth comparison group. These interventions employed telehealth to connect patients in the hospital with distant site specialists who assisted with diagnosis, care planning, or treatment, when the necessary specialized expertise was not available in-person. While mortality measures improved directionally under these interventions, most studies did not show statistical significance.[233] Similarly, the review found that inpatient telehealth consultations had a beneficial impact on the direction of outcomes such as length-of-stay or hospital transfers, but the impact was not statistically significant.[234]

Limited research on unintended consequences. Some researchers suggest that expanding telehealth access could have negative impacts on the quality of care.[235] For example, if used sporadically and without integration with EHRs, the telehealth services may create gaps in patient medical histories and put more burden on patients for communicating future needs.[236] [237] However, the potential for adverse impacts or unintended consequences resulting from telehealth interventions has not been widely studied in the literature. Many studies either do not explicitly examine adverse effects on quality or provide insufficient evidence based on small sample sizes.[238]

Impact on Patient Engagement and Satisfaction

While the use of remote consultations is associated with improved access to outpatient services, a systematic review found no overall association with improved rates of patient satisfaction. [239] [240] However, the literature does show that telehealth delivered under Medicare FFS has positive effects on beneficiary engagement and levels of interest. Almost half of Medicare beneficiaries expressed a willingness to participate in a video call, despite only 1 percent of respondents having previously done so.[241]

Impact on Health Care Costs

The evidence on the impact of telehealth on cost and utilization across conditions, settings, and provider types is limited and requires additional research and evaluation.[242] Some research shows savings associated with telehealth in other health care systems, such as the Veterans Health Administration. The VA introduced telehealth in the 1990s to provide routine care and monitor chronic conditions. Following implementation, the VA reported reductions in hospitalizations for chronic conditions including heart failure, hypertension, and diabetes.[243] Furthermore, a 2019 study found that telehealth interventions might reduce unnecessary ambulance transports.[244]

However, some researchers have suggested that the convenience of telehealth has the potential to increase utilization and spending by beneficiaries.[245] In 2015, the Congressional Budget Office (CBO) noted that expanding Medicare telehealth benefits has the potential to increase utilization and overall costs, depending on how the services are used. For example, if telehealth services offer a substitute for more expensive care, they may reduce spending. However, if telehealth services supplement and expand medical services overall, coverage could lead to spending increases.[246]

In a 2017 study using 2011-2013 Blue Shield of California Health Maintenance Organization plan data, researchers found that 88 percent of telemedicine visits created a new demand for additional services (i.e., lab tests, prescriptions, follow-up appointments), rather than replacing an in-person visit for a population with respiratory conditions.[247] Likewise, a study of Medicare beneficiaries using telehealth services for mental health care found that the services did not substitute for in-person services.[248] If telehealth services supplement usual care, they may still lead to reduced spending if research demonstrates they help avoid downstream health care utilization.

Impact on Access to Care

Telehealth consultations can improve access to care by reducing wait times, increasing the number of appropriate referrals, and helping patients to receive necessary diagnostic tests or treatment.[249] Stakeholders emphasize the use of telehealth interventions to expand access to care in underserved areas, especially rural areas where workforce shortages may limit access. Through telehealth, patients in rural areas can connect with health care providers when in-person visits are not feasible.[250] Telehealth can also facilitate provider-to-provider communication and help rural providers by connecting them with specialists for clinical decision-making or education on specialty concerns, such as in Project ECHO.[251] [252]

Research also demonstrates telehealth-related improvements in access to care outside of rural settings. In an evaluation of a telemedicine program in Rochester, New York, 86 percent of patients reported that the availability of the videoconference service saved them from a trip to the emergency room.[253]

Barriers to telehealth access persist in many settings. A national study shows that more than half of rural respondents expressed willingness to use live video communication, but only 7 percent had used the technology.[254] One survey of physicians and advanced practice providers attending the 2016 Society for Post-Acute and Long-Term Care Medicine Annual Conference found that only 13 percent of the providers had telehealth services available to them despite their interest in referring through telehealth.[255]

Telehealth and APMs

This section reviews the role telehealth plays in APMs, including a discussion of how APMs incorporate telehealth and the role of telehealth in the vision, design, and potential effectiveness of APMs. While real world experience is limited, many of the CMMI APMs reference telehealth as a tool to optimize resources to improve quality and reduce spending while meeting the needs of Medicare beneficiaries and other populations. Furthermore, we found that 18 of the 36 proposals submitted to PTAC as of March 2020 included a telehealth component. We provide context related to both the CMMI APM experience with telehealth as well as the vision laid out by PTAC submitters below.

Role of Telehealth in Medicare or CMMI APMs to Date

Through CMMI, authorized under the 2010 Affordable Care Act, CMS has broad authority to test innovative payment and care delivery models. This innovation has been further supported by MACRA. Under section 1115A(d)(1) of the Social Security Act, CMS can waive Medicare telehealth requirements for the purposes of model testing.[256] A number of the Medicare innovation models are APMs that include telehealth components. Several of the CMMI models use waivers for remote care to circumvent restrictions around telehealth services or provide care management fees that can support telehealth.

Overall, these CMMI models offer opportunities for telehealth waivers and more flexible payments that can incorporate telehealth, but do not include payments specific to telehealth. Limited published information is available regarding the effectiveness and impact of telehealth in these models. The following is a description of how these CMMI models incorporated telehealth prior to the PHE.

Bundled Payment for Care Improvements (BPCI) and BPCI Advanced. The Bundled Payments for Care Improvement Advanced (BPCI Advanced) model builds on the original BPCI model, where awardees assume financial liability for episode spending. BPCI Advanced includes a telehealth waiver, which provides a workaround to the rural area originating site requirement. Other coverage requirements (e.g., restriction on eligible facilities and providers) still apply. [257] [258]

A discussion of telehealth waiver implementation was not included in the first annual evaluation report for BPCI Advanced in June 2020.[259] Under the original BPCI model, CMS also waived telehealth geographic originating site requirements for some awardees if they met other coverage and payment criteria.[260] BPCI site visits found that there was limited implementation of the telehealth waiver. In the

evaluation report, interviewees noted challenges with the requirement that patients receive telehealth services at specific sites of care, confusion regarding waiver details, or instances where telehealth services were not relevant to the clinical episode.[261]

Comprehensive Care for Joint Replacement (CJR). The CJR model combines bundled payment and quality measurements within an episode of care associated with hip and knee replacement.[262] For CJR, CMS waived the restrictions related to originating site (both geographic and facility requirements). The intention is to support care coordination and timely access to care to beneficiaries recovering at home.[263] In addition, participating hospitals were able to provide beneficiary incentives, including access to devices used for telehealth, during episodes of care.[264]

Next Generation Accountable Care Organization (NGACO). Under the NGACO model, participating organizations assume greater financial risk in return for potential shared savings. NGACO has an optional telehealth waiver that allows participating ACOs to waive the originating site coverage restriction. Clinicians in NGACOs may provide telehealth services to Medicare beneficiaries outside of the specific health care facilities that are approved telehealth originating sites, which allows for telehealth delivery in the home of the beneficiary.[265] [266] In 2017, 14 percent of the participating ACOs implemented the telehealth expansion waiver.[267] Beginning on January 1, 2018, CMS expanded the telehealth waiver to include coverage of asynchronous or "store-and-forward" technologies based on feedback from providers.[268]

Comprehensive Primary Care Plus (CPC+). The CPC+ model uses a care management fee for non-visit-based care (i.e., telehealth or other means) paid on a per-beneficiary per-month (PBPM) basis. The fee is risk-adjusted based on the intensity of care management services within each practice.[269] In 2018, 47 percent of practices offered telehealth and e-visits.[270] As a goal for Track 2 of CPC+, CMS is working with vendors and providers to identify non-visit-based care activities and quantify the provision of care provided through alternative means, including telehealth.[271] A discussion on telehealth findings was not included in the first or second annual evaluation reports in 2019 and in 2020.[272]

Value-Based Insurance Design. In 2019, CMS announced a series of health plan innovations eligible for testing under the Value-Based Insurance Design model for CY 2020. Eligible Medicare Advantage organizations can test one or more of these interventions, including telehealth networks. Telehealth networks allow plans to suggest telehealth services instead of in-person visits to meet certain provider network requirements. While the in-person option remains, the intent behind this intervention is to increase access to telehealth services.[273]

Health Care Innovation Awards (HCIA). HCIA round two awardees were required to design innovative payment models by the end of their three-year cooperative agreement with CMS.[274] By the end of the program, 46 payment models were proposed by 37 awardees, with most models incorporating one or more aspects of an APM. Among the 37 awardees, five implemented telehealth models as a key component (see Exhibit 8), and eight incorporated telehealth more broadly.

Awardees with telehealth as a key component typically included other key innovations, such as care coordination, care transitions, or extended provider roles.[275] Four awardees included telehealth as a mechanism to reach rural populations. The target populations differed broadly, including high-risk

chronic conditions (two awardees), lower-risk chronic conditions (one awardee), and primary and preventive care (two awardees).

Exhibit 8. Description of Health Care Innovation Award Round Two Awardees with Telehealth as Key Component (Adapted from Mathematica Policy Research Third Annual Report) [276]

Awardee	Program Description	Key Innovation
Avera Health*	Virtual wraparound services for comprehensive, resident-centered, geriatric care services	Use of video and audio technology to provide instant, round-the-clock access to health care providers; development and use of a risk stratification algorithm for the geriatric population in skilled nursing facilities
Fund for Public Health in New York, Inc.*	Identified and treated people with hepatitis C virus	Improved treatment for the hepatitis C virus in New York City by using patient-centered medical and behavioral health care integrated with care coordination and telementoring
Nebraska Medical Center	Remote patient monitoring for patients with Type 2 diabetes and at risk for readmission, 90 days post-discharge using telehealth consultations	Telehealth for clinic visits with patients 90 days after the end of patient monitoring
University of Kansas Hospital Authority	Rural, clinically integrated network of providers focused on improving heart health and survival after stroke by implementing acute care protocols for patients presenting with signs and symptoms of heart attack or stroke, developing telehealth solutions, implementing regional transitional care management, and providing chronic care management	Formed a patient safety organization and developed a rural health payment model; also used remote critical care staff to support Avera eCare emergency consultation
University of North Carolina	Care delivery model for new onset lower back pain (LBP); model included patient education and shared decision-making tools, and nurses who were patient navigators	A checklist for LBP, which was integrated into the EHR or provided on paper. The checklist (1) prompted participating providers to follow an evidence-based treatment protocol for all patients presenting with new, acute LBP; and (2) offered decision support.

*Each of these organizations submitted a proposal to PTAC in 2017.

Limited information is available regarding the effectiveness of telehealth aspects of awardee projects under HCIA round two. However, among the HCIA round one awardees, 18 programs included telehealth services.[277] In a meta-regression analysis of key innovation features, awardees with telehealth components did not show a statistically significant improvement on per beneficiary cost measures.[278]

Characteristics and Themes of Telehealth-Related PTAC Proposals

This section reviews characteristics of proposed models that were submitted to PTAC and included a telehealth component and themes that emerged during the review of these proposals. Between December 2016 and March 2020, stakeholders submitted 36 proposed PFPMs to PTAC, including 18 proposals that included telehealth as a component of their models.[iii] This environmental scan refers to proposed PFPMs by their abbreviated names as shown in Exhibit 9.

Exhibit 9. Proposed PFPMs Related to Telehealth Submitted to PTAC

Full Proposal Name	Submitter	Abbreviated Name
Advanced Primary Care: A Foundational Alternative Payment Model (APC-APM) for Delivering Patient-Centered, Longitudinal, and Coordinated Care	American Academy of Family Physicians	AAFP
Patient and Caregiver Support for Serious Illness	American Academy of Hospice and Palliative Medicine	AAHPM
The Patient-Centered Headache Care Payment (PCHCP)	American Academy of Neurology	AAN
Acute Unscheduled Care Model (AUCM): Enhancing Appropriate Admissions	American College of Emergency Physicians	ACEP
An Innovative Model for Primary Care Office Payment	Jean Antonucci, MD	Antonucci
Intensive Care Management in Skilled Nursing Facility Alternative Payment Model (ICM SNF APM)	Avera Health	Avera Health
Oncology Care Model 2.0	Community Oncology Alliance	COA
Advanced Care Model (ACM) Service Delivery and Advanced Alternative Payment Model	Coalition to Transform Advanced Care	C-TAC
Oncology Bundled Payment Program Using CNA-Guided Care	Hackensack Meridian Health and Cota	HMH/Cota
Project Sonar	Illinois Gastroenterology Group and SonarMD	IGG/SonarMD
Making Accountable Sustainable Oncology Networks (MASON)	Innovative Oncology Business Solutions	IOBS
HaH Plus (Hospital at Home Plus) Provider-Focused Payment Model	Icahn School of Medicine at Mount Sinai	Mount Sinai

[iii] This excludes four proposals that are either under active review as of August 2020, or are pending submission of comments and recommendations to the Secretary.

Full Proposal Name	Submitter	Abbreviated Name
Multi-Payer, Bundled Episode-of-Care Payment Model for Treatment of Chronic Hepatitis C Virus (HCV) Using Care Coordination by Employed Physicians in Hospital Outpatient Clinics	New York City Department of Health and Mental Hygiene	NYC-DOHMH
The COPD and Asthma Monitoring Project	Pulmonary Medicine, Infectious Disease and Critical Care Consultants Medical Group	PMA
Home Hospitalization: An Alternative Payment Model for Delivering Acute Care in the Home	Personalized Recovery Care	PRC
Bundled Payment for All Inclusive Outpatient Wound Care Services in Non-Hospital Based Setting	Seha Medical and Wound Care	Seha
Remote Specialists and Experts On Demand Improving Care and Savings Costs	Eitan Sobel, MD	Sobel
ACCESS Telemedicine: An Alternative Healthcare Delivery Model for Rural Cerebral Emergencies	University of New Mexico Health Sciences Center	UNMHSC

NOTE: Sorted alphabetically by abbreviated name.

Exhibit 10 below summarizes important features for each of these 18 proposals. A more detailed version of this table can be found in Appendix C.

Variation among PTAC Submitters Proposing Telehealth Components

The 18 proposals include varying approaches to using telehealth, but altogether indicate a clear interest in telehealth as a component of APMs. The telehealth-related proposals identified include:

- Proposals with telehealth as a central feature of the model (five proposals);
- Proposals with telehealth as an aspect of the care delivery and/or payment model (nine proposals); and
- Proposals with telehealth as an optional component and/or the potential for the adoption of telehealth under the model (four proposals).

Exhibit 10. Summary of the Features of PTAC Telehealth-Related Proposals

Proposal Submitter*	Type of Submitter	Telehealth Modality	Clinical Focus, Provider-type, and Place of Service	Care Delivery and Payment Model Objectives	Payment Mechanism
Proposals with telehealth as a central feature of the model					
Avera Health	Regional/local multispecialty practice/health system	Synchronous (live-video, telephone); Asynchronous	**Clinical Focus:** SNFs and nursing facilities (NFs) **Provider:** Geriatrician Care Teams for SNFs and NFs **Place of Service:** SNFs and NFs	Improve access to care; provide enhanced and/or 24/7 access to care; improve quality of care and associated health outcomes; reduce avoidable and costly ED visits and hospitalizations	Add on PBPMs, with shared risk
IGG / SonarMD	Regional/local single specialty practice and device technology company	Synchronous (telephone); mHealth; Remote Patient Monitoring	**Clinical Focus:** Crohn's disease **Provider:** Gastroenterology practices; Community-based Physicians; Nurse Care Manager; Community-based Specialists **Place of Service:** Patient home	Improve access to care; improve patient engagement**;** reduce avoidable and costly ED visits and inpatient (IP) utilization	Add-on PBPM payment, with shared risk
PMA	Regional/local single specialty practice	Synchronous (live-video, telephone); mHealth; Remote Patient Monitoring	**Clinical Focus:** Chronic Obstructive Pulmonary Disease (COPD) and/or asthma **Provider:** Pulmonology physicians **Place of Service:** Patient home	Improve access to care; reduce avoidable and costly ED visits and inpatient utilization; provide payments for remote monitoring	Add-on PBPMs, with shared risk

Proposal Submitter*	Type of Submitter	Telehealth Modality	Clinical Focus, Provider-type, and Place of Service	Care Delivery and Payment Model Objectives	Payment Mechanism
Sobel	Individual provider	Synchronous (live-video, telephone); Remote Patient Monitoring	**Clinical Focus:** Not specified **Provider:** Regional Referral Centers (specialists); Remote specialists "for most health issues at any level of care and at any geographic location"[iv] **Place of Service:** Not specified	Improve access to care/quality of specialist care in rural/remote areas; improve care coordination and delivery, and patient choice; reduce avoidable and costly transfers, ED visits, and hospitalizations	Additional payments to the Medicare Physician Fee Schedule (MPFS)
UNMHSC	Academic institution	Synchronous (live-video)	**Clinical Focus:** Cerebral emergencies **Provider**: Neurologists and neurosurgeons; providers in rural and community hospitals **Place of Service:** Inpatient; outpatient; or emergency department in rural/ community hospital	Improve access to care/quality of specialist care in rural/remote areas; provide enhanced and/or 24/7 access to care; improve quality of care and associated health outcomes; reduce avoidable and costly transfers and patient travel; improve financial viability of rural and community hospitals	Additional payments to the MPFS, with no downside risk
Proposals with telehealth as an aspect of the care delivery and/or payment model					
AAHPM	Provider association / specialty society	Synchronous (live-video, telephone); Remote Patient Monitoring	**Clinical Focus:** Serious illness and palliative care **Provider**: Palliative care teams **Place of Service:** Inpatient; outpatient; other palliative care settings	Improve access to care; provide enhanced and/or 24/7 access to care; improve quality of care and associated health outcomes; provide payments for remote monitoring	Capitated PBPMs, with shared risk

[iv] The Sobel proposal does not specify any clinical settings, but seeks to provide remote care at all levels of care.

Proposal Submitter*	Type of Submitter	Telehealth Modality	Clinical Focus, Provider-type, and Place of Service	Care Delivery and Payment Model Objectives	Payment Mechanism
AAN	Provider association / specialty societies	Synchronous (live-video, telephone); Asynchronous; mHealth; Remote Patient Monitoring	**Clinical Focus:** Migraines or recurrent/complex headache disorders **Provider:** Primary care providers; neurologists; physicians with headache care expertise **Place of Service:** Inpatient; outpatient in primary care; patient home	Improve access to care/quality of specialist care in rural/remote areas; improve care coordination and delivery, and patient choice; reduce avoidable and costly ED visits and hospitalizations	Depends on model category: Additional payments to the MPFS, with shared risk OR Fixed (flexible) episode payment
ACEP	Provider association / specialty society	Synchronous (telephone); Modality not Specified	**Clinical Focus:** Patients discharged home from ED and in a care transition **Provider:** ED physician; Part B provider **Place of Service:** Patient home	Improve quality of care and associated health outcomes; improve care coordination and delivery, and patient choice; reduce avoidable and costly ED visits	Continued FFS during episode, with shared risk
C-TAC	Coalition	Synchronous (live-video, telephone); mHealth	**Clinical Focus:** Serious illness and palliative care **Provider:** Advanced Care Model (ACM) care team **Place of Service:** Patient home	Improve access to care; improve care coordination and delivery, and patient choice	Capitated PBPMs, with shared risk

Proposal Submitter*	Type of Submitter	Telehealth Modality	Clinical Focus, Provider-type, and Place of Service	Care Delivery and Payment Model Objectives	Payment Mechanism
HMH/ Cota	Regional/local multispecialty practice/health system and device technology company	Mobile Health; Modality not Specified	**Clinical Focus:** Breast, colon, rectal, or lung cancer **Provider:** Eligible professionals in HMH system **Place of Service:** Patient home	Improve access to care; improve quality of care and associated health outcomes; improve care coordination and delivery, and patient choice	Fixed episode payment, with shared risk
IOBS	For-profit corporation	Synchronous (telephone); mHealth; Modality not Specified	**Clinical Focus:** Cancer **Provider:** NCCA oncology physicians **Place of Service:** Patient home	Improve access to care; provide enhanced and/or 24/7 access to care; improve quality of care and associated health outcomes	Continued FFS during episode, with shared risk
Mount Sinai	Academic institution	Synchronous (live-video, telephone)	**Clinical Focus:** Acute illness/exacerbated chronic disease **Provider**: Physicians; HaH-Plus providers **Place of Service:** Patient home	Improve quality of care and associated health outcomes; improve care coordination and delivery, and patient choice; reduce avoidable and costly hospitalizations	Fixed episode payment, with shared risk
NYC-DOMH	Public health department	Synchronous (live-video); mHealth	**Clinical Focus:** Hepatitis C virus **Provider:** Primary care physicians; specialists, nurse practitioners; etc. **Place of Service:** Primary care and specialty practices	Improve access to care; improve care coordination and delivery, and patient choice	Fixed episode payment, with shared risk

Proposal Submitter*	Type of Submitter	Telehealth Modality	Clinical Focus, Provider-type, and Place of Service	Care Delivery and Payment Model Objectives	Payment Mechanism
PRC	Regional/local multispecialty practice/health system	Synchronous (live-video, telephone); Optional mHealth; Remote Patient Monitoring	**Clinical Focus:** Acute illness / exacerbated chronic disease in patient home **Provider:** Admitting physician; on-call physician; recovery care coordinator **Place of Service:** Patient home	Provide enhanced and/or 24/7 access to care; improve quality of care and associated health outcomes; improve care coordination and delivery, and patient choice; reduce avoidable and costly hospitalizations; provide payments for remote monitoring	Fixed episode payment, with shared risk
Proposals with telehealth as an optional component and/or potential for adoption of telehealth under the model					
AAFP	Provider association / specialty society	Synchronous (telephone)	**Clinical Focus:** Primary care patients **Provider:** Primary care providers **Place of Service:** Patient home	Improve access to care; improve care coordination and delivery, and patient choice	Capitated PBPMs, with shared risk
Antonucci	Individual provider	Synchronous (telephone); Modality not Specified	**Clinical Focus:** Primary care patients **Provider:** Primary care physicians and independent care nurse practitioners **Place of Service:** Patient home	Improve access to care; improve care coordination and delivery, and patient choice	Capitated PBPMs, with shared risk
COA	Coalition	Synchronous (live-video, telephone); Remote Patient Monitoring; Modality not Specified	**Clinical Focus:** Cancer **Provider:** Medical oncologists **Place of Service:** Patient home	Improve access to care; provide enhanced and/or 24/7 access to care	Fixed episode payment, with shared risk

Proposal Submitter*	Type of Submitter	Telehealth Modality	Clinical Focus, Provider-type, and Place of Service	Care Delivery and Payment Model Objectives	Payment Mechanism
Seha	Individual provider	Synchronous (live-video, telephone); Modality not Specified	**Clinical Focus:** Acute and/or chronic wound **Provider:** Office-based outpatient wound care **Place of Service:** Patient home	Improve care coordination and delivery, and patient choice; reduce avoidable and costly hospitalizations	Additional payments to the MPFS, with no downside risk

* Additional information is available in Appendix C.

As outlined in Exhibit 10, a wide range of stakeholders submitted proposed PFPMs that included telehealth components for PTAC review. Provider associations and specialty societies were the most common submitter type. Other stakeholders included regional and local multispecialty practices or health systems; individual providers; regional and local single specialty practices; coalitions; academic institutions; device technology companies; a public health department; and a for-profit corporation.

The PTAC telehealth-related proposal submissions reflected the different approaches and modalities related to telehealth and illustrate current uses of telehealth services and their anticipated role in APMs, prior to the PHE. Many of the proposals incorporated more than one approach to using telehealth. For example, the PRC model included both synchronous (telephonic and video-conferencing) services, remote patient monitoring (via a telehealth platform using Bluetooth-enabled peripheral device to capture biometric data, clinical quality data, and caregiver notes), and an optional mobile health component (i.e., use of telehealth tablets to better manage patients across the episode). As outlined in Appendix C and Exhibit 10, of the 18 proposals that included telehealth components:

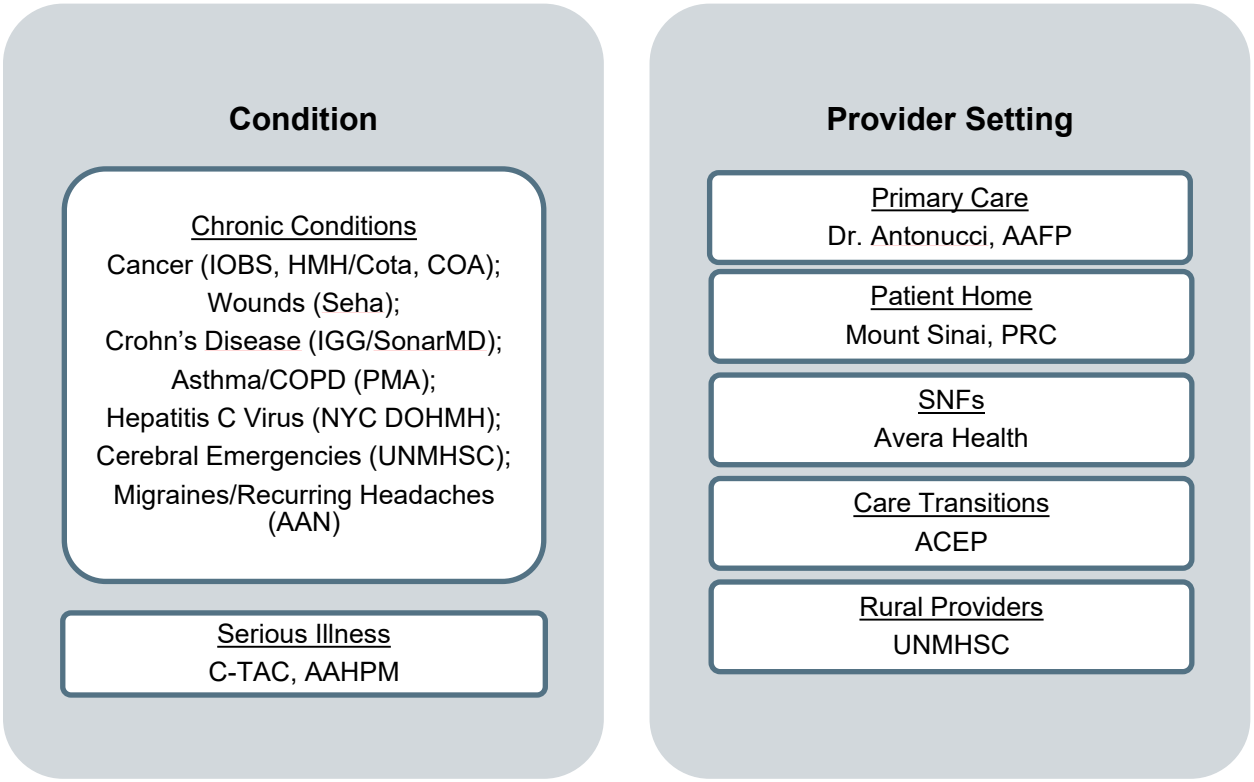
- Sixteen incorporated telephonic and/or live-videoconferencing synchronous services;
- Seven included remote patient monitoring via telehealth;
- Seven included distinct mHealth services; and
- Two incorporated asynchronous services.

It is possible that more of the proposals intended to use asynchronous or mHealth services when they referred to their "telehealth services" and/or "e-visits," but did not provide specifics at the time of their submission. Therefore, this analysis included a "telehealth modality not specified" category for five of the 18 proposals, and did not identify any asynchronous modalities unless the service explicitly discussed storing data for later use.

Variations in Conditions and Clinical Settings of Focus

As with all of the PTAC proposal submissions, the 18 proposals with a telehealth component vary by populations served and provider settings.[279] Exhibit 11 illustrates how the 18 submitters vary across these dimensions.

Exhibit 11. Populations Served and Provider Settings of Telehealth-Related PTAC Proposal Submissions, December 2016 – March 2020



Note: The Sobel proposed model did not specify a health condition or provider setting.

Eleven of the 18 telehealth-related PTAC proposals focused on the care of patients with specific health conditions, including patients with chronic conditions (e.g., Crohn's disease, COPD, and cancer), and patients with acute illnesses or emergency conditions (e.g., cerebral emergencies, acute wounds). Using telehealth, the proposal submitters aimed to:

- Monitor and provide remote initial assessments and/or follow-ups with clinicians as needed (e.g., IGG/SonarMD, PMA);
- Provide remote emergency consultations and assessments for patients with health care emergencies (e.g., UNMHSC);
- Provide non-emergency consultations and assessments, and 24/7 access to care for patients with chronic conditions (e.g., IOBS, COA);
- Provide telementoring for providers with high-need patients (i.e., NYC-DOMH); and
- Address gaps in care for specific health conditions.

Three other proposals (Mount Sinai, PRC, and ACEP) prescribed the use of telehealth to assist with home-based care or to assist in the transition of care to the patient home. In these cases, telehealth would be provided by primary care physicians, ED physicians, and, for PRC, a recovery care coordinator. Two primary care proposals (Antonucci and AAFP) leveraged optional telehealth services as an

opportunity to increase access to primary care. These submitters aimed to reduce the burden of face-to-face visits for both the patients and the primary care providers implementing telehealth services, either telephonically or via "e-visits."[v]

The Avera Health proposal included telehealth services to provide enhanced 24/7 clinical support to geriatrician care teams for residents of Nursing Facilities (NFs) and SNFs, to help bridge the care management gap between SNF staff and medical consultants. Finally, the Sobel proposal sought to improve access to specialists and high-quality care "for most health issues at any level of care and at any geographic location." [280]

PTAC Proposal Submitters' Use of Telehealth to Address Access and Quality

PTAC proposal submitters have typically targeted gaps in care delivery or associated payment gaps, or potential opportunities in Medicare FFS. [281] In this context, previous proposal submitters envisioned telehealth tools as a way to increase a model's capacity to address various care delivery issues, including inconsistent access to quality care; avoidable costs and transfers; timeliness of clinical intervention; and providing high-quality, patient-centered care in the lowest cost setting. As described in Exhibit 10, to address these issues, the proposed models identified telehealth as a tool to address care delivery issues clustered around several broad themes described below.

Improving access to care. In some cases, past submitters aimed to improve access to care through telephonic and videoconference assessments and consultations, patient outreach using web- and mobile-based technology, and remote patient monitoring. For example, past submitters aimed to:

- Increase access to and quality of specialist care in rural and remote areas;
- Provide enhanced and/or 24/7 access to providers via telephone, video-conferencing, smartphone applications, and other software tools; and
- Reduce the burden of face-to-face visits for both the patients and the care providers implementing telehealth services, either telephonically or via "e-visits."

The UNMHSC proposal noted that one-third of New Mexico's population lives in rural or underserved areas that do not have timely access to cerebral specialists due to geography; this motivated the submitter to propose increasing access to these specialists through telehealth. UNMHSC's proposed intervention aimed to reduce the number of transfers for cerebral consultations to avoid costs and increase timeliness of clinical intervention.

The PRC proposal aimed to expand the types of care available to beneficiaries at home. The model sought to expand and improve delivery of care at home to beneficiaries with acute illness or

[v] While the submitter does not clarify its definition of "e-visits," CMS defines e-visits as "non-face-to-face patient-initiated communication through an online patient portal" which are paid separately through Medicare Part B, and are not included as telehealth under the 1135 waiver. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

exacerbated chronic disease using telehealth visits, in-person nurse visits, and 24/7 on-call physician and registered nurse access.

Improving quality of care. In addition to proposing telehealth as a means to improve access, past submitters also focused on potential benefits to quality of care and associated health outcomes. This often came in the form of proposing remote patient and disease state monitoring to collect and respond to real-time data on the patient. Examples include:

- Improved care coordination, care delivery, and patient choice using telemanagement practices, electronic communication between care team members and specialists to support coordination, and secure messaging between patients and providers; and
- Improved patient engagement using secure messaging and digital communication platforms to facilitate patient outreach.

As an example of remote monitoring working to improve quality of care, the IGG/SonarMD model sought to increase providers' capacity to monitor a patient's clinical situation and engage with them in a timely manner through web and mobile-based technology, remote monitoring, and telephonic communications.

Payment Approaches Proposed By Submitters with Telehealth-Related Models

Recent evidence regarding the impact of telehealth on overall cost and cost-effectiveness of alternative payment models is limited.[282, 283] However, as highlighted above, there is the potential that telehealth services can reduce avoidable in-person health care use.[284 285] Exhibit 10 above summarizes care delivery and payment model goals of the proposed PTAC models and the alternative payment approaches associated with addressing them.

Ten out of 18 of the proposals discussed telehealth as a tool to help reduce avoidable costs (e.g., ED visits, hospitalizations, and inpatient utilization) and reduce burden on patients to travel and transfer to distant facilities. UNMHSC also highlighted the potential use of telehealth services to assist rural hospitals in keeping their patients rather than transferring them to regional hospitals with more specialists. Four proposals specified payments for remote patient monitoring using telehealth technology (e.g., smartphone applications, telephonically, and software tools to permit data transmission).

PTAC submitters incorporating telehealth components proposed a variety of payment models, including:

- Reimbursing telehealth services with add-on PBPM payments or capitated PBPM payments with shared risk;
- Continued FFS during episode or fixed episode payments with shared risk and prospective payments;
- Continued FFS during episode or fixed episode payments with shared risk and retrospective reconciliation; and
- Additional payments in addition to the Medicare Physician Fee Schedule (MPFS) with either no downside risk or shared risk.

Exhibit 10 includes a summary of the proposed payment mechanisms that were included in each proposed PFPM. The proposed PTAC models also varied widely in how they structured these payments to facilitate telehealth adoption and use. For example, proposals varied as to whether they incorporated training and other implementation costs in the payment methodology. Most of the proposed payment models did not specify telehealth-specific payments, but instead included flexible payments that could cover the costs of telehealth services and technology. However, a few of the proposed payment models included specific payments for telehealth services.

Of the proposed models with add-on or capitated PBPM payments, two specifically designated payments to cover the costs of telehealth services. IGG/SonarMD specified a monthly payment for non-face-to-face services by clinical staff. Similarly, the PMA proposal included a per-participant fee for the Bluetooth Peak Flow meter and a monthly remote monitoring management fee per patient.

The rest of the PBPM payment models covered telehealth services within a general per capita payment. Three of the four models with additional payments to the MPFS also included specific payments for telehealth services. The UNMHSC bundled payment was designed to include costs of telemedicine services, associated technology, on-call availability, education, and training; Sobel provided additional payments for remote consultations; AAN included an add-on service payment category (Category 3) for non-face-to-face visits.

Only one model, PRC, proposed retrospective payments (i.e., continued FFS during the episode with retrospective payments). The submitter explained that the intention behind this payment model was to reduce additional review or scrutiny associated with prospective payments and to ensure model implementation and timely launch.

Assessment and Recommendations from PTAC

This section summarizes PTAC's comments relating to the telehealth components of the 15 telehealth-related proposals for which PTAC submitted a Report to the Secretary (RTS).[vi] While PTAC's references to telehealth varied based on the centrality of telehealth to the overall model, several important themes emerged.

PTAC included positive remarks about the inclusion of telehealth services in the RTS's for six of the 15 proposals (Avera Health, IGG/SonarMD, C-TAC, AAFP, UNMHSC, PMA). These remarks included highlighting HIT and telehealth as a strength of the model (UNMHSC, Avera); emphasizing the data-sharing opportunities created by HIT and telehealth (C-TAC); noting the use of telehealth to create efficiency for providers with patient outreach and patient-submitted data through a platform (IGG/SonarMD); and highlighting the use of telehealth to support higher quality care (AAFP). PTAC also noted how technology-enabled daily remote monitoring could allow for earlier intervention and support

[vi] Three of the 18 telehealth-related proposals were withdrawn prior to being deliberated on at a PTAC public meeting.

reductions in ED visits, hospitalizations, and mortality (PMA). Additionally, PTAC noted that the element of telementoring in the NYC-DOMH proposal needed to be more clearly articulated and specified.

The use of proprietary software and how this might impact the scalability of the proposed models was referenced in the RTS's of three proposals (IOBS, HMH/Cota, and IGG/SonarMD). Of the past submitters that proposed using a platform or application to provide telehealth services to their patients, seven referenced the use of their own proprietary software or specified software that they currently license for these services. The specifics of these proprietary technologies and their uses are summarized in Exhibit 12 below.

Exhibit 12. Proprietary Technology Identified in PTAC-Submitted Telehealth-Related Proposals

Proposal	Proprietary Technology	Technology Use
Submitter-owned proprietary technology		
IGG / SonarMD	HIT/Sonar Platform	Provided communication and immediate feedback to and between providers, staff and patients
HMH / Cota	Cota Cortex Clinical platform; Cota Cortex Financial platform; and HMH digital communication platform	Facilitated patient outreach, and electronic reporting and feedback to clinicians
PRC	Telehealth platform with Bluetooth-enabled peripheral devices	Incorporated video communication to deliver care and captures biometric data, clinical quality data, and caregiver notes [vii]
IOBS	Cognitive computing platform, with a patient mobile application	Identified care management pathways
AAN	Axon Registry and Updox	Axon Registry connected to a practice's EHR to support data collection and reporting; and Updox or other software used to support electronic interaction between EHRs, practices, and patients
Technology is specified, but is not owned by the submitter		
PMA	Smartphone application with Bluetooth functionality	Data transmission
UNMHSC	Net Medical Express (NMXS), but submitter is "platform agnostic"	Audiovisual hardware, call center services, and network infrastructure

Past Submitters' Insights Regarding Optimizing Telehealth Based on Follow-Up Discussions

This section summarizes potential barriers and enablers to telehealth adoption, as well as potential unintended consequences of the use of telehealth from the perspective of past PTAC submitters with telehealth-related proposals. There were 18 past submitters who were contacted for discussions, with

[vii] Caregiver notes were transferred from the providers delivering home care to the EHR system of the PCP.

13 responding organizations that participated in discussions to inform this environmental scan. These past submitters noted the importance of telehealth for improving access to care, reducing costs, and improving quality. They characterized telehealth as a tool that, if used in a specific way, can improve access for patients, expand the number of patients a provider can serve, increase engagement with patients' family members and caregivers, and produce value through efficiency.

Like many other stakeholders, during the PHE, many past submitters whose proposals included telehealth as a component of their models experienced increases in their reliance on telehealth. While they indicated that the increased telehealth reliance was encouraging as an emergency measure, many of the past submitters indicated that there are still persistent barriers and potential unintended consequences that exist related to using telehealth. As noted below, payment policy was among the barriers to effective use of telehealth that were identified by the past submitters. These past submitters often favored APMs as a potential mechanism to optimize use of telehealth by allowing flexibility and innovation in how providers use this tool. This was particularly true for forms of telehealth that supplement rather than substitute for in-person care (e.g., remote monitoring and virtual follow-up care after hospitalization). A few of the past submitters also expressed a belief that emphasizing innovative use of telehealth can potentially help stakeholders to mitigate increased financial risk as they transition from FFS to APMs.

Payment policy can be a barrier. In spite of the current interest and enthusiasm about telehealth, many past submitters indicated that constraints on coverage have acted as a major barrier to effective use of telehealth. Many past submitters expressed concerns about the inconsistency and lack of clarity around when applicable regulations and payer rules would allow them to receive compensation for telehealth services. Prior to the PHE, there was inconsistency between payers, reimbursement parity based on modality, and restrictions around allowable services. A few past submitters expressed hesitance to commit to further telehealth investment without guidance on if the temporary coverage expansions would continue after the PHE. Many of the past submitters expressed a belief that the CMS expanded coverage of telehealth under Medicare FFS telehealth services through the 1135 waiver authority and the Coronavirus Preparedness and Response Supplemental Appropriations Act should persist following the PHE. For example, one submitter stated that the lack of payment parity between in-person and virtual services was a barrier to telehealth adoption pre-PHE and the equal payment under the waiver was an important step.

Most of the past submitters also indicated that prior to the waivers, even when telehealth services were covered, there could be challenges related to limited reimbursement for some telehealth services (i.e., lower reimbursement for audio services) and confusion around copays for patients. One submitter noted that patients may be charged a copay for non-audiovisual services delivered via telehealth (i.e., medication reconciliation, provider communication), which acts as a barrier to their engagement. In at least one case during the PHE, a past submitter noted that, as with other aspects of medical billing, often the reimbursement for audio-only care, which was the primary modality requested by patients, did not adequately account for the administrative costs associated with generating and submitting a claim.

The past submitters also cited several additional issues related to setting coverage rules and reimbursement levels for telehealth under FFS, which existed prior to and during the expanded waiver

coverage. These include the fact that limited work has been done to date related to identifying appropriate clinical indications where providers can substitute virtual care for in-person care, and the lack of a robust understanding of the difference in work effort required to deliver similar care virtually versus in-person. In addition, a few past submitters expressed a belief that payers should consider reimbursing more at the facility level for telehealth services (such as for SNFs), and including non-traditional health care settings (such as community-based organizations implementing programs like syringe exchange) to support improving access to patients. One submitter noted that facilities interested in providing telehealth services during the PHE were not pursuing waiver reimbursement because the administrative costs were too high for credentialing, licensing, and implementing the regulation.

Overall, many past submitters expressed skepticism that a FFS model would be able to provide enough incentive for providers to invest in innovating to explore how to employ telehealth optimally. One past submitter indicated that value needed to be incorporated into any telehealth models in order to create a sustainable and high-quality form of care delivery. Another noted that when delivered under FFS, the financial return on investment for their proposed telehealth intervention would be seen by payers, not implementing providers. A third noted that even with reimbursement for a patient's home as an originating site, their home-based model would not be reimbursable under FFS due to other services (i.e., conversations on care goals, care coordination, physician coaching) integrated into the model. However, many past submitters indicated that with additional analysis of effort required to deliver some forms of care virtually and alignment of billing codes and reimbursement-levels, some virtual services could potentially be effectively compensated under FFS. This may be particularly true in cases where virtual care is a direct substitute for in-person care.

Implementation costs and challenges. A related barrier is adoption of telehealth. A few of the past submitters pointed to the lack of definition and formal guidance regarding implementing telehealth. Providers who move forward with telehealth implementation invest substantial time to develop contracts, get themselves credentialed across multiple states, develop necessary workflows, and ensure that clinicians have access to the appropriate information at the time of a visit. However, one past submitter felt that state licensing and required pre-existing patient-provider relationships help deter concerns over decreasing quality of care.

Depending on the populations they served and their settings of care, past submitters emphasized the need for specific resources like language interpretation to help support the provision of telehealth services. They also indicated that in some cases, virtual care can exacerbate challenges stemming from the lack of interoperability across clinical systems that acts as a barrier to physician communication. For example, when telehealth is used outside of the context of a fully integrated module in an interoperable electronic health record (EHR), providers have to work harder to make sure they have appropriate and accurate information when providing care from outside of the usual medical setting. Without a telehealth interface imbedded in an interoperable EHR, notes from the telehealth encounter are more difficult to record and share. Two past submitters noted that without a model that includes preemptive outreach from the provider, the provider-patient communication may not be meaningful enough to prevent escalations in care.

Technical challenges with using telehealth technologies. Most of the past submitters indicated that providers face limited access to broadband connectivity in some parts of the country, and cited this as a

major barrier to effective use of telehealth. They noted that this is particularly true for rural areas or areas with limited recent infrastructure investments. Some past submitters also expressed concerns over limited experience using virtual technologies in sensitive clinical situations that require a better understanding of potential errors that could be introduced by misuse or ineffective use of the technology. Additionally, one past submitter indicated that working with telehealth involved a larger cost than expected, including more labor hours, in order to appropriately interpret and use the data created by remote monitoring.

Culture of provider and patient engagement can be a barrier. Most of the past submitters indicated that there is a learning curve for both patients and providers before they are comfortable with virtual care. Many of these past submitters also noted that older Medicare beneficiaries had a lower level of comfort with audiovisual telehealth technologies.

A few of the past submitters expressed a belief that in order to provide effective telehealth services, there would not only need to be beneficiary and provider acceptance, but also robust support. They indicated that this would require provider education on the best way to conduct and document a virtual visit; patient education; and careful tracking of telehealth-specific patient engagement and satisfaction measures. For example, two past submitters noted the importance of setting up a workflow that, as much as possible, mirrors the in-person experience for both providers and patients in order to maximize comfort with the provision of telehealth services.

Telehealth as a tool, not a stand-alone solution. Many of the past submitters cautioned that, while telehealth can be an effective tool, it will not, on its own, improve care delivery. In addition, a few of the past submitters expressed a concern that treating telehealth as a stand-alone solution could lead to unintended consequences. For example, past submitters indicated that if it is not implemented with thoughtful design, telehealth could exacerbate rather than mitigate the impact of disparities with respect to access to care for vulnerable groups. One past submitter explained that she is concerned that telehealth will widen the divide in health disparities because in her experience, telehealth works best for affluent people rather than those who are already experiencing issues in access to health care.

A few past submitters cautioned that the rapid ramp-up of virtual care under the PHE should not lead to a substitution of telehealth for in-person care when there may be a potential difference in quality, particularly in specific clinical circumstances such as end-of-life care. Past submitters also cited potential licensing or legal concerns, for example relating to whether it would be an Emergency Medical Treatment and Labor Act (EMTALA) violation if a patient is instructed to use telehealth services during an emergency.

Telehealth as a tool for use in the context of APMs. Despite identifying challenges, many of the past submitters who participated in discussions for this environmental scan responded that telehealth is an important tool for APMs and PFPMs. Based on their experiences, these past submitters had recommendations for the structure of telehealth as a part of an APM/PFPM. One past submitter suggested the need for a critical mass of patients to offset the risk involved in an APM when compared to telehealth in a FFS payment environment. Two past submitters focused on the need to align incentives across stakeholders to encourage a focus on quality in telehealth care delivery. However, an ongoing challenge is the lack of a method for determining appropriate compensation for services

delivered using telehealth, and less than ideal information with which to create payment incentives in APMs.

Issues and Opportunities for Optimizing Telehealth

Based on the background information that has been provided on telehealth, and the role of telehealth in the context of APMs and proposed PFPMs, the following is a summary of some issues and opportunities associated with optimizing telehealth in an APM. This section draws on the review of the literature as well as discussions with subject matter experts and past submitters, and incorporates the perspectives of different stakeholders including providers and patients.

Understanding services for which telehealth can substitute for in-person care while maintaining standard of care. While telehealth can offer advantages, it is not the preferred mode when the virtual aspect interferes with meeting established clinical standards or clinical decision-making.[286] [287] The American College of Physicians (ACP) recommends that physicians use professional judgment to determine the appropriateness of telehealth services for a patient.[288] The American Medical Association's (AMA) Council on Ethical and Judicial Affairs advises providers to consider patient privacy, informed consent, patient comfort with technology, access to equal in-person care sources, and their own competence to provide the service virtually prior to providing telehealth.[289] The American Heart Association (AHA) and ACP both recommend additional research to address barriers to adoption and create evidence-based guidelines for improving patient outcomes.[290] [291] While regulations addressing telehealth for new patients were relaxed during the PHE, many providers opted not to provide those services in order to maintain a level of clinical care and quality that they felt confident in due to the absence of formal clinical guidelines.[292] Subject matter experts emphasized the need for providers and professional organizations to participate in defining appropriate use of telehealth services. Based on their own practice, and experience there were a number of items that cannot be replaced (i.e., removing earwax, palpating stomach for pain) and also the positive situations where telehealth was able to improve care through thorough screening and discussion with the patient. For example, one provider was able to effectively treat a rash due to the quality of the video service, and another found remote monitoring of blood pressure to deliver more accurate trends than in-office snapshots.

Provider readiness and costs associated with telehealth adoption. Implementing a telehealth strategy is time- and resource-intensive.[293] During the initial shift to telehealth due to the PHE, many providers found it time-consuming to prepare patients, address technical issues, and adjust clinic workflows.[294] Best practices encourage providers to evaluate possible technology vendors after developing requirements specific to their patients' needs, privacy and security requirements, usability, customer service, and integration with their existing clinical systems.[295] Costs for implementing telehealth can include procuring or maintaining reliable broadband internet access, training staff, and hiring additional information technology experts.[296] [297] [298]

Care integration and interoperability. Using telehealth may require new clinical workflows and new standards for information required to deliver different types of services virtually.[299] For this reason, many stakeholders recommend that providers adopt telehealth applications native to their EHRs or easily configured for integration into their EHR as an application programming interface (API).

Interoperability of common "stand-alone" audiovisual meeting platforms with medical records is limited. This means that necessary information may not be available to the provider during the virtual visit. Furthermore, providers cannot easily transfer information gathered during the virtual visit into an EHR.[300] [301]

Telehealth-specific quality measures. Subject matter experts emphasized the importance of quality within telehealth care delivery, explaining that quality needs to be embedded in a care model to encourage proper utilization by providers. In reviewing data from the PHE, subject matter experts cautioned that while quality measures should increase as access to care via telehealth increased, some patients may adjust experience of care scores as a reaction to the change. Stakeholders call for additional research to develop tools for measuring quality of care delivered using telehealth.[302] Provider organizations and stakeholders have published frameworks for measures that address access to care, financial impact, patient and provider experience, effectiveness, and care quality.[303] [304] [305] [306] However, stakeholders have not widely tested these measures relative to traditional quality measures used for in-person services.[307] [308] [309] [310]

Liability and patient consent. There is not a standard liability insurer or policy for telehealth.[311] [312] Each insurer creates a policy on a case-by-case basis, depending on the type of telehealth service provided, the state regulations, and coverage required for the provider.[313] Providers may need to request written proof that insurers cover malpractice insurance related directly to telehealth.[314]

Providers in the UNC Health Care System surveyed regarding malpractice noted telehealth liability as a concern.[315] [316] When providers deliver services using telehealth, informed consent may require more than simple discussion of medical issues or treatment, but special requirements specific to the telehealth modality. [317]

Challenges with billing and reimbursement. As noted in the discussion of telehealth reimbursement policy above, providers aiming to bill for telehealth face a mix of complex rules and limitations across state, federal, and commercial payers. As such, many providers have not invested in technical infrastructure to bill for care delivered virtually or telephonically even when it is covered. Because telehealth encompasses a myriad of different services, there is no single appropriate approach for determining coverage, reimbursement levels, or billing requirements. In particular, some experts note that reimbursement for telehealth may not take into account the administrative costs associated with documentation and billing itself, and the extent to which variable costs associated with billing for a telehealth encounter vary from costs associated with billing for in-person services. From a patient relationship perspective, subject matter experts noted that patients may be surprised when receiving a bill from an audio-only telehealth interaction that is at payment parity for an in-person service.

Opportunities for using telehealth to improve patient-centeredness of care. Telehealth has the potential to benefit patients and caregivers. For example, eliminating or reducing travel times has the potential to improve adherence and patient satisfaction, and make services more accessible and affordable for beneficiaries.[318] [319] [320] Subject matter experts highlighted that by permitting telehealth services in the patient's home, providers have the ability to observe any potential home risks, and/or involve family caregivers. Telehealth has long been employed as a strategy to mitigate the impact of limited access to providers in rural areas, and it is increasingly identified as a strategy to address

provider shortages (e.g., of geriatricians) across all geographies. However, all individuals may not react to telehealth in the same way, and may find communication with medical personnel more difficult to conduct virtually.[321] For example, some subject matter experts cautioned against assuming that virtual care is an adequate substitute for in-person patient-centered care in the context of palliative care or services delivered to those with serious illness. However, other stakeholders believe that post-PHE would be the perfect opportunity to for policy makers to focus on improving incentives for telehealth and disparities within APMs.[322]

Accessibility of telehealth technologies for patients. The usability of telehealth technologies is a critical consideration for implementing services. Patients uncomfortable with technology or with needs that are unmet by the technologies offered, will not benefit from telehealth.[323] Subject matter experts consulted for this environmental scan noted that lack of familiarity with technology may cause patients to push back against the services or refuse to follow care instructions. During the PHE, subject matter experts that were providing patient care were surprised by the level of technological engagement and interpersonal connection displayed by patients. Studies show that prior to the PHE, Medicare beneficiaries using telehealth tended to be younger than 65 years old, indicating they most likely qualify for coverage based on a disability. [324] However, some telehealth technologies may not accommodate the diverse needs of populations with disability. To be effective in reaching these populations, providers will need to employ software designed to meet the specific needs of each group. For example, the software and technology needs of a person with hearing loss are different from those for persons with upper body mobility limitations.[325]

During the PHE, many providers expressed a preference for providing care through audiovisual technologies; however, one-third of telehealth visits in the spring of 2020 were conducted as audio-only visits.[326] [327] Providers indicated that audio-only visits were easier to implement due to patient challenges, such as digital literacy, that may require additional attention in the future, should they continue.[328] In addition, early data suggest that practices serving lower income patients provided more audio-only care than practices serving higher income patients.[329]

Internet or communications access. Some experts refer to broadband access as a "super-determinant" of health.[330] Alongside the ability to use the technology, access to reliable broadband internet service may be necessary to use telehealth services.[331] [332] As noted by both subject matter experts and the literature, having access to a robust wireless network is a particular barrier for those in rural and remote areas.[333] The historical variation in telehealth utilization may relate to the availability of broadband.[334] Even the use of audio-only telehealth services may be inaccessible, as telephone service or sufficient minutes on cell phones may be cost-prohibitive.[335] One subject matter expert explained that many rural patients do not have access to internet or phone service at their homes, such that most synchronous conversations must happen while the patient is in a public location (i.e., coffee shop, reservation chapter house, library).

Awareness and availability of services. A consistent barrier to beneficiary or caregiver utilization of telehealth is knowledge and understanding of the included services. Many patients are confused about whether their provider offers telehealth and then whether their insurance covers the services.[336] This means that even if the services are available, patients may not be aware of how, when, or where to access them.[337] For some patients, the services may also not always be available due to barriers created

by state-based licensure.[338] For example, there are relatively few psychologists able to provide culturally competent care to deaf or hard of hearing people, including the use of ASL (American Sign Language). If the provider and patient are located in incompatible licensure states, then the patient may not be able to access telehealth care that fits his or her needs.[339]

Equity of access to services. While telehealth may improve access to care for some populations, many subject matter experts expressed concern that populations with lower income, disability, or living in rural areas will continue to be underserved. Programs working with patients experiencing homelessness, severe mental illness, or certain disabilities are often under-resourced and may not have the funds for additional technology, associated training, or ongoing maintenance. Subject matter experts cautioned that this may make the benefits of telehealth self-selecting and recommended that disparities with telehealth should be further investigated.

Similarly, patients with limited English proficiency may face limitations as medical interpreter services can be difficult to implement on-camera for video visits, such that interpreter services may only be available over the phone. If video visits are available only through a patient portal, this may further restrict patients with limited English proficiency since many portals are only available in English or through email confirmations sent in English.[340] One subject matter expert suggested that health systems should include testing translation services as a core component for selecting new software systems.

Unintended consequences related to program integrity. As with any care modality, telehealth raises issues associated with potential fraud or billing abuse. There are emerging schemes involving false telehealth services, including those that lead to the prescription of excessive durable medical equipment.[341] [342] Following the PHE, the HHS Office of Inspector General has created an inter-agency coalition with the Department of Justice to continue investigations of telemedicine fraud. [343]

A more common concern may relate to the potential for billing abuse, which could include issues such as incorrectly billing for audiovisual services when delivering audio-only services.[344] [345] Documentation of all services delivered via telehealth can help to assure auditability and mitigate risk for both providers and payers.[346] However, these documentation requirements may also discourage billing for these services because providers may not be set up for documenting care that is delivered virtually. Two subject matter experts believed that, in some ways, incorporating telehealth into an APM could decrease the risk of billing abuse or gaming. This would be particularly true where provider compensation is linked to quality measures and outcomes rather than linked primarily to volume of telehealth touches.

Potential role of APMs in helping to optimize the use of telehealth. Some experts have noted challenges associated with making the most effective use of telehealth under traditional payment models and the potential for APMs to help providers use telehealth to derive value.[347]

Because stakeholders can design, implement, and evaluate APMs as integrated care delivery and payment strategies drawing on multiple levers, APMs may offer an efficient path to study outstanding questions related to telehealth. Under APMs, payers can help shoulder investments associated with identifying the best technology to use, expand the evidence base regarding standard of care and quality of care using telehealth, and allow for innovation at the provider level. Multiple subject matter experts

expressed support for telehealth as a part of bundled payment models, believing the design to best align incentives while increasing provider flexibility. APMs offer an opportunity to investigate the role specific telehealth tools play across a variety of applications that vary by care setting, specialty, and patients targeted. Additional research can help to address these issues and realize the opportunities for optimizing the use of telehealth, as well as the role that telehealth can play in optimizing health care delivery and value-based transformation.

Appendix A. Discussants

Past Submitters with Telehealth-Related Proposed Models

- American Academy of Family Physicians
- American Academy of Neurology
- American College of Emergency Physicians
- Avera Health
- Coalition to Transform Advanced Care (C-TAC)
- Community Oncology Alliance
- Eitan Sobel, MD
- Innovative Oncology Business Solutions, Inc. (IOBS)
- Jean Antonucci, MD
- New York City Department of Health and Mental Hygiene (NYC DOHMH)
- Pulmonary Medicine, Infectious Disease and Critical Care Consultants Medical Group, Inc. of Sacramento, California (PMA)
- The Illinois Gastroenterology Group and SonarMD, LLC
- University of New Mexico Health Sciences Center

Subject Matter Experts

Subject matter experts acted as discussants representing their own expertise and opinions, not those of their respective organizations or affiliations.

- Anton Arbotov, MHA – SOC Telemed
- Albert S. Chan, MD, MS, FAAFP – Sutter Health
- Ateev Mehrotra, MD, MPH – Harvard Medical School
- Andrew Talal, MD, MPD – University of Buffalo
- Dave Terry, MBA – Archway Health
- Gretchen E. Alkema – SCAN Foundation
- Jason Hallock, MD, MMM – SOC Telemed
- Meena Seshamani, MD – MedStar Health
- Mary Sowers – NASDDDS
- Robert Berenson, MD – Urban Institute
- Sandy Marks – American Medical Association
- Sanjeev Arora, MD – University of New Mexico Health Sciences Center

Appendix B. Telehealth Definitions[348]

Organization	Quoted Definition
Telehealth	
Agency on Healthcare Research and Quality (AHRQ)	The use of information and telecommunications technology in healthcare delivery for a specific patient or group of patients, involving a provider across distance or time to address a diagnosis, health condition, or overarching needs of a patient.
Centers for Medicare & Medicaid Services (CMS)	Telehealth (or telemonitoring) is the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, and information across distance. Telehealth includes such technologies as telephones, facsimile machines, electronic mail systems, and remote patient monitoring devices that are used to collect and transmit patient data for monitoring and interpretation. Medicare defines telemedicine more narrowly and makes payment for telemedicine services only under certain circumstances specified by statute.
HRSA Office for the Advancement of Telehealth (OAT) [349]	Telehealth is defined as the use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration. Technologies include video conferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications.
Veterans Administration (VA)	The wider application of care and case management principles to the delivery of healthcare services using health informatics, disease management and telehealth technologies to facilitate access to care and improve the health of designated individuals and populations with the intent of providing the right care in the right place at the right time.
Federal Communications Commission (FCC)[350]	Telehealth is similar to telemedicine but includes a wider variety of *remote healthcare services beyond the doctor-patient relationship*. It often involves services provided by nurses, pharmacists, or social workers, for example, who help with patient health education, social support and medication adherence, and troubleshooting health issues for patients and their caregivers.

Organization	Quoted Definition
Telemedicine	
Federation of State Medical Boards[351]	The practice of medicine using electronic communication, information technology, or other means between a physician in one location, and a patient in another location, with or without an intervening health care provider. Generally, telemedicine is not an audio-only, telephone conversation, e-mail/instant messaging conversation, or fax. It typically involves the application of secure videoconferencing or store and forward technology to provide or support healthcare delivery by replicating the interaction of a traditional, encounter in person between a provider and a patient.
Federal Communications Commission (FCC)[352]	Telemedicine can be defined as using telecommunications technologies to support the delivery of all kinds of medical, diagnostic, and treatment-related services usually by doctors. For example, this includes conducting diagnostic tests, closely monitoring a patient's progress after treatment or therapy and facilitating access to specialists that are not located in the same place as the patient.
Centers for Medicare & Medicaid Services (CMS)[353]	For purposes of Medicaid, telemedicine seeks to improve a patient's health by permitting two-way, real time interactive communication between the patient, and the physician or practitioner at the distant site. This electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment. Telemedicine is viewed as a cost-effective alternative to the more traditional face-to-face way of providing medical care (e.g., face-to-face consultations or examinations between provider and patient) that states can choose to cover under Medicaid. This definition is modeled on Medicare's definition of telehealth services (42 CFR 410.78). Note that the federal Medicaid statute does not recognize telemedicine as a distinct service.
Other	
World Health Organization (WHO) - eHealth[354]	eHealth is the use of information and communication technologies (ICT) for health. The eHealth unit works with partners at the global, regional and country level to promote and strengthen the use of ICT in health development, from applications in the field to global governance. The unit is based in the Department of Service Delivery and Safety in the Cluster of Health Systems and Innovation.

Organization	Quoted Definition
U.S. Food and Drug Administration – Digital Health[355]	The broad scope of digital health includes categories such as mobile health (mHealth), health information technology (IT), wearable devices, telehealth and telemedicine, and personalized medicine. These technologies can empower consumers to make better-informed decisions about their own health and provide new options for facilitating prevention, early diagnosis of life-threatening diseases, and management of chronic conditions outside of traditional care settings. From mobile medical apps and software that support the clinical decisions doctors make every day to artificial intelligence and machine learning, digital technology has been driving a revolution in health care. Digital health tools have the vast potential to improve our ability to accurately diagnose and treat disease and to enhance the delivery of health care for the individual. Digital tools are giving providers a more holistic view of patient health through access to data and giving patients more control over their health. Digital health offers real opportunities to improve medical outcomes and enhance efficiency.

Appendix C. Comparison of Past PTAC Telehealth Models

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Proposals with telehealth as a central feature of the model					
Avera Health Intensive Care Management in Skilled Nursing Facility Alternative Payment Model (ICM SNF APM) 3/27/2018: Recommended	**Synchronous (live videoconferencing; telephonic):** Two-way audiovisual assessment of patient; 24/7 access via telehealth **Asynchronous (store-and-forward):** Virtual access to health records	**Clinical Focus**: Skilled Nursing Facilities (SNF) and Nursing Facilities (NF) **Provider**: Geriatrician Care Teams for SNF and NF residents **Place of Service:** SNFs and NFs	SNF and NF residents	Add-on PBPMs, with shared risk	**Roles:** - Initial assessment - 24/7 access to care - Real-time patient and disease state monitoring and management - Virtual access to health records **Objectives:** - **Improve access to care** with 24/7 clinical support **- Improve quality of care** with care management and real-time responses - **Reduce costly and avoidable** ED visits and hospitalizations

[viii] ‡ Indicates the use of proprietary software, or the specification of software that the submitter currently licenses for telehealth services.

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Illinois Gastroenterology Group and SonarMD (IGG/Sonar) Project Sonar 4/10/2017: Limited-scale testing	**Mobile Health:** HIT platform uses web and mobile-based technology to communicate with providers, staff, and patients and monitor patients ‡ **Synchronous (telephonically):** Patients without access to mobile technology receive their communications from providers and staff via telephone **Remote Patient Monitoring:** Monthly monitoring of Crohn's patients at risk of complications and hospitalizations via smartphone, telephone, or other devices ‡	**Clinical Focus:** Crohn's disease **Provider:** Gastroenterology practices; Community-based Physicians; Nurse Care Manager; Community-based Specialists **Place of Service:** Patient home	Patients with Crohn's disease at risk of complications and hospitalizations	Add-on PBPMs, with shared risk	**Roles:** - Initial assessment - Subsequent monthly monitoring - Follow-up with clinicians as needed **Objectives:** - **Improve access to care** by reducing burden/time of in-person visits - **Improve patient engagement** - **Reduce costly and avoidable** ED visits and IP utilization - **Increase patient receptiveness** to HIT

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Pulmonary Medicine, Infectious Disease and Critical Care Consultants Medical Group (PMA) The COPD and Asthma Monitoring Project 4/11/2017: Not Recommended	**Synchronous (live-videoconferencing; telephonically):** Voice phone, secure text messaging, email and video conferencing used for telemonitoring and pulmonology specialist management of COPD and asthma patients **Mobile Health:** Smart phone application with Bluetooth functionality tracks member input ǂ **Remote Patient Monitoring:** Bluetooth peak flow meter and software tools to permit data transmission to a central server – monitored and managed to trigger early clinical interventions ǂ	**Clinical Focus**: COPD and/or asthma **Provider**: Pulmonary physicians **Place of Service:** Patient home	COPD and asthma patients	Add-on PBPMs, with shared risk	**Roles:** **-** Real-time patient and disease state monitoring and management - Early clinical intervention, as needed **Objectives:** **- Improve access to care** by reducing time/burden of in-person visits - **Reduce costly and avoidable** ED visits and IP utilization

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Eitan Sobel, MD (Sobel) Remote specialists and experts on demand improving care and saving costs (Revised version) N/A - Withdrawn	**Synchronous (live-videoconferencing; telephonic):** Telephone or video-based remote consultations, evaluation, and monitoring of patients for most health issues, at any level of care **Remote Patient Monitoring:** Automate collection of quality measures	**Clinical Focus**: not specified **Provider**: Regional Referral Centers (specialists); "Remote specialists and experts for most health issues at any level of care and at any geographic location"[ix] **Place of Service:** not specified	Condition and patient sub-population not specified	Additional payments to the MPFS[x]	**Roles:** - Remote consultation - Patient monitoring - Collection of quality metrics **Objectives:** **- Improve access to care and specialists,** overall and in remote areas - **Reduce costly and avoidable** transfers, ED visits, and hospitalizations **- Improve care coordination**

[ix] The Sobel proposal does not specify any clinical settings, but seeks to provide remote care at all levels of care.

[x] Risk not specified in proposed model

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
University of New Mexico Health Sciences Center (UNMHSC) ACCESS Telemedicine: An Alternative Healthcare Delivery Model for Rural Cerebral Emergencies 9/16/2019: Recommended for further development and testing	**Synchronous (live videoconferencing):** Telehealth consultations for cerebral emergencies, as requested by provider, and verbal/visual assessments using audio/video conferencing ǂ	**Clinical Focus**: Cerebral emergencies **Provider**: Neurologists and Neurosurgeons; Providers in rural and community systems **Place of Service:** Inpatient; outpatient; or emergency department in rural/community hospital	Patients presenting with cerebral emergencies in rural areas	Additional payments to the MPFS, with no downside risk	**Roles:** - Initial assessment/consultation - Virtual access to imaging - Requesting provider access to specialist-provided recommendation on treatment **Objectives:** - **Improve access to and quality of specialty care** in rural areas for cerebral emergencies - **Reduce costly and avoidable** transfers and patient travel - **Improve financial viability** of rural and community hospitals - **Improve quality of care** with more timely responses and treatment

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Proposals with telehealth as an aspect of the care delivery and/or payment model					
American Academy of Hospice and Palliative Medicine (AAHPM) Patient and Caregiver Support for Serious Illness (PACSSI) 5/7/2018: Limited-scale testing	**Synchronous (telephonic; video-conferencing):** Model allows palliative care teams to provide care and remote patient monitoring through videoconferencing services and/or telephonically. **Remote Patient Monitoring:** Care teams required to engage in electronic reporting of quality data inpatient; outpatient; other palliative care settings	**Clinical Focus**: Serious illness and palliative care **Provider**: Palliative care teams (could include physician, Medicare billing eligible clinician, nurse, social worker, and spiritual care provider) **Place of Service:** Inpatient; outpatient; other palliative care settings	Patients with either serious, potentially life-limiting illnesses or multiple chronic conditions coupled with functional limitations	Capitated PBPMs with shared risk	**Roles:** **-** Facilitate service delivery and 24/7 access to care and response to caregiver requests - Real-time patient monitoring - Collection of data, and data exchange **Objectives**: - **Improve access to care** - **Improve quality of care** with electronic reporting of quality data

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
American Academy of Neurology (AAN) The Patient-Centered Headache Care Payment (PCHCP) N/A - Withdrawn	**Synchronous (video-conferencing; telephonic):** Electronic communication to support coordination between PCPs and specialists and teleneurology to monitor high need but stable patients (via phone or video) **Mobile Health:** Touchbase via phone or secure message to remind patients to complete and submit their headache diary **Remote Patient Monitoring:** Access to the Axon Registry, which connects to a practice's EHR to support data collection and reporting ‡ **Asynchronous (store-and-forward):** Updox or other software may be used to support electronic interaction between EHRs, practices, and patients ‡	**Clinical Focus**: Migraines or complex/recurrent headache disorders **Provider**: Primary care providers; Neurologists; Other physicians with expertise in headache care **Place of Service:** Inpatient or outpatient in primary care; patient home	Patients with migraines and other complex and/or recurrent headache disorders	Depending upon the category in the model: Additional payments to the MPFS, with shared risk OR Fixed (flexible) episode payment	**Roles:** - Communication between PCPs and specialists - Remote patient and disease state monitoring - Remote follow-up consultations and assessments -Collection of quality measures **Objectives:** **- Improve care coordination** **- Improve access to care,** especially for patients who live in rural areas/aren't as mobile **- Reduce avoidable ED visits and hospitalizations**

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
American College of Emergency Physicians (ACEP) Acute Unscheduled Care Model (AUCM): Enhancing Appropriate Admissions 9/6/2018: Recommended	**Synchronous (telephonic):** Waiver to allow emergency physicians to provide telehealth services (e.g., communicate with follow-up care provider during ED discharge) **Telehealth Modality Not Specified:** Telemedicine visits are a potential option for 20% of ED patients who weren't seen by another Part B providers within 30 days of discharge	**Clinical Focus**: Care transitions from qualifying ED visit; Home-based follow-up **Provider**: ED physician; Part B providers **Place of Service:** Patient home	Patients who receive ED services or observations stays in the location of the ED and are discharged home to the community	Continued FFS during episode with shared risk	**Roles:** - Remote follow-up consultations and assessments **Objectives:** **- Improve quality of care and health outcomes** by increasing flexibility - **Improve care coordination** - **Reduce costly and avoidable** ED visits
Coalition to Transform Advanced Care (C-TAC) Advanced Care Model (ACM) Service Delivery and Advanced Alternative Payment Model 5/7/2018: Limited-scale testing	**Synchronous (telephonic; video-conferencing):** ACM services provided through mixture of face-to-face and telephonic encounters based on patients' current and anticipated needs; anticipate telehealth technology and video-conferencing will be leveraged to maximize efficiency of the ACM; proactive telemanagement procedures **Mobile Health:** Optional secure text messaging	**Clinical Focus**: Serious illness and palliative care **Provider**: ACM care team (includes registered nurse, licensed social worker, and provider with board-certified care expertise); Other ancillary collaborating organizations (e.g. telehealth providers) **Place of Service:** Patient home	Patients in the last 12 months of life (using ACM criteria including acute care utilization, functional decline, nutritional decline, and performance scale)	Capitated PBPMs with shared risk	**Roles:** - Remote follow-up consultations and assessments - Telemanagement procedures **Objectives:** **- Improve care coordination,** with remote follow-up and telemanagement - **Improve patient safety and health outcomes**, with increased patient engagement - **Improve access to care**

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Hackensack Meridian Health (HMH) and Cota Inc. (HMH/Cota) Oncology Bundled Payment Program Using CAN-Guided Care 10/20/2017: Limited-scale testing	**Mobile health:** Digital communication platform to facilitate patient outreach ǂ **Telehealth Modality Not Specified:** Telehealth used to overcome potential leakage outside of the HMH system	**Clinical Focus**: Breast, colon, rectal, or lung cancer **Provider**: Eligible professionals in HMH health system (13-hospital health care system with large cancer population) with attributed Medicare cancer patients **Place of Service:** Patient home	Medicare cancer patients (with breast, colon, rectal, or lung cancer) in the HMH system	Fixed episode payment, with shared risk	**Roles:** - Secure physician communication application - Digital communication platform for patient outreach **Objectives:** **- Improve access to care** **- Improve quality of care and health outcomes,** with physician communication and patient outreach - **Improve care coordination,** with secure physician communication and electronic reporting

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Innovative Oncology Business Solutions, Inc. (IOBS) Making Accountable Sustainable Oncology Networks (MASON) 10/3/2018: Recommended	**Synchronous (telephonic):** Patient triage process to educate/inform patients of medical home processes; 24/7 access to triage nurses for care/consultation; and telephonic interventions as needed ‡ **Mobile Health**: Cognitive computing platform, complete with patient mobile app, to identify care management pathways ‡ **Telehealth Modality Not Specified:** Option to deliver other support services (e.g., education of caregivers, community support for patients, etc.) using telemedicine	**Clinical Focus**: Cancer **Provider**: National Cancer Care Alliance (NCCA) oncology physicians **Place of Service:** Patient home	NCCA patients with cancer	Continued FFS during episode with shared risk	**Roles:** - Patient education and triage process - Option to provide additional services via telehealth - Remote consultation - 24/7 access to triage nurses **Objectives**: - **Improve access to care** with 24/7 access to triage nurses - **Improve quality of care and health outcomes,** with patient education and remote consultations

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Icahn School of Medicine at Mount Sinai (Mount Sinai) HaH Plus (Hospital at Home Plus) Provider-Focused Payment Model 9/17/2017: Recommended	**Synchronous (live-videoconferencing; telephonic):** Hospital-level acute care services in the home (telephonic follow-up during transition, physician video televisits as needed)[xi]	**Clinical Focus**: Acute illness/exacerbated chronic disease in patient home **Provider**: Physicians; HaH-Plus providers **Place of Service:** Patient home	Patients with acute illness or exacerbated chronic disease, who would otherwise require hospitalization	Fixed episode payment, with shared risk	**Roles:** - Remote care transition follow-up - Consultation and evaluation as needed **Objectives:** **- Improve quality of care and health outcomes,** by increasing flexibility and compliance - **Reduce costly and avoidable** hospitalization **- Improve care coordination** **- Improve patient choice**

[xi] The Mount Sinai model submitters clarified that it is "theoretically possible as the model evolves to include various tele-monitoring options" but that for the time being the model excludes activities like telemetry monitoring.

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
New York City Department of Health and Mental Hygiene (NYC-DOMH) Multi-provider, bundled episode of care payment model for treatment of chronic hepatitis C virus (HCV) using care coordination by employed physicians in hospital outpatient clinics 2/28/2018: Not Recommended	**Synchronous (video-conferencing):** Weekly case management video conferences and telementoring sessions which allow primary care providers to be trained by physician specialists to treat HCV; and optional telehealth visits for patient (via bonus payments) **Mobile Health:** Web-based teaching modules and screen-sharing technology to support telementoring activities	**Clinical Focus**: Hepatitis C virus **Provider**: Primary care physicians (trained by hepatologists or other gastroenterologists); specialists; nurse practitioners; physician assistants; and non-clinician staff **Place of Service:** Primary care and specialty practices	High-need patients (e.g., dual-eligible, behavior health and substance use disorders, etc.) with HCV	Fixed episode payment, with shared risk	**Roles:** - Telementoring sessions between physician specialists and physician non-specialists - Telementoring training **Objectives**: - **Improve access to specialist care,** by training primary care providers in HCV treatment - **Improve care coordination**, by connecting primary care providers with a multi-disciplinary team

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Personalized Recovery Care (PRC) Home Hospitalization: An Alternative Payment Model for Delivering Acute Care in the Home 3/26/2018: Recommended	**Synchronous (telephonic; video-conferencing):** Admitting physician would hold telehealth visits, at least daily; 24/7 phone response and on-call physician access; telehealth platform incorporates video communication ‡ **Optional Mobile Health:** Could incorporate telehealth tablets **Remote patient monitoring:** Telehealth platform (including Bluetooth-enabled peripheral devices) captures biometric data, clinical quality data, and caregiver notes; patient satisfaction conducted telephonically ‡	**Clinical Focus**: Acute illness/exacerbated chronic disease in patient home **Provider**: Admitting physician at facility receiving PRC payments; On-Call Physician; Recovery Care Coordinator (registered nurse) **Place of Service:** Patient home	Patients with acute illness or exacerbated chronic disease, who would otherwise require hospitalization	Fixed episode payment, with shared risk	**Roles:** - Daily remote assessments - Real-time patient and disease state monitoring - Collection of quality metrics - 24/7 access to care **Objectives:** **- Improve quality of care and health outcomes** by increasing flexibility and compliance - **Reduce costly and avoidable** hospitalization

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Proposals with telehealth as an optional component and/or potential for adoption of telehealth under the model					
American Academy of Family Physicians (AAFP) Advanced Primary Care: A Foundational Alternative Payment Model (APC-APM) for Delivering Patient-Centered, Longitudinal, and Coordinated Care 12/19/2017: Limited-scale testing	**Synchronous (telephonic):** Optional addition of telehealth capabilities	**Clinical Focus**: Primary care patients **Provider**: Primary care providers **Place of Service:** Patient home	Patients who designate the enrolled practice as their primary care provider OR assigned to the practice using a claims-based attribution methodology	Capitated PBPMs with shared risk	**Role:** - Additional flexibility for providers **Objectives:** **- Improve access to primary care,** by reducing burden/time of in-person visits - **Improve care coordination**
Jean Antonucci, MD An Innovative Model for Primary Care Office Payment 10/20/2018: Limited-scale testing	**Synchronous (telephonic):** Option for primary care practices to use additional resources and flexibility to provide telehealth services **Telehealth Modality Not Specified:** Option for primary care practices to use additional resources and flexibility to provide e-visits	**Clinical Focus**: Primary care patients **Provider**: Primary care physicians and independent primary care nurse practitioners **Place of Service:** Patient home	Primary care patients (attributed through patient choice of provider or four-step attribution process)	Capitated PBPMs with shared risk	**Roles:** - Remote assessments and consultations **Objectives:** **- Improve access to primary care,** by reducing burden/time of in-person visits **- Improve care coordination**

Proposal: Submitter, Proposal Name, and PTAC Recommendation and Date	Proposal and Telehealth-Related Component Details				
	Telehealth Services and Telehealth Modality [viii]	**Clinical Focus, Providers, and Place of Service**	**Target Patient Population**	**Payment Mechanism**	**Intended Role and Objectives of Telehealth Components**
Coalition Oncology Alliance (COA) Oncology Care Model 2.0 N/A: Withdrawn	**Synchronous (video-conferencing and telephonic):** Optional payments for virtual or telephonic care (in-person check-ins followed by telephone check-ins) **Remote patient monitoring:** Optional use of telehealth for E&M services between patients and their care teams **Telehealth Modality Not Specified:** Model supports greater use of telehealth, while reducing onerous documentation requirements	**Clinical Focus**: Cancer **Provider**: Individuals or groups of medical oncologists providing services to patients **Place of Service:** Patient home	Cancer patients (noted the MA plans may choose to limit types of cancers covered)	Fixed episode payment, with shared risk	**Roles:** - Additional flexibilities for providers - 24/7 access to care - Remote patient monitoring **Objectives:** **- Improve access to care** by reducing time/burden of in-person visits and providing 24/7 clinical support
Seha Medicare and Wound Care Bundled Payment for All Inclusive Outpatient Wound Care Services in Non Hospital Based Setting 5/17/2019: Not recommended	**Synchronous (video-conferencing; telephonic):** In between visits, if there is a change in the wound, one option would be for the visiting nurse or caregiver to send a picture to a provider, make a simple call to discuss, or use a secure audiovisual application on the smartphone. **Telehealth Modality Not Specified**: Option to incorporate telemedicine between providers and home care	**Clinical Focus**: Acute and/or chronic wound care **Provider**: Independent office-based wound care physician or provider and home care providers **Place of Service:** Patient home	Patients with an acute or chronic wound	Additional payments to the MPFS, with no downside risk	**Role:** **-** Additional flexibility for providers **Objectives:** **- Improve care coordination** between patients, home care, and/or nursing homes and an office-based provider **- Reduce avoidable hospitalizations**

Appendix D. Annotated Bibliography of Key Sources

Abelson R. Is Telemedicine Here to Stay? *The New York Times*. https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html. Published August 3, 2020. Accessed August 4, 2020.

Subtopic(s): Background
Type of Source: News article
Objective: To highlight experiences with telemedicine during the public health emergency.
Main Findings: Both public and private insurers have expanded telemedicine coverage during the public health emergency, but its future reimbursement is uncertain. Many providers see an increased connection to their patients during this time, but it may not be appropriate for all visits to be by telemedicine. Not all patients can use current versions of telemedicine, most notably people without phone or computer access or patients with limited English proficiency.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: N/A

American Hospital Association. Telehealth: Helping Hospitals Deliver Cost-Effective Care. Published April 22, 2016. Accessed July 8, 2020. https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf

Subtopic(s): Background
Type of Source: Issue brief
Objective: To highlight successful applications of telehealth in hospital systems.
Main Findings: Telehealth lowers cost and improves access and quality of care. Coverage for telehealth should be incorporated into emerging payment models. Medicare provides the most limited coverage for telehealth.
Strengths/Limitations: Additional research is needed, as this brief focused only on successful telehealth implementations. However, evidence around telehealth as a cost-effective care model is expanding.
Generalizability to Medicare Population: Yes
Methods: Review of policies and applications of telehealth applications.

Antoniotti NM, Drude KP, Rowe N. Private Payer Telehealth Reimbursement in the United States. *Telemedicine and e-Health*. 2014;20(6):539-543. doi:10.1089/tmj.2013.0256

Subtopic(s): Background
Type of Source: Journal article
Objective: To understand telehealth provider experiences with telehealth reimbursement from private insurance payers.
Main Findings: Government payers as well as several major private payers are highly influential in payment policies for telehealth private payers, that private payers have administrative rules regarding telehealth reimbursement that are barriers to services and reimbursement, and that some providers would benefit from being better informed about billing and coding for telehealth services and how to advocate for telehealth services reimbursement.
Strengths/Limitations: Limitations include that the study is preliminary, answers from surveys lack detailed analysis, and comparisons with plan perceptions were unavailable. However, the study interviewed a large number of telemedicine providers.
Generalizability to Medicare Population: Yes

Methods: The American Telemedicine Association's (ATA's) Telemental Health Special Interest Group (SIG), the Policy Group, and the Business and Finance SIG, with the help of ATA staff, conducted a national private payer reimbursement online survey in 2012 using Survey Monkey.

Bavafa H, Hitt LM, Terwiesch C. The Impact of E-Visits on Visit Frequencies and Patient Health: Evidence from Primary Care. *Management Science*. 2018;64(12):5461-5480. doi:10.1287/mnsc.2017.2900

Subtopic(s): Background
Type of Source: Journal article
Objective: To estimate the impact of e-visit usage on visit frequency of office and phone encounters as well as on patient health outcomes.
Main Findings: E-visits trigger about 6 percent more office visits (due to provider request), with mixed results on phone visits and patient health. E-visit adoption increases care consumption through not only increased office and phone visits with providers, but also through the utilization of other system resources, such as the testing facilities.
Strengths/Limitations: The analysis improves upon existing literature and robust to different specifications of e-visit adoptions. Limitations include that the study is limited to fee-for-service patients and that patient health and satisfaction was not fully captured with blood cholesterol and blood glucose levels.
Generalizability to Medicare Population: Yes
Methods: A panel data set from a large health care system between 2008 and 2013. All patients had to have three or more office visits in the time period.

Bloss CS, Wineinger NE, Peters M, et al. A prospective randomized trial examining health care utilization in individuals using multiple smartphone-enabled biosensors. *PeerJ*. 2016;4:e1554. doi:10.7717/peerj.1554

Subtopic(s): Background
Type of Source: Journal article
Objective: To assess the impact of mobile health monitoring on short-term health care utilization in individuals with hypertension, diabetes, or arrhythmia.
Main Findings: There was little evidence of differences in health care costs or utilization as a result of the intervention. Control and intervention groups were equivalent with respect to most health care utilization outcomes. Overall, there are not large short-term increases or decreases in health care costs or utilization associated with monitoring chronic health conditions using mobile health or digital medicine technologies. There was some evidence of improvement in health self-management which was characterized by a decrease in the propensity to view health status as due to chance factors in the intervention group.
Strengths/Limitations: There was low drop-out and good compliance among individuals in the monitoring group. Limitations included issues with collaboration between multiple entities and technological issues.
Generalizability to Medicare Population: Yes
Methods: A prospective randomized controlled trial of adults who had submitted a 2012 health insurance claim associated with hypertension, diabetes, and/or cardiac arrhythmia. The intervention involved receipt of one or more mobile devices that corresponded to their condition(s) and an iPhone with linked tracking applications for a period of six months; the control group received a standard disease management program. Moreover, intervention study participants received access to an online health management system which provided participants detailed device tracking information over the course of the study.

Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

Subtopic(s): Background
Type of Source: Report
Objective: To evaluate telehealth use during the COVID-19 public health emergency.
Main Findings: Medicare FFS in-person visits for primary care fell precipitously in mid-March at the start of the COVID-19 public health emergency (PHE), and began to rise again in mid-April through May. Nearly half (43.5 percent) of Medicare primary care visits were provided via telehealth in April, compared with less than 1 percent before the PHE in February (0.1 percent). The use of telehealth in primary care declined somewhat but appears to have leveled off at a persistent and significant level by the beginning of June. Providers in rural counties had smaller increases in Medicare primary care telehealth visits compared with providers in urban areas who had much greater use of telehealth visits early in the PHE. Among major urban areas, the proportion of total primary care visits delivered by telehealth in April ranged from one-third in Phoenix to nearly two-thirds in Boston. Cities with more COVID-19 hospitalizations like New York City, Detroit, and Boston had higher uptake of telehealth in primary care visits along with San Francisco, which largely avoided the early COVID-19 surge. This suggests telehealth is partly driven by concerns with COVID-19, but also patient and provider readiness for telehealth.
Strengths/Limitations: The findings are consistent with CMS reported telehealth utilization. However, there are some small discrepancies in the rate of rural telehealth use at the beginning of the public health emergency.
Generalizability to Medicare Population: Yes
Methods: Evaluation of Medicare FFS and dual eligible Part B claims from January through May 2020 for primary care services. Primary care services included evaluation and management (E&M), preventive services, and advance care planning. Primary care E&M services may include some mental health services. The team compared primary care visits to rates of COVID-19 hospitalizations among Medicare beneficiaries, identifying COVID-19 hospitalizations using the U071 ICD-10 CM code.

Crock Bauerly B, McCord RF, Hulkower R, Pepin D. Broadband Access as a Public Health Issue: The Role of Law in Expanding Broadband Access and Connecting Underserved Communities for Better Health Outcomes. *J Law Med Ethics*. 2019;47(2 Suppl):39-42. doi:10.1177/1073110519857314

Subtopic(s): Issues and Opportunities for Optimizing Telehealth
Type of Source: Journal article
Objective: To highlight the need to address broadband as a public health issue in order to improve telemedicine access.
Main Findings: Digitally isolated communities, especially low-income and rural areas, do not benefit from the expansion of telehealth in the United States. They are also the most likely to benefit from the expansion. There are national and state laws and policies that prevent broadband expansion in some of these areas. However, updated laws and policies can facilitate better access.
Strengths/Limitations: N/A
Generalizability to Medicare Population: N/A
Methods: Synthesis of laws that facilitate adequate broadband access in underserved and rural communities.

Dang S, Dimmick S, Kelkar G. Evaluating the Evidence Base for the Use of Home Telehealth Remote Monitoring in Elderly with Heart Failure. *Telemedicine and e-Health*. 2009;15(8):783-796. doi:10.1089/tmj.2009.0028

Subtopic(s): Background
Type of Source: Journal article
Objective: To evaluate the evidence base to monitor elderly patients with heart failure.
Main Findings: The ideal intervention is not clear, because the interventions have varied from study to study, in terms of the technology used, its duration, the process in which information was analyzed, and the final provider who was responsible for intervening (cardiologist or nurse practitioner or primary care physician).
Strengths/Limitations: The literature has shown that telemonitoring has opportunities to successfully monitor patients, but there is little information on quality and cost outcomes.
Generalizability to Medicare Population: Yes
Methods: A literature review of evidence on remote monitoring of patients with heart failure. The search was restricted to randomized controlled trials using either automated monitoring of signs and symptoms or automated physiologic monitoring. For this review, telephone-based monitoring of signs and symptoms was not considered remote monitoring. Studies were also excluded if they did not present outcomes related to health care utilization.

Doarn CR, Pruitt S, Jacobs J, et al. Federal Efforts to Define and Advance Telehealth—A Work in Progress. *Telemed J E Health*. 2014;20(5):409-418. doi:10.1089/tmj.2013.0336

Subtopic(s): Appendix B: Telehealth Definitions
Type of Source: Journal article
Objective: To identify and evaluate the definitions of telehealth/telemedicine across the U.S. Government to provide a better understanding of what each agency or department means when it uses these terms.
Main Findings: Although many definitions are similar, there are nuanced differences that reflect each organization's legislative intent and the population they serve. The evidence base suggests that a common nomenclature for defining telemedicine may benefit efforts to advance the use of this technology to address the changing nature of health care and new demands for services expected as a result of health reform.
Strengths/Limitations: The survey was representative of a range of government agencies. However, this may not be generalizable to the private sector.
Generalizability to Medicare Population: Yes
Methods: The U.S. Government, under the leadership of the Health Resources & Services Administration in the U.S. Department of Health and Human Services, established the Federal Telemedicine (FedTel) Working Group, through which all members responded to a survey on each agency or department's definition and use of terms associated with telehealth.

Driessen J, Chang W, Patel P, Wright RM, Ernst K, Handler SM. Nursing Home Provider Perceptions of Telemedicine for Providing Specialty Consults. *Telemedicine and e-Health*. doi:10.1089/tmj.2017.0076

Subtopic(s): Background
Type of Source: Journal article
Objective: The goal of this study was to survey a national sample of nursing home (NH) physicians and advanced practice providers to document their views on telemedicine for providing specialty consults in the NH.
Main Findings: The team received surveys from 524 of the 1,274 conference attendees for a 41.1 percent response rate. Respondents expressed confidence in the ability of telemedicine to

fill existing service gaps and provide appropriate, timelier care. Providers showed the highest level of interest in telemedicine for dermatology, geriatric psychiatry, and infectious disease. Only 13 percent of respondents indicated that telemedicine was available for use in one of their facilities.
Strengths/Limitations: The sample of physicians surveyed was at a national conference, which may not be representative and is limited. However, this study revealed that many providers overall would like to support telehealth.
Generalizability to Medicare Population: Yes
Methods: A survey of physician and advanced practice providers who attended the 2016 AMDA—The Society for Post-Acute and Long-Term Care Medicine Annual Conference about their likelihood of referral to and perceptions of a telemedicine program for providing specialty consults in the NH.

Dummit L, Marshall J, Bergman S, et al. *CMS Bundled Payments for Care Improvement Advanced Model: Year 1 Evaluation Annual Report*.; 2020. https://innovation.cms.gov/data-and-reports/2020/bpciadvanced-firstannevalrpt
Subtopic(s): Background
Type of Source: Evaluation report
Objective: To provide a formative evaluation of the BPCI Advanced Model from its beginning on October 1, 2018, through March 31, 2019.
Main Findings: Approximately 22 percent of eligible hospitals participated in BPCI Advanced. BPCI Advanced participants and episode initiators (EIs) we interviewed told us that they decided to join the model and chose particular clinical episodes based on their assessment of the financial opportunity. All of the 32 clinical episodes had participation from both hospital and physician group practice EIs, although most EIs participated in relatively few clinical episodes. During the first six months of the model, approximately 22 percent of eligible hospitals participated in BPCI Advanced, compared with 13 percent of hospitals eligible for BPCI Advanced that participated in BPCI.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Evaluation of the BPCI Advanced Model with participants and EIs

Gillespie SM, Wasserman EB, Wood NE, et al. High Intensity Telemedicine Reduces Emergency Department Use by Older Adults with Dementia in Senior Living Communities. *J Am Med Dir Assoc*. 2019;20(8):942-946. doi:10.1016/j.jamda.2019.03.024
Subtopic(s): Background
Type of Source: Journal article
Objective: To evaluate the effect of a high-intensity telemedicine program that delivers care for acute illnesses on ED use rates for individuals with dementia who reside in senior living communities.
Main Findings: The intervention group participants had 201 telemedicine visits. In participants with dementia, it is estimated that one year of access to telemedicine services is associated with a 24 percent decrease in ED visits.
Strengths/Limitations: This study adds to existing literature that telemedicine for acute illnesses is feasible. However, this study was limited to a single geriatric practice in one metropolitan area and was a secondary analysis.
Generalizability to Medicare Population:

Methods: A secondary analysis of data for patients with dementia from a prospective cohort study over 3.5 years that evaluated the effectiveness of high-intensity telemedicine for acute illnesses among senior living community residents. This was a primary care geriatrics practice at 22 senior living communities in a Northeastern city. Six communities were intervention and the additional 15 were controls. They compared the rate of ED use among participants with dementia and access to high-intensity telemedicine services to control participants with dementia but without access to services.

Gilman B, McCall N, Bogen K, et al. Evaluation of the Round Two Health Care Innovation Awards (HCIA R2): Third Annual Report. https://downloads.cms.gov/files/cmmi/hcia2-yr3evalrpt.pdf

Subtopic(s): Background
Type of Source: Evaluation report
Objective: To evaluate round two HCIA awardees.
Main Findings: About half of the awardees met at least 90 percent of their enrollment target and almost two-thirds implemented their service delivery models effectively, awardees' progress sustaining their programs and developing the payment models to support them was mixed, and the limited early impact analyses found little evidence of favorable effects on utilization or expenditures.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Evaluation of the 38 programs funded under round two of HCIA.

Harvey JB, Valenta S, Simpson K, Lyles M, McElligott J. Utilization of Outpatient Telehealth Services in Parity and Nonparity States 2010–2015. *Telemedicine and e-Health*. 2018;25(2):132-136. doi: https://doi.org/10.1089/tmj.2017.0265

Subtopic(s): Background
Type of Source: Journal article
Objective: To describe the trends in telehealth utilization from 2010 to 2015 for privately insured patients.
Main Findings: We found the states with parity laws saw significant increases in the number of outpatient telehealth visits. Controlling for year, the odds of receiving a telehealth visit in a parity state were 29.8 percent greater than in a nonparity state.
Strengths/Limitations: Findings are consistent with studies on the impact of telehealth reimbursement policy on Medicare beneficiaries
Generalizability to Medicare Population: Yes.
Methods: Examine the change over time in the utilization of outpatient telehealth visits between states enacting parity legislation and those who do not using a nationally representative sample of patient data from the 2010–2015 Truven MarketScan Commercial Claims dataset.

Hollander JE, Davis TM, Doarn C, et al. Recommendations from the First National Academic Consortium of Telehealth. *Population Health Management*. 2017;21(4):271-277. doi:10.1089/pop.2017.0080

Subtopic(s): Background
Type of Source: Journal article
Objective: To highlight outcomes from a meeting of leaders from academic medical centers that was convened to brainstorm and explore new opportunities to educate the workforce, expand the science, and improve the delivery of quality care to patients through the use of telemedicine.

Main Findings: The academic community needs to develop an evidence base that can inform new care delivery models, including the role for remote monitoring and wearable technology, as well as the methods by which the best patient-centered care can be provided. It is important that the future of medicine be determined by solid research and education rather than the latest ''cool toy'' to reach the market. Academic medical centers are in a unique position to help shape this future direction, collaborating to create innovative and efficient solutions for patient care.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Synthesized recommendations based on the National Academic Telehealth Consortium in June 2016.

Huilgol YS, Miron-Shatz T, Joshi AU, Hollander JE. Hospital Telehealth Adoption Increased in 2014 and 2015 and Was Influenced by Population, Hospital, and Policy Characteristics. *Telemedicine and e-Health*. 2019;26(4):455-461. doi:10.1089/tmj.2019.0029

Subtopic(s): Background
Type of Source: Journal article
Objective: To examine predictors of telehealth adoption over time and assess hospital and systemic factors.
Main Findings: Telehealth adoption was more likely in 2014 and 2015. Compared with those not using telehealth, hospitals using telehealth were less likely to be located in more populated areas, nonrural areas as defined by metropolitan statistical area, and have a higher percentage of employed individuals. Hospitals were more likely to adopt telehealth if they had mobile device integration into the electronic health record (EHR) or a higher percentage of commuters in their ZIP code. Telehealth reimbursement for health professional shortage areas did not contribute to increased telehealth adoption.
Strengths/Limitations: There are difficulties in capturing all independent variables that influence adoption of telehealth, and hospitals may have greater reach than their surrounding zip codes. However, this study isolates the impact of other correlates and provides recommendations for policy makers to highlight where care delivery can be improved.
Generalizability to Medicare Population: Yes
Methods: Data from the Information Technology (IT) Supplement to the American Hospital Association (AHA) Annual Survey of Hospitals from 2012 to 2015 to identify hospital, population, and policy-level factors associated with telehealth adoption among California hospitals.

Kriegel G, Bell S, Delbanco T, Walker J. Covid-19 as Innovation Accelerator: Cogenerating Telemedicine Visit Notes with Patients. *NEJM Catalyst Innovations in Care Delivery*. Published online May 12, 2020. Accessed August 4, 2020. https://catalyst.nejm.org/doi/abs/10.1056/CAT.20.0154

Subtopic(s): Background
Type of Source: Journal article
Objective: To highlight Beth Israel Deaconess Medical Center's practice of allowing patients to review notes before and after a telemedicine visit.
Main Findings: N/A
Strengths/Limitations: Patients may not have access to equipment to monitor their vital signs. However, this system is in pilot and can provide better communication to patients through systems they may already be familiar with.
Generalizability to Medicare Population: Yes

Methods: Collection of data through OpenNotes based on feedback from participating doctors. They were most interested in having patients add information about their medications and, for those with equipment at home, to take their vital signs and other measurements. Two days prior to a scheduled visit, patients have been receiving a portal message asking them to complete and return an electronic form on which they (a) provide a brief interval history, and (b) list their goals for the visit. Once submitted, the forms are saved as independent and permanent records, marked as "Patient Notes" in the electronic health record. Clinicians can review them prior to or during visits, and then either refer to them or incorporate them into the note itself by copying and pasting.

Lau J, Knudsen J, Jackson H, et al. Staying Connected In The COVID-19 Pandemic: Telehealth At The Largest Safety-Net System In The United States. *Health Affairs*. Accessed August 3, 2020. http://www.healthaffairs.org/doi/full/10.1377/hlthaff.2020.00903

Subtopic(s): Background
Type of Source: Journal article
Objective: To highlight NYC Health + Hospital's (NYC H+H's) movement to telehealth.
Main Findings: While telehealth existed in NYC H+H, COVID-19 has brought urgency to move toward telehealth. There was a need to promote health equity through access to virtual care and language accessibility. There was an initial lack of credentialing for clinicians and issues with reimbursement; however, federal policy changes have allowed for better clinician coverage and reimbursement policy.
Strengths/Limitations: This project was localized to New York City. However, these shifts toward telehealth are long lasting and can be applied to cities around the country.
Generalizability to Medicare Population: Yes
Methods: NYC H+H identified priorities based on existing technologies and knowledge of the patient population. They assembled a team to maintain some existing ambulatory operations, bolster behavioral health access, and address new and emerging demands for patients and staff due to COVID-19.

Lin C-CC, Dievler A, Robbins C, Sripipatana A, Quinn M, Nair S. Telehealth In Health Centers: Key Adoption Factors, Barriers, And Opportunities. Health Affairs. 2018;37(12):1967-1974. doi: https://doi.org/10.1377/hlthaff.2018.05125

Subtopic(s): Issues and Opportunities for Optimizing Telehealth
Type of Source: Journal article
Objective: This study examined factors associated with and barriers to telehealth use by federally funded health centers.
Main Findings: Rural location, operational factors, patient demographic characteristics, and reimbursement policies influence health centers' decisions about using telehealth. Cost, reimbursement, and technical issues were described as major barriers. Medicaid reimbursement policies promoting live video and store-and-forward services were associated with a greater likelihood of telehealth adoption. Many health centers were implementing telehealth or exploring its use.
Strengths/Limitations: Limitations include that the analysis was only a year, there was no analysis on intensity or site-specific factors, and all data are self-reported. However, the data are representative of the country's needs for telehealth and highlight where to address barriers.
Generalizability to Medicare Population: Yes
Methods: Data analysis of demographics, services, performance measures, and organizational characteristics from the 2016 Uniform Data System.

Lin MP, MacDonald L-Q, Jin J, Reddy A. Association between care delivery interventions to enhance access and patients' perceived access in the Comprehensive Primary Care Initiative. *Healthc (Amst)*. 2020;8(2):100412. doi:10.1016/j.hjdsi.2020.100412

Subtopic(s): Background
Type of Source: Journal article
Objective: To describe Comprehensive Primary Care (CPC) practice-level interventions to enhance access and measure their association with patients' perceptions of access.
Main Findings: Payment models using patient experience of care and patient experience questionnaires do not align, making evaluation of impact difficult. Smaller practices had higher patient perception scores on access, and practices with more comorbid illnesses received lower patient perception ratings.
Strengths/Limitations: Limitations include response and selection bias based on the cross-sectional survey design and limited generalizability of CPC practices. However, there was a large number of practices that participated with a wide range of geographic regions.
Generalizability to Medicare Population: Yes
Methods: A cross-sectional study comparing CPC practice surveys to patient experience surveys in 2016 through a web-based survey.

Lucia K, Blumberg LJ, Curran E, et al. *The COVID-19 Pandemic: Insurer Insights into Challenges, Implications, and Lessons Learned*.; 2020. Accessed August 5, 2020. https://www.rwjf.org/en/library/research/2020/06/the-covid-19-pandemic-insurer-insights-into-challenges-implications-and-lessons-learned.html

Subtopic(s): Background
Type of Source: Report
Objective: To understand the experiences of health insurers' experiences and insights for the future in light of COVID-19.
Main Findings: Insurers were in a strong financial position prior to the pandemic and have used that money to assist providers and consumers financially through paperwork reductions. They have not yet seen an impact on their employer business and expect increases in marketplace enrollment. Medicaid enrollment is increasing rapidly. Insurers do not expect large financial impacts or changes in benefit design in the future. Insurers are working to assist providers and address health disparities.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Researchers interviewed executives from 25 health insurance plans between April and June 2020 to understand insurers' experiences during the COVID-19 crisis.

Mann DM, Chen J, Chunara R, Testa PA, Nov O. COVID-19 transforms health care through telemedicine: Evidence from the field. *J Am Med Inform Assoc*. 2020;27(7):1132-1135. doi:10.1093/jamia/ocaa072

Subtopic(s): Background
Type of Source: Journal article
Objective: This study provides data on the feasibility and impact of video-enabled telemedicine use among patients and providers and its impact on urgent and non-urgent health care delivery from one large health system (NYU Langone Health) at the epicenter of the coronavirus disease 2019 (COVID-19) outbreak in the United States.
Main Findings: Between March 2 and April 14, 2020, telemedicine visits increased from 102.4 daily to 801.6 daily (683 percent increase) in urgent care after the system-wide expansion of

virtual urgent care staff in response to COVID-19. Of all virtual visits post expansion, 56.2 percent and 17.6 percent of urgent and non-urgent visits, respectively, were COVID-19–related. Telemedicine usage was highest by patients 20 to 44 years of age, particularly for urgent care. The COVID-19 pandemic has driven rapid expansion of telemedicine use for urgent care and non-urgent care visits beyond baseline periods. This reflects an important change in telemedicine that other institutions facing the COVID-19 pandemic should anticipate.
Strengths/Limitations: This project was localized to NYU Langone Health. However, health systems around the country are enduring the same issues with telehealth and adapting similarly.
Generalizability to Medicare Population: Yes
Methods: Data were captured from the hospital system's EHR between January 1 and April 14, 2020. Twelve key words were identified to capture any COVID-related visits. Descriptive statistics were applied to estimate rates of telemedicine visits in urgent and non-urgent care that are COVID- and non-COVID-related.

Marcoux RM, Vogenberg FR. Telehealth: Applications From a Legal and Regulatory Perspective. *P T*. 2016;41(9):567-570. PMID: 27630526

Subtopic(s): Background
Type of Source: Journal article
Objective: To define telehealth and telehealth technologies from a legal and regulatory perspective.
Main Findings: Telehealth and telemedicine are often used interchangeably but are defined differently by federal agencies. There are three approaches to telehealth: synchronous, asynchronous, and mobile health. Expansion is based on current access to care and state Medicaid programs/expansion. Reimbursement is dependent on state parity laws and the payer. Regulations differ among programs.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Review and synthesis of various definitions in the public and private sector.

Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program.*; 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

Subtopic(s): Background
Type of Source: Government report
Objective: To highlight telehealth services and how they are used within Medicare and in non-Medicare settings.
Main Findings: Medicare's coverage of telehealth is limited and utilization is low. Interest and use has grown but is still not widespread. Most state Medicaid programs cover telehealth. Evidence is mixed about the efficacy of telehealth services to expand access, improve quality and outcomes, and reduce costs. Telehealth should be expanded under the Medicare program based on financial incentives in Medicare payment models.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: An analysis of telehealth services in 2015 and 2016.

Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

Subtopic(s): Background
Type of Source: Report
Objective: To highlight telehealth services and how they are used within Medicare.
Main Findings: In general, commercial plans have not found strong evidence that telehealth services reduce costs or improve outcomes. Therefore, policy makers should take a measured approach to further incorporating telehealth into Medicare by evaluating individual telehealth services to assess their capacity to address the Commission's three principles of cost reduction, access expansion, and quality improvement. In 2018, Medicare coverage of telehealth services is broad and flexible under payment systems in which providers or payers bear some degree of financial risk, but is more limited under the PFS. The use of telehealth services under the PFS has grown rapidly in recent years but remained low in 2016. The coverage of telehealth services by commercial insurance plans in 2017 was variable. The Commission recommends that policy makers use a set of principles (cost, access, and quality) to evaluate individual telehealth services separately before adoption into Medicare coverage.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: To identify the extent to which telehealth services are covered under Medicare, the Commission gathered information from CMS and analyzed Medicare claims data from 2006 to 2016, conducted semi-structured interviews with managed care organizations (MCOs), and conducted site visits, focus groups, and telehealth services.

Mehrotra A, Chernew M, Linetsky D. *The Impact of the COVID-19 Pandemic on Outpatient Visits: Practices Are Adapting to the New Normal*. doi:https://doi.org/10.26099/2v5t-9y63
Subtopic(s): Background
Type of Source: Report
Objective: To highlight the impact of COVID-19 on outpatient visits.
Main Findings: Overall visit counts are still down 11 percent, and the cumulative visit deficit is nearly 40 percent. The number of visits to ambulatory practices has declined nearly 60 percent since April, but has rebounded to 10 percent. The rebound was most evident in the New England, Mid-Atlantic, and Pacific regions. The decline in visits was for states with early surges of COVID-19 cases. Telemedicine use has begun to decline but is still higher than pre-pandemic. In the past week, visits to some clinical specialties, such as dermatology and rheumatology, have returned to their baseline rates. The cumulative decline in visits from the start of the pandemic is greatest among pediatricians, pulmonologists, and several surgical specialties. There has been a substantial rebound in visits among people covered by Medicare, but not Medicaid. Visits have rebounded mostly for older adults, but less so for children under 17. The smallest practices had the highest rebound.
Strengths/Limitations: The data were limited to Phreesia clients and may not include unscheduled same day and walk-in visits, as well as unscheduled phone calls. Workflow has shifted during the pandemic, and early visits may not have been captured. However, this is nationwide and provides insights into telehealth adaptation for other health systems.
Generalizability to Medicare Population: Yes
Methods: Researchers at Harvard University and Phreesia, a health care technology company, analyzed data on changes in visit volume for the more than 50,000 providers that are Phreesia clients. The data come from several sources at the practices: 1) practice management/scheduling software; 2) check-in information submitted via patients on the Phreesia platform (e.g., age); and 3) selected data from the electronic health record, such as

problem lists. Visits were captured from February 1 through June 20, 2020. A visit was counted if it was in the practice's scheduling software and the patient was "checked in."

NEJM Catalyst. What Is Telehealth? *NEJM Catalyst*. Published online February 1, 2018. Accessed July 8, 2020. https://catalyst.nejm.org/doi/abs/10.1056/CAT.18.0268

Subtopic(s): Background
Type of Source: Journal article
Objective: To define telehealth, telemedicine, and associated technologies.
Main Findings: The terms telehealth and telemedicine are often used interchangeably, but telehealth has evolved to encapsulate a broader array of digital health care activities and services.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Review of various definitions and efforts to further telehealth adoption.

Neufeld JD, Doarn CR, Aly R. State Policies Influence Medicare Telemedicine Utilization. *Telemedicine and e-Health*. 2015;22(1):70-74. doi:10.1089/tmj.2015.0044

Subtopic(s): Background
Type of Source: Journal article
Objective: To explore the impact of two significant state-level policy changes—one expanding Medicaid telemedicine coverage and the other introducing telemedicine parity for commercial payers—on Medicare utilization in the affected states.
Main Findings: Medicare telemedicine encounters and professional fee expenditures grew sharply following changes in state Medicaid and commercial payer policy in the examined states. By contrast, annual Medicare telemedicine utilization growth in surrounding states (in which there were no significant policy changes during these years) varied somewhat but showed no discernible pattern.
Strengths/Limitations: Analysis was limited to one region and may not be generalizable to states with more restrictive laws around telehealth, and these data reflect only fee-for-service claims. However, other studies have been consistent in showing that state policies can have an impact on utilization of the Medicare telemedicine benefit.
Generalizability to Medicare Population: Yes
Methods: Medicare claims data from 2011–2013 were examined for states in the Great Lakes region. All valid claims for live interactive telemedicine professional fees were extracted and linked to their states of origin. Allowed encounters and expenditures were calculated in total and on a per 1,000 members per year basis to standardize against changes in the Medicare population by state and year.

Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

Subtopic(s): Background
Type of Source: Journal article
Objective: To examine trends in telehealth usage over time across the U.S. population and subgroups, as well as examine the role that state telehealth policies play in telehealth usage.
Main Findings: Telehealth use increased dramatically during the period 2013–16, with new modalities such as live video, live chat, texting, and mobile apps gaining traction. The rate of live video communication rose from 6.6 percent in June 2013 to 21.6 percent in December 2016.

However, underserved populations—including Medicaid, low-income, and rural populations—did not use live video communication as widely as other groups did. Less restrictive state telehealth policies were not associated with increased usage overall or among underserved populations.

Strengths/Limitations: The study was widely representative of adults and revealed that populations with limited mobility, such as Medicare beneficiaries, use telehealth services the most. Limitations of the study are that the study was online only which may have contributed to overestimation of telehealth use, rural populations were overrepresented, the sample included only adults who indicated a need for care, and self-reported bias due to retrospective analysis.

Generalizability to Medicare Population: Yes

Methods: This study used a nationally representative biannual survey of consumers commissioned by the Association of American Medical Colleges from June 2013 to December 2016 with a repeated cross-sectional time series design with state fixed effects. Each survey wave included 2,000–3,500 respondents, with oversampling of rural, uninsured, Medicaid, Black, Hispanic, and low-income populations in every other wave.

Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

Subtopic(s): Background

Type of Source: Book

Objective: To provide an overview of the large and disparate body of evidence about telehealth for use by decision makers.

Main Findings: A large volume of research reported that telehealth interventions produce positive outcomes when used for remote patient monitoring, broadly defined, for several chronic conditions and for psychotherapy as part of behavioral health. The most consistent benefit has been reported when telehealth is used for communication and counseling or remote monitoring in chronic conditions such as cardiovascular and respiratory disease, with improvements in outcomes such as mortality, quality of life, and reductions in hospital admissions.

Strengths/Limitations: Evidence maps focus on a limited number of characteristics, and telehealth is a broad term that encompasses a range of applications and technologies. However, there is a broad evidence base on effectiveness summarized in this literature review.

Generalizability to Medicare Population: Yes

Methods: An evidence map of available literature on telehealth.

Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

Subtopic(s): Background

Type of Source: Report

Objective: To assess the effectiveness of telehealth consultations and explore supplemental decision analysis.

Main Findings: Results vary by setting and condition, with telehealth consultations producing generally either better outcomes or no difference from comparators in settings and clinical indications studied. Remote intensive care unit (ICU) consultations reduce mortality, specialty telehealth consultations reduce time in the emergency department, emergency telehealth consultations likely reduce heart attack mortality, and remote consultations for outpatient care improve access and clinical outcomes.

Strengths/Limitations: There are variations in study designs, and study rigor is inconsistent. However, a large volume of literature was included, and there are a diverse set of characteristics within studies.
Generalizability to Medicare Population: Yes
Methods: Literature review of comparative studies that provided data on clinical, cost, or intermediate outcomes associated with the use of any technology to facilitate consultations for inpatient, emergency, or outpatient care.

Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *New England Journal of Medicine*. 2017;377(16):1585-1592. doi:10.1056/NEJMsr1503323

Subtopic(s): Background
Type of Source: Journal article
Objective: To present policy-relevant trends in telehealth adoption, to describe the state of the telehealth evidence base, and to assist physicians, other health care professionals, and researchers in identifying key priorities for telehealth research.
Main Findings: Telehealth technologies, tools, and services are becoming an important component of the health care system. Private insurers increasingly provide reimbursement for telehealth, as well as Medicaid, but Medicare has been more restrictive. There are nine telehealth research topics that need further analysis: physician leadership, reimbursement, licensure, liability, human factors, device interoperability and data integration, privacy and security, performance management, and patient engagement and the patient-physician relationship.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Review and analysis of telehealth definitions and policy.

Walker D, Mora A, McAlearney AS. Accountable Care Organization Hospitals Differ in Health IT Capabilities. *AJMC*. Accessed August 4, 2020. https://www.ajmc.com/view/accountable-care-organization-hospitals-differ-in-health-it-capabilities

Subtopic(s): Background
Type of Source: Journal article
Objective: The aim of this study was to evaluate health information technology (IT) adoption in hospitals participating in accountable care organizations (ACOs) and compare this adoption to non-ACO hospitals.
Main Findings: Of the 393 ACO hospitals and 810 non-ACO hospitals, a greater percentage of ACO hospitals were capable of meeting Meaningful Use (MU) Stage 1 (50.9 percent vs. 41.6 percent) and Stage 2 (7.6 percent vs. 4.8 percent), having patient engagement health IT (39.8 percent vs. 15.2 percent), and participating in health information exchange (HIE) (49.0 percent vs. 30.1 percent). In adjusted models, no difference was found between ACO and non-ACO hospital ability to meet MU Stage 1 or Stage 2, but ACO hospitals were more likely to have patient engagement health IT and be HIE participants.
Strengths/Limitations: The AHA IT Supplement and the CSP Survey limit the sample, and these hospitals differ from the population of acute care hospitals in the United States.
Generalizability to Medicare Population: Yes
Methods: A cross-sectional sample of U.S. nonfederal, acute care hospitals with data from three matched sources: the 2013 American Hospital Association (AHA) Annual Survey, the 2013 AHA Survey of Care Systems and Payments (CSP), and the 2014 AHA Information Technology Supplement. To compare health IT adoption in ACO- and non-ACO hospitals, the team created

measures of Meaningful Use (MU) Stage 1 and Stage 2 core and menu criteria, patient engagement—oriented health IT, and health information exchange (HIE) participation. Adoption was compared using both naïve and multivariate logit models.

Wilson FA, Rampa S, Trout K, Stimpson J. Telehealth Delivery of Mental Health Services: An Analysis of Private Insurance Claims Data in the United States. *Psychiatric Services*. 2017;68(12):1303–1306. doi:10.1176/appi.ps.201700017

Subtopic(s): Background
Type of Source: Journal article
Objective: To characterize telehealth claims for mental health and substance abuse (MH/SA) services by using national private claims data.
Main Findings: In 2009–2013, there were 13,480 MH/SA telehealth provider claims out of 3,986,159 claims, with the majority of telehealth claims submitted by psychiatrists. For telehealth services, there was a decreasing trend for average reimbursements. Average reimbursements for telehealth claims were half those for non-telehealth claims. Reimbursements for nine of the top 10 telehealth services were lower in 2015 than for the same services provided during face-to-face treatment.
Strengths/Limitations: Findings in this study are similar to findings within the Medicare program for mental health services. However, their study was limited to three major private insurers and did not include outcomes of these telehealth interventions.
Generalizability to Medicare Population: Yes
Methods: Telehealth-related mental health service claims were identified with private claims data from 2009 to 2013. These data were provided by the Health Care Cost Institute and included claims from Aetna, Humana, and UnitedHealth.

Yang YT. Telehealth Parity Laws | Health Affairs. *Health Affairs*. Accessed July 8, 2020. http://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

Subtopic(s): Background
Type of Source: Journal article
Objective: To highlight telehealth parity laws in the United States.
Main Findings: Laws at the federal and state levels affect telehealth use. There is no uniform legal approach, and reimbursement concerns limit implementation. Currently, there is little incentive to provide telehealth services.
Strengths/Limitations: N/A
Generalizability to Medicare Population: Yes
Methods: Synthesis and review of telehealth parity laws and current laws and reforms.

Zhao M, Hamadi H, Haley DR, Xu J, White-Williams C, Park S. Telehealth: Advances in Alternative Payment Models. *Telemed J E Health*. Published online February 26, 2020. doi:10.1089/tmj.2019.0294

Subtopic(s): Background
Type of Source: Journal article
Objective: To examine the association between alternative payment models (APMs), market competition, and telehealth provisions in the hospital setting.
Main Findings: Hospital participation in accountable care organizations and participation in a bundled payment risk arrangement are significantly associated with the provision of telehealth services. Competitive advantage was found to be statistically associated with hospitals providing telehealth services. Other hospital characteristics such as ownership, part of a system, part of a network, and major teaching affiliation also have impact on the provision of telehealth.

Strengths/Limitations: This study is consistent with existing literature and is geographically diverse. However, due to studying only acute-care hospitals, counties with no hospitals were excluded, and individuals in those counties may also use telehealth at smaller facilities.
Generalizability to Medicare Population: Yes
Methods: A secondary cross-sectional design to analyze 2018 census data of nonfederal short-term acute care hospitals in the United States.

[1] Telehealth Programs. Official website of the U.S. Health Resources & Services Administration. Published April 28, 2017. Accessed July 8, 2020. https://www.hrsa.gov/rural-health/telehealth

[2] Marcoux RM, Vogenberg FR. Telehealth: Applications From a Legal and Regulatory Perspective. *P T*. 2016;41(9):567-570. PMID: 27630526

[3] Medicare Learning Network. *Telehealth Services*.; 2020. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/TelehealthSrvcsfctsht.pdf

[4] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[5] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[6] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[7] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[8] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[9] Centers for Medicare & Medicaid Services. Trump Administration Makes Sweeping Regulatory Changes to Help U.S. Healthcare System Address COVID-19 Patient Surge. Published March 30, 2020. Accessed August 7, 2020. https://www.cms.gov/newsroom/press-releases/trump-administration-makes-sweeping-regulatory-changes-help-us-healthcare-system-address-covid-19

[10]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[11] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[12] Harvey JB, Valenta S, Simpson K, Lyles M, McElligott J. Utilization of Outpatient Telehealth Services in Parity and Nonparity States 2010–2015. *Telemedicine and e-Health*. 2018;25(2):132-136. doi:10.1089/tmj.2017.0265

[13] Center for Connected Health Policy. COVID-19 Related State Actions. Accessed August 7, 2020. https://www.cchpca.org/resources/covid-19-related-state-actions

[14] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[15] Yu J. Emerging Opportunities for Telemedicine Research in Rhode Island. *Rhode Island Medical Journal.* February 2020. http://www.rimed.org/rimedicaljournal/2020/02/2020-02-29-telehealth-yu.pdf

[16] Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program*.; 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

[17] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[18] Harvey JB, Valenta S, Simpson K, Lyles M, McElligott J. Utilization of Outpatient Telehealth Services in Parity and Nonparity States 2010–2015. *Telemedicine and e-Health*. 2018;25(2):132-136. doi:10.1089/tmj.2017.0265

[19] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[20] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[21] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[22] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[23] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[24] Lucia K, Blumberg LJ, Curran E, et al. *The COVID-19 Pandemic: Insurer Insights into Challenges, Implications, and Lessons Learned*.; 2020. Accessed August 5, 2020. https://www.rwjf.org/en/library/research/2020/06/the-covid-19-pandemic-insurer-insights-into-challenges-implications-and-lessons-learned.html

[25] Abelson R. Is Telemedicine Here to Stay? *The New York Times*. Published August 3, 2020. Accessed August 4, 2020.https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html

[26] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[27] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[28] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[29] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[30] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[31] Dang S, Dimmick S , Kelkar G . Evaluating the evidence base for the use of home telehealth remote monitoring in elderly with heart failure. Telemed J E Health. 2009; 15 (8): 783 – 96 . 10.1089/tmj.2009.0028

[32] Polisena J , Tran K , Cimon K , Hutton B , McGill S , Palmer K , et al. Home telemonitoring for congestive heart failure: a systematic review and meta-analysis . J Telemed Telecare. 2010; 16 (2): 68 – 76. 10.1258/jtt.2009.090406

[33] Bavafa H, Hitt LM, Terwiesch C. The Impact of E-Visits on Visit Frequencies and Patient Health: Evidence from Primary Care. *Management Science*. 2018;64(12):5461-5480. doi:10.1287/mnsc.2017.2900

[34] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[35] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[36] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[37] Chaet D, Clearfield R, Sabin JE, and Skimming K. Ethical Practice in Telehealth and Telemedicine. *J Gen Intern Med*. 2017 Oct; 32(10): 1136-1140. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5602756/#MOESM1

[38] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[39] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[40] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[41] Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

[42] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[43] American Hospital Association. Telehealth: Helping Hospitals Deliver Cost-Effective Care. Published April 22, 2016. Accessed July 8, 2020. https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf

[44] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[45] Congressional Budget Office. Telemedicine. Accessed August 7, 2020. https://www.cbo.gov/publication/50680

[46] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[47] Mueller KJ, Potter AJ, MacKinney AC, Ward MM. Lessons from tele-emergency: Improving care quality and health outcomes by expanding support for rural care systems. Health Aff. 2014;33(2):228-234. https://doi.org/10.1377/hlthaff.2013.1016

[48] Ward MM, Jaana M, Natafgi N. Systematic review of telemedicine applications in emergency rooms. Int J Med Inform. 2015;84(9):601-616. doi: 10.1016/j.ijmedinf.2015.05.009

[49] Komaromy M, Duhigg D, Metcalf A, Carlson C, et al. Project ECHO (Extension for Community Healthcare Outcomes): A new model for educating primary care providers about treatment of substance use disorders, Substance Abuse, 37:1, 20-24, (2016). DOI: https://doi.org/10.1080/08897077.2015.1129388

[50] Markwick L, McConnochie K, Wood N. Expanding telemedicine to include primary care for the urban adult. J Health Care Poor Underserved. 2015;26(3:771–776. doi: 10.1353/hpu.2015.0078

[51] Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

[52] Hagenbrok E. *Bundled Payments for Care Improvement Advanced.*; 2018. https://innovation.cms.gov/files/x/bpciadvanced-rfa.pdf

[53] Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program*.; 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

[54] Centers for Medicare & Medicaid Services. Comprehensive Care for Joint Replacement Model | CMS Innovation Center. Accessed July 10, 2020. https://innovation.cms.gov/innovation-models/cjr

[55] Phillip S. Telehealth under alternative payment models. Published September 13, 2017. Accessed July 10, 2020. https://www.milliman.com/en/insight/telehealth-under-alternative-payment-models

[56] Centers for Medicare & Medicaid Services. "Information on Medicare Telehealth" November 15, 2018. Available at: https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[57] Centers for Medicare & Medicaid Services. Comprehensive Primary Care Plus | CMS Innovation Center. Accessed July 10, 2020. https://innovation.cms.gov/innovation-models/comprehensive-primary-care-plus

[58] Centers for Medicare & Medicaid Services. Value-Based Insurance Design Model (VBID) Fact Sheet CY 2020. Accessed August 4, 2020. https://www.cms.gov/newsroom/fact-sheets/value-based-insurance-design-model-vbid-fact-sheet-cy-2020

[59] Gilman B, Barterian L, Ellis L-L, et al. *Evaluation of the Round Two Health Care Innovation Awards (HCIA R2): First Annual Report*.; https://downloads.cms.gov/files/cmmi/hcia2-yroneevalrpt.pdf.

[60] Mehrotra A, Wang B, Snyder G. Telemedicine: What Should the Post-Pandemic Regulatory and Payment Landscape Look Like? Published August 5, 2020. Accessed August 13, 2020. https://www.commonwealthfund.org/publications/issue-briefs/2020/aug/telemedicine-post-pandemic-regulation

[61] Telehealth Programs. Official website of the U.S. Health Resources & Services Administration. Published April 28, 2017. Accessed July 8, 2020. https://www.hrsa.gov/rural-health/telehealth

[62] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[63] Telehealth Programs. Official website of the U.S. Health Resources & Services Administration. Published April 28, 2017. Accessed July 8, 2020. https://www.hrsa.gov/rural-health/telehealth

[64] Marcoux RM, Vogenberg FR. Telehealth: Applications From a Legal and Regulatory Perspective. *P T*. 2016;41(9):567-570. PMID: 27630526

[65] Marcoux RM, Vogenberg FR. Telehealth: Applications From a Legal and Regulatory Perspective. *P T*. 2016;41(9):567-570. PMID: 27630526

[66] Office of the National Coordinator for Health Information Technology. Telemedicine and Telehealth. Published September 28, 2017. Accessed July 8, 2020. https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth

[67] NEJM Catalyst. What Is Telehealth? *NEJM Catalyst*. Published online February 1, 2018. Accessed July 8, 2020. https://catalyst.nejm.org/doi/abs/10.1056/CAT.18.0268

[68] Telehealth Resource Centers. *A Framework for Defining Telehealth*. Center for Connected Health Policy https://www.telehealthpolicy.us/sites/default/files/2018-10/Telehealth%20Definintion%20Framework%20for%20TRCs_0.pdf

[69] American Telemedicine Association. Telehealth Basics. ATA. Accessed August 7, 2020. https://www.americantelemed.org/resource/why-telemedicine/

[70] Office of the National Coordinator for Health Information Technology. Telemedicine and Telehealth. Published September 28, 2017. Accessed July 8, 2020. https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth

[71] Center for Connected Health Policy. *CMS Finalized Telehealth Changes to Physician Fee Schedule CY 2019.* 2018. Accessed August 25, 2020. https://www.cchpca.org/sites/default/files/2018-11/Finalized%20PFS%202019%20Infographic%20Final%20V.%204.pdf?utm_source=Telehealth+Enthusiasts&utm_campaign=bd7f7979d7-EMAIL_CAMPAIGN_2018_11_06_06_05&utm_medium=email&utm_term=0_ae00b0e89a-bd7f7979d7-353223937

[72] Center for Connected Health Policy. Store-and-Forward (asynchronous). Accessed July 8, 2020. https://www.cchpca.org/about/about-telehealth/store-and-forward-asynchronous

[73] Office of the National Coordinator for Health Information Technology. Telemedicine and Telehealth. Published September 28, 2017. Accessed July 8, 2020. https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth

[74] American Telemedicine Association. Telehealth Basics. ATA. Accessed August 7, 2020. https://www.americantelemed.org/resource/why-telemedicine/

[75] Office of the National Coordinator for Health Information Technology. Telemedicine and Telehealth. Published September 28, 2017. Accessed July 8, 2020. https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth

[76] American Telemedicine Association. Telehealth Basics. ATA. Accessed August 7, 2020. https://www.americantelemed.org/resource/why-telemedicine/

[77] Office of the National Coordinator for Health Information Technology. Telemedicine and Telehealth. Published September 28, 2017. Accessed July 8, 2020. https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth

[78] Cubanski J, Neuman T, Freed M. The Facts on Medicare Spending and Financing. KFF. Published August 20, 2019. Accessed August 3, 2020. https://www.kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/

[79] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[80] Medicare Learning Network. *Telehealth Services*.; 2020. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/TelehealthSrvcsfctsht.pdf

[81] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[82] Larson JB. Bipartisan Budget Act of 2018.; 2018. Accessed July 29, 2020. https://www.congress.gov/bill/115th-congress/house-bill/1892/text

[83] Larson JB. Bipartisan Budget Act of 2018.; 2018. Accessed July 29, 2020. https://www.congress.gov/bill/115th-congress/house-bill/1892/text

[84] Center for Connected Health Policy. *Billing Guide for Telehealth Encounters: An Introductory Guide on Fee-For-Service*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-01/Billing%20Guide%20for%20Telehealth%20Encounters_FINAL.pdf

[85] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[86] Center for Connected Health Policy. *CMS Finalized Telehealth Changes to Physician Fee Schedule CY 2019.* 2018. Accessed August 25, 2020. https://www.cchpca.org/sites/default/files/2018-11/Finalized%20PFS%202019%20Infographic%20Final%20V.%204.pdf?utm_source=Telehealth+Enthusiasts&utm_campaign=bd7f7979d7-EMAIL_CAMPAIGN_2018_11_06_06_05&utm_medium=email&utm_term=0_ae00b0e89a-bd7f7979d7-353223937

[87] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[88] Medicare Learning Network. *Telehealth Services*.; 2020. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/TelehealthSrvcsfctsht.pdf

[89] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[90] Center for Connected Health Policy. *Billing Guide for Telehealth Encounters: An Introductory Guide on Fee-For-Service*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-01/Billing%20Guide%20for%20Telehealth%20Encounters_FINAL.pdf

[91] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[92] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[93] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[94] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[95] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[96] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[97] Centers for Medicare & Medicaid Services. Rural Health Clinics (RHCs) and Federally Qualified Health Centers (FQHCs): CMS Flexibilities to Fight COVID-19. Published July 9, 2020. Accessed August 18, 2020. https://www.cms.gov/files/document/covid-rural-health-clinics.pdf

[98] Centers for Medicare & Medicaid Services. List of Telehealth Services. Updated April 30, 2020. Accessed July 24, 2020. https://www.cms.gov/Medicare/Medicare-General-Information/Telehealth/Telehealth-Codes

[99] Centers for Medicare & Medicaid Services. Additional Background: Sweeping Regulatory Changes to Help U.S. Healthcare System Address COVID-19 Patient Surge. Published March 30, 2020. Accessed August 7, 2020. https://www.cms.gov/newsroom/fact-sheets/additional-backgroundsweeping-regulatory-changes-help-us-healthcare-system-address-covid-19-patient

[100] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[101] Centers for Medicare & Medicaid Services. List of Telehealth Services. Updated April 30, 2020. Accessed July 24, 2020. https://www.cms.gov/Medicare/Medicare-General-Information/Telehealth/Telehealth-Codes

[102] Medicare Learning Network. *Telehealth Services*.; 2020. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/TelehealthSrvcsfctsht.pdf

[103] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[104] Center for Connected Health Policy. *CMS Finalized Telehealth Changes to Physician Fee Schedule CY 2019.* 2018. Accessed August 25, 2020. https://www.cchpca.org/sites/default/files/2018-11/Finalized%20PFS%202019%20Infographic%20Final%20V.%204.pdf?utm_source=Telehealth+Enthusiasts&utm_campaign=bd7f7979d7-EMAIL_CAMPAIGN_2018_11_06_06_05&utm_medium=email&utm_term=0_ae00b0e89a-bd7f7979d7-353223937

[105] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[106] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[107] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[108] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[109] Centers for Medicare & Medicaid Services. Rural Health Clinics (RHCs) and Federally Qualified Health Centers (FQHCs): CMS Flexibilities to Fight COVID-19. Published July 9, 2020. Accessed August 18, 2020. https://www.cms.gov/files/document/covid-rural-health-clinics.pdf

[110] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[111] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[112] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[113] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[114] Navathe AS, Liao JM. After COVID-19, a payment policy reboot: three lessons from the pandemic on how to improve value-based payment. August 11, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200805.905205/full/

[115] Ravindranath M. FCC Exhausts $200M Pandemic Fund. *Politico*. July 10, 2020. https://www.politico.com/newsletters/morning-ehealth/2020/07/10/fcc-exhausts-200m-pandemic-fund-789071

[116] Goodkind N. Medicare Chief Seema Verma Reflects on lessons Learned from the COVID-19 Front Lines. July 7, 2020. https://fortune.com/2020/07/07/coronavirus-front-lines-medicare-chief-seema-verma-covid-19/

[117] Diamond D, Cancryn A, Roubein R. Trump signs order aimed at boosting rural health care, telehealth. POLITICO. Accessed August 7, 2020. https://www.politico.com/news/2020/08/03/trump-executive-order-rural-health-care-telehealth-390947

[118] The White House. Executive Order on Improving Rural Health and Telehealth Access. The White House. Accessed August 7, 2020. https://www.whitehouse.gov/presidential-actions/executive-order-improving-rural-health-telehealth-access/

[119] Gianforcaro R. Virtual Care: Business vs Primary Care Model. Presented at the: UNC Virtual Care Center.

[120] Antoniotti NM, Drude KP, Rowe N. Private Payer Telehealth Reimbursement in the United States. *Telemedicine and e-Health*. 2014;20(6):539-543. doi:10.1089/tmj.2013.0256

[121] Centers for Medicare & Medicaid Services. Virtual Communication Services in Rural health clinics (RHCs) and Federally Qualified Health Centers (FQHCs) Frequently Asked Questions. December 2018. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/FQHCPPS/Downloads/VCS-FAQs.pdf

[122] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[123] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[124] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[125] Center for Connected Health Policy. Federally Qualified Health Centers & Rural Health Clinics Acting as Distant Site Providers in Medicare. Published April 30, 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CMS%20FQHC%20RHC%20FACT%20SHEET%204.30.20%20FINAL.pdf

[126] Center for Connected Health Policy. *Billing Guide for Telehealth Encounters: An Introductory Guide on Fee-For-Service*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-01/Billing%20Guide%20for%20Telehealth%20Encounters_FINAL.pdf

[127]Center for Connected Health Policy. Federally Qualified Health Centers & Rural Health Clinics Acting as Distant Site Providers in Medicare. Published April 30, 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CMS%20FQHC%20RHC%20FACT%20SHEET%204.30.20%20FINAL.pdf

[128]Center for Connected Health Policy. Federally Qualified Health Centers & Rural Health Clinics Acting as Distant Site Providers in Medicare. Published April 30, 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CMS%20FQHC%20RHC%20FACT%20SHEET%204.30.20%20FINAL.pdf

[129] American College of Physicians. ACP Recommendations for Maintaining Certain Telehealth Policies and Waivers after the Public Health Emergency. Published June 4, 2020. Accessed August 7, 2020. https://www.acponline.org/acp_policy/letters/acp_letter_to_cms_regarding_extending_telehealth_policy_changes_after_the_phe_june_2020.pdf

[130] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[131] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[132] Centers for Medicare & Medicaid Services. Trump Administration Makes Sweeping Regulatory Changes to Help U.S. Healthcare System Address COVID-19 Patient Surge. Published March 30, 2020. Accessed August 7, 2020. https://www.cms.gov/newsroom/press-releases/trump-administration-makes-sweeping-regulatory-changes-help-us-healthcare-system-address-covid-19

[133] American College of Physicians. ACP Recommendations for Maintaining Certain Telehealth Policies and Waivers after the Public Health Emergency. Published June 4, 2020. Accessed August 7, 2020. https://www.acponline.org/acp_policy/letters/acp_letter_to_cms_regarding_extending_telehealth_policy_changes_after_the_phe_june_2020.pdf

[134] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[135] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[136] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[137] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[138] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[139]Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[140] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[141]Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[142] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[143] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[144] Center for Connected Health Policy. *Billing Guide for Telehealth Encounters: An Introductory Guide on Fee-For-Service*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-01/Billing%20Guide%20for%20Telehealth%20Encounters_FINAL.pdf

[145] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[146] Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[147]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[148]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[149] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[150]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[151]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[152] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[153] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[154]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[155] Centers for Medicare & Medicaid Services. Medicare Telemedicine Health Care Provider Fact Sheet. Published March 17, 2020. Accessed July 8, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[156] Bajowala SS, Milosch J, Bansal C. Telemedicine Pays: Billing and Coding Update. *Curr Allergy Asthma Rep*. 2020;20(10):60. doi:10.1007/s11882-020-00956-y

[157]Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. *J Am Acad Dermatol*. 2020;82(5):1213-1214. doi:10.1016/j.jaad.2020.03.052

[158] Center for Connected Health Policy. *Billing Guide for Telehealth Encounters: An Introductory Guide on Fee-For-Service*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-01/Billing%20Guide%20for%20Telehealth%20Encounters_FINAL.pdf

[159] Medicare Learning Network. *Telehealth Services*.; 2020. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/TelehealthSrvcsfctsht.pdf

[160] Center for Connected Health Policy. *Billing Guide for Telehealth Encounters: An Introductory Guide on Fee-For-Service*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-01/Billing%20Guide%20for%20Telehealth%20Encounters_FINAL.pdf

[161] Tseng P, Kaplan RS, Richman BD, Shah MA, Schulman KA. Administrative Costs Associated With Physician Billing and Insurance-Related Activities at an Academic Health Care System. *JAMA*. 2018;319(7):691-697. doi:10.1001/jama.2017.19148

[162] Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *New England Journal of Medicine*. 2017;377(16):1585-1592. doi:10.1056/NEJMsr1503323

[163] Ashwood JS, Mehrortra A, Cowling D, and Uscher-Pines L. Direct-to-Consumer Telehealth May Increase Access to Care But Does Not Decrease Spending. *HealthAffairs*. March 2017. https://doi.org/10.1377/hlthaff.2016.1130

[164] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[165] Oyeka O, Ullrich F, Mueller K. *Medicare Advantage Enrollment Update 2018*.; 2019. https://rupri.public-health.uiowa.edu/publications/policybriefs/2019/Medicare%20Advantage%20Enrollment%20Update%202018.pdf

[166] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[167] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[168] Centers for Medicare & Medicaid Services. Telehealth Insurance Coverage. Accessed July 8, 2020. https://www.medicare.gov/coverage/telehealth

[169] Neufeld JD, Doarn CR, Aly R. State Policies Influence Medicare Telemedicine Utilization. *Telemedicine and e-Health*. 2015;22(1):70-74. https://doi.org/10.1089/tmj.2015.0044

[170] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[171] Harvey JB, Valenta S, Simpson K, Lyles M, McElligott J. Utilization of Outpatient Telehealth Services in Parity and Nonparity States 2010–2015. *Telemedicine and e-Health*. 2018;25(2):132-136. doi:10.1089/tmj.2017.0265

[172] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[173] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[174] Quinn WV, O'Brien E, and Springan G. Using Telehealth to Improve Home-Based Care for Older Adults and Family Caregivers. *Insight on Issues AARP Public Policy Institute*. May 2018.

[175] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[176] Yu J. Emerging Opportunities for Telemedicine Research in Rhode Island. *Rhode Island Medical Journal.* February 2020. http://www.rimed.org/rimedicaljournal/2020/02/2020-02-29-telehealth-yu.pdf

[177] Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program*.; 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

[178] Yu J. Emerging Opportunities for Telemedicine Research in Rhode Island. *Rhode Island Medical Journal.* February 2020. http://www.rimed.org/rimedicaljournal/2020/02/2020-02-29-telehealth-yu.pdf

[179] Nurse Licensure Compact. Accessed August 7, 2020. https://www.nursecompact.com/Updated_onepaged_NLC.pdf

[180] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[181] Center for Connected Health Policy. COVID-19 Related State Actions. Accessed August 7, 2020. https://www.cchpca.org/resources/covid-19-related-state-actions

[182] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[183] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[184] Center for Connected Health Policy. Assessing the Impact of Telehealth Private Payer Laws Across States. Accessed August 7, 2020. https://www.cchpca.org/about/projects/assessing-impact-telehealth-private-payer-laws-across-states

[185] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[186] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[187] Center for Connected Health Policy. *State Telehealth Laws & Reimbursement Policies*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-05/CCHP_%2050_STATE_REPORT_SPRING_2020_FINAL.pdf

[188] Yang, YT. Telehealth Parity Laws. *Health Affairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[189] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[190] Center for Connected Health Policy. *Telehealth Coverage Policies in the Time of COVID-19 to Date*.; 2020. Accessed August 7, 2020. https://www.cchpca.org/sites/default/files/2020-04/CORONAVIRUS%20TELEHEALTH%20POLICY%20FACT%20SHEET%20APRIL%2030%202020%20FINAL.pdf

[191] American College of Physicians. *Private Payer Coverage during Covid-19*. August 28, 2020. Accessed August 31, 2020. https://www.acponline.org/system/files/documents/clinical_information/resources/covid19/payer_chart-_covid-19.pdf

[192] Lucia K, Blumberg LJ, Curran E, et al. *The COVID-19 Pandemic: Insurer Insights into Challenges, Implications, and Lessons Learned*.; 2020. Accessed August 5, 2020. https://www.rwjf.org/en/library/research/2020/06/the-covid-19-pandemic-insurer-insights-into-challenges-implications-and-lessons-learned.html

[193] Abelson R. Is Telemedicine Here to Stay? *The New York Times*. Published August 3, 2020. Accessed August 4, 2020. https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html.

[194] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[195] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[196] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[197] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[198] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[199]Mehrotra A, Huskamp HA, Souza J, et al. Rapid Growth In Mental Health Telemedicine Use Among Rural Medicare Beneficiaries, Wide Variation Across States. *Health Affairs*. 2017;36(5):909-917. doi:10.1377/hlthaff.2016.1461

[200] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[201] Douglas MD, Xu J, Heggs A, Wrenn G, Mack DH, Rust G. Assessing Telemedicine Utilization by Using Medicaid Claims Data. *PS*. 2016;68(2):173-178. doi:10.1176/appi.ps.201500518

[202] Douglas MD, Xu J, Heggs A, Wrenn G, Mack DH, Rust G. Assessing Telemedicine Utilization by Using Medicaid Claims Data. *PS*. 2016;68(2):173-178. doi:10.1176/appi.ps.201500518

[203] Talbot JA, Burgess AR, Thayer D, Parenteau L, Paluso N, Coburn AF. Patterns of Telehealth Use Among Rural Medicaid Beneficiaries. *The Journal of Rural Health*. 2019;35(3):298-307. doi: 10.1111/jrh.12324

[204] Douglas MD, Xu J, Heggs A, Wrenn G, Mack DH, Rust G. Assessing Telemedicine Utilization by Using Medicaid Claims Data. *PS*. 2016;68(2):173-178. doi:10.1176/appi.ps.201500518

[205] MACPAC. *Telehealth in Medicaid*. Accessed August 7, 2020. https://www.macpac.gov/wp-content/uploads/2018/03/Telehealth-in-Medicaid.pdf

[206] Care Innovations. Why Telemedicine Delivery Is Shifting to Platform-as-a-Service. Accessed August 7, 2020. https://news.careinnovations.com/blog/why-telemedicine-delivery-is-shifting-to-platform-as-a-service

[207] Lazur B, Bennett A, King V. *The Evolving Policy Landscape of Telehealth Services Delivered in the Home and Other Nonclinical Settings*.; 2019. https://www.milbank.org/wp-content/uploads/2019/08/IssueBrief_CenterMilbankTelehealth_Final_v2.pdf

[208] Abelson R. Is Telemedicine Here to Stay? *The New York Times*. Published August 3, 2020. Accessed August 4, 2020.https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html

[209] Walker D, Mora A, McAlearney AS. Accountable Care Organization Hospitals Differ in Health IT Capabilities. *AJMC*. 2016;22(12). Accessed July 10, 2020. https://www.ajmc.com/journals/issue/2016/2016-vol22-n12/accountable-care-organization-hospitals-differ-in-health-it-capabilities

[210] Zhao M, Hamadi H, Haley DR, Xu J, White-Williams C, Park S. Telehealth: Advances in Alternative Payment Models. *Telemed J E Health*. Published online February 26, 2020. doi:10.1089/tmj.2019.0294

[211] Zhao M, Hamadi H, Haley DR, Xu J, White-Williams C, Park S. Telehealth: Advances in Alternative Payment Models. *Telemed J E Health*. Published online February 26, 2020. doi:10.1089/tmj.2019.0294

[212] Harvey JB, Valenta S, Simpson K, Lyles M, McElligott J. Utilization of Outpatient Telehealth Services in Parity and Nonparity States 2010–2015. *Telemedicine and e-Health*. 2018;25(2):132-136. doi:10.1089/tmj.2017.0265

[213] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[214] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[215] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[216] Bosworth A, Ruhter J, Samson LW, et al. *ASPE Issue Brief: Medicare Beneficiary Use of Telehealth Visits: Early Data From the Start of the COVID-19 Pandemic*.; 2020. Accessed August 4, 2020. https://aspe.hhs.gov/pdf-report/medicare-beneficiary-use-telehealth

[217] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[218] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[219] Nosek MA. Health disparities and equity: The intersection of disability, health, and sociodemographic characteristics among women. In: *Eliminating Inequities for Women with Disabilities: An Agenda for Health and Wellness.* Washington, DC: American Psychological Association; 2016:13-38. Pages 83-89. doi: https://psycnet.apa.org/doi/10.1037/14943-002

[220] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[221] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[222] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[223] Dang S, Dimmick S , Kelkar G . Evaluating the evidence base for the use of home telehealth remote monitoring in elderly with heart failure. Telemed J E Health. 2009; 15 (8): 783 – 96. DOI: 10.1089/tmj.2009.0028

[224] Polisena J , Tran K , Cimon K , Hutton B , McGill S , Palmer K , et al. Home telemonitoring for congestive heart failure: a systematic review and meta-analysis. J Telemed Telecare. 2010; 16 (2): 68 – 76. DOI: 10.1258/jtt.2009.090406

[225] Clark RA, Inglis SC, McAlister FA , Cleland JG , Stewart S . Telemonitoring or structured telephone support programmes for patients with chronic heart failure: systematic review and meta-analysis. BMJ. 2007; 334 : 942. https://doi.org/10.1136/bmj.39156.536968.55

[226] Kulshreshtha A, Kvedar J, Goyal A , Halpern EF , Watson AJ . Use of remote monitoring to improve outcomes in patients with heart failure: a pilot trial. Int J Telemed Appl. 2010; 2010 : 870959. Epub 2010 May 19. https://doi.org/10.1155/2010/870959

[227] Bavafa H, Hitt LM, Terwiesch C. The Impact of E-Visits on Visit Frequencies and Patient Health: Evidence from Primary Care. *Management Science*. 2018;64(12):5461-5480. doi:10.1287/mnsc.2017.2900

[228] Gillespie SM, Wasserman EB, Wood NE, et al. High-Intensity Telemedicine Reduces Emergency Department Use by Older Adults With Dementia in Senior Living Communities. *The Journal of Post-Acute and Long-Term Medicine.* July 2019. DOI: https://doi.org/10.1016/j.jamda.2019.03.024

[229] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[230] Sockalingam S, Arena A, Serhal E, et al. Building Provincial mental health capacity in primary care: an evaluation of a project ECHO mental health program. *Academic Psychiatry*. **42**, pages 451–457(2018). https://doi.org/10.1007/s40596-017-0735-z

[231] Zhou C, Crawford A, Serhal E et al. The Impact of Project ECHO on participant and patient outcomes: a systematic review. *Association of American Medical Colleges.* (2016). doi: 10.1097/ACM.0000000000001328

[232] Fischer SH, Rose AJ, McBain RK, Faherty LJ, Sousa J, Martineau M. Evaluation of technology-enabled collaborative learning and capacity building models: Materials for a report to Congress. Attachment B: RAND Report. In Report to Congress: Current state of technology-enabled collaborative learning and capacity building models. https://aspe.hhs.gov/system/files/pdf/260691/ECHOAct-ConsolidatedReportToCongress.pdf

[233] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[234] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[235] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[236] Yang, YT. Telehealth Parity Laws. *HealthAffairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[237] Chaet D, Clearfield R, Sabin JE, and Skimming K. Ethical Practice in Telehealth and Telemedicine. *J Gen Intern Med*. 2017 Oct; 32(10): 1136-1140. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5602756/#MOESM1

[238] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[239] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[240] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[241] Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

[242] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[243] American Hospital Association. Telehealth: Helping Hospitals Deliver Cost-Effective Care. Published April 22, 2016. Accessed July 8, 2020. https://www.aha.org/system/files/content/16/16telehealthissuebrief.pdf

[244] Champagne-Langabeer T, Langabeer JR, Roberts KE, et al. Telehealth Impact on Primary Care Related Ambulance Transports. *Prehospital Emergency Care*. 2019;23(5):712-717. doi:10.1080/10903127.2019.1568650

[245] Medicare Payment Advisory Commission (MedPAC). *Mandated Report: Telehealth Services and the Medicare Program*. MedPAC; 2018. Accessed July 8, 2020. http://www.medpac.gov/docs/default-source/reports/mar18_medpac_ch16_sec.pdf?sfvrsn=0

[246] Congressional Budget Office. Telemedicine. Accessed August 7, 2020. https://www.cbo.gov/publication/50680

[247] Ashwood JS, Mehrotra A, Cowling D, Uscher-Pines L. Direct-To-Consumer Telehealth May Increase Access To Care But Does Not Decrease Spending. *Health Affairs*. 2017;36(3):485-491. doi:10.1377/hlthaff.2016.1130

[248] Mehrotra A, Huskamp HA, Souza J, et al. Rapid Growth In Mental Health Telemedicine Use Among Rural Medicare Beneficiaries, Wide Variation Across States. *Health Affairs*. 2017;36(5):909-917. doi:10.1377/hlthaff.2016.1461

[249] Totten AM, Hansen RN, Wagner J, et al. *Telehealth for Acute and Chronic Care Consultations*. Agency for Healthcare Research and Quality; 2019. doi:10.23970/AHRQEPCCER216

[250] Mueller KJ, Potter AJ, MacKinney AC, Ward MM. Lessons from tele-emergency: Improving care quality and health outcomes by expanding support for rural care systems. Health Aff. 2014;33(2):228-234. doi: https://doi.org/10.1377/hlthaff.2013.1016

[251] Ward MM, Jaana M, Natafgi N. Systematic review of telemedicine applications in emergency rooms. Int J Med Inform. 2015;84(9):601-616. https://doi.org/10.1016/j.ijmedinf.2015.05.009

[252] Komaromy M, Duhigg D, Metcalf A, Carlson C, et al. Project ECHO (Extension for Community Healthcare Outcomes): A new model for educating primary care providers about treatment of substance use disorders, Substance Abuse, 37:1, 20-24, (2016). https://doi.org/10.1080/08897077.2015.1129388

[253] Markwick L, McConnochie K, Wood N. Expanding telemedicine to include primary care for the urban adult. J Health Care Poor Underserved. 2015;26(3:771–776. doi: 10.1353/hpu.2015.0078

[254] Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

[255] Driessen J, Chang W, Patel P, Wright WM, Ernst K, and Handler SM. Nursing Home Provider Perceptions of Telemedicine for Providing Specialty Consults. *Telemed J E Health.* 2018 Jul 1; 24(7): 510–516. doi: 10.1089/tmj.2017.0076

[256] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[257] Hagenbrok E. *Bundled Payments for Care Improvement Advanced*.; 2018. https://innovation.cms.gov/files/x/bpciadvanced-rfa.pdf

[258] Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program*.; 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

[259] Dummit L, Marshall J, Bergman S, et al. *CMS Bundled Payments for Care Improvement Advanced Model: Year 1 Evaluation Annual Report*.; 2020. https://innovation.cms.gov/data-and-reports/2020/bpciadvanced-firstannevalrpt

[260] Centers for Medicare & Medicaid Services. *Information on Medicare Telehealth*.; 2018. Accessed July 8, 2020. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[261] Dummit L, Marshall J, Bergman S, et al. *CMS Bundled Payments for Care Improvement Advanced Model: Year 1 Evaluation Annual Report*.; 2020. https://innovation.cms.gov/data-and-reports/2020/bpciadvanced-firstannevalrpt

[262] Centers for Medicare & Medicaid Services. Comprehensive Care for Joint Replacement Model | CMS Innovation Center. Accessed July 10, 2020. https://innovation.cms.gov/innovation-models/cjr

[263] Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program*. 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

[264] The Lewin Group. CMS Comprehensive Care for Joint Replacement Model: Performance Year 2 Evaluation Report – Appendices. Second Annual Report. June 2019. https://downloads.cms.gov/files/cmmi/cjr-secondannrpt-app.pdf

[265] Phillip S. Telehealth under alternative payment models. Published September 13, 2017. Accessed July 10, 2020. https://www.milliman.com/en/insight/telehealth-under-alternative-payment-models

[266] Centers for Medicare & Medicaid Services. "Information on Medicare Telehealth" November 15, 2018. Available at: https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[267] NORC at the University of Chicago. *Next Generation Accountable Care Organization Model Evaluation*.; 2020. https://innovation.cms.gov/nextgenaco-secondevalrpt-app.pdf

[268] Centers for Medicare & Medicaid Services. "Information on Medicare Telehealth" November 15, 2018. Available at: https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

[269] Centers for Medicare & Medicaid Services. Comprehensive Primary Care Plus | CMS Innovation Center. Accessed July 10, 2020. https://innovation.cms.gov/innovation-models/comprehensive-primary-care-plus

[270] Centers for Medicare & Medicaid Services. *CPC+ 2018 Year in Review*. 2018. https://innovation.cms.gov/files/reports/cpcplus-2018-review.pdf

[271] Centers for Medicare & Medicaid Services. CPC+ Certified Health IT Requirements. Accessed July 10, 2020. https://innovation.cms.gov/files/x/cpcplus-hit-track2reqs.pdf

[272] Peikes D, Anglin G, Harrington M, et al. *Independent Evaluation of Comprehensive Primary Care Plus (CPC+) First Annual Report*. Accessed July 10, 2020. https://downloads.cms.gov/files/cmmi/cpcplus-first-ann-rpt.pdf

[273] Centers for Medicare & Medicaid Services. Value-Based Insurance Design Model (VBID) Fact Sheet CY 2020. Accessed August 4, 2020. https://www.cms.gov/newsroom/fact-sheets/value-based-insurance-design-model-vbid-fact-sheet-cy-2020

[274] Gilman B, Barterian L, Ellis L-L, et al. *Evaluation of the Round Two Health Care Innovation Awards (HCIA R2): First Annual Report*.; https://downloads.cms.gov/files/cmmi/hcia2-yroneevalrpt.pdf

[275] Gilman B, McCall N, Bogen K, et al. *Evaluation of the Round Two Health Care Innovation Awards (HCIA R2): Third Annual Report*. https://downloads.cms.gov/files/cmmi/hcia2-yr3evalrpt.pdf

[276] Gilman B, McCall N, Bogen K, et al. *Evaluation of the Round Two Health Care Innovation Awards (HCIA R2): Third Annual Report*. https://downloads.cms.gov/files/cmmi/hcia2-yr3evalrpt.pdf

[277] Smith KW, Bir A, Freeman NLB, Koethe BC, Cohen J, Day TJ. Impact Of Health Care Delivery System Innovations On Total Cost Of Care. *Health Affairs*. 2017;36(3):509-515. doi:10.1377/hlthaff.2016.1308

[278] Bir A, Smith K, Kahwati L, et al. Health Care Innovation Awards (HCIA) Meta-Analysis and Evaluators Collaborative. Annual Report Year 3. February 2018. https://downloads.cms.gov/files/cmmi/hcia-metaanalysisthirdannualrpt.pdf

[279] Devers K, Shartzer A, Torres GW, Berenson R. A Review of Proposed Models Deliberated and Voted on by the Physician-Focused Payment Model Technical Advisory Committee (PTAC) as of December 2019. March 2020. https://aspe.hhs.gov/system/files/pdf/252376/ProposedModelsDeliberatedandVotedonasofDec2019.pdf

[280] Sobel E. Remote specialists and experts on demand improving care and saving costs (Revised Version). Received October 30, 2019. https://aspe.hhs.gov/system/files/pdf/261881/ProposalSobel-Resubmitted_0.pdf

[281] Devers K, Shartzer A, Torres GW, Berenson R. A Review of Proposed Models Deliberated and Voted on by the Physician-Focused Payment Model Technical Advisory Committee (PTAC) as of December 2019. March 2020. https://aspe.hhs.gov/system/files/pdf/252376/ProposedModelsDeliberatedandVotedonasofDec2019.pdf

[282] Totten AM, Womack DM, Eden KB, et al. *Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews*. Agency for Healthcare Research and Quality (US); 2016. Accessed July 10, 2020. http://www.ncbi.nlm.nih.gov/books/NBK379320/

[283] Grusta A, Severns J, van Nijnatten J, et al. *Cost-Effectiveness of Telehealth Interventions for Chronic Heart Failure Patients: A Literature Review.* International Journal of Technology Assessment in Health Care; 2014 30(1): 1-10. doi: https://doi.org/10.1017/S0266462313000779

[284] Dinesen B, Haesum LKE, Soerensen N, et al. *Using preventive home monitoring to reduce hospital admission rates and reduce costs: a case study of telehealth among chronic obstructive pulmonary disease patients.* Journal of Telemedicine and Telecare; 2012. Accessed July 24, 2020. https://journals.sagepub.com/doi/abs/10.1258/jtt.2012.110704

[285] Darkin A, Kendall S, Edmonson E, et al. *Reduced Cost and Mortality Using Home Telehealth to Promote Self-Management of Complex Chronic Conditions: A Retrospective Matched Cohort Study of 4,999 Veteran Patients.* Telemedicine and e-Health Journal; 2015 Jan 19 21(1): 70-76. doi:10.1089/tmj.2014.0067

[286] Chaet D, Clearfield R, Sabin JE, and Skimming K. Ethical Practice in Telehealth and Telemedicine. *J Gen Intern Med*. 2017 Oct; 32(10): 1136-1140. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5602756/#MOESM1

[287] Abelson R. Is Telemedicine Here to Stay? *The New York Times*. Published August 3, 2020. Accessed August 4, 2020.https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html

[288] Daniel H and Sulmasy LS. Policy Recommendations to Guide the Use of Telemedicine in Primary Care Settings: An American College of Physicians Position Paper. *Annals of Internal Medicine.* November 17 2015.

[289] Chaet D, Clearfield R, Sabin JE, and Skimming K. Ethical Practice in Telehealth and Telemedicine. *J Gen Intern Med*. 2017 Oct; 32(10): 1136-1140. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5602756/#MOESM1

[290] Schwamm LH, Brown E, Fonarow GC, et al. Recommendations for the Implementation of Telehealth in Cardiovascular and Stroke Care: A Policy Statement from the American Heart Association. *AHA Journals*. Volume 135, Issue 7, 14 February 2017, Pages e24-e44 https://doi.org/10.1161/CIR.0000000000000475

[291] Daniel H and Sulmasy LS. Policy Recommendations to Guide the Use of Telemedicine in Primary Care Settings: An American College of Physicians Position Paper. *Annals of Internal Medicine.* November 17 2015.

[292] Uscher-Pines L. Moving on from telehealth-by-desperation: what will make telehealth stick. *HealthAffairs.* Published August 14, 2020. Accessed August 17, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200810.737666/full/

[293] Maryland Health Care Commission. Telehealth Readiness Assessment Tool. 2019. https://mhcc.maryland.gov/mhcc/pages/hit/hit_telemedicine/documents/TLHT_TRA_Tool.pdf

[294] Uscher-Pines L. Moving on from telehealth-by-desperation: what will make telehealth stick. *HealthAffairs.* Published August 14, 2020. Accessed August 17, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200810.737666/full/

[295] American Medical Association. Telehealth Implementation Playbook. Published 2020. Accessed July 8, 2020. https://www.ama-assn.org/system/files/2020-04/ama-telehealth-playbook.pdf

[296] United States Government Accountability Office. Telehealth: Use in Medicare and Medicaid. Testimony Before the Subcommittee on Agriculture, Energy, and Trade and Subcommittee on health and Technology, Committee on Small Business, House of Representatives. July 20, 2017. https://www.gao.gov/assets/690/685987.pdf

[297] AMD Global Telemedicine. I want to "do telemedicine": What is involved and how much does it cost? Published July 9, 2015. Accessed July 8, 2020. https://www.amdtelemedicine.com/blog/article/i-want-do-telemedicine-what-involved-and-how-much-does-it-cost

[298] American Medical Association. Telehealth Implementation Playbook. Published 2020. Accessed July 8, 2020. https://www.ama-assn.org/system/files/2020-04/ama-telehealth-playbook.pdf

[299] Badowski ME, Wright EA, Bainbridge J, Michienzi AM et al. Implementation and Evaluation of Comprehensive Medication Management in Telehealth Practices. *Journal of the American College of Clinical Pharmacy.* February 2020.

[300] The App Association, American Association for Respiratory Care, American Society of Nephrology, et al. *Multistakeholder Comments to the Senate to Finance Chronic Care*. Accessed July 9, 2020. https://actonline.org/wp-content/uploads/Multistakeholder-Comments-re-Senate-Finance-Chronic-Care-WG-062215.pdf

[301] Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *New England Journal of Medicine*. 2017;377(16):1585-1592. doi:10.1056/NEJMsr1503323

[302] Hollander JE, Davis TM, Doarn C, et al. Recommendations from the First National Academic Consortium of Telehealth. *Population Health Management*. 2017;21(4):271-277. doi:10.1089/pop.2017.0080

[303] American Academy of Dermatology. Position Statement on Teledermatology. Published March 21, 2020. Accessed July 10, 2020. https://server.aad.org/Forms/Policies/Uploads/PS/PS-Teledermatology.pdf?

[304] National Quality Forum. *Creating a Framework to Support Measure Development for Telehealth*. National Quality Forum; 2017. https://www.qualityforum.org/Publications/2017/08/Creating_a_Framework_to_Support_Measure_Development_for_Telehealth.aspx

[305] Hilty DM, Maheu MM, Drude KP, Hertlein KM. The Need to Implement and Evaluate Telehealth Competency Frameworks to Ensure Quality Care across Behavioral Health Professions. *Acad Psychiatry*. 2018;42(6):818-824. doi:10.1007/s40596-018-0992-5

[306] Navathe AS, Liao JM. After COVID-19, a payment policy reboot: three lessons from the pandemic on how to improve value-based payment. August 11, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200805.905205/full/

[307] American Academy of Dermatology. Position Statement on Teledermatology. Published March 21, 2020. Accessed July 10, 2020. https://server.aad.org/Forms/Policies/Uploads/PS/PS-Teledermatology.pdf?

[308] National Quality Forum. *Creating a Framework to Support Measure Development for Telehealth*. National Quality Forum; 2017. https://www.qualityforum.org/Publications/2017/08/Creating_a_Framework_to_Support_Measure_Development_for_Telehealth.aspx

[309] Hilty DM, Maheu MM, Drude KP, Hertlein KM. The Need to Implement and Evaluate Telehealth Competency Frameworks to Ensure Quality Care across Behavioral Health Professions. *Acad Psychiatry*. 2018;42(6):818-824. doi:10.1007/s40596-018-0992-5

[310] National Quality Forum. *Creating a Framework to Support Measure Development for Telehealth*. National Quality Forum; 2017. https://www.qualityforum.org/Publications/2017/08/Creating_a_Framework_to_Support_Measure_Development_for_Telehealth.aspx

[311] Daniel H and Sulmasy LS. Policy Recommendations to Guide the Use of Telemedicine in Primary Care Settings: An American College of Physicians Position Paper. *Annals of Internal Medicine.* November 17 2015.

[312] Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *New England Journal of Medicine*. 2017;377(16):1585-1592. doi:10.1056/NEJMsr1503323

[313] Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *New England Journal of Medicine*. 2017;377(16):1585-1592. doi:10.1056/NEJMsr1503323

[314] The American College of Obstetricians and Gynecologists (ACOG). Implementing Telehealth in Practice Number 798: Presidential Task Force on Telehealth. February 2020. https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2020/02/implementing-telehealth-in-practice

[315] Gianforcaro R. Virtual Care: Business vs Primary Care Model. Presented at the: UNC Virtual Care Center.

[316] Yang, YT. Telehealth Parity Laws. *Health Affairs*. August 2016. https://www.healthaffairs.org/do/10.1377/hpb20160815.244795/full/

[317] Chaet D, Clearfield R, Sabin JE, and Skimming K. Ethical Practice in Telehealth and Telemedicine. *J Gen Intern Med*. 2017 Oct; 32(10): 1136-1140. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5602756/#MOESM1

[318] Rehm J. Telemedicine: The Cost-Effective Future of Healthcare. AJMC. Published December 6, 2016. Accessed July 9, 2020. https://www.ajmc.com/contributor/john-rehm/2016/12/telemedicine-the-cost-effective-future-of-healthcare

[319] Hollander JE, Davis TM, Doarn C, et al. Recommendations from the First National Academic Consortium of Telehealth. *Population Health Management*. 2017;21(4):271-277. doi:10.1089/pop.2017.0080

[320] United States Government Accountability Office. Telehealth: Use in Medicare and Medicaid. Testimony Before the Subcommittee on Agriculture, Energy, and Trade and Subcommittee on health and Technology, Committee on Small Business, House of Representatives. July 20, 2017. https://www.gao.gov/assets/690/685987.pdf

[321] Abelson R. Is Telemedicine Here to Stay? *The New York Times*. Published August 3, 2020. Accessed August 4, 2020.https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html

[322] Navathe AS, Liao JM. After COVID-19, a payment policy reboot: three lessons from the pandemic on how to improve value-based payment. August 11, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200805.905205/full/

[323] Chaet D, Clearfield R, Sabin JE, and Skimming K. Ethical Practice in Telehealth and Telemedicine. *J Gen Intern Med*. 2017 Oct; 32(10): 1136-1140. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5602756/#MOESM1

[324] Medicare Payment Advisory Commission (MedPAC). *Telehealth Services and the Medicare Program*.; 2016. Accessed July 9, 2020. http://www.medpac.gov/docs/default-source/reports/chapter-8-telehealth-services-and-the-medicare-program-june-2016-report-.pdf

[325] Khubchandani A and Thew D. Achieving Equity in the Health of Women with Disabilities Through Telehealth: Challenges and Benefits. *Eliminating Inequities for Women with Disabilities: An Agenda for Health and Wellness*. 2016. Pages 83-89

[326] Uscher-Pines L. Moving on from telehealth-by-desperation: what will make telehealth stick. *HealthAffairs.* Published August 14, 2020. Accessed August 17, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200810.737666/full/

[327] Horn, D. Telemedicine is booming during the pandemic. But it's leaving people behind. *Washington Post.* Published July 9, 2020. Accessed August 19, 2020. https://www.washingtonpost.com/outlook/2020/07/09/telemedicine-is-booming-during-pandemic-its-leaving-people-behind/

[328] Uscher-Pines L. Moving on from telehealth-by-desperation: what will make telehealth stick. *HealthAffairs.* Published August 14, 2020. Accessed August 17, 2020. https://www.healthaffairs.org/do/10.1377/hblog20200810.737666/full/

[329] Horn, D. Telemedicine is booming during the pandemic. But it's leaving people behind. *Washington Post.* Published July 9, 2020. Accessed August 19, 2020. https://www.washingtonpost.com/outlook/2020/07/09/telemedicine-is-booming-during-pandemic-its-leaving-people-behind/

[330] Bauerly BC, McCord RF, Hulkower R, et al. Broadband Access as a Public Health Issue: The Role of Law in Expanding Broadband Access and Connecting Underserved Communities for Better Health Outcomes" *The Journal of Law, Medicine & Ethics.* July 12 2019. https://journals.sagepub.com/doi/10.1177/1073110519857314

[331] United States Government Accountability Office. Telehealth: Use in Medicare and Medicaid. Testimony Before the Subcommittee on Agriculture, Energy, and Trade and Subcommittee on health and Technology, Committee on Small Business, House of Representatives. July 20, 2017. https://www.gao.gov/assets/690/685987.pdf

[332] Khubchandani A and Thew D. Achieving Equity in the Health of Women with Disabilities Through Telehealth: Challenges and Benefits. *Eliminating Inequities for Women with Disabilities: An Agenda for Health and Wellness*. 2016. Pages 83-89

[333] Schadelbauer R. Anticipating Economic Returns of Rural Telehealth. *NTCA The Rural Broadband Association*. March 2017. https://www.ntca.org/sites/default/files/documents/2017-12/SRC_whitepaper_anticipatingeconomicreturns.pdf

[334] Wilcock AD, Rose S, and Busch AB. Association Between Broadband Internet Availability and Telemedicine Use. *JAMA Intern Med.* 2019;179(11):1580-1582. doi: 10.1001/jamainternmed.2019.2234

[335] Abelson R. Is Telemedicine Here to Stay? *The New York Times*. Published August 3, 2020. Accessed August 4, 2020. https://www.nytimes.com/2020/08/03/health/covid-telemedicine-congress.html.

[336] Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

[337] Park J, Erikson C, Han X, Iyer P. Are State Telehealth Policies Associated With The Use Of Telehealth Services Among Underserved Populations? *Health Affairs*. 2018;37(12):2060-2068. doi:10.1377/hlthaff.2018.05101

[338] Schwamm LH, Brown E, Fonarow GC, et al. Recommendations for the Implementation of Telehealth in Cardiovascular and Stroke Care: A Policy Statement from the American Heart Association. *AHA Journals*. Volume 135, Issue 7, 14 February 2017, Pages e24-e44 https://doi.org/10.1161/CIR.0000000000000475

[339] Khubchandani A and Thew D. Achieving Equity in the Health of Women with Disabilities Through Telehealth: Challenges and Benefits. *Eliminating Inequities for Women with Disabilities: An Agenda for Health and Wellness*. 2016. Pages 83-89

[340] Horn, D. Telemedicine is booming during the pandemic. But it's leaving people behind. *Washington Post.* Published July 9, 2020. Accessed August 19, 2020. https://www.washingtonpost.com/outlook/2020/07/09/telemedicine-is-booming-during-pandemic-its-leaving-people-behind/

[341] Knight V. Medicare Fraudsters Now Tap Telemedicine In Medical Equipment Scams. Kaiser Health News. Published October 9, 2019. Accessed August 7, 2020. https://khn.org/news/medicare-fraud-telemedicine-medical-equipment-scams/

[342] The United States Attorney's Office Southern District of Georgia. Telemedicine company owner charged in $60 million fraud scheme. Published April 23, 2020. Accessed August 7, 2020. https://www.justice.gov/usao-sdga/pr/telemedicine-company-owner-charged-60-million-fraud-scheme

[343] American Bar Association. Federal Government Steps Up Investigations to Expose Fraud as Telemedicine Expands. Published July 16, 2020. Accessed August 7, 2020. https://www.americanbar.org/groups/health_law/section-news/2020/07/fed-ste/

[344] Health IT Security. Telehealth Is the New Normal, But So Is Online Fraud. HealthITSecurity. Published July 27, 2020. Accessed August 7, 2020. https://healthitsecurity.com/news/telehealth-is-the-new-normal-but-so-is-online-fraud

[345] Eramo LA. Implement these 6 safeguards against fraud accusations in telehealth. hfma. Accessed August 7, 2020. https://www.hfma.org/topics/news/2020/07/implement-these-6-safeguards-against-fraud-accusations-in-telehe.html

[346] Eramo LA. Implement these 6 safeguards against fraud accusations in telehealth. hfma. Accessed August 7, 2020. https://www.hfma.org/topics/news/2020/07/implement-these-6-safeguards-against-fraud-accusations-in-telehe.html

[347] Mehrotra A, Wang B, Snyder G. Telemedicine: What Should the Post-Pandemic Regulatory and Payment Landscape Look Like? Published August 5, 2020. Accessed August 13, 2020. https://www.commonwealthfund.org/publications/issue-briefs/2020/aug/telemedicine-post-pandemic-regulation

[348] Doarn CR, Pruitt S, Jacobs J, et al. Federal Efforts to Define and Advance Telehealth—A Work in Progress. *Telemed J E Health*. 2014;20(5):409-418. https://doi.org/10.1089/tmj.2013.0336

[349] Telehealth Programs. Official website of the U.S. Health Resources & Services Administration. Published April 28, 2017. Accessed July 8, 2020. https://www.hrsa.gov/rural-health/telehealth

[350] FMSB of State Medical Boards "Telehealth, Telemedicine, and Telecare: What's What? Federal Communications Commission" Published September 17, 2014. Accessed July 10, 2020.https://www.fcc.gov/general/telehealth-telemedicine-and-telecare-whats-what

[351] Federation of State Medical Boards. House of Delegates Annual Business Meeting. https://www.fsmb.org/siteassets/annual-meeting/hod/april-28-2018-fsmb-hod-book.pdf

[352] FMSB of State Medical Boards "Telehealth, Telemedicine, and Telecare: What's What? Federal Communications Commission" Published September 17, 2014. Accessed July 10, 2020. https://www.fcc.gov/general/telehealth-telemedicine-and-telecare-whats-what

[353] Medicaid. *Telemedicine.* Accessed August 31, 2020.https://www.medicaid.gov/medicaid/benefits/telemedicine/index.html

[354] World Health Organization. eHealth at WHO. World Health Organization. Published 2020. Accessed July 10, 2020.https://www.who.int/ehealth/about/en/

[355] Federal Drug Administration. Digital Health. FDA. Published June 30, 2020. https://www.fda.gov/medical-devices/digital-health