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## Medicare incentive payments to U.S. ophthalmologists for use of electronic health records: 2011–2016

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### Abstract

**Objective:** To investigate ophthalmologists' rate of attestation to meaningful use of their electronic health record (EHR) systems in the Medicare EHR Incentive program and their continuity and success in receiving payments in comparison to other specialties.

**Design:** Administrative database study

**Participants:** Eligible professionals participating in the Medicare EHR Incentive Program

**Methods:** Based on publicly available data sources, subsets of payment and attestation data were created for ophthalmologists and for other specialties. The number of eligible professionals attesting was determined using the attestation data for each year and stage of the program. The proportion of attestations by EHR vendor was calculated using all attestations for each vendor.

**Main Outcome Measures:** Numbers of ophthalmologists attesting by year and stage of the Medicare EHR Incentive program, incentive payments, and number of attestations by EHR vendor

**Results:** 51.6% of ophthalmologists successfully attested to meaningful use in the peak year of participation, compared to 37.1% of optometrists, 50.2% of dermatologists, 54.5% of otolaryngologists, and 64.4% of urologists. Across the six years of the program, ophthalmologists received an average of \$US 17,942 in incentive payments compared to \$US 11,105 for optometrists, \$US 16,617 for dermatologists, \$US 20,203 for otolaryngologists, and \$US 23,821 for urologists. Epic and Nextgen were the most frequently used EHRs for attestation by ophthalmologists.

**Conclusions:** Ophthalmology as a specialty performed better than optometry and dermatology but worse than otolaryngology and urology in terms of the proportion of eligible professionals

attesting to meaningful use of EHRs. Ophthalmologists were more likely to remain in the program after their initial year of attestation compared to all eligible providers. The top 4 vendors accounted for 50% of attestations by ophthalmologists.

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## Introduction

As of April, 2018, the Medicare electronic health record (EHR) incentive program initiated by the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 provided \$8.7 billion in direct payments to incentivize the adoption of EHRs by U.S. eligible professionals (EPs).<sup>1</sup> These payments were made on a yearly schedule with the total available reimbursement declining over time for those who did not begin participating in the first two years (Table 1). The program made payments between 2011 and 2016, allocating up to \$44,000 to each EP over the life of the program, and EP's who attested to meaningful use earlier, were eligible for larger amounts. To earn these incentive payments, providers were expected to demonstrate meaningful use of certified EHR technology according to metrics established by the Centers for Medicare & Medicaid Services (CMS). The measures of meaningful use were assigned to "core" and "menu" categories such that all providers had to satisfy the core measures and then could select a subset of the menu measures. Each measure was linked to one or more of the key priorities of the program: (1) improve quality, safety, efficiency, and reduce health disparities; (2) engage patients and families in their health care; (3) improve care coordination; and (4) ensure adequate privacy and security protections for personal health information.<sup>2, 3</sup> Penalties were scheduled to begin in 2015 for those who did not successfully attest to meaningful use in 2014, though these penalties were later delayed. Beginning in the 2016 payment year, penalties were determined based on EP performance from two years prior, and could escalate 1% per year to a maximum of 5%.

The latest survey of American Academy of Ophthalmology (AAO) members revealed that approximately 75% of ophthalmology practices had deployed an EHR as of 2015, an increase from 15% in 2006.<sup>4-6</sup> This significant change suggests that the incentive payments did indeed have the intended consequence of driving EHR adoption in ophthalmology. Other studies have shown a similar increase in EHR adoption across medicine. The Centers for Disease Control and Prevention (CDC) conducts the National Ambulatory Medical Care Survey (NAMCS) annually and it has included questions about EHR use dating back to 2001.<sup>7</sup> The results of the NAMCS survey have shown a similar increase in EHR use with 11% of office-based physicians using a "basic" EHR in 2001 and 48% in 2013. As of 2013, 69% of respondents to the NAMCS were planning to attest to meaningful use of their EHR and 13% had EHR systems were capable of meeting meaningful use requirements. In 2014, 74% of office-based physicians had a certified EHR system.<sup>8</sup> Additional analyses of the NAMCS data demonstrated that specialists were less likely to have EHRs that were ready for meaningful use than were primary care providers.<sup>9</sup> Some specialties (including ophthalmology) were also shown to have adopted EHRs at a slower rate than others.<sup>10</sup>

With the conclusion of Medicare EHR incentive payments in 2016, we investigated the participation and performance of ophthalmology in the federal incentive program for the meaningful use of EHRs compared to other medical specialties.

## Methods

This study was performed using publicly available data and so Institutional Review Board approval was not necessary. Based on available data sources, subsets of payment and attestation data were created for ophthalmologists, optometrists and for other ambulatory surgical subspecialties (dermatologists, otolaryngologists, and urologists). The number of eligible professionals attesting was determined using the attestation data for each year and stage of the program. The proportion of attestations by EHR vendor was calculated using all attestations for each vendor.

### Data Sources

Data regarding attestations to meaningful use were downloaded from [data.gov](https://data.gov)<sup>11</sup> and data on meaningful use payments to professionals were downloaded from the Centers for Medicare and Medicaid Service (CMS).<sup>12</sup> To categorize each professional for each year of data, data from the Medicare Provider Utilization and Payment Data for the years 2012 to 2016 were downloaded from CMS.<sup>13</sup> The utilization and payment data from 2012 were used for calculations involving 2011 and 2012 of meaningful use. The Provider Utilization and Payment dataset was also used to calculate the total number of Medicare billing professionals for each specialty and each year. The data from all these sources were linked by NPI number. Note that only providers who submitted more than 10 claims were included by CMS in the payment data set in order to prevent identification of individual patients.

### Data Analysis

To count the number of EP attestations per specialty, duplicate entries were removed from the payment data where a given provider attested using more than one EHR system. This situation occurred when a provider was using EHR modules from more than one vendor to achieve the meaningful use requirements. Duplicate attestations were not excluded when summarizing the proportion of attestations per EHR vendor. Subsets of payment and attestation data were created for providers by specialty (ophthalmology, optometry, dermatology, otolaryngology, and urology) based on the taxonomy code in the Provider Utilization and Payment Data. The proportion of all meaningful use payments going to each specialty was calculated using these same data files. In the case of meaningful use, this is appropriate as the payments were the same to each provider once each reached a modest threshold in Medicare payments.

The number of EPs attesting in each year of the program and to each stage (1 or 2) was determined using the attestation data. These same data were used to summarize participation in each year of the program compared to the total number of years that EP was in the program. To determine cohorts that participated continuously after the first year of participation, each NPI was used to determine the length of continuous participation in the program.

To summarize lapses in participation, we calculated the difference between each EP's first year in the program and the last year of the program (total possible years of participation). The difference between the calculated total possible years of continuous participation and

the number of years that the EP actually attested (based on CMS data) was the number of years they spent “out” of the program after their initial year attestation. Payments to EPs were determined using the CMS payment data and these were summarized by specialty. The proportion of attestations by EHR vendor was calculated by adding up all of the attestations linked to a given vendor and then dividing by the total number of attestations. All analyses were performed using Ruby (<https://www.ruby-lang.org>) and R (<https://www.r-project.org/>, version 3.3.2).

## Results

After 6.7% of Medicare-billing ophthalmologists attested to meaningful use in the first year of the program (2011), approximately half attested during the final four years (2013–2016). This percentage was higher than optometry, similar to that in dermatology and otolaryngology, and lower than that for urology where almost two-thirds were attesting (Table 2). In terms of changes in participation from 2011 to 2016, ophthalmology had an increase of 7.70-fold compared to 2.64, 5.98, 3.41, and 3.90-fold increases in optometry, dermatology, otolaryngology, and urology. Of the ophthalmologists attesting in the first year, only 48% continued through all years of the program without dropping out at some point along the way, although some returned to attest in later years. The dropout rate from year to year varied from 5 to 20%, with higher rates seen in the later years of the program and in the cohort that started later (Table 3). Compared to all EPs, ophthalmologists were more likely to stay in the program after their initial year of attestation (Table 3, Figure 1). There was an increase in the average number of claims submitted for providers who attested in more years of the program (Figure 2). The trend did not hold for providers who attested in all 6 years of the program as they submitted, on average, fewer claims than those who participated in only 4 or 5 years. To better assess at which point providers dropped out of the MU program, we created a histogram of the number of years spent in Stage 2 (Figure 3). Most providers dropped out before transitioning to Stage 2 (i.e., they spent 0 years in Stage 2). The next most likely time to drop out was after 1 year of Stage 2. An alluvial plot of how all providers worked their way through the stages of MU is available as a Supplement (link).

In addition, ophthalmologists, who represent 1.6% of all Medicare-billing providers, demonstrated an increase in their share of payments in each year of the program from 2.1% of all payments to EPs in 2011 to 4.7% in 2016. Similarly, dermatology showed an increase in each year of the program from 1.6% in 2011 to 2.8% in 2016. Urology was relatively stable varying from 2.7% to 2.4% throughout the years of the program. Finally, optometry experienced a decline in the percentage of all payments from 3.8% in 2011 to 3.2% in 2016. All of the specialties included here received payments in excess of their percentage of all Medicare-billing providers (Table 4).

To summarize the payments to the average participating provider and the payments to the average member of each specialty (participating or not), we calculated the average payment for attesting providers as well as for Medicare-billing providers in each of our specialties (Table 5). Differences between attesting providers based on specialty are due to a combination of the proportion of successful attestations and on the mix in a given year of the number of years each EP had been in the meaningful use program. The average payments to

members of each specialty are one measure of the overall success of that specialty in terms of participation in the meaningful use program.

The percentage of times a given EHR vendor was used to attest by ophthalmologists and by all EPs are summarized in Table 6 and Table 7 respectively. Each EP could use more than one EHR vendor to attest so the counts for EHR vendors exceeds the counts for EPs. For ophthalmology, the top two vendors account for 33% of attestations and the top 4 for 50%. For all EPs, the top 3 vendors accounted for 50% of all attestations. There was significant overlap in the vendors used to attest to meaningful use between ophthalmologists and all EPs with 6 of 10 EHRs used most frequently by all EPs also used by ophthalmologists. As a specialty, ophthalmologists relied on a larger number of unique EHRs than other specialties, suggesting increased fragmentation of the EHR market in ophthalmology. (Figure 4)

## Discussion

Approximately 50% of Medicare-billing ophthalmologists attested to meaningful use in the peak years of the program. These numbers were similar to the surgical subspecialties of dermatology and otolaryngology but lower than those for urology. All of these specialties had a higher participation rate than Medicare-billing optometrists. The reasons for differences between different specialties are not clear from the data available from CMS but are worthy of future study.

Based on the higher rate of retaining ophthalmologists in the meaningful use program, the year-over-year growth in the proportion of all payments received by ophthalmologists, the largest increase in the percent of attesting providers, and the fact that the percentage of payments received by ophthalmologists (3.6%) was more than twice the percentage of ophthalmologists in the population of Medicare-billing providers (1.6%), the profession can be said to have done well compared to EPs overall. When comparing overall payments (Table 4), ophthalmology was on par with dermatology and otolaryngology and worse than urology, but all of these specialties were better than average in terms of their percentage of all program payments received.

Even though ophthalmologists were more likely than the average EP to remain in the program without dropping out, it is still the case that 5 to 20% dropped out between consecutive years of the program, even with facing the payment reductions for not participating. One would expect some drop out over time as a prior survey found that about 10% of respondents were not planning to attest to subsequent stages of the meaningful use program.<sup>2</sup> The expected dropout based on the AAO survey is similar to some of the year-to-year changes in participation noted in the actual attestation data (Table 3). Despite what might be considered a high rate of dropout, ophthalmologists spent fewer years out of the program after their initial year of attestation than EPs overall (Figure 1).

There are several possible reasons for the drop-out from meaningful use. First is the all-or-nothing design of the program, in which failure to meet one of the many criteria disqualified an EP from the entire program. Combined with escalating requirements of the meaningful use stages, EPs may have determined participation to be excessively burdensome, which, in

a prior survey of ophthalmologists, was a common reason for the decision not to continue in the program.<sup>1</sup> Looking at years spent in stage 2 before dropping out, it appears the transition to stage 2 was significant and many who dropped out did so before ever making it to stage 2 (Figure 3). We cannot be sure Stage 2 was the barrier as providers would have encountered it at different points in the program depending on the particular situation of their own practice. Second, the design of the program emphasized elements of EHR that are known to be associated with physician dissatisfaction, including computerized provider order entry. Third, a sentiment exists in which physicians do not believe that the MU program actually helps realize its stated goal to improve the efficiency and quality of patient care.<sup>14</sup> In addition, fewer physicians believed that MU would decrease medical errors in stage 2 compared to stage 1.<sup>15</sup> Finally, when examining nonparticipants in the MU program, Jung et al. demonstrated that unfamiliarity with EHR, lack of financial resources, and smaller organizational capacity were barriers to participation, despite facing payment reductions from CMS.<sup>16</sup> This effect may be magnified in ophthalmology with the fragmentation of the EHR market and the large number of solo practitioners.

Unlike other, similar specialties, ophthalmology was able to increase its overall share of incentive payments in each year of the program (Table 4). Possible reasons for this include efforts by the profession to educate ophthalmologists about meaningful use and EHRs in general,<sup>3, 6, 17</sup> and the relatively low rate of participation in the initial years among ophthalmologists that allowed a greater degree of improvement in subsequent years. One possible reason for the latter explanation is the relative fragmentation of the EHR market for ophthalmology. While the top 4 vendors accounted for 50% of attestations by ophthalmologists, ophthalmology had the highest number of unique EHRs used to attest (Figure 4), the vast majority of which represented about 1% of the market. It may have been the case that these smaller vendors took more time to get their products ready for meaningful use certification.

On a related note, the most prevalent EHR for attestation for meaningful use in ophthalmology was Epic which is almost exclusively deployed at large health systems. The large proportion of attestations using Epic in meaningful use program may suggest the resources required to participate may favor institutions with greater economies of scale. This possibility is supported by the fact that providers who submitted more claims to CMS were more likely to be in the program for more years (Figure 2).

While the data sets are complete in that they represent all payments to all EPs throughout the program, they are limited in that they do not contain other information about the practice environment (small vs large practices, single specialty vs multi-specialty group, private versus public health organization, etc.) of each EP. Such practice demographics would be useful in generating models that might help determine the factors that predict success or failure with meaningful use attestation. The CMS data are also limited in that the taxonomy codes used to classify each EP are known to be out of date for some providers, particularly if they are not updated after training, or if a provider spans more than one taxonomy code in their practice (we relied on the “primary” taxonomy code from the physician payment data to determine EP specialty).

To determine which factors predicted success (or failure) with the meaningful use program, future work could consider surveying practices based on their attestation results, asking for demographic details not included in the administrative data available from CMS. Such factors might include the practice ownership (private, government, University, HMO) number of physicians in the practice, the age of those physicians, the EHR vendor used, and length of time on EHR.

However, though ophthalmology fared well in the meaningful use program compared to other EPs, a significant proportion did not engage at all or dropped out at some point. In a previous survey, the top reasons identified by ophthalmologists for not participating in the program or for not wanting to continue were that the cost was too high, or the complexity of reporting was too great.<sup>4</sup> Our data should help guide the federal government in designing future EHR policy. Measures for programs should be easy to understand, should tie in to real-world practice, and should not be overly-complex. They should be tasks that any busy practitioner can strive to accomplish to satisfy the goals of promoting better use of health information technology.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

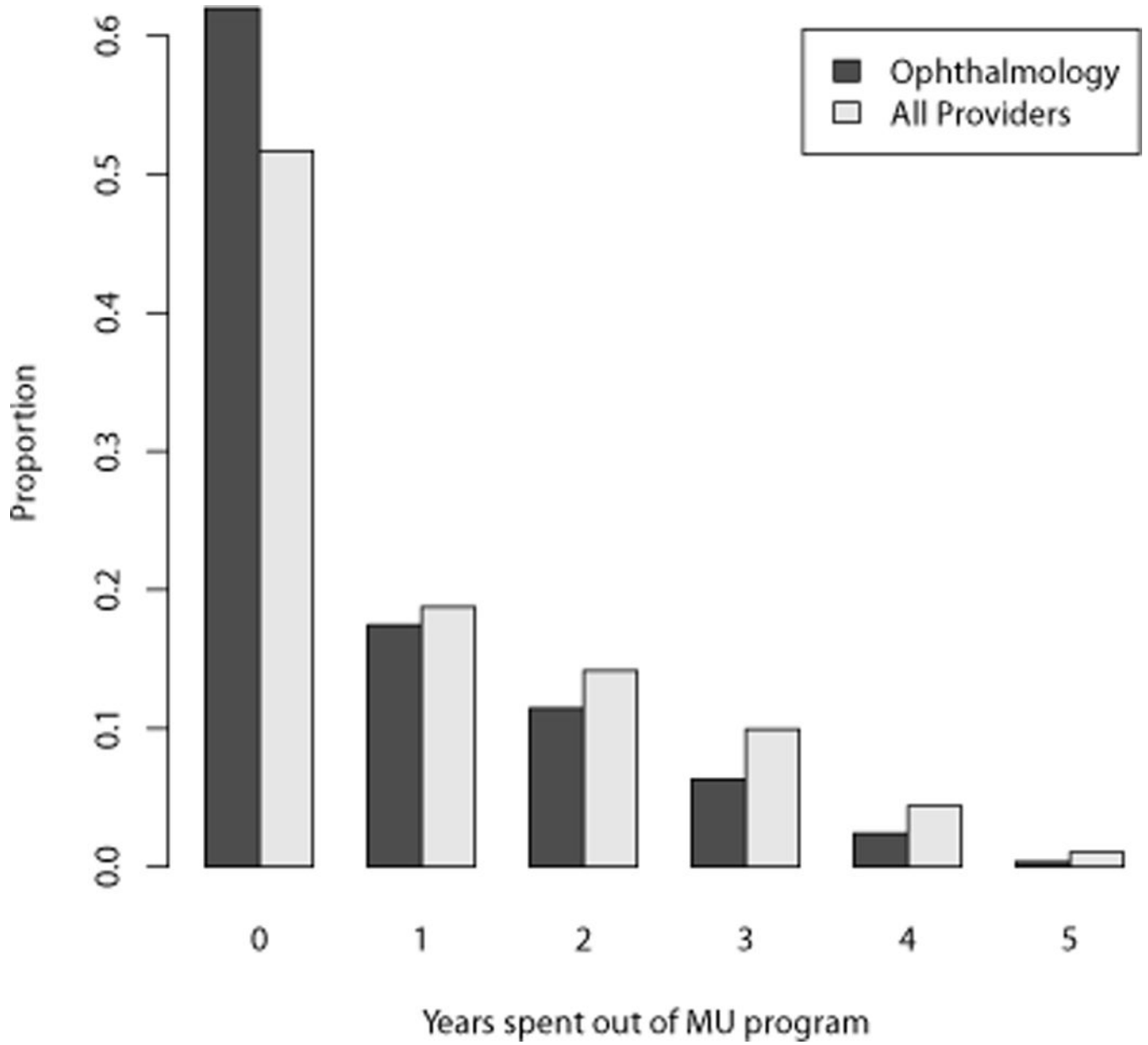
**Financial Support:** Aaron Lee was supported by NEI (K23EY029246) and an unrestricted grant from the Research to Prevent Blindness. The sponsor or funding organization had no role in the design or conduct of this research

## References

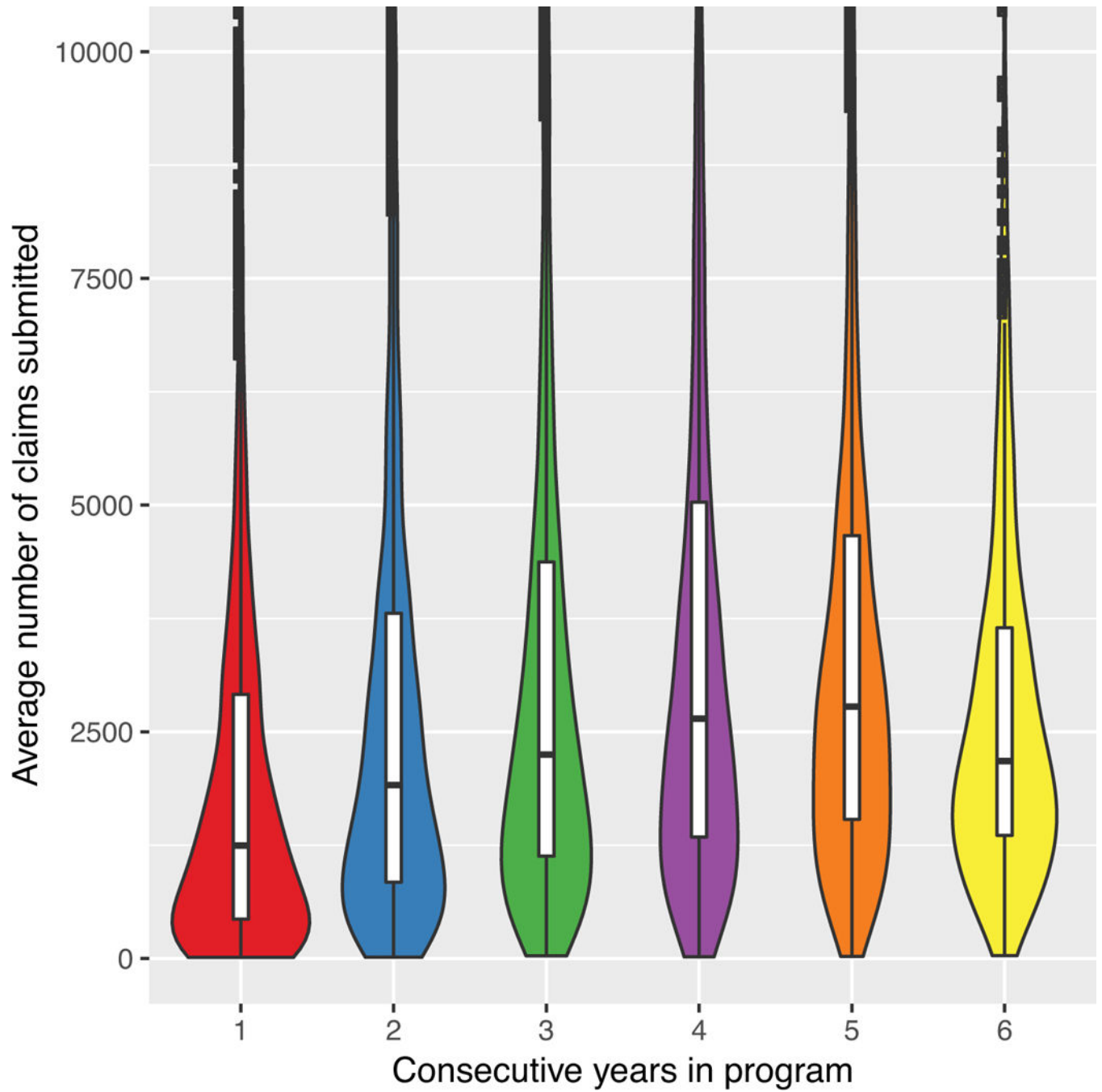
1. 111th Congress; HITECH; <https://www.gpo.gov/fdsys/pkg/PLAW-111publ5/pdf/PLAW-111publ5.pdf>;
2. Blumenthal D, Tavenner M. The “Meaningful Use” Regulation for Electronic Health Records. *N Engl J Med* 2010;363:501–4. [PubMed: 20647183]
3. Boland MV. Meaningful use of electronic health records in ophthalmology. *Ophthalmology* 2010;117:2239–40. [PubMed: 21129571]
4. Lim MC, Boland MV, McCannel CA, et al. Adoption of Electronic Health Records and Perceptions of Financial and Clinical Outcomes Among Ophthalmologists in the United States. *JAMA Ophthalmol* 2018;136:164–70. [PubMed: 29285542]
5. Boland MV, Chiang MF, Lim MC, et al. Adoption of Electronic Health Records and Preparations for Demonstrating Meaningful Use: An American Academy of Ophthalmology Survey. *Ophthalmology* 2013;120:1702–10. [PubMed: 23806425]
6. Lim MC, Chiang MF, Boland MV, et al. Meaningful use: how did we do, where are we now, where do we go from here? *Ophthalmology* 2014;121:1667–9. [PubMed: 25066764]
7. Hsiao CJ, Hing E, Ashman J. Trends in electronic health record system use among office-based physicians: United States, 2007–2012. *Natl Health Stat Report* 2014;(75):1–18.
8. Jamoom EW, Yang N, Hing E. Adoption of Certified Electronic Health Record Systems and Electronic Information Sharing in Physician Offices: United States, 2013 and 2014. *NCHS Data Brief* 2016;(236):1–8.
9. Patel V, Jamoom E, Hsiao CJ, et al. Variation in electronic health record adoption and readiness for meaningful use: 2008–2011. *J Gen Intern Med* 2013;28:957–64. [PubMed: 23371416]
10. Kokkonen EW, Davis SA, Lin HC, et al. Use of electronic medical records differs by specialty and office settings. *J Am Med Inform Assoc* 2013;20:33.



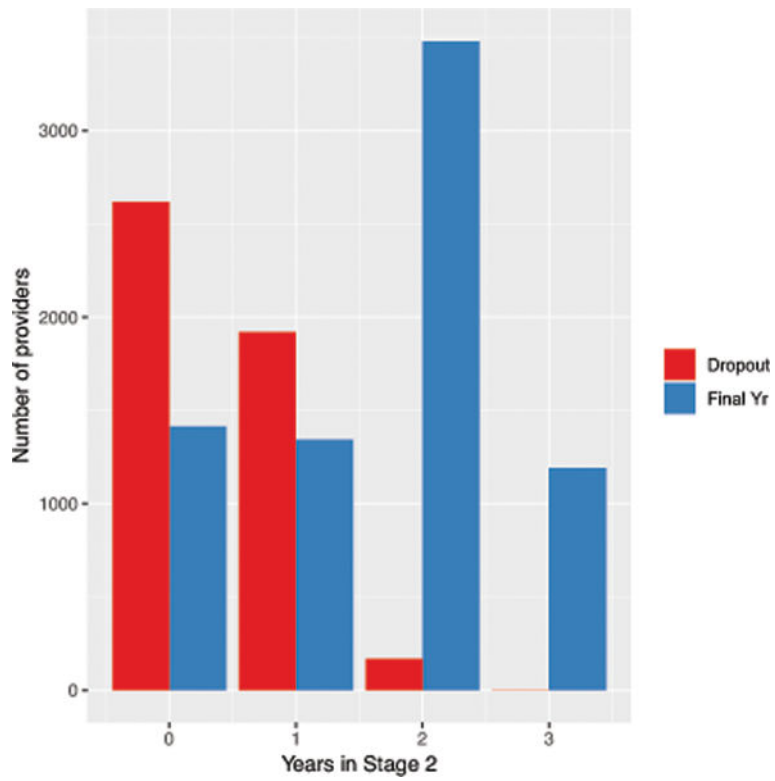
11. Centers for Medicare and Medicaid Services. Electronic health record products used for attestation <https://catalog.data.gov/dataset/cms-medicare-and-medicare-ehr-incentive-program-electronic-health-record-products-used-for-f4247>; Retrieved July 14,2018.
12. Center for Medicare and Medicaid Services. Data and program reports <https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/DataAndReports.html>; Retrieved July 14,2018.
13. Center for Medicare and Medicaid Services. Medicare provider utilization and payment data <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Physician-and-Other-Supplier.html>; Retrieved July 14,2018.
14. Weeks DL, Keeney BJ, Evans PC, et al. Provider perceptions of the electronic health record incentive programs: a survey of eligible professionals who have and have not attested to meaningful use. *J Gen Intern Med* 2015;30:123–30. [PubMed: 25164087]
15. Emani S, Ting DY, Healey M, et al. Physician Beliefs about the Meaningful Use of the Electronic Health Record: A Follow-Up Study. *Appl Clin Inform* 2017;8:1044–53. [PubMed: 29241244]
16. Jung HY, Unruh MA, Kaushal R, et al. Growth Of New York Physician Participation In Meaningful Use Of Electronic Health Records Was Variable, 2011–12. *Health Aff (Millwood)* 2015;34:1035–43. [PubMed: 26056210]
17. Chiang MF, Boland MV, Brewer A, et al. Special requirements for electronic health record systems in ophthalmology. *Ophthalmology* 2011;118:1681–7. [PubMed: 21680023]



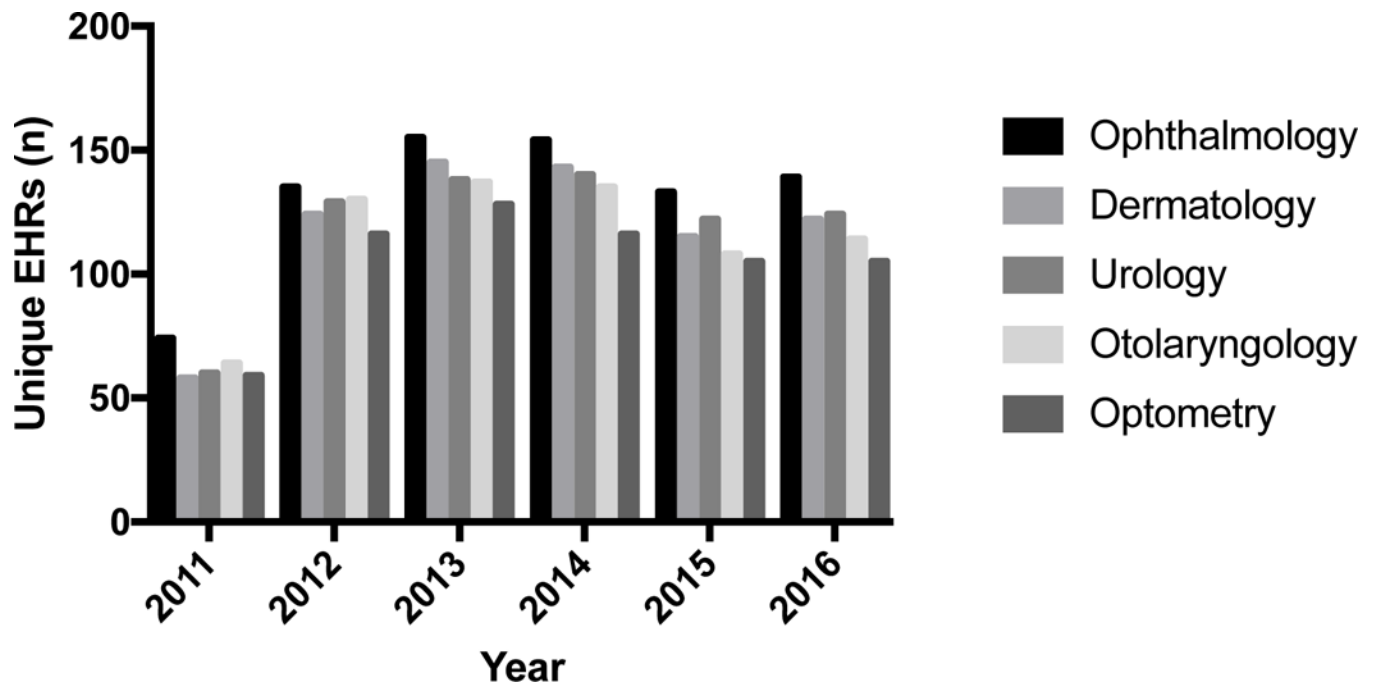
**Figure 1.** Proportion of years spent out of the meaningful use (MU) program after initially attesting (ophthalmologists and all eligible professionals).



**Figure 2.** Combination violin and box plot of the average number of claims submitted to Medicare versus the number of years attesting in the meaningful use program. The violin plot shows the underlying distribution and the boxplot shows the median with the inter-quartile range.



**Figure 3.** Histogram of the number of years spent in Stage 2 before dropping out (red bars) or reaching the end of the meaningful use program (blue bars). Providers included in the “0” bars did not achieve Stage 2 during their time in the program, either dropping out before reaching it (red) or starting too late to achieve it before the end of the program (blue).



**Figure 4.**  
Number of unique EHRs used in ambulatory care settings to attest for meaningful use.

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**Table 1.**

Potential payments (\$US) to eligible professionals by initial year of attestation and year in the program. Values after 2013 were reduced from those in the initial legislation due to global reductions in the US Federal Budget.

Initial Year	Program year						Total
	2011	2012	2013	2014	2015	2016	
2011	18,000	12,000	7,840	3,920	1,960	-	43,720
2012		18,000	11,760	7,840	3,920	1,960	43,480
2013			14,700	11,760	7,840	3,920	38,220
2014				11,760	7,840	3,920	23,520

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**Table 2.**

Number and percentage of total Medicare-billing ophthalmologists, optometrists, dermatologists, otolaryngologists, and urologists attesting by year and stage of the meaningful use program.

	Program year					
	2011	2012	2013	2014	2015	2016
<b>Ophthalmology</b>						
Stage 1	1150 (6.7%)	5720 (33.5%)	7905 (45.9%)	7158 (41.3%)	2393 (13.8%)	1413 (8.1%)
Stage 2				1537 (8.9%)	6046 (34.9%)	7577 (43.5%)
Total	1150 (6.7%)	5720 (33.5%)	7905 (45.9%)	8695 (50.2%)	8439 (48.7%)	8990 (51.6%)
<b>Optometry</b>						
Stage 1	2465 (9.7%)	8174 (32.0%)	9751 (37.1%)	6387 (23.9%)	1730 (6.4%)	1181 (4.3%)
Stage 2				1861 (6.9%)	5373 (19.8%)	5861 (21.3%)
Total	2465 (9.7%)	8174 (32.0%)	9751 (37.1%)	8248 (30.8%)	7103 (26.2%)	7042 (25.6%)
<b>Dermatology</b>						
Stage 1	887 (8.4%)	3354 (31.9%)	4748 (44.3%)	3623 (33.1%)	1660 (14.9%)	1167 (10.4%)
Stage 2				1417 (12.9%)	3596 (32.4%)	4488 (39.8%)
Total	887 (8.4%)	3354 (31.9%)	4748 (44.3%)	5040 (46.0%)	5256 (47.3%)	5655 (50.2%)
<b>Otolaryngology</b>						
Stage 1	1247 (14.8%)	3836 (45.4%)	4628 (54.5%)	3356 (39.2%)	873 (10.2%)	575 (6.7%)
Stage 2				1110 (13.0%)	3262 (38.0%)	3753 (43.8%)
Total	1247 (14.8%)	3836 (45.4%)	4628 (54.5%)	4466 (52.2%)	4135 (48.1%)	4328 (50.5%)
<b>Urology</b>						
Stage 1	1450 (16.5%)	4670 (53.1%)	5620 (63.9%)	4066 (46.4%)	1000 (11.4%)	671 (7.7%)
Stage 2				1316 (15.0%)	4370 (49.8%)	4972 (56.8%)
Total	1450 (16.5%)	4670 (53.1%)	5620 (63.9%)	5382 (61.4%)	5370 (61.2%)	5643 (64.4%)

**Table 3.**

Number of ophthalmologists and all eligible professionals attesting without dropping out of the program by the first year of attestation.

Starting Year	Years in program					
	1	2	3	4	5	6
Ophthalmology						
2011	1150 (100.0 %)	992 (86.3 %)	891 (77.5 %)	715 (62.2 %)	607 (52.8 %)	557 (48.4 %)
2012	4728 (100.0 %)	4213 (89.1 %)	3441 (72.8 %)	2744 (58.0 %)	2447 (51.8 %)	
2013	2726 (100.0 %)	2316 (85.0 %)	1857 (68.1 %)	1650 (60.5 %)		
2014	1914 (100.0 %)	1542 (80.6 %)	1336 (69.8 %)			
2015	901 (100.0 %)	716 (79.5 %)				
2016	777 (100.0 %)					
All Eligible Professionals						
2011	7199 (100.0 %)	6191 (86.0 %)	5529 (76.8 %)	4083 (56.7 %)	3173 (44.1 %)	2797 (38.9 %)
2012	19563 (100.0 %)	16919 (86.5 %)	12751 (65.2 %)	9877 (50.5 %)	8700 (44.5 %)	
2013	9766 (100.0 %)	7674 (78.6 %)	5677 (58.1 %)	4906 (50.2 %)		
2014	5972 (100.0 %)	4586 (76.8 %)	3773 (63.2 %)			
2015	3350 (100.0 %)	2559 (76.4 %)				
2016	2773 (100.0 %)					



**Table 4.**

Payments, in million \$US, to ophthalmologists, optometrists, dermatologists, otolaryngologists, urologists, and to all eligible professionals by year of the meaningful use program. The percentage as a total of all payments to EPs are in (). Ophthalmology, optometry, dermatology, otolaryngology, and urology represented 1.6%, 2.7%, 1.0%, 0.8%, and 0.8% of all Medicare billing providers.

<b>Program Year</b>						
<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Total</b>
<b>Ophthalmology</b>						
19.4 (2.1)	95 (2.3)	95.3 (3.7)	79.8 (4.2)	41.7 (4.4)	19.7 (4.7)	350.8 (3.6)
<b>Optometry</b>						
35.6 (3.8)	113.8 (4.0)	102.6 (4.0)	67.3 (3.6)	31.5 (3.3)	13.4 (3.2)	364.2 (3.8)
<b>Dermatology</b>						
14.8 (1.6)	54.4 (1.9)	56.6 (2.2)	46.2 (2.4)	24.9 (2.6)	11.6 (2.8)	208.5 (2.2)
<b>Otolaryngology</b>						
21.8 (2.3)	61.2 (2.1)	52.5 (2.0)	36.9 (1.9)	17.7 (1.9)	7.9 (1.9)	198.0 (2.1)
<b>Urology</b>						
24.9 (2.7)	76.1 (2.7)	64.2 (2.5)	44.5 (2.4)	23.1 (2.4)	10.4 (2.5)	243.4 (2.5)
<b>All Eligible Professionals</b>						
938.4	2858.5	2569.6	1893.1	949.2	421.5	9630.3

**Table 5.**

Average payment for meaningful use per eligible professional per specialty. The total payment to each specialty was divided by the number of attesting providers and the total number of Medicare providers in that specialty. The final column represents the average payments for each sub-group across the entirety of the meaningful use program.

	Year						Average for entire Program
	2011	2012	2013	2014	2015	2016	
<b>Attesting Providers</b>							
Ophthalmology	17608.37	16702.40	12144.35	9216.68	5493.55	2948.36	33166.38
Optometry	15331.42	14036.31	10575.11	8178.94	4941.05	2793.59	28149.06
Dermatology	17691.78	16352.61	12022.97	9197.70	511.31	2992.08	32609.12
Otolaryngology	17775.88	16053.82	11436.29	8294.85	4740.38	2719.42	33862.36
Urology	17887.05	16255.80	11493.55	8242.89	4655.33	2674.37	36027.08
<b>Medicare-billing providers</b>							
Ophthalmology	1134.63	5559.31	5536.38	4601.96	2379.63	1125.34	17941.69
Optometry	1395.02	4451.14	3907.78	2511.08	1149.39	484.36	11105.05
Dermatology	1404.16	5158.28	5279.52	4217.33	2220.30	1028.95	16616.66
Otolaryngology	2581.18	7238.47	6174.98	4303.12	2044.52	922.87	20202.55
Urology	2829.95	8560.55	7231.83	4987.46	2559.42	1189.39	23821.19

**Table 6.**

Proportion of electronic health record vendors used to attest to meaningful use by ophthalmologists over the life of the program.

Vendor	%	Vendor	%
Epic	21	MDoffice	2
Nextgen	14	Allscripts	2
Medflow	8	GE Healthcare	2
Cerner	7	ManagementPlus	2
MDIntellesys	5	NexTech	2
Compulink	4	ManagementPlus	1
SRSOft	3	Practice Fusion	1
EyeMD	3	Integrity Digital	1
Modernizing Medicine	3	iMedicWare	1
IO Practiceware	2	Partners Healthcare	1

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**Table 7.**

Proportion of electronic health record vendors used to attest to meaningful use by all eligible professionals over the life of the program. Vendors also appearing on the list of most frequently used EHR vendors in ophthalmology (Table 6) are highlighted.

<b>Vendor</b>	<b>%</b>
Epic	25
Cerner	19
Allscripts	8
eClinicalWorks	5
GE Healthcare	4
Nextgen	4
athenahealth	3
Greenway Health	2
Intermountain	2
Practice Fusion	1