

Eye Care Emergency Department Avoidance (EyEDA) Model Environmental Scan

8/28/2019

I. Overview

The purpose of this environmental scan is to provide members of the Physician-Focused Payment Model Technical Advisory Committee (PTAC) with background information and context for the physician-focused payment model (PFPM), Eye Care Emergency Department Avoidance (EyEDA) Model, which was proposed by the University of Massachusetts Medical School on June 27, 2019.

The scan focuses on the epidemiology of emergency department (ED)-avoidable eye conditions among Medicare beneficiaries, issues in Medicare payment policy affecting ocular disease care, problems in eye care delivery, and results of proposed or similar models addressing ocular care. The Appendix includes the search terms and sources used to identify the research summarized below.

Information on the Submitter, University of Massachusetts Medical School Department of Population & Quantitative Health Sciences

The University of Massachusetts (UMass) Medical School, in partnership with UConn Health, formed the Southern New England Practice Transformation Network (SNE-PTN), one of the 29 current PTNs formed through the Transforming Clinical Practice Initiative (TCPI). Under TCPI, the UMass SNE-PTN provides support to clinicians investing in quality improvement strategies, including over 1,600 optometry practices. According to a press release put out by SNE-PTN, the collaboration has enrolled over 5,400 participating clinicians and expects to achieve \$59 million in cost savings over a four-year period ending in 2019. In addition to specialty and primary care, the SNE-PTN provides quality improvement resources specifically for optometrists, including information on how to reduce unnecessary hospitalizations and the importance of diabetes eye exams.

Epidemiology of ED-Avoidable Ocular Conditions

ED-avoidable eye conditions. In a study using National Emergency Department Sample data, between 2006 and 2011 adults over age 65 visited the ED 932,757 times, or about 186,000 visits per year, for eye-related diagnoses (Channa et al., 2016). Visits by adults over age 65 composed 7.8 percent of all eye-related ED visits. In classifying visits as emergent or non-emergent, Channa and colleagues considered whether the diagnosis codes suggested an immediate threat to vision and whether the condition could be managed in an eye clinic or urgent care center. This environmental scan did not identify published estimates of the prevalence of the eye conditions proposed by the submitter among Medicare fee-for-service (FFS) beneficiaries. Published literature generally focused on the prevalence of age-related ophthalmic conditions such as glaucoma, cataracts, and macular degeneration.

Emergent and non-emergent utilization for eye-related care. Among those age 65 or over who visited an ED for eye-related care, the Channa et al. study found 37.0 percent of visits were emergent, 37.3 percent were non-emergent, and 25.7 percent could not be determined. The most common non-emergent ED diagnoses among adults age 65 or older were conjunctivitis (13 percent of all eye-related ED visits), conjunctival hemorrhage (10 percent), and external hordeolum (external eyelid stye, 1.2

percent). These were also the most common non-emergent diagnoses among adults age 19 to 64 (Channa et al., 2016). The most common reasons for emergent eye-related ED visits among adults age 65 and older were corneal abrasion (10 percent of all eye-related visits), foreign bodies (4.0 percent), and contusion of eye and orbital tissues (3.4 percent). Previous studies have shown that nearly three-quarters of ophthalmic-related ED visits were for patients age 44 years and younger (Vaziri et al., 2016; Owens & Mutter, 2011). Elderly adults aged 65 years or older accounted for only 8.5 percent of ED visits related to eye injuries (Vaziri et al., 2016).

After adjusting for other patient characteristics, Medicare beneficiaries were slightly more likely than uninsured patients to use the ED for emergent eye-related conditions, as were patients with private insurance (Channa et al., 2016). Prager et al., (2019) found that 73.2 percent of inpatient hospitalizations of Medicare patients for eye conditions were emergent and 14.7 percent were urgent (the rest were elective, from a trauma center, or other). Information on urgent care visits for eye conditions is limited, but for all age groups and payers between 2006 and 2011, emergent and non-emergent eye injuries made up 1.8 percent of urgent care center visits, 0.6 percent of ED visits, and 0.0 percent of retail clinic visits (Weinick et al., 2010).

When avoidable ED visits occur. A disproportionate number of eye-related ED visits on weekends or after hours could indicate access barriers if patients need eye care when office-based providers are generally closed. If ED visits were evenly distributed across days, 29 percent of visits would occur on the weekend. However, Channa et al. (2016) found that for patients over the age of 65, 36 percent of all ED visits with a principal diagnosis related to the eye occurred on the weekend.

Characteristics of Medicare beneficiaries impacted by ED-avoidable eye conditions. Channa and colleagues found that the average age of patients over the age of 65 who visited an ED with any eye condition was 75, 57 percent were female, and 38.7 percent lived in the South. Most eye-related ED visits were discharged home (88.7 percent). There was no significant difference in ED visits by income. Additionally, the majority (53.8 percent) of Medicare beneficiaries hospitalized for an eye condition were female and, compared to non-ocular hospitalizations, significantly more patients were younger and African American (Channa et al., 2016).

Issues in Payment Policy

Medicare FFS optometry/ophthalmology coverage. In general, Medicare FFS does not provide beneficiaries with vision benefits to cover routine eye exams, eyeglasses, or contacts. Federal laws explicitly exclude Medicare from covering expenses for routine vision services to determine the refractive state of eyes, such as comprehensive eye exams and eyeglasses (CMS Medicare Vision Services, 2018). Some FFS beneficiaries have access to additional benefits through supplemental private coverage or Medicaid, and Medicare Advantage beneficiaries may have supplemental vision benefits (Willink et al., 2018).

FFS Medicare does cover optometry and ophthalmology procedures that are “reasonable and necessary for the diagnosis or treatment of illness or injury,” primarily physicians’ services performed in conjunction with an eye disease (CMS, 2019). Covered eye and vision services under Medicare FFS

include macular degeneration tests and treatment, glaucoma screening¹, intraocular lenses (IOLs) and related services², eye exams, and eye prostheses (CMS Medicare Vision Services, 2018). For Medicare beneficiaries with diabetes, Part B covers one comprehensive eye exam per year to screen for diabetic retinopathy (CMS, n.d.). Among those covered eye conditions, age-related macular degeneration and cataracts accounted for the largest sources of Medicare spending for ophthalmologists. In 2012, Medicare paid 44,960 providers \$6.7 billion for ophthalmology services for cataracts and age-related macular degeneration (OIG, 2015).

Merit-Based Incentive Payment Systems (MIPS) program. For 2019, CMS finalized a new MIPS Improvement Activity (IA) focused on promoting comprehensive eye exams. Physicians may provide patients with literature or facilitate conversations regarding the importance of a comprehensive eye exam using materials created by the American Optometric Association (AOA) to earn this MIPS IA credit (AOA, 2019).

Medicare Advantage optometry/ophthalmology coverage. Medicare Advantage (MA) plans are required to cover the optometry and ophthalmology services that are covered under Medicare FFS. MA plans may also offer additional coverage in vision care, but these benefits vary from plan to plan. The majority of MA beneficiaries have access to services and benefits that are not covered by Medicare FFS. Among MA enrollees, 78 percent are enrolled in plans that cover routine eye exams or glasses (Jacobson et al., 2019).

Relationship between Medicare beneficiaries and eye care providers. An established relationship with an eye care specialist has been shown to decrease avoidable ED visits for non-emergent eye conditions; one study of adults aged 21 and over found that enrollees in a managed care network with a regular eye care provider had a 14 percent decreased chance for seeking treatment in the ED for any ocular problem and a 10 percent decreased chance of going to the ED for a non-emergent eye condition (compared to those who did not have a regular eye care provider) (Stagg et al., 2017). Evidence for Medicare beneficiaries' relationships with eye care providers primarily focuses on beneficiaries with chronic conditions. For instance, using data from the Health and Retirement Study from 1998, 2000, and 2002, Sloan and colleagues found that beneficiaries with diabetes, glaucoma, or age-related macular degeneration, 12 percent had no eye examinations in a five-year period (13.6 percent had one visit, 17.0 percent had two visits, and 57.5 percent had at least three exams) (Sloan et al., 2014).

In general, Medicare beneficiaries report unmet need for vision care, particularly low-income beneficiaries. In an analysis of the 2016 Medicare Current Beneficiary Survey, Willink and colleagues found that 48 percent of beneficiaries with income below 100 percent FPL who had trouble seeing had had an eye exam in the past year; even among higher-income beneficiaries (>400 percent FPL), only 66 percent with trouble seeing reported having an eye exam in the past year (2018).

Medicare FFS optometry/ophthalmology payments. Medicare reimbursements to optometrists are increasing as a share of practice revenue. In 2013, Medicare disbursed nearly \$1.1 billion to optometrists, a 74 percent increase from the reported payment of \$611 million in 2004. During the same year, Medicare paid \$5.6 billion to ophthalmologists, which indicated an increase of 32 percent

¹ Medicare Part B will cover glaucoma tests once every 12 months if the patient is at high risk for glaucoma. This includes people with diabetes, a family history of glaucoma, African Americans who are age 50+, and Hispanics who are age 65+.

² Cataract removal is included.

compared to 2004 (AOA, 2013). In 2011, 5.7 million Medicare beneficiaries were treated by optometrists, and 10.9 million were treated by ophthalmologists (AOA, 2013). For ophthalmologists, a substantial portion of Medicare payments (30.6 percent) was attributed to medication use, primarily for anti-vascular endothelial growth factor therapy drugs.³ (Han et al., 2017). During the same year, Medicare also disbursed \$2 million for ophthalmology procedures to approximately 800 physicians who were not listed as eye specialists in the CMS database (OIG, 2015).

Spending for eye-related ED visits. In 2010, the total ED charge across payers for ophthalmic-related visits was \$1.72 billion, accounting for 0.76 percent of the total ED charge for all reasons (\$225 billion). However, according to the National Emergency Department Sample, presentations for ophthalmic reasons in 2010 represented 1.5 percent of all ED visits (Vaziri et al., 2016). The majority of the patients who seek ophthalmic care in an ED were covered by private insurance; Medicare accounted for only approximately 10 percent of the payment (Haring et al., 2016).

Eye specialists in Accountable Care Organizations (ACOs). Medicare beneficiaries who are associated with a Next Generation ACO (NGACO) can receive telehealth services from their doctor from their homes, regardless of geographic location, using two-way telecommunications systems. In addition, these beneficiaries are allowed to receive certain ophthalmology services such as reading of retinal scans using asynchronous (i.e., store and forward) telehealth technology. (To bill for these services, physicians—including ophthalmologists—must be a NGACO participant or preferred provider.) (CMS Next Generation..., 2018)

Problems in Care Delivery

Health outcomes and costs of ED usage. Patients presenting at an ED with non-emergent ocular conditions may experience long wait times, which may cause them to choose to leave without treatment (Weinick, 2010). Further, patients with non-urgent medical conditions may contribute to ED overcrowding, leading to delays in care for other patients with emergent conditions (Stagg, 2017).

Additionally, some studies report a significant increase in cost when treating non-emergent conditions in the ED. Non-urgent ED care, on average, costs two to three times more when compared to similar visits in other settings. For example, in 2011 the average cost of conjunctivitis treatment is \$390 in the ED, \$136 in an ophthalmologist's office, and \$101 in urgent care (Channa et al., 2016).

Symptoms of emergent eye conditions typically do not overlap with non-emergent conditions. For example, conjunctivitis presents with continuous discharge that is watery or serous. No other conditions present with discharge, mild or no pain, and blurring or normal vision besides conjunctivitis. Any other conditions presenting with mild or no pain, such as episcleritis, subconjunctival hemorrhage, and dry eye, are non-emergent and can be handled in outpatient or urgent care situations. Moderate to severe eye pain, vision loss, distorted pupils, and/or corneal involvement characterizes emergent conditions (Cronau et al., 2010).

Current standards of care for optometry. Annual comprehensive eye exams are recommended for adults over 65 to quickly diagnose and treat potentially blinding eye conditions (AOA, 2015). The equipment needed to perform these exams is generally only available in an optometrist's office (Duffy,

³ Ophthalmologists use anti-VEGF drugs to treat wet age-related macular degeneration, macular edema, diabetic retinopathy, and retinal vein occlusion.

n.d.). A 2015 survey of optometric offices showed that offices are open, on average, 46 hours a week. Few offices are open on Sundays, and 59 percent of offices are open on Saturdays for an average of five hours (Management and Business Academy for Eye Care Professionals, 2015). Therefore, the ED is one of the few options for after-hours treatment. Problems arise in EDs, however, as equipment to diagnose the condition accurately is not always available (Stagg et al., 2017).

Channa et al. (2016) suggest that current utilization of EDs for ocular conditions includes a significant share of non-emergent visits that are more suitable for an optometrist's office, and EDs should focus their resources on patients with urgent conditions through prioritization. Eye care professionals are not often available in ED settings. Therefore, patients may often be seen by a provider who may not accurately diagnose their condition. Patients seen by eye care professionals will also receive screening for more serious conditions, such as glaucoma, diabetic retinopathy, and macular degeneration.

Guidelines from the American Academy of Ophthalmology (2014) recommend that a patient who exhibits the following signs should be referred to an ophthalmologist for a definitive diagnosis:

- Failure to achieve normal acuity in either eye, unless pre-diagnosed
- Significant eye injury, trauma, or pain
- Flashes or recent onset of floaters, halos, dimming, or distortion, obscured vision, loss of vision, double vision, or tearing
- Transient or sustained loss of any part of the visual field
- Abnormalities or opacities in the normally transparent media of the eye
- Tumor or swelling of the eyes
- Inflammation with or without discharge
- Crossed eyes that do not straighten with glasses
- Intraocular pressure at an abnormal level or a family history of glaucoma
- Diabetes mellitus without a recent retinal exam
- Eye abnormalities associated with thyroid disease

Innovations in care delivery for optometry. The latest in eye care innovation is remote eye care through portable diagnostic devices. These are specialized tools for ophthalmologists. Through data-sharing, decision support systems, and training, ophthalmologists can expand resources to patients who may not otherwise have access, as well as screen at-risk patients in other health care settings (Richhariya et al., 2019).

University of New Mexico's Project ECHO (Extension for Community Healthcare Outcomes) expanded knowledge through pairing ophthalmologists with community optometrists (COs). In a small-scale evaluation, COs felt more confident after learning sessions in diagnosis, explaining that "certainly for me it will reduce some unnecessary referrals but it will also help me pick up on things that I really need to refer" (Williams et al., 2018).

Results of Other Similar or Proposed Models

The vast majority of eye care specialists (ophthalmologists and optometrists) bill using a FFS model, and it is anticipated that most will continue to do so under the MIPS program (Kinker et al., 2017). However, optometrists in particular are still unable to access certain aspects of the MIPS infrastructure due to the lack of specialty-specific MIPS quality reporting measures (AOA, 2016).

This environmental scan was unable to identify any specialty-specific payment or delivery model available to ophthalmologists or optometrists (Herbst and Emmert, 2017). Although eye care specialists can participate in an APM through an ACO, there is limited research on the involvement of eye care specialists and the impact of ACOs on eye and vision health, in part due to a lack of eye care-related quality measures in the reporting requirements for ACOs (Teutsch, 2016).

Alternative Payment Models Available to Eye Care Specialists:

Next Generation ACO Model. The NGACO model includes optometrists as a category of non-physician practitioners eligible to affiliate with the model as preferred but not participating providers. As preferred providers, optometrists may operate across multiple ACOs and may participate in shared savings and in waiver services (like teleophthalmology services to interpret scans) under the model but do not participate in quality reporting through the NGACO (CMMI, NGACO Model Evaluation Annual Report, 2018). Multiple studies have measured the effectiveness of telehealth technology in evaluating, diagnosing, and managing a remote patient in need of eye care. For example, the diabetic retinopathy surveillance programs implemented in more than 100 Indian Health Service (IHS) rural and urban facilities in 25 states complete over 20,000 yearly eye exams and have increased surveillance by 50 percent (IHS, n.d.). Emergency tele-ophthalmology services are also used by small, rural hospitals to connect with ED physicians who remotely examine the patient and determine whether the patient can be treated locally instead of in the ED. A study by Natafghi et al. (2017) examined more than 9,000 tele-ER encounters over the course of 52 months at 85 small rural hospitals and concluded that nearly 1,200 patients likely would have been transferred to the ED if not for the tele-ER service.

TCPI. This CMS-led initiative was designed to support clinician practices through peer-based learning networks that facilitate practice transformation. Multiple PTNs have produced favorable outcomes through the TCPI initiative. For instance, a pilot project within the MidSouth PTN was able to reduce all-cause ED visits per 1,000 patients by 52 percent in the first year, whereas comparable practices only reduced ED visits per 1,000 members by 2 percent during the same period (MidSouth PTN, n.d.).

Medicare Advantage Plans. MA plans contract with the federal government to provide extra benefits and services to seniors, including vision care. Although this environmental scan did not find published descriptions of efforts by MA plans to reduce potentially avoidable eye-related ED visits specifically, a study by Avalere Health for the Better Medicare Alliance (an MA advocacy group) compares utilization, costs, and quality for beneficiaries with chronic conditions in Medicare Advantage and FFS Medicare. The analysis showed that Medicare beneficiaries with chronic conditions enrolled in MA plans had 33 percent fewer emergency room visits and 23 percent fewer inpatient stays than those enrolled in traditional FFS Medicare in 2015 (Avalere Health, 2018). Beneficiaries in FFS Medicare did have higher rates of eye disease than beneficiaries in MA plans (42 percent versus 32.9 percent). Lower rates of ED utilization for all conditions is attributed to MA plans' efforts to guide seniors to lower-cost services and coordinated care. Seniors in MA plans have higher rates of screening/tests and receive more preventative care. MA beneficiaries are also encouraged to see primary doctors, which avoids downstream utilization of costly and unnecessary services driven by acute care and emergency needs, ultimately keeping seniors out of the hospital and ED.

II. Annotated Bibliography

American Academy of Ophthalmology. Referral of Persons with Possible Eye Diseases or Injury—2014. <https://www.aao.org/clinical-statement/guidelines-appropriate-referral-of-persons-with-po>. Accessed August 7, 2019.

Subtopic(s): Problems in Care Delivery

Type of Source: Clinical guidelines

Objective: To determine the evidence-based guidelines for ophthalmology referrals.

Main Findings: Most eye conditions should be referred to an ophthalmologist for accurate diagnosis and further testing.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

American Optometry Association. Comprehensive Adult Eye and Vision Examination. <https://www.aoa.org/patients-and-public/caring-for-your-vision/comprehensive-eye-and-vision-examination/recommended-examination-frequency-for-pediatric-patients-and-adults>. Published September 2015. Accessed August 7, 2019.

Subtopic(s): Problems in Care Delivery

Type of Source: Clinical guidelines

Objective: To determine the clinical guidelines for comprehensive adult eye exams.

Main Findings: N/A

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

American Optometric Association. 2019 MIPS Guidebook. A Road Map to Success for Doctors of Optometry. <https://www.aoa.org/news/practice-management/mips-what-you-need-to-know-for-2019>. Published February 20, 2019. Accessed August 5, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: 2019 MIPS Guidebook

Objective: To provide information on policy, payment, and quality provisions changes to the Medicare PFS for CY2019 and their impact to optometrists.

Main Findings: In 2019, physicians may provide patient literature or facilitate conversation about the value of comprehensive eye examinations using materials provided from AOA to earn an IA credit.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

American Optometric Association. The State of the Optometric Profession: 2013. https://www.aoa.org/Documents/news/state_of_optometry.pdf. Accessed August 7, 2019

Subtopic(s): Issues in Payment Policy

Type of Source: A report produced by American Optometric Association

Objective: To provide the current status of optometry in the delivery to the American public.

Main Findings: Medicare payments to optometrists account for an increasing share of revenue. In 2013, it is anticipated that Medicare will pay nearly \$1.1 billion to optometrists. This represents an increase of 74 percent compared to 2004. In the same year, Medicare payments to ophthalmologists increased 32 percent, from \$4.2 billion in 2004 to \$5.6 billion in 2013.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

Avalere Health. Medicare Advantage Achieves Cost-Effective Care and Better Outcomes for Beneficiaries with Chronic Conditions Relative to Fee-for-Service Medicare.

http://go.avalere.com/acton/attachment/12909/f-0570/1/-/-/-/20180711%20-%20MA%20v%20FFS%20Study%20Report%20Final%20-%20Embargo.pdf?nc=0&ao_optin=1. Published July 2018. Accessed August 7, 2019.

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Report

Objective: The objective of this study is to compare demographic and clinical characteristics, overall healthcare utilization, cost of care, and related clinical quality outcomes in 2 large national samples of Medicare Advantage and FFS Medicare beneficiaries enrolled for the full year of 2015.

Main Findings: Despite a higher proportion of clinical and social risk factors, Medicare Advantage beneficiaries with chronic conditions experience lower utilization of high-cost services, comparable average costs, and better outcomes. Dual eligible/low-income subsidy Medicare Advantage beneficiaries with chronic conditions experience significantly better patient outcomes and lower costs savings compared to similar beneficiaries in FFS Medicare.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: A descriptive cross-sectional cohort design was used to analyze a sample of 1,581,822 Medicare Advantage beneficiaries extracted from Inovalon's proprietary MORE2 Registry® and a sample of 1,212,698 FFS Medicare beneficiaries extracted from Medicare Standard Analytic Files.

Channa R, Zafar SN, Canner JK, Haring RS, Schneider EB, Friedman DS. Epidemiology of eye-related emergency department visits. *JAMA Ophthalmology*. 2016;134(3):312–319.

<https://doi.org/10.1001/jamaophthalmol.2015.5778>

Subtopic(s): Problems in Care Delivery; Epidemiology of Ocular Conditions

Type of Source: Journal article

Objective: To determine the epidemiology, costs, and health outcomes of eye-related ED visits.

Main Findings: The majority of ED visits for ocular problems across the United States were non-emergent, 44.3 percent. Twenty-eight percent of those visits were for conjunctivitis, which is managed best in an outpatient setting. Costs were often lower in urgent care centers and outpatient settings than EDs.

Strengths/Limitations: The study was robust and had a large sample size. One limitation is that Nationwide Emergency Department Sample (NEDS) does not provide final cost to the patient, physician, or hospital for ED visits and only provides overall hospital charges.

Generalizability to Medicare Population: Yes.

Methods: The data analysis examined 2006-2011 NEDS data.

Center for Medicare and Medicaid Innovations (CMMI). First Annual Report: Next Generation Accountable Care Organization (NGACO) Model Evaluation. <https://innovation.cms.gov/Files/reports/nextgenaco-firstannrpt.pdf>. Published August 2018. Accessed August 14, 2019.

Subtopic(s): Results of Proposed or Similar Models

Type of Source: Evaluation report

Objective: To present initial descriptive and analytic findings for the 18 NGACOs that launched in 2016, were active for at least one quarter, and were financially responsible in the model's first performance year (PY1).

Main Findings: In PY1, 2016 NGACO providers reduced spending for their beneficiaries by \$100.08 million (1.7 percent). Most of the decline in spending could be attributed to reduced Medicare spending on post-acute care, most notably on spending in skilled nursing facilities that reached statistical significance for three ACOs. Early findings show a significant reduction in Medicare Part A and B spending, totaling \$100.09 million. There was a significant relative reduction in inpatient hospital days and evaluation and management visits (outside acute care hospital and ED settings). There was a significant relative increase in beneficiaries receiving annual wellness visits. Impact on measures of spending, utilization, and quality of care were favorable for most of 18 NGACOs in PY1, with few showing significant findings. The authors calculated a net reduction in Medicare spending totaling \$62.12 million from NGACOs in 2016, corresponding to a decrease of \$11.20 per beneficiary per month (PBPM), or 1.1 percent.

Strengths/Limitations: Limitations include the potential impact on modeling of the wide variation in Medicare spending among the study sample and the influence of spillover (ACO-affiliated providers delivering care to both aligned beneficiaries and comparators) and of other value-based purchasing models, including other CMMI initiatives.

Generalizability to Medicare Population: Yes

Methods: Analyses of program documents and of interviews and surveys with ACO leadership were conducted to identify organizational characteristics, NGACO model features selected for PY1 (2016), and selected market characteristics, as well as to describe early implementation experience. Impact was measured using Medicare claims and a difference-in-differences design.

Centers for Disease Control and Prevention. Conjunctivitis (Pink Eye). <http://www.cdc.gov/conjunctivitis/about/diagnosis.html>. Page Reviewed January 4, 2019. Accessed August 2, 2019.

Subtopic(s): Problems in Care Delivery

Type of Source: Fact Sheet

Objective: To determine the diagnosis and difference in strains of conjunctivitis.

Main Findings: There are three different strains of conjunctivitis: allergic, viral, and bacterial.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

CMS. Next Generation Accountable Care Organization (NGACO) Year Three Benefit Enhancements. MLN Matters article. <https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/downloads/MM10044.pdf>. Revised August 24, 2018. Retrieved August 20, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Training booklet

Objective: To provide physicians who are participating in NGACOs and submitting claims to Medicare Administrative Contractors (MACs) for services provided to Medicare enrollees.

Main Findings: CMS is expanding the current telehealth waiver to include asynchronous telehealth in the specialties of teleophthalmology. Payment will be permitted for telemedicine when asynchronous telehealth in single or multimedia formats. This is used as a substitute for an interactive telecommunications system for ophthalmology services.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

CMS. Medicare Benefit Policy Manual. Chapter 15: Covered Medical and Other Health Services. <https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/bp102c15.pdf>. Revised February 1, 2019. Retrieved August 5, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Medicare Benefit Policy Manual

Objective: To provide information to the Medicare population regarding covered medical and other health services.

Main Findings: Under current law, Medicare covers optometrist's services that are medically reasonable and necessary for the diagnosis or treatment of illness or injury.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

CMS. Final Policy, Payment, and Quality Provisions Changes to the Medicare Physician Fee Schedule for Calendar Year 2019. CMS.gov fact sheet. <https://www.cms.gov/newsroom/fact-sheets/final-policy-payment-and-quality-provisions-changes-medicare-physician-fee-schedule-calendar-year>. Published November 1, 2018. Retrieved August 5, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Medicare Physician Fee Schedule Fact sheet

Objective: To provide information on the final policy, payment, and quality provisions changes to the Medicare PFS for CY2019.

Main Findings: Medicare telehealth services: CMS is paying separately for two newly defined services using communication technology: brief communication technology-based services (e.g. virtual check-in) and remote evaluation of recorded video and images submitted by an established patient.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

CMS. Medicare Vision Services. MLN fact sheet. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/VisionServices_FactSheet_ICN907165.pdf. Published April 2018. Retrieved August 5, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Medicare fact sheet

Objective: To provide information to the Medicare population regarding covered and non-covered eye and vision services under Medicare FFS and Medicare Advantage.

Main Findings: Medicare FFS does not cover routine vision services, including eye exams and eyeglasses. Eye services that are covered under Medicare include glaucoma screenings, intraocular lenses (IOLs) and related services, and other related Medicare-covered services (eye exam for diabetic patients, eye prostheses, and age-related macular degeneration). MA plans may cover extra vision care benefits and services; however, these benefits and coverage vary from plan to plan. In general, an MA vision benefit plan will likely to cover: 1) routine eye exams, 2) eyeglass frames (once every 24 months), and 3) one pair of eyeglass lenses or contact lenses every 24 months.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

CMS. Eye Exams (for Diabetes) <https://www.medicare.gov/coverage/eye-exams-for-diabetes>. n.d. Accessed August 5, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Medicare informational webpage

Objective: To provide information to the Medicare population regarding Medicare coverage on eye exams for those with diabetes.

Main Findings: For Medicare beneficiaries with diabetes, Plan B covers eye exams for diabetic retinopathy once a year. Enrollees will pay 20 percent of the Medicare-approved amount for doctor's services, and the Plan B deductible applies.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

Cronau H, Kankanala RR, Mauger, T. Diagnosis and management of red eye in primary care. *American Family Physician*. 2010;81(2):137–144.

Subtopic(s): Problems in Care Delivery

Type of Source: Journal article and clinical review

Objective: To determine the differential diagnosis of conjunctivitis.

Main Findings: Conjunctivitis is different from other ocular conditions and is not similar to other, more emergent conditions.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: The article reviews diagnoses of general red eye.

Duffy, M.A. The Difference Between a Vision Screening and a Comprehensive Eye Examination. VisionAware. <https://www.visionaware.org/info/your-eye-condition/eye-health/eye-examination/125>. n.d. Accessed August 15, 2019.

Subtopic(s): Problems in Care Delivery

Type of Source: Webpage

Objective: To define the differences in scope between a vision screen and a comprehensive eye examination.

Main Findings: The article describes the differences between a screening and examination by outlining the services and tests each provides, as well as the types of providers who do these services.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

Han E, Baisiwala S, Jain A, Bundorf MK, Pershing S. An analysis of Medicare reimbursement to ophthalmologists: years 2012 to 2013. *Am J Ophthalmol.* 2017;182:133-140.
[doi:10.1016/j.ajo.2017.07.022](https://doi.org/10.1016/j.ajo.2017.07.022)

Subtopic(s): Issues in Payment Policy

Type of Source: Journal article

Objective: To analyze trends in utilization and payment of ophthalmic services in the Medicare population for years of 2012 and 2013.

Main Findings: Ophthalmologists who represent only 2% of Medicare physician workforce in the US but received 8.1% of all Medicare Part B payments in 2013. The study found that a large portion of the total ophthalmology Medicare reimbursement was attributed to ophthalmic drugs. Of the \$1.9 billion Medicare drug payments in 2013, the anti-VEGF biologic agents accounted for 95% of total drug reimbursement.

Strengths/Limitations: The database did not include nearly one-quarter of Medicare beneficiaries who are covered through MA plans nor does it include Medicaid patients.

Generalizability to Medicare Population: Yes

Methods: A retrospective cross-sectional study was conducted using publicly available Medicare physician and other supplier aggregated file. Variables included beneficiary demographics, Medicare payments to ophthalmologists, ophthalmic medical services provided, and most common Medicare-reimbursed ophthalmic services.

Haring, RS, Canner JK, Haider AH, Schneider EB. Ocular injury in the United States: Emergency department visits from 2006–2011. *Injury.* 2016;47(1):104–108.
<https://doi.org/10.1016/j.injury.2015.07.020>

Subtopic(s): Epidemiology of ocular conditions

Type of Source: Journal article

Objective: To examine ED visits associated with ocular injury and factors contributing to inpatient admission

Main Findings: Ocular trauma was the primary diagnosis of 77.9% of ED visits for eye injuries. Males, older individuals, and those on Medicaid were more likely to be admitted to the hospital. The number of ocular trauma cases per year fell 16.9% over the six-year study period.

Strengths/Limitations: Unable to look at injury severity or the setting in which the injury occurred.

Generalizability to Medicare Population: Weak; study includes individuals on Medicare, but does not give many specifics on the population.

Methods: Identified cases in which patients presented with a primary or secondary diagnosis of ocular trauma in NEDS. Estimated logistic regression models to determine odds of inpatient admission based on patient demographics, payer, and the existence of multiple injuries.

Herbst T, Emmert M. Characterization and effectiveness of pay-for-performance in ophthalmology: A systematic review. *BMC Health Services Research*. 2017;17. <https://doi.org/10.1186/s12913-017-2333-x>

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Journal article

Objective: To identify, characterize and compare existing pay-for-performance (P4P) approaches and their impact on the quality of care and efficiency in ophthalmology.

Main Findings: Overall, 13 relevant articles were included. Eleven articles were descriptive, and two articles included empirical analyses. Based on these articles, four different P4P approaches implemented in the United States were identified. With regard to quality and incentive elements, systematic comparison showed numerous differences between P4P approaches. Empirical studies showed isolated cost or quality effects, while a simultaneous examination of these effects was missing.

Strengths/Limitations: This review has several limitations. The inclusion criterion that P4P programs have to include (quality) measures that can be assigned to at least one of Donabedian's quality dimensions may lead to the impression that aspects like cost-effectiveness or patient satisfaction may have been neglected during the screening process. The aim of this study was to identify various pay-for-performance approaches in ophthalmology and their empirical evaluation. Because this medical discipline might be part of interdisciplinary P4P approaches, identification of further relevant approaches might have been missed.

Generalizability to Medicare Population: Yes

Methods: A systematic evidence-based review was conducted. English, French, and German written literature published between 2000 and 2015 were searched. Empirical as well as descriptive articles were included. Controlled clinical trials, meta-analyses, randomized controlled studies as well as observational studies were included as empirical articles. Systematic characterization of identified pay-for-performance approaches (P4P approaches) was conducted according to the Model for Implementing and Monitoring Incentives for Quality (MIMIQ). Methodological quality of empirical articles was assessed according to the Critical Appraisal Skills Programme (CASP) checklists.

IHS. Evidence Basis. Joslin Vision Network Teleophthalmology Program. <https://www.ihs.gov/teleophthalmology/evidencebasis/>. n.d. Accessed August 8, 2019.

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Web page

Objective: The Early Treatment Diabetic Retinopathy (DR) Study defined the photographic method used to establish the current scientific basis for the diagnosis and treatment of DR.

Main Findings: A four-year study conducted at a large IHS facility demonstrated a 50% increase in DR surveillance and a 51% increase in DR laser treatments as compared to the pre-deployment baseline year. Further review of the data showed that 100% of the increase in both measures were due to the JVN imaging activity. Ongoing review of national data shows a steady climb in the DR exam rate since the historical low in 2006-2007. This is temporally related to the increasing contribution to the national rate by the IHS-JVN program.

Strengths/Limitations: N/A

Generalizability to Medicare Population: N/A

Methods: N/A

Jacobson G, Freed M, Damico A, Neuman T. A Dozen Facts About Medicare Advantage in 2019. Henry J Kaiser Family Foundation. <https://www.kff.org/medicare/issue-brief/a-dozen-facts-about-medicare-advantage-in-2019/>. Published June 6, 2019. Accessed August 7, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Issue brief on MA in 2019

Objective: To provide current information and trends about MA enrollment, premiums, and out-of-pocket limits.

Main Findings: In 2019, 34% of all Medicare beneficiaries (22 million people) are enrolled in MA plans. Most MA enrollees have access to some benefits not covered by traditional Medicare in 2019. Most enrollees are in plans that provide access to dental care (67%), a fitness benefit (72%), and eye exams or glasses (78%).

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

Kinker B, Dobesh K, Nassiri N, Juzych MS, Wilson M R. The impact of the Medicare Access and CHIP Reauthorization Act on the field of ophthalmology. *Amer J of Ophthalmology*. 2017;179:1–9. <https://doi.org/10.1016/j.ajo.2017.04.002>

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Journal article

Objective: To analyze the impact of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) on the field of ophthalmology.

Main Findings: Physicians will need to use one of two payment structures: MIPS or APMs. APMs and MIPS will focus on bundling payments and reimbursing based on “fee-for-service-plus” models, which take into account clinical outcomes, coordination of care, clinical improvement, and electronic information exchange and security. APMs have substantial advantages, with eligible participants receiving a bonus and a higher rate of annual adjustment over the program's life. For most ophthalmology practices, MIPS may be more appropriate, owing to its broader applicability and the current paucity of APMs for ophthalmologists.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

Management and Business Academy for Eye Care Professionals. *Key Metrics: Assessing Optometric Practice Performance*. https://ecpu.com/media/wysiwyg/docs/paa_keymetrics_0415.pdf. Published 2015.

Subtopic(s): Problems in Care Delivery

Type of Source: Metrics sheet

Objective: To determine practice characteristics for optometrists

Main Findings: On average, optometric practices stay open 46 hours. More than half are open on Saturdays, typically for five hours, and very few are open on Sundays.

Strengths/Limitations: N/A

Generalizability to Medicare Population: N/A

Methods: Survey of optometric practices

MidSouth Practice Transformation Network. LANE ER Visits. <https://midsouthptn.com/milestone-summaries/reducing-ed-visits/>. Accessed August 8, 2019.

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Webpage

Objective: To outline the implementation and results of a pilot project within MidSouth PTN that aimed reduce ED visits amongst their patients.

Main Findings: This pilot collaboration was able to reduce ED visits per 1,000 patients by 52% in the first year (from 120 to 58). Comparable practices reduced ED visits per 1,000 members by 2% during the same period. Since imaging is more common in EDs than in a pediatrician's office, this pilot was estimated to generate a 30% reduction in X-ray use and 70% reduction in MRI utilization, both resulting in cost savings. Finally, this pilot showed promise for a model that will allow physicians to maintain a good work-life balance while maintaining quality continuous care for patients, improving both physician and patient satisfaction.

Strengths/Limitations: The program provides an ER toolkit to help practices implement a pilot to reduce low acuity non emergent (LANE) visits to the emergency room.

Generalizability to Medicare Population: No.

Methods: Implementation of pilot program that increased after-hours coverage plan that included extended office and weekend hours, as well as an answering service. MidSouth PTN partnered with a retail urgent care clinic near the practice and piloted the program with three key elements: continuity of care, quality care, and PCP referrals.

Natafqi N, Shane DM., Ullrich F, MacKinney AC, Bell A, Ward MM. Using tele-emergency to avoid patient transfers in rural emergency departments: An assessment of costs and benefits. *Journal of Telemedicine and Telecare*. 2017;24(3):193–201. <https://doi.org/10.1177/1357633X17696585>

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Journal article

Objective: The purpose of this paper is to (a) examine the rates of avoided transfers in rural emergency departments that adopted tele-emergency applications; and (b) estimate the costs and benefits of using tele-emergency to avoid transfers.

Main Findings: In these analyses, 1175 avoided transfers were attributed to tele-emergency. From a rural hospital perspective, tele-emergency costs around US\$1739 to avoid a single transfer. However, tele-emergency saves around US\$5563 in avoided transportation and indirect patient costs. Combining these, from a societal perspective, tele-emergency has the potential to result in a net savings of US\$3823 per avoided transfer while accounting for tele-emergency technology costs, hospital revenues, and patient-associated savings.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: Analysis is based on 9048 tele-emergency encounters generated by the Avera eEmergency program (Sioux Falls, South Dakota) in 85 rural hospitals across seven states between October 2009 – February 2014. For each non-transfer patient, physicians indicated whether the transfer was avoided because of tele-emergency activation. The cost-benefit analysis is conducted from the hospital, patient and societal perspectives, and includes technology costs, local hospital revenues and patient-associated savings. All monetary values are expressed in US\$. Sensitivity analysis is conducted by examining the worst and best case scenarios of costs, revenues and savings.

Office of Inspector General (OIG), Department of Health and Human Services. Questionable Billing for Medicare Ophthalmology Services. <https://oig.hhs.gov/oei/reports/oei-04-12-00280.pdf>. Published September 2015. Accessed August 5, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Office of Inspector general report

Objective: To determine the extent to which ophthalmology services are vulnerable to fraud, waste, and/or abuse.

Main Findings: In 2012, 4% of providers billing Medicare for ophthalmology services demonstrated questionable billing. Medicare paid them \$171 million for services related to these services. Medicare also paid \$2 million for ophthalmology services to 821 providers that were not listed as eye specialists in CMS database.

Strengths/Limitations: The study did not conduct a medical record review for any claims associated with the services in the report to determine if they were inappropriate or fraudulent.

Generalizability to Medicare Population: Yes

Methods: The study investigated paid Medicare Part B claims for 64 different HCPCS codes for ophthalmology procedures from the NCH File, which included nearly 34 million paid claims billed by 44,960 unique providers in 2012.

Owens PL, Mutter R. Emergency Department Visits Related to Eye Injuries, 2008. Healthcare Cost and Utilization Project. <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb112.pdf>. Accessed August 7, 2019.

Subtopic(s): Issues in Payment Policy

Type of Source: Statistical brief

Objective: To present statistics on the characteristics and cause of ED visits for eye injuries.

Main Findings: In 2008, there were about 636,619 ED visits related to eye injuries, a rate of 209 visits per 100,000 population. Nearly 74% of ED visits related to eye injuries were for patients age 44 years and younger.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Limited

Methods: The study compiled data from HealthCare Cost and Utilization Project (HCUP) on emergency department visits related to eye injuries in 2008.

Prager AJ, Volpe NJ, French DD. National study of ocular hospitalizations in Medicare beneficiaries. *Amer J of Ophthalmology*. 2019;199:238–245. <https://doi.org/10.1016/j.ajo.2018.12.003>

Subtopic(s): Problems in Care Delivery; Epidemiology of Ocular Conditions

Type of Source: Journal article

Objective: To study characteristics of Medicare beneficiaries who hospitalized for ocular conditions.

Main Findings: Most admissions were for non-traumatic disorders of the eye, and on average had lower inpatient stay and lower mortality. Patients were also more likely to have comorbidities.

Strengths/Limitations: This study was an observational study design, which can introduce selection bias through EMR coding. However, the study used admitting and principal diagnoses.

Generalizability to Medicare Population: Yes

Methods: The article describe an observational, cross-sectional study of the 2015 National Medicare Inpatient Dataset.

Ramirez DA, Porco TC, Lietman TM, Keenan JD. Ocular injury in United States emergency departments: Seasonality and annual trends estimated from a nationally representative dataset. *Amer J of Ophthalmology*. 2018;191:149–155. <https://doi.org/10.1016/j.ajo.2018.04.020>

Subtopic(s): Epidemiology of ocular conditions

Type of Source: Journal article

Objective: To determine if there is any seasonality in eye-related ED visits

Main Findings: Over the eight-year study period, ED visits for eye trauma decreased by an average of 4% per year. ED visits for eye conditions were more likely to occur between May and July, and patients were mostly male and under 60 years of age.

Strengths/Limitations: Unable to determine eye injury severity.

Generalizability to Medicare Population: Good; study examines all age groups and reports data for Medicare patients and by age group.

Methods: The study used the National Emergency Department Sample to identify patients with either a primary or secondary diagnosis of ocular trauma and employed a logistic regression model to identify the odds of an inpatient admission based on demographics and injuries.

Richhariya A, Taneja M, Strauss GH, Walden ML, Hausheer JR, Lansing VC, Khanna RC. Technology and Innovation for Eye Care. In R. C. Khanna, G. N. Rao, & S. Marmamula (Eds.), *Innovative Approaches in the Delivery of Primary and Secondary Eye Care* (pp. 57–68). Switzerland: Springer, 2019. https://doi.org/10.1007/978-3-319-98014-0_5

Subtopic(s): Problems in Care Delivery

Type of Source: Book chapter

Objective: To determine the new technologies and innovation in eye care

Main Findings: New technologies are constantly expanding to deliver high quality and immediate eye care.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: Review of new and expanding technologies for ocular conditions.

Sloan FA, Yashkin AP, Chen Y. Gaps in receipt of regular eye examinations among Medicare beneficiaries diagnosed with diabetes or chronic eye diseases. *Ophthalmology*. 2014;121(12):2452–2460. <https://doi.org/10.1016/j.ophtha.2014.07.020>

Subtopic(s): Epidemiology of ocular conditions

Type of Source: Journal article

Objective: To examine factors related to receipt of regular eye examinations by Medicare beneficiaries with diabetes, glaucoma, and age-related macular degeneration.

Main Findings: One-third of beneficiaries with diabetes or a chronic eye condition saw an eye care provider in all four 15-month follow-up periods. One-quarter of beneficiaries had one or no examinations over the five-year study period. Male, limited activities of daily living, distance to nearest ophthalmologist, and low cognitive function were associated with fewer eye examinations. Individuals with diabetes had particularly low rates of examinations.

Strengths/Limitations: The study did not account for individuals having more than one examination in a period. Receipt of eye examinations do not necessarily reflect proper eye care.

Generalizability to Medicare Population: Strong; looked specifically at Medicare population. However, sample limited to individuals with diabetes, glaucoma, or age-related macular degeneration.

Methods: Medicare beneficiaries diagnosed with at least one of the three specified conditions were followed for five years (four 15-month follow-up periods). Demographic and health-related data from the Health and Retirement Study were merged with Medicare claims data, which was used to identify optometrist and ophthalmologist data.

Stagg BC, Shah MM, Talwar N., Padovani-Claudio DA, Woodward MA, Stein JD. Factors affecting visits to the emergency department for urgent and nonurgent ocular conditions. *Ophthalmology*. 2017;124(5):720–729. <https://doi.org/10.1016/j.ophtha.2016.12.039>

Subtopic(s): Epidemiology of ocular conditions

Type of Source: Journal article

Objective: To determine the frequency of ED visits for emergent and non-emergent eye conditions for patients in a managed care network

Main Findings: Approximately one-quarter of enrollees who visited the ED with an eye problem had a non-emergent condition. Non-urgent eye-related visits were more likely for patients who were young, black or Latino, male, and lower income. Enrollees with established health care providers were 10% less likely to visit the ED for a non-urgent eye condition.

Strengths/Limitations: Possible that patients were misdiagnosed if they were not seen by an eye care professional in the ED.

Generalizability to Medicare Population: Low; studied a managed care population.

Methods: Analyzed the claims of individuals enrolled in a managed care network and classified eye-related ED visits as “urgent” “non-urgent” and “other.”

Teutsch SM, McCoy MA, Woodbury RB, Welp A. Making Eye Health a Population Health Imperative. *National Academies of Sciences*. 2016. <https://doi.org/10.17226/23471>

Subtopic(s): Results of Similar or Proposed Models

Type of Source: Book

Objective: This section of the book describes some of the current inconsistencies and challenges related to clinical practice guidelines in eye and vision health and to reiterate the standards to which clinical practice guidelines should be held.

Main Findings: A comprehensive population health approach to reducing vision impairment and promoting eye and vision health requires the ability to deliver and measure high-quality care. A single set of evidence-based guidelines, especially in the context of vision screenings and comprehensive eye examinations, that adhere to specific development standards can improve the uniformity and quality of patient care, establish a consistent baseline from which to measure improvement, and promote accountability for eye and vision health outcomes and care processes. Integrated models of care have the potential to improve detection and diagnosis of vision problems and subsequent referral to eye care providers. Patient-centered medical homes, ACOs, and other integrated care models provide lessons in collaboration and coordination that can inform efforts to integrate vision care, medicine, and public health. Investment in emerging technologies may also increase the accessibility of vision care for underserved populations.

Strengths/Limitations: N/A

Generalizability to Medicare Population: Yes

Methods: N/A

Vaziri K, Schwartz SG, Flynn HW, Kishor KS, Moshfeghi AA. Eye-related emergency department visits In the United States, 2010. *Ophthalmology*. 2016;123(4):917-919. doi:[10.1016/j.ophtha.2015.10.032](https://doi.org/10.1016/j.ophtha.2015.10.032)

Subtopic(s): Issues in Payment Policy

Type of Source: Journal article

Objective: To present the utilization, patient characteristics, and cost of eye-related presentations to EDs in the United States.

Main Findings: The mean charge per ED visit for ophthalmic reasons was \$989.30 and the total ED charge for these visits in the year 2010 was close to \$1.72 billion. In comparison, the mean charge per ED visit for all reasons in 2010 was \$2,060, for a total of \$225 billion. Moreover, ophthalmic ED visits make up 1.5% of all ED visits but only 0.76% of total ED charges, suggesting that reimbursements for ophthalmic care may lag behind those of other types of care. The study also concluded that elderly aged 65 years or older accounted for only 8.5% of ED visits related to eye injuries.

Strengths/Limitations: NEDS does not report who made the diagnoses, whether that's an ophthalmologist, an emergency physician or others.

Generalizability to Medicare Population: Limited.

Methods: Using 2010 data from the NEDS database. Statistical analyses were performed using descriptive statistics and cross tabulations. Complex sample analysis utilizing Taylor linearization was used to estimate national statistics.

Weinick RM, Burns RM, Mehrotra A. How many emergency department visits could be managed at urgent care centers and retail clinics? *Health Aff (Project Hope)*. 2010;29(9):1630–1636. <https://doi.org/10.1377/hlthaff.2009.0748>

Subtopic(s): Epidemiology of ocular conditions

Type of Source: Journal article

Objective: To examine overlap between care provided at urgent care clinics, retail clinics and EDs to determine where there is potential for alternative sites to substitute for ED visits.

Main Findings: An estimated 13.7–27.1% of all ED visits could be treated at retail clinics or urgent care centers.

Strengths/Limitations: Retail and urgent care clinic data from limited sets of providers, while ED data was a nationally-representative sample. Cannot account for distance between patients and local EDs, retail and urgent care clinics.

Generalizability to Medicare Population: Good; study examines all age groups and reports data for Medicare patients and by age group.

Methods: Identified conditions that could be treated in a non-emergent setting as diagnoses seen in more than 2% of retail and urgent care clinics.

Williams M, Blanco AA, Hogg R, Mahon G, McMullan M, Curran R, Watson M. Creating a virtual community of practice: an evaluation of ophthalmology-optometry Project ECHO. *Eye*. 2018;32(12):1910. <https://doi.org/10.1038/s41433-018-0184-2>

Subtopic(s): Problems in Care Delivery

Type of Source: Journal article

Objective: To highlight Project ECHO, which pairs specialists with community optometrists to expand knowledge on referring to specialists using OCTs.

Main Findings: Ninety percent of community oncologists learned through Project ECHO, and 70% agreed that their patient care improved.

Strengths/Limitations: Sample size was small.

Generalizability to Medicare Population: Yes

Methods: Pairing of community optometrists with specialists in order to expand knowledge.

Willink A, Schoen C, Davis K. How Medicare Could Provide Dental, Vision, and Hearing Care for Beneficiaries. Commonwealth Fund.

https://www.commonwealthfund.org/sites/default/files/documents/media_files_publications_issue_brief_2018_jan_willink_medicare_dental_vision_hearing_ib.pdf. Published January 2018. Accessed August 7, 2019.

Subtopic(s): Problems in Care Delivery

Type of Source: Issue brief

Objective: To examine gaps in access to dental, vision, and hearing services for Medicare beneficiaries and to outline a voluntary dental, vision, and hearing plan.

Main Findings: Many beneficiaries go without hearing aids and have problems eating and or seeing. Few beneficiaries have supplemental coverage, and costs often come out of pocket.

Strengths/Limitations: The data comes from the MCBS Survey and is therefore representative of Medicare beneficiaries.

Generalizability to Medicare Population: Yes

Methods: This is an analysis of the 2012 MCBS Cost and Use file, with population and costs projected to 2016 values.

III. Research Questions, Data Sources, Key Word, and Search Term Table

The environmental scan includes a review of information from existing peer-reviewed and non-peer-reviewed publications. We conducted a formal search of major medical, health services research, and general academic databases. We also conducted targeted searches of content available in the grey literature. We reviewed the websites of professional associations/societies and CMS for relevant evaluation reports and program documentation. The table below lists the research questions motivating this environmental scan as well as the sources and search terms used.

Table 1. Search Strategy

Research Questions	Preliminary Search Terms	Sources
Epidemiology of ED-avoidable eye conditions		
<p>Clearly define the issue / population by addressing the following:</p> <ol style="list-style-type: none"> 1. What ocular conditions are considered ED-avoidable? <ol style="list-style-type: none"> a. What is the prevalence of these conditions among Medicare beneficiaries? b. Are these consistent with the diagnosis codes proposed by the submitter in Appendix B? 2. What are the trends or future projections of the prevalence of eye conditions among Medicare beneficiaries, particularly FFS beneficiaries? 3. What are the rates of avoidable ED visits, urgent care visits, and hospitalization for ocular conditions among Medicare beneficiaries? <ol style="list-style-type: none"> a. What are the trends in ED visits and urgent care visits among Medicare beneficiaries for eye conditions? b. What are the reasons why rates might be increasing (or decreasing)? c. How much Medicare spending is associated with these potentially avoidable visits? 4. Do avoidable ED visits for eye conditions tend to occur on the weekend, at night, or during other times when access to ambulatory providers might be more limited? 5. What are the characteristics (including demographics, socioeconomic status, co-morbidities) of Medicare beneficiaries impacted by these ocular conditions? 6. Information on the submitter: University of Massachusetts <ol style="list-style-type: none"> a. Transforming Clinical Practices Initiative (TCPI) 	<p>Medicare beneficiary prevalence (AND):</p> <ul style="list-style-type: none"> - ocular disease <p>Medicare beneficiaries + ocular disease (AND):</p> <ul style="list-style-type: none"> - avoidable Emergency department (ED) visits - Hospitalization <p>Medicare beneficiaries + ocular diseases (AND):</p> <ul style="list-style-type: none"> - Demographics - SES - Co-morbidities 	<ul style="list-style-type: none"> ● PubMed ● Google Scholar ● National Health Interview Survey (NHIS) ● American Optometric Association Research & Information Center ● Cited articles from the proposal

Research Questions	Preliminary Search Terms	Sources
Issues in Payment Policy		
<p>7. What are Medicare’s vision benefits?</p> <p>a. For FFS beneficiaries without and without diabetes?</p> <p>b. For MA enrollees, who may have supplemental benefits?</p> <p>8. What are current Medicare FFS payment rules for ocular diseases? What services/supports are currently covered under the Medicare FFS payment model for patients with eye conditions?</p> <p>a. Evaluation & management (E&M) services</p> <p>b. Comprehensive eye exams</p> <p>c. Other services/treatments</p> <p>9. What are the Medicare payment guidelines for care coordination between PCPs and eye care specialists?</p> <p>a. What are the barriers/gaps to care coordination between PCPs and eye care specialists under current payment system?</p> <p>b. How (if at all) do Medicare service mix and compensation vary between optometrists and ophthalmologists?</p> <p>10. To what extent do ACOs include optometry/ophthalmology, and how is their risk classified? Are any taking downside risk?</p>	<p>Ocular disease + Medicare Fee-for-service (FFS) (AND):</p> <ul style="list-style-type: none"> - Payment - Reimbursement - Services/supports/coverage <p>Medicare + Vision benefits (AND):</p> <ul style="list-style-type: none"> - Fee for service - Diabetes - Medicare Advantage 	<ul style="list-style-type: none"> ● Medicare coverage database (MCD) ● MedPAC ● American Optometric Association Research & Information Center

Research Questions	Preliminary Search Terms	Sources
Problems in Care Delivery		
<p>11. What are the health outcomes associated with ED visits, urgent care visits, or delayed/unmet need for ocular conditions?</p> <p>a. Do health outcomes vary for Medicare beneficiaries with ocular conditions when treated in different settings?</p> <p>12. How many Medicare beneficiaries have an established relationship with optometrists? Ophthalmologists?</p> <p>a. What types of services do optometrists deliver to Medicare beneficiaries?</p> <p>b. What portion of ED visits for eye conditions occur among those with an established relationship?</p> <p>c. Is there evidence that specialty care averts ED usage for this population?</p> <p>13. What are the challenges in diagnosing and assessing the severity of relevant ocular conditions in Medicare beneficiaries?</p> <p>a. For the list of included diagnoses, how do symptoms present?</p> <p>b. When a patient presents with symptoms similar to conjunctivitis and other conditions mentioned in the proposal, what other eye conditions might be occurring?</p> <p>c. Are those other conditions also easily managed in the outpatient setting by PCPs and/or eye specialists, or are some serious and potentially require hospitalization?</p> <p>d. What is the likelihood that the symptoms are serious and an ED visit or hospitalization is the recommended course of treatment?</p> <p>14. Are there evidence-based guidelines for if/when a PCP should refer to an optometrist or ophthalmologist for relevant (ED-avoidable) conditions?</p> <p>a. Do recommendations differ for the proposed conditions in Appendix B (e.g. conjunctivitis versus retinal detachment), or are they consistent?</p> <p>15. What are the current practices/standards of care/evidence-based guidelines for optometry?</p> <p>a. Are the current practices problematic/leading to poor outcomes?</p> <p>b. What are the innovations in care delivery for optometry?</p>	<p>Medication costs, costs, patient outcomes (AND) - ocular disease</p> <p>Medicare Fee-for-service (FFS) + barriers/gaps (AND): - Care coordination</p> <p>Best practices Treatment guidelines</p>	<p>PubMed Cochrane NCQA MedPAC Cited references from the proposal</p>

Research Questions	Preliminary Search Terms	Sources
Results of Proposed or Similar Models		
<p>16. What approaches (if any) are Medicare Advantage plans using to address potentially avoidable ED visits for ocular conditions?</p> <p>17. What, if any, other payment/delivery models exist for eye care specialists?</p> <p> a. Transforming Clinical Practices Initiative (TCPI)</p> <p> b. NextGen ACO</p> <p>18. What are the results (if any) of other payment and/or delivery models?</p>	<p>Alternative payment model (AND):</p> <ul style="list-style-type: none"> - ocular disease - optometrists - ophthalmologists <p>Bundled payment (AND):</p> <ul style="list-style-type: none"> - ocular disease <p>Medicare Advantage (AND):</p> <ul style="list-style-type: none"> - ocular disease <p>Models (AND):</p> <p>care coordination</p>	<p>PubMed</p> <p>Google Scholar</p> <p>CMMI</p>