Physicians' Use, Exchange, and Evaluation of Electronic Medical Records

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ASU Center for Health Information and Research
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The Center for Health Information & Research (CHiR) is a multidisciplinary unit under the College of Health Solutions at Arizona State University. CHiR provides comprehensive health care information for Arizona and serves as a community resource and tool for academia and public health. CHiR is directed by George Runger, PhD, who is also Chair of the Department of Biomedical Informatics and Professor in the School of Computing, Informatics, and Decision Systems Engineering. For more information about CHiR's current initiatives as well as downloadable publications, please visit our website or contact us via email.

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Executive Summary

- This report focuses on the use of Electronic Medical Records and their effects. Physicians who treat AHCCCS patients are compared to non-AHCCCS physicians.
- The percentage of Arizona physicians using EMRs increased from approximately 45% in 2007-2009 to approximately 90% in 2015-2017. Solo practice physicians are, all else equal, much less likely to adopt EMRs than are physicians in other practice settings. The prevalence of solo practice is declining in Arizona, in part due to acquisitions of practices by hospital systems. All else equal, utilization rates of EMRs will continue to increase as the percentage of physicians in solo practice declines.
- The incentives and support provided by Medicare and Medicaid, combined with other influences, have succeeded in increasing EMR adoption, but important obstacles remain.
- The most important obstacle to the inter-organizational transfer of electronic health information has been the shortage of Health Information Exchanges (HIEs). *Health Current* (formerly the Health Information Network of Arizona or HINAz) is one such HIE, which has enrolled 353 participants. *Health Current* continues to expand.
- The physicians who treat AHCCCS enrollees are, with few exceptions, the same physicians who treat most privately insured patients. AHCCCS patients are also more likely to be served by physicians with EMRs than are the patients of non-AHCCCS physicians.
- It is often suggested that physicians are very dissatisfied with their EMRs. Our results show that physicians are somewhat positive about their EMRs, ranking them slightly above the midpoint in the 1 (awful) – 5 (outstanding) scale. The rankings are also increasing over time. The more accurate conclusion may be that physicians seek to improve individual elements of their EMRs, but recognize the advantages of EMRs relative to scanned or paper medical records.
- This report is one of the annual summaries of the survey of physicians. More in-depth analyses of the use of EMRs are available from scholarly publications based on the data. See Appendix B for a complete list of workforce publications.

Introduction

This report is part of an ongoing series of reports that began in 2007 on physicians' experiences with the use of electronic medical records (EMRs). The trend toward nearly universal use of some form of EMR has been well established, and subsequent surveys will focus more on the extent to which EMRs are exchanged than on a detailed analysis of EMR brands and physician satisfaction with their use.

Since 2014, the reports have included detailed comparisons between physicians who treat Arizona Health Care Cost Containment System (AHCCCS) patients and those who do not. Although this is not typical of all States, the majority of physicians in Arizona treat AHCCCS patients, and their patients are more likely to receive the benefits of EMR use than the patients of other physicians (Butler, Harootunian and Johnson 2013).

The complete f results include a very large number of tables and figures, including all the information needed to compare current results to previous years. To minimize the burden on the readers without limiting access to the complete set of results, more than 100 pages of detailed statistics are included in a series of appendices (Appendices A through I). The main body of the text includes selected information on All Arizona Physicians and comparisons of AHCCCS physicians to non-AHCCCS physicians.

The main body of this report describes patterns of EMR utilization; the extent to which EMR data are exchanged among health care providers; and the values placed on EMRs by users and non-users. This report also distinguishes between physicians who influence decisions to implement EMRs and physicians who are not decision makers. Selected characteristics of AHCCCS providers are compared to non-AHCCCS physicians.

It was predicted that EMR use would improve the quality of health care, increase productivity, reduce errors and eliminate unnecessary testing (Chaudhry, et al. 2006; Jha, DesRoches, et al. 2009; Skolnik 2011). The predictions have not, however, been fully realized (Kellermann and Jones 2013; Jones, et al. 2012; Freudenheim 2012; Lau, et al. 2012). One contribution of this report is a clear description of the prevalence of mixing EMRs with other forms of medical records, a fact typically ignored in the discussions of the productivity of EMRs. Those discussions typically assume that if a physician has an EMR, it is the only type of record in use. The mixing of EMRs with other records dilutes the productivity of EMRs by adding steps in the workflow that would not be required if EMRs were the only type of record.

Background

Studies of EMR utilization have increased since 2005, but most use neither comparable definitions of an EMR nor comparable samples. We summarize several of the better known studies in Appendix A of this report. Additional, but not strictly comparable, information is available from a meta-analysis of national surveys of physician adoption of EMRs between 1994 and 2005. It estimated that, in 2005, approximately 24% of physicians used EMRs, but only 9% of the EMRs in use included functions such as e-prescribing (Jha, Ferris, et al. 2006).

A consistent set of estimates is produced by the National Center for Health Statistics (NCHS) surveys of ambulatory care physicians in office settings. It is important to recognize that the estimates apply to only one segment of the physicians in this study. The exclusions include physicians in federal facilities and a number of specialty practices.

The recent NCHS data show that the percentage of office-based physicians using some form of an EMR increased from 18% in 2001 to 86.9% in 2015 (Jamoom and Yang 2016). A smaller percentage (53.9% in 2015) used EMRs that included functions such as patient summaries, e-prescribing and lab results (Jamoom and Yang 2016).

This report examines both the trends in the use of EMRs and some of the obstacles to the realization of the full benefits of EMRs among all Arizona physicians. It then evaluates a number of other aspects of EMR use by including the information in comparisons of AHCCCS to non-AHCCCS providers.

The CHiR Survey of Physicians

This report and its predecessors are made possible by an ongoing partnership between the physician licensing boards in Arizona and Arizona State University's Center for Health Information & Research (CHiR). Beginning in 1992, the licensing boards permitted CHiR to add survey questions to license applications from physicians. With few exceptions, the data have been collected continuously since 1992. Previous reports and articles from the survey are listed in Appendix B.

The voluntary survey responses are merged with the licensing data collected by the boards for each physician. The licensing data for non-respondents to the survey permits a rigorous analysis of non-response bias.

The survey questions change over time and among different project sponsors. AHCCCS, an agency of the State of Arizona, has provided financial support for the project since 2009.

Short paper survey forms were used from 1992 through July 2009, greatly restricting the number and complexity of survey questions. The 2007 paper survey consisted, for example, of six questions. The licensing boards converted to electronic applications in 2009, but a large number of physicians continued to use paper surveys, and funding was not available to create an electronic survey. Results for the periods July 2007 to March 2013 are described in previous CHiR reports (See Appendix B).

A new electronic survey was implemented in early 2012 with funding from AHCCCS and the Arizona Strategic Enterprise Technology Agency (see Appendix C). The electronic survey included a greatly expanded set of questions and a large number of decision trees, including different questions for physicians with Arizona licenses who practice outside the state. Many of the questions on the survey duplicate questions used in national surveys, such as the NCHS and the National Health and Nutrition Examination Survey (NHANES) surveys, to permit direct comparisons to the national data. An expanded version of the survey instrument was implemented in April 2015 (See Appendix D).

The periods discussed in this report are:

- 2007-2009 – represents July 17, 2007 to July 17, 2009
- 2009-2011 – represents November 1, 2009 to November 1, 2011
- 2012-2014 – represents March 20, 2012 to March 20, 2014
- 2013-2015 – represents April 1, 2013 to March 31, 2015
- 2015-2017 – represents April 1, 2015 to March 31, 2017

Some studies of EMR adoption identify the *number of practices* with EMRs, while this report counts the *number of physicians* with EMRs, as does the NCHS. Estimates of the number of physicians using EMRs is the most direct measure of potential impact on patients, but the number of practices is a more useful measure of the impact on organizations. A 2007 Massachusetts study is a good example of the effects of larger practices on physician counts (Simon, et al. 2007). The study reported that almost half of Massachusetts' physicians used EMRs, but less than one-quarter of practices in Massachusetts had adopted EMRs.

Definitions

Active license: The licensing boards define active physicians as those whose license has not expired or been suspended. Some physicians renew their licenses after retirement or while on leave. The distinction between physicians with an active license and those who are actively practicing medicine is only obtainable from responses to the survey. The true status of physicians who do not respond to the survey is, therefore, unknown. Survey respondents who indicate that they are retired or semi-retired/on leave physicians with active licenses are excluded from our results.

Electronic Medical Record: Physicians were given the opportunity to select any or all of the possible methods of storing their medical records. The specific survey question is:

How does the organization in which you practice store its medical records? **(Please answer Yes or No to <u>each part</u> a, b, c)**

a) Paper ☐ Yes ☐ No
b) Scanned images of paper records ☐ Yes ☐ No
c) Electronic files (an electronic version of a patient's medical history, including progress notes, diagnosis, medications and other information used in treatment.)
☐ Yes ☐ No

{if 6 c) checked yes, continue}
i. What is the name of your current EMR/EHR system (**Please check only one box.)**

Note: Check boxes are provided for 36 different EMR systems with an open ended response for others.

This question is much more specific than the question on previous surveys, which was thought to be too general, allowing some respondents to include billing software as an EMR by mistake. The previous question was:

Are patients' medical records in your practice/organization stored as:
a.paper ◯ Yes ◯ No
Scanned images of paper files ◯ Yes ◯ No
Electronic files ◯ Yes (continue) ◯ No (If no, go to question #5)
◯ The records are stored on a PC/server located in my organization
◯ The records are stored on a server to which I connect via the internet
◯ I don't know where they are stored

Therefore, comparisons between the current results and data based on the short survey question may not be strictly comparable.

Specialty: Physicians can report more than one specialty to the licensing boards, and they need not be board certified in the reported specialty. We adopt the first specialty reported and do not classify physicians by multiple specialties. *Pediatric Specialties* are defined as pediatricians or physicians practicing a pediatric subspecialty. *Surgical Specialties* are defined to include surgeons or any surgical subspecialty. *Hospital Based Specialties* include critical care medicine, diagnostic imaging and radiology, emergency medicine, hospitalist medicine, infectious disease, neonatology, respiratory care, transport medicine, anesthesiology, intensive care medicine, pathology, nuclear medicine, rehab and occupational medicine, or radiation oncology. *Primary Care is* defined to include family care, general practice, geriatrics, or internal medicine when no other sub-specialty is listed. All other specialties are defined as *Medical Specialties,* including obstetrics and gynecology, following the conventions used by AHCCCS.

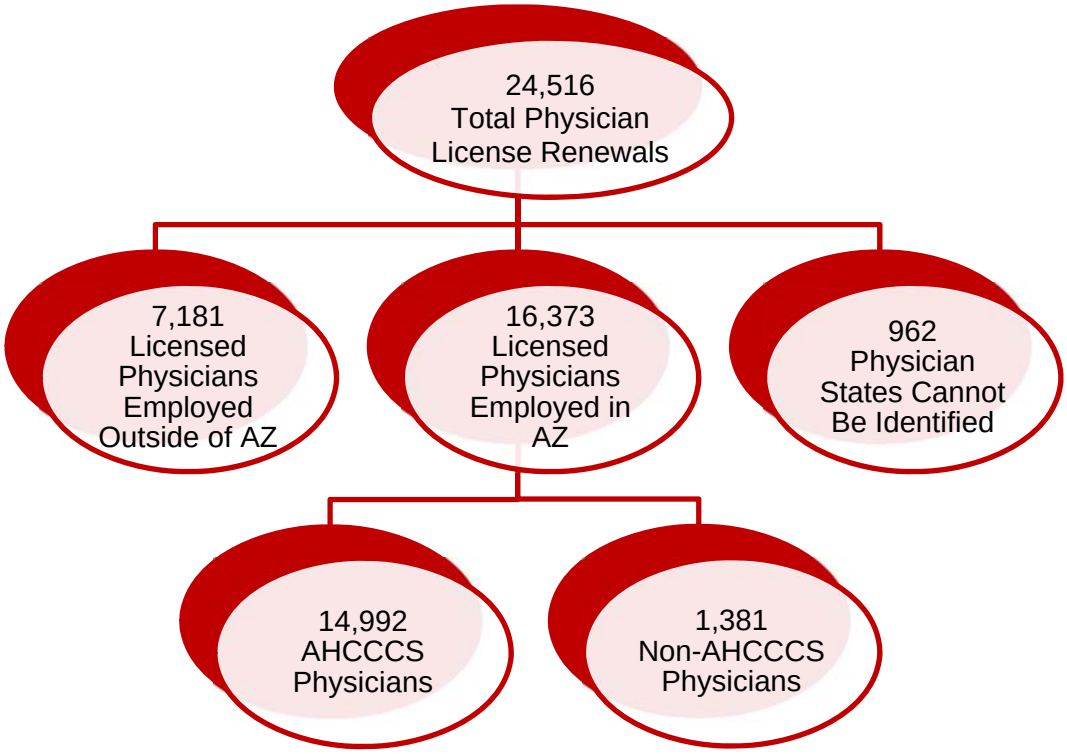
Type of Practice: The categories used from 1990-2012 were expanded and revised for the new electronic survey to be more internally consistent. Categories defined in terms of physician activity (e.g. semi-retired; locum tenens) were removed and replaced by categories representing the type of practice/organization in which a physician works. Thus, the type of practice data prior to 2012 is not strictly comparable to the data collected after March 2012.

Survey Sample

The number of physician renewals and survey respondents is described in Figure 1. A total of 24,516 physicians renewed their licenses between April 1, 2015 and March 31, 2017. Allopathic physicians renew their licenses every two years on their birthdays, and osteopathic physicians renew their licenses every other year, so the results represent approximately 72% of the physicians in the 2015-2017 renewal cycle. The high response rate from the population of all physicians, rather than a sample, provides a very robust, representative set of results. The renewals included 16,373 physicians who live in Arizona and an additional 7,181 physicians with Arizona licenses who live outside Arizona. There were 962 physicians whose state of residence could not be identified.

An increasing number of physicians with Arizona licenses provide services to Arizona patients, such as interpreting images, even though the physicians live in other states. The information needed to identify these physicians is not always available, so it is likely that some of the non-resident physicians would properly be included in the Arizona physician workforce if more information were available.

Figure 1. All Physician License Renewals, 2015-2017

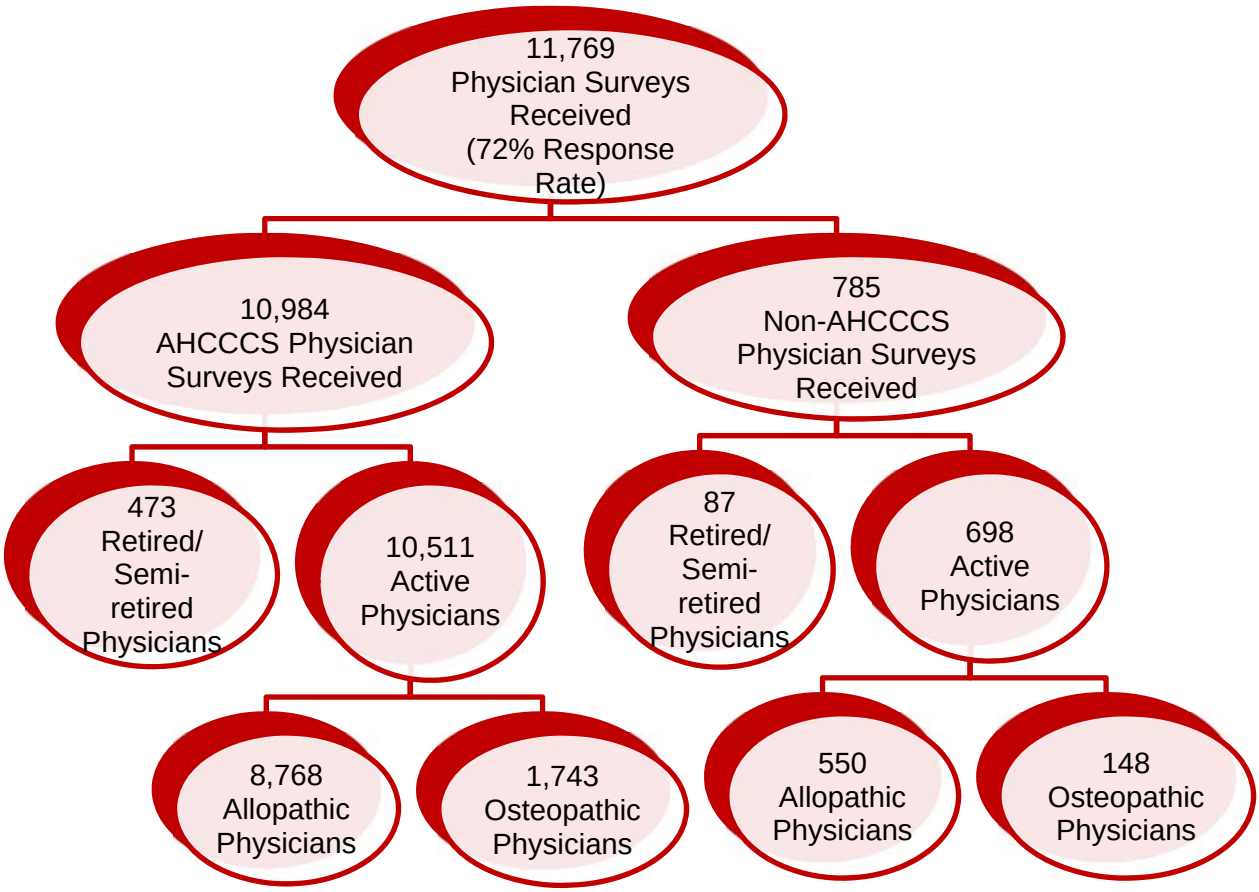


Source: Arizona Medical Board (AMB), Arizona Board of Osteopathic Examiners (ABOE) Survey and Administrative Data, April 2015-March 2017.

Because all physicians renewing Arizona licenses have the opportunity to complete a survey, the number of respondents is substantially larger than the number obtained from a fractional sample that typically draws respondents from a relatively small percentage of a population. If, for example, a five percent sample of the 24,516 renewals had a response rate of 72%, then the survey results would include 883 physicians rather than the 11,769 physician respondents represented in our results. Response rates of 60% or more are considered adequate for surveys, so at 72%, the response rate is high. The NCHS survey, for example, used a sample of 3,180 physicians to represent all office-based physicians in the United States (Jamoom, et al. 2012).

Our very large sample minimizes the need to rely on small numbers of responses to some questions on the survey, and it reduces the variance surrounding estimates. In other words, the results are more certain.

Figure 2. All Surveys Received, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Survey responses were received from 11,769 physicians living in Arizona. Of those, 11,209 physicians were in active practice. These respondents include 9,318 allopathic physicians and 1,891 osteopathic physicians. The data described in Figure 2 show that the AHCCCS program has succeeded in enrolling nearly all of Arizona's physicians to provide services to AHCCCS clients. Of the 11,209 renewing physicians employed in Arizona in 2015-17, 10,511 (93.8%) treated AHCCCS enrollees. AHCCCS enrollees account for approximately one-sixth or approximately 24% of the State's population.

Non-Response Bias

Arizona physicians renew their licenses over a two-year cycle; therefore, the results in this report include the population of all physicians rather than a sample.

The data in Table 1 show no significant differences in response rate by sex; physicians in the youngest and oldest age groups are less likely to have responded to the survey while physicians

ages 45-54 are slightly overrepresented among respondents. Primary care and hospital-based physicians are slightly overrepresented while medical specialists and surgical specialists are slightly underrepresented among the respondents. Geographically, physicians in rural areas are slightly over represented among respondents while physicians in Maricopa County are underrepresented, and there are no significant differences for physicians in Pima County. The results should be interpreted with these limitations in mind.

Effectively, the most likely impact of significant differences in response rates will be on those sets of results that rely on variables specifically affected by the differences. Thus, for example, results that rely on comparisons among ages will be affected by the differential response rates among age groups that have been described.

Table 1. Comparison of Respondents to Non-Respondents, 2015-2017

Characteristic	*Respondents (N =11,209)*		*Non-Respondents (N = 4,604)*		*P-Value*
Sex					
Female	3,410	30.4%	1,370	29.7%	NS
Male	7,482	66.7%	3,104	67.4%	NS
Total	10,892	97.1%	4,474	97.1%	
Age Group					
25 - 34	467	4.1%	536	11.6%	<0.01
35 - 44	2,863	25.5%	1,082	23.5%	<0.01
45 - 54	3,149	28.0%	1,045	22.6%	<0.01
55 - 64	2,674	23.8%	1,015	22.0%	<0.01
65+	1,489	13.2%	833	18.0%	<0.01
Total	10,642	94.9%	4,511	97.9%	
Specialty					
Primary Care	4,123	36.7%	1,511	32.8%	<0.01
Medical	2,440	21.7%	1,202	26.1%	<0.01
Hospital-Based	2,606	23.2%	943	20.4%	<0.01
Pediatric	980	8.7%	418	9.0%	NS
Surgical	1,024	9.1%	516	11.2%	<0.01
Total	11,173	99.6%	4,590	99.6%	
Location					
Maricopa County	7,140	63.6%	2,958	64.2%	NS
Pima County	1,955	17.4%	873	18.9%	<0.05
All Other Counties	2,114	18.8%	773	16.7%	<0.01
Total	11,209	100.0%	4,604	100.0%	

Source: AMB, ABOE Administrative/Survey Data, April 2015-March 2017 retired and semi-retired physicians.

Note: A p-value of .05 or less implies only a 5% probability of declaring the relationship significant when in fact it is not. NS = no significant difference. Gender was unknown for 317 (2.8%) respondents and 130 (2.8%) non-respondents. Age was unknown for 566 (5%) respondents and 92 (1.9%) non-respondents. Specialty was unknown for 36 (0.3%) respondents and 14 (0.3%) non-respondents.

The licensing board data are available for each of the 16,373 physicians who were employed in Arizona and who renewed their licenses between April 2015 and March 2017. There were 11,769 physicians who responded to the survey. We excluded the retired/semi-retired physicians and focused on the remaining 11,209 physicians. Each survey respondent represents approximately 1.5 physicians in active practice who renewed their licenses April 2015 and March 2017. Except where noted, the results are un-weighted counts and percentages because our primary interest is in the averages, which do not change if weighted, rather than the absolute number of responses.

Note: Retired and semi-retired/on leave physicians are excluded from all subsequent results in this report, except where noted.

All Physician Results

EMR Utilization

The percentage of office-based physicians in the United States who used some form of an EMR increased from 18% in 2001 to 86.9% in 2015 (Jamoom and Yang 2016). Nationally, physicians who used EMRs that included functions such as patient summaries, e-prescribing and lab results were 48% in 2013 (Hsiao and Hing 2014) and 53.9% in 2015 (Jamoom and Yang 2016).

The trend in the utilization of EMRs in Arizona is consistent with trends in in the United States. Approximately 90% of Arizona physicians use some type of EMR compared to 45% in 2007-2009. The national data from the National Ambulatory Medical Care Survey (NAMCS) are not strictly comparable to our results because they represent only a portion of the types of physicians included in our survey. The NAMCS exclusions include physicians in federal facilities where the utilization rates of EMRs are 96% and a number of specialty practices (Hsiao and Hing 2012). However, NAMCS estimates that more than 85% of physicians in office-based practices in Arizona used some form of EMR in 2014 (Jamoom, Yang and Hing 2015).

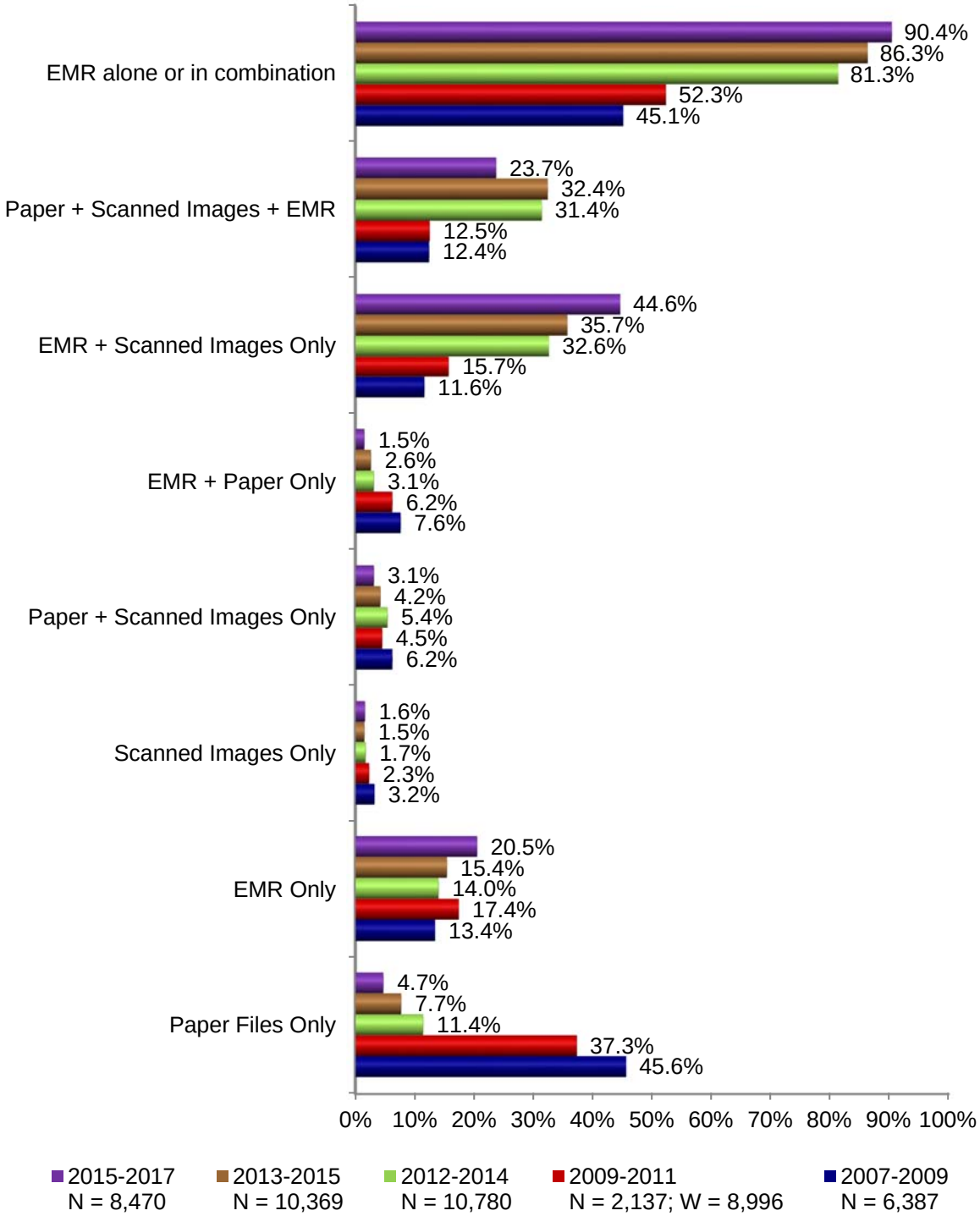
Trends in the utilization of EMRs in Arizona are described in Figure 3. A serious problem with the reporting software for the survey in 2009-2011 required the application of utilization rates from the paper surveys to the electronic survey data. The paper surveys represented a substantial portion of the total responses at that time, but the potential agreement between the paper and electronic results could not be validated. The overall results for that period can be interpreted with a reasonable level of confidence, but the results for some individual characteristics are subject to uncertainty.

The uncertainty in the 2009-2011 estimates, notwithstanding, the trend to increasing reliance on EMRs, often in combination with paper or scanned medical records, is quite clear. The use of paper records alone in Arizona declined from nearly 46% to approximately 5% between 2007-2009 and 2015-2017. The use of EMRs as the only medical record in a practice increased from 13% to 20% in the same period. Thus, the most prevalent use of EMRs is in combination with other forms of medical records. As indicated in Figure 3, the single most prevalent combination is that of EMRs with scanned records. The combination is the only one of the many combinations whose use has increased over time, rising from 11% to 45% of all EMR users since 2007-2009. We believe that its importance reflects the relative shortage of networks for the electronic transfer

of EMRs. More information on the recent expansion of a health information exchange in Arizona, namely Health Current, is presented in a subsequent section.

The use of EMRs in combination with paper and scanned files increased steadily in the years between 2007-2009 and 2013-2015, suggesting that many of the new adopters of EMRs had previously begun a transition from paper records to scanned records. The process is one of gradual transition from paper records and scanned records to EMRs rather than the complete translation of existing records to EMRs. The trend reversed for the first time, however, between 2013-2015 and 2015-2017 with the percentage using *EMR+paper+scanned* files dropping from 32% to 24%. The break in the trend suggests that the first stage of conversion from paper records is approaching maturity and that reliance on EMRs or *EMRs+scanned* files without paper, will increase. The next stage in the transition to EMRs as the sole medical record depends upon the availability of exchanges that can transfer EMRs electronically and thereby reduce reliance on scanned records.

Figure 3. Methods of Storing Medical Records



Source: AMB, ABOE Survey Data, 2007-2009; 2009-2011; 2012-2014; 2013-2015; 2015-2017.

Note: The 2011 weight = 4.21. The 2011 estimates are subject to substantially more uncertainty than the other renewal period data.

Respondents who did not identify a method of storing medical records (missing): 390 for 2007-2009; 2,177 for 2012-2014; 2,039 for 2013-2015; and 2,739 for 2015-2017.

*Data on "EMR alone or in combination" is not mutually exclusive from other categories.

Estimates of the productivity from the use of EMRs typically assume that if a practice has an EMR, it is the only form of medical record. As our results indicate, EMRs are typically used in combination with scanned and paper records. Reliance on multiple types of records limits potential increases in productivity from EMRs by adding steps to the workflow process. Until the transition to EMRs is complete, estimates that do not account for the use of multiple records will systematically understate the productivity effects of EMRs (Johnson, Butler and Harootunian 2016). Another possible influence on productivity is the absence of electronic networks for the exchange of clinical information. In a summary of several surveys reported in *Information Week*, 80% of organizations with EMRs also use paper records (Terry 2012). The *Information Week* article, citing various sources, reports that many practices with EMRs receive faxes and paper documents from other practices because electronic interfaces are not available. Many of the documents are scanned or entered into the EMRs. The electronic exchange of EMRs in Arizona is discussed in the next section of this report.

Utilization of EMR Functions

The functions included in EMR software packages vary among vendors. In addition, different physicians make different choices from the functions available in their EMRs. The results describe the extent to which key functions are included in physicians' EMRs; the extent to which physicians use those functions; and the extent to which information is exchanged with others by physicians who use the functions. We examine the inclusion, use and exchange of the following:

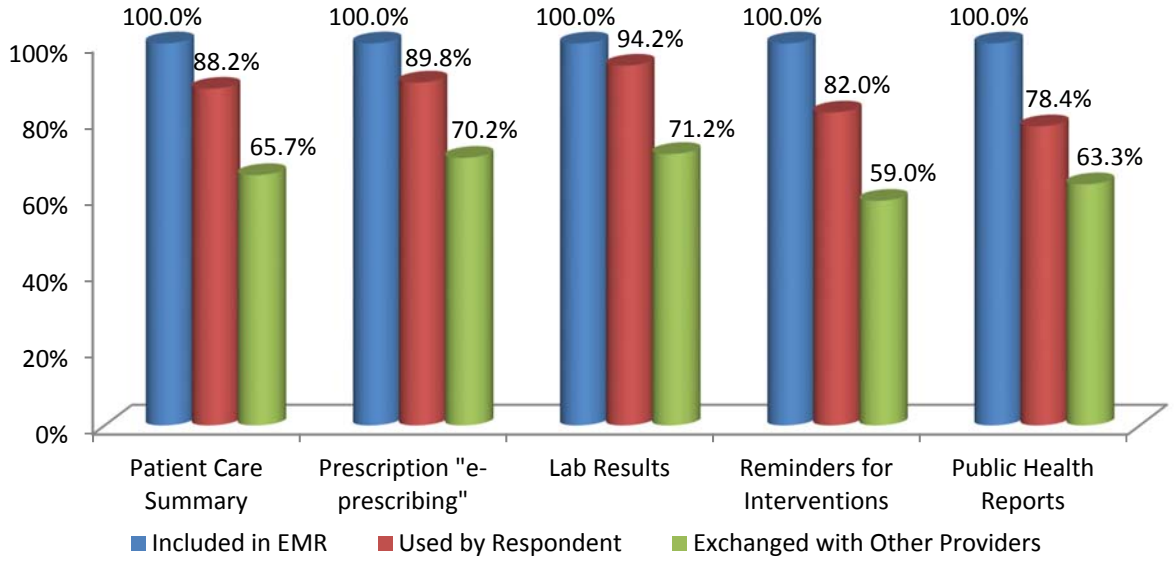
- Patient Care Summary
- Prescription Function
- Lab Results Function
- Reminders Intervention Function
- Public Health Reports Function

Only 14% of office-based physicians in the U.S. shared data with other organizations in 2009-2013 and not all the exchanges were electronic (E Health Initiative 2012; Furukawa, et al. 2014). In Arizona, transfers of information from EMRs were also limited. In 2015, the percentage of electronic data sharing increased to 38% nationwide (The Office of the National Coordinator for Health Information Technology (ONC) 2016). The increases in Arizona have outstripped the

national averages. More than 3,500 physicians or 46% of physicians with an EMR exchange one or more elements of their EMRs through a Health Information Exchange (HIE) compared to 25% in 2013-2015. Using 2013-2015 as the reference year rather than 2007-2009 recognizes that most of the considerable progress in electronic exchanges is attributable to the introduction and expansion of Health Current, the statewide HIE.

The results in Figure 4 include exchanges between different health care organizations but excludes transfers between hospitals and hospital owned practices. The results in Figure 4 must be interpreted as an overstatement of the percentage of physicians exchanging EMRs with different health care organizations. Since the 2013-2015 results are subject to the same bias, the estimated increase in exchanges is less biased than the absolute estimates in either of the two time periods.

Figure 4. Summary Utilization of Available EMR Functions, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

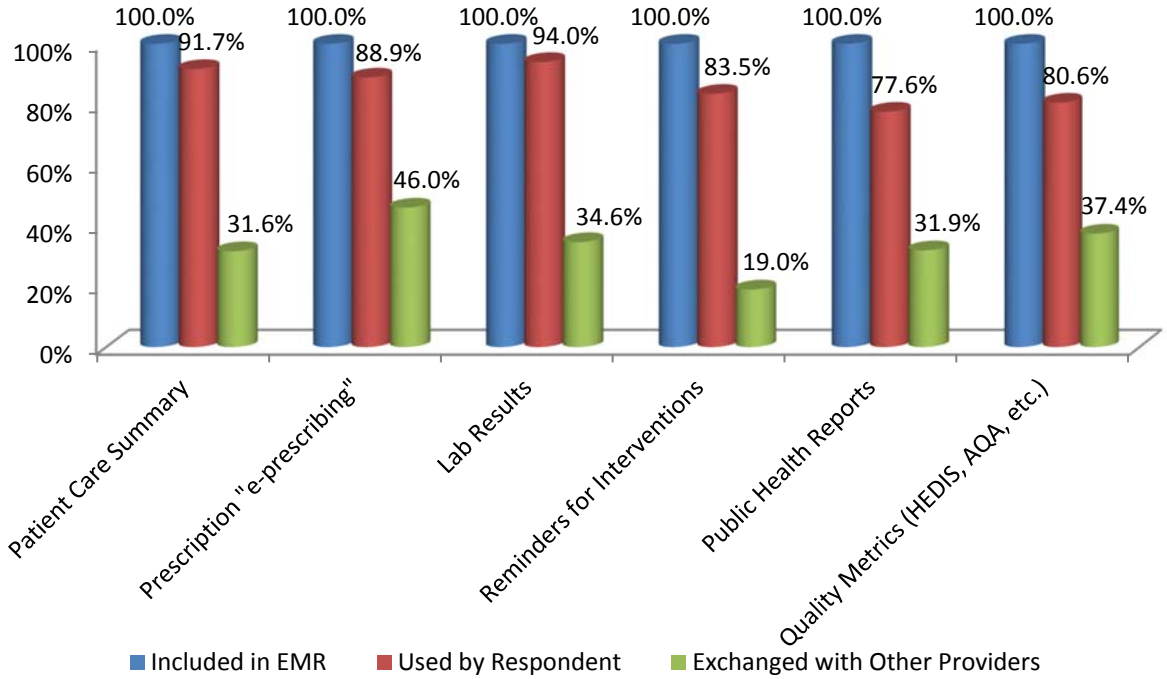
Note: The data in this table only include those physicians that answered *"Yes"* to the Include question for each EMR function. Furthermore, the data only includes those that answered both the Used and Exchanged questions for each EMR functions; if either question was left blank the physician was excluded from the table for that function.

The data exclude physicians in hospitals or hospital owned practices.

The most frequently used functions are the *Lab Results*, *Patient Care Summary* and *E-Prescribing* functions. There has been a concerted effort in Arizona to incent providers to use e-prescribing, and it appears to be succeeding. The prevalence of the use of lab functions probably reflects the long-standing practice of electronic reporting by Sonora Quest Laboratories. The pre-existing reporting systems simplified the inclusion of laboratory results in EMR software.

The benefits of using EMRs is being achieved through recent strides in exchanging information. In this cycle, 71.2% of physicians with EMRs that included Lab results, reported they exchanged *Lab Results* with other providers, followed by 70.2% for *E-Prescribing* and 65.7% for *Patient Care Summaries*. Note the significant increase in exchanging information when compared to the previous cycle as displayed in Figure 5 below. This is likely due to the efforts and incentives provided by *Health Current* (formerly the Health Information Network of Arizona or HINAz), Arizona's statewide health information organization. *Health Current* splits operational costs with providers equally and community providers can participate in the HIE at no cost (Kotrys 2015).

Figure 5. Summary Utilization of Available EMR Functions, 2013-2015



Source: AMB, ABOE Survey Data, 2013–2015.

Note: The data in this table only include those physicians that answered *"Yes"* to the Include question for each EMR function. Furthermore, the data only includes those that answered both the Used and Exchanged questions for each EMR functions; if either question was left blank the physician was excluded from the table for that function.

Quality metrics and required reports such as reportable diseases are reported by other methods, including email, faxes and separate electronic networks. Although the information is not lost, EMRs would be a more efficient and timelier means of delivery. The marked disparity between the use of EMRs and the sharing of information is a consistent feature of all the previous CHiR surveys, although the previous results are less detailed.

The results overstate exchanges of information that occur between physicians in different practices or different hospital systems because the results include exchanges within a practice or a single hospital system as well as exchanges between organizations. Exchanges among different organizations such as between hospital systems or among physician-owned solo or group practices are much less frequent.

The single most important obstacle to the inter-organization transfer of electronic health information is the shortage of HIEs. The history of HIEs linking different organizations is one of frequent failure, largely traceable to the absence of viable business models (E Health Initiative 2012). The lack of HIEs also forces practices with EMRs to exchange information via fax, requiring the recipients to continue to use paper or scanned documents in addition to their EMRs (Terry 2012).

Health Current is striving to solve the problems that have hampered the expansion of HIEs. *Health Current* has 353 participants as of August 2017, defined as organizations who have executed a Network Participation Agreement enabling data sharing. Data collection, which typically lags enrollments, is gradually increasing.

Table 2. *Health Current* Participants

Type of Organization	*Number of Participants*	*Participants Sending Data to Health Current*
Hospitals/health systems	29	21
Health plans	12	--
Community health centers	21	5
State & local government agencies	18	--
Reference laboratories & imaging centers	2	1
Community providers	129	2
Behavioral health providers	71	2
Accountable care organizations	14	--
Long-Term & Post-Acute Care	57	--
Total	353	31

Source: (Health Current 2017).

One promising feature of *Health Current* is the involvement of the 12 health plans. The economic benefits of exchanging patient information directly accrue to payers. The unnecessary costs of duplicate testing, treatments required because of prescription errors, and other information related problems are borne by the organizations that assume economic risk, including insurers and health care organizations that provide capitated care. Thus, they are also the primary economic beneficiaries of exchanges of information that reduce avoidable negative outcomes of care.

EMR Adoption Incentives

The costs of implementing an EMR system are one of the most significant obstacles to EMR adoption, and the problem is especially difficult for relatively small health care organizations. Economic incentives increased the rate of adoption nationally. A 2010 study of e-prescribing shows, for example, that nearly 40 percent of e-prescribers had adopted e-prescribing in response to a federal incentive program (Joseph, et al. 2013).

There are a number of conditions defining eligibility for Medicare or Medicaid incentives (Centers for Medicare & Medicaid Services 2012). The basic eligibility criteria for hospitals under the Medicare incentive program are:

- Subsection (d) hospitals that are paid under the inpatient prospective payment system (PPS)
- Critical Access Hospitals (CAH)
- Medicare Advantage (MA-Affiliated) Hospitals

The Medicaid Eligible Hospitals include:

- Acute care hospitals with at least 10% Medicaid patient volume
- Children's hospitals

Eligible Professionals for Medicaid incentives include:

- Physicians (primarily MD and DO)
- Nurse Practitioners
- Certified nurse-midwives
- Dentists
- Physician assistants who furnish services in a federally qualified community health center or rural health clinic led by a physician assistant.

Eligible Professionals for Medicare incentives include:

- MDs and DOs
- Doctor of dental surgery or dental medicine
- Doctor of podiatry
- Doctor of optometry
- Chiropractor

The available survey data do not adequately distinguish between eligible and non-eligible physicians. The results include, therefore, physicians in environments to which the incentives do not apply. We hope to improve this analysis in future reports.

As noted, we do not have the data needed to link adoptions to incentives, but it is true that the recent increases in the rate of adoption of EMRs are correlated with the incentive payments made to health care providers.

Table 3. Total Arizona Medicare and Medicaid EHR Incentive Payments by Provider Type (January 2011 – June 2017)

Program - Provider Type	*Number of Payments*	*Amount of Incentive Payments*
Medicare - Eligible Professionals	16,898	$158,523,387
Medicaid - Eligible Professionals	5,754	$95,834,685
Total Eligible Professionals	22,652	$254,358,072
Medicare - Eligible Hospital	4	$3,042,953
Medicaid - Eligible Hospitals	7	$12,063,347
Medicare/Medicaid - Eligible Hospitals (Medicare)	250	$250,738,822
Medicare/Medicaid - Hospitals (Medicaid)	188	$161,910,754
Total Eligible Hospitals	449	$427,755,876
Total Eligible Professionals and Eligible Hospitals	23,101	$682,113,949

Source: Centers for Medicare and Medicaid Services, Combined Medicare and Medicaid Payments by State, https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/June2017_PaymentsbyStateProgramandProvider.pdf.

Prevalence of EMR Replacement

The purchase and installation of an EMR system is expensive. When a system is discovered to be a failure in terms of the expectations of the users, the initial investment is lost and the costly process of purchasing and installing a replacement package is repeated. There have been many allusions to the problem of having to replace EMR packages, but this is the first time that we have data available on the prevalence of replacements among physicians in Arizona.

We also asked physicians to estimate the length of time over which they had used their current EMR. The primary purpose of the question is to estimate the effects of experience in using EMRs on physician productivity, as we discuss next, but the answers give us an approximate view of the life span of an EMR package.

We emphasize that the results must be interpreted as a rough ordering rather than precise measures. Survey designers know that respondents are unlikely to accurately remember events that have occurred in the past. Unless the timing in question is of importance to an individual or is correlated with an important event, even relatively short periods of time can be subject to recall error. To reduce the problems of recall error, we grouped the answers given in one-year increments into three-year increments, as indicated in Table 4.

Table 4. Duration of EMR System Use and Whether a Replacement, 2015-2017 (N = 6,363)

Duration of EMR use	*Replacement for Different Brand of EMR*						*Total (includes don't know responses)*	
	Yes		*No*		*Total*			
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
<1 Year	140	8.2%	103	3.0%	243	4.8%	297	4.6%
1-3 Years	880	51.7%	1,153	34.3%	2,033	40.1%	2,545	39.9%
4-6 Years	367	21.5%	999	29.7%	1,366	26.9%	1,699	26.7%
7-9 Years	123	7.2%	586	17.4%	709	14.0%	892	14.0%
10 Years or More	192	11.2%	519	15.4%	711	14.0%	930	14.6%
Total	1,702	100.0%	3,360	100.0%	5,062	100.0%	6,363	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

The data in Table 4 show that 1,702, or approximately one quarter of the 6,363 physicians who responded to the question on EMR replacement, used EMRs that replaced a previous EMR. An additional 1,301 physicians who reported duration of use but did not know whether their EMR was a replacement, are included in the final right hand column of the table.

The results show the number of physicians affected by EMR replacements rather than the number of EMRs replaced, so replacements by larger organizations are implicitly weighted more heavily than smaller practices.

Table 5. Effect of EMR Replacement on Physician Productivity Ranking, 2015-2017

Physician Productivity Ranking	*Replacement for Different Brand of EMR*						*Total*	
	Yes		*No*		*Don't Know*			
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
1 (Awful)	255	33.5%	366	48.1%	139	18.2%	760	11.9%
2	337	29.2%	600	52.0%	215	18.6%	1,152	18.0%
3	543	26.6%	1,073	52.5%	425	20.8%	2,041	32.0%
4	374	23.1%	881	54.5%	361	22.3%	1,616	25.3%
5 (Outstanding)	201	25.2%	426	53.5%	169	21.2%	796	12.5%
Total	1,710	100.0%	3,346	100.0%	1,309	100.0%	6,365	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table 6. Duration of EMR Use Effects on Physician Productivity Ranking, 2015-2017

Duration of EMR Use	*Physician Productivity Ranking*										*Total*	
	1 (Awful)		*2*		*3*		*4*		*5 (Outstanding)*			
<1 Year	34	10.7%	64	20.2%	111	35.1%	73	23.1%	34	10.7%	316	4.6%
1-3 Years	381	13.9%	530	19.3%	874	31.9%	660	24.1%	287	10.5%	2,732	40.1%
4-6 Years	208	11.5%	319	17.6%	588	32.6%	456	25.2%	232	12.8%	1,803	26.4%
7-9 Years	99	10.4%	139	14.7%	274	28.9%	296	31.3%	137	14.4%	945	13.8%
10 Years or More	91	8.9%	179	17.6%	326	32.0%	257	25.2%	163	16.0%	1,016	14.9%
Total	813	100.0%	1,213	100.0%	2,173	100.0%	1,742	100.0%	853	100.0%	6,812	100.0%

Source: AMB, ABOE Survey Data, April 2015– March 2017.

The next section of this report focuses on some selected differences in the characteristics of physicians who treat AHCCCS patients compared to physicians who do not accept AHCCCS patients.

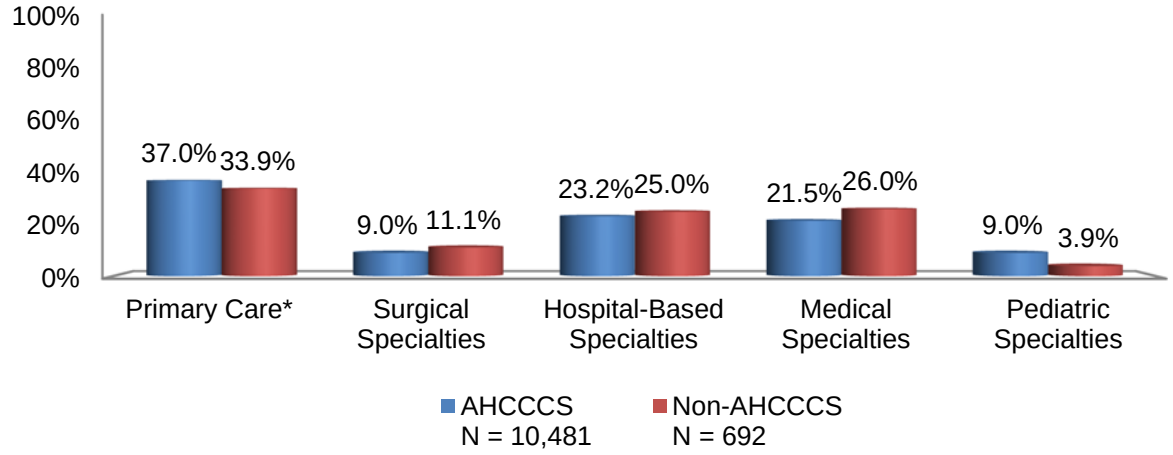
Comparing AHCCCS to Non-AHCCCS Physicians

We define an "AHCCCS Physician" as one who is registered with AHCCCS and has an active provider participation agreement with them, either as an individual or group/organization, to deliver health care services to eligible members. AHCCCS supplies its provider database to CHiR to be used to match with the administrative data from the medical boards.

This section of the report compares some selected characteristics of AHCCCS physicians to non-AHCCCS physicians. A complete description of the survey results on both groups is included in Appendices H and I.

One question that is often asked of Medicaid plans is whether their enrollees have access to the same types of physicians as do persons with private health insurance. The data described in Figure 6 show that the distribution of AHCCCS physicians by specialty is, with slight variations, effectively the same as the specialty distribution for non-AHCCCS providers. It is also true that the AHCCCS providers include the majority of all physicians in Arizona and thereby, are the majority of the physicians who treat patients with private health insurance in Arizona.

Figure 6. Distribution of Practicing Physicians by Specialty, 2015-2017 (N = 11,173)



Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: *Primary care includes family/general practice, geriatrics, and internal medicine not involving a specialty. Primary specialty reported by physician at the time of licensure. 6 non-AHCCCS physicians and 30 AHCCCS physicians did not report specialty to the medical board.

Practice Settings

The distribution of physicians by practice type represents the prevalence of practice types within each group. It is not weighted by the size distribution of physicians, so it is important to remember

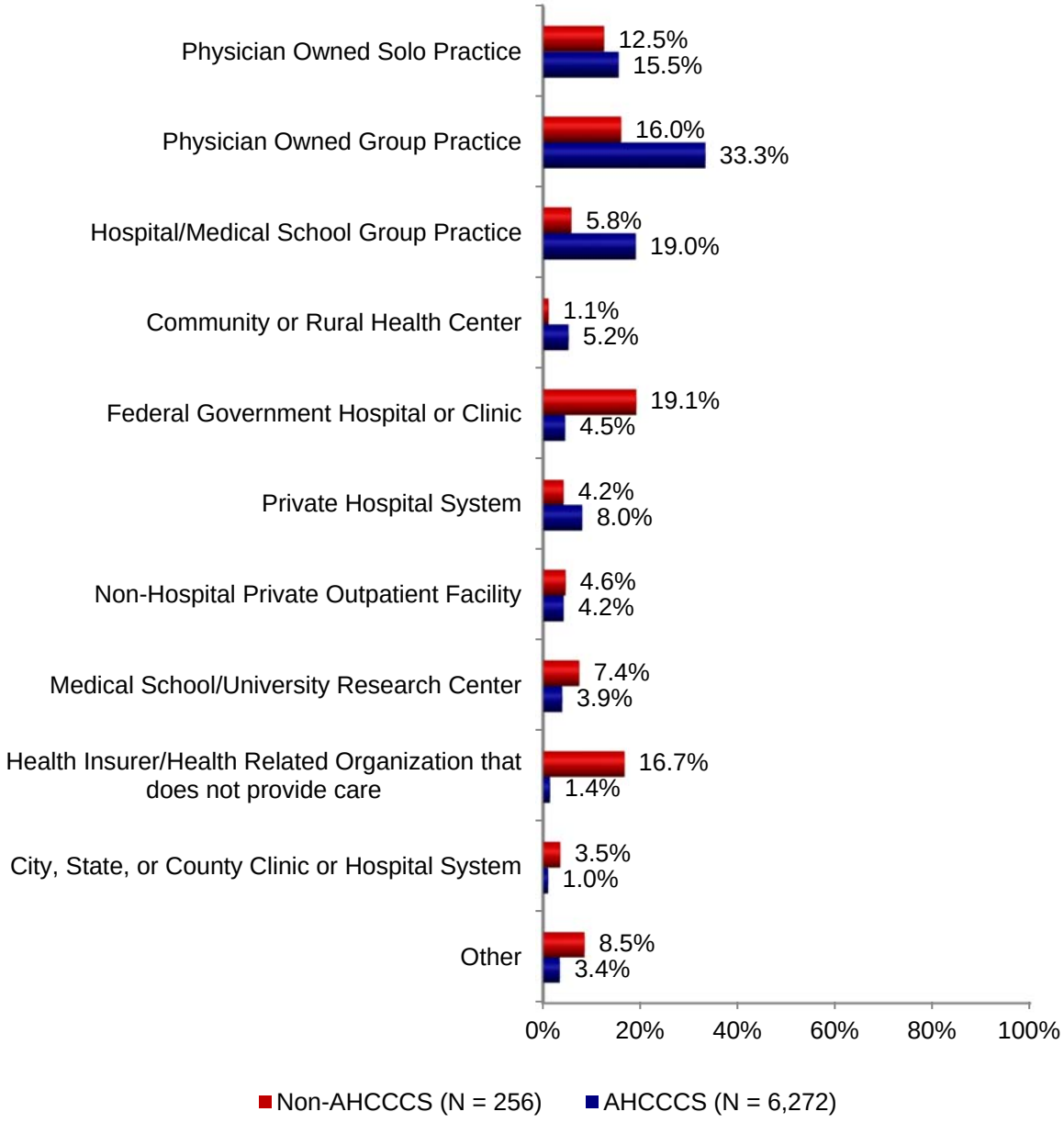
that 94% of the physicians are AHCCCS physicians and non-AHCCCS (NAHC) physicians represent only 6%.

Approximately 17% of NAHC physicians simply do not provide patient care to AHCCCS or private health insurance patients. The corresponding results for AHCCCS physicians is approximately 1%. The latter figure is likely to represent physicians who have left practice for administrative positions to recently to be captured by revisions to the AHCCCS provider database. AHCCCS physicians are also much less likely to practice in federal facilities (4.5% vs. 19%), which is not surprising since the exceptions are physicians who practice in both settings.

The largest differences between the AHCCCS and NAHC physicians are in solo practice (15.5% AHCCCS vs 12.5% NAHC); Physician owned group practice (33% vs. 16%); Hospital/Medical School Group Practice (19% vs. 6%). The practice settings in which NAHC physicians are more likely to practice than AHCCCS physicians (relative to their own colleagues) are private outpatient facility, medical school/university research center, and city, state or county clinic/hospital system.

The prevalence of solo practice is declining in Arizona, in part due to acquisitions of practices by hospital systems. The percentage of physicians (all physicians) in solo practice dropped from 24% in 2007-2009 to 15% in 2015-2017. Solo practice physicians are, all else equal, much less likely to adopt EMRs than are physicians in other practice settings and, as indicated, are less likely to serve AHCCCS patients than physicians in group practices. All else equal, utilization rates of EMRs will continue to increase as the percentage of physicians in solo practice declines.

Figure 7. Distribution of Practicing Physicians by Type of Practice, 2015-2017 (N = 6,528)

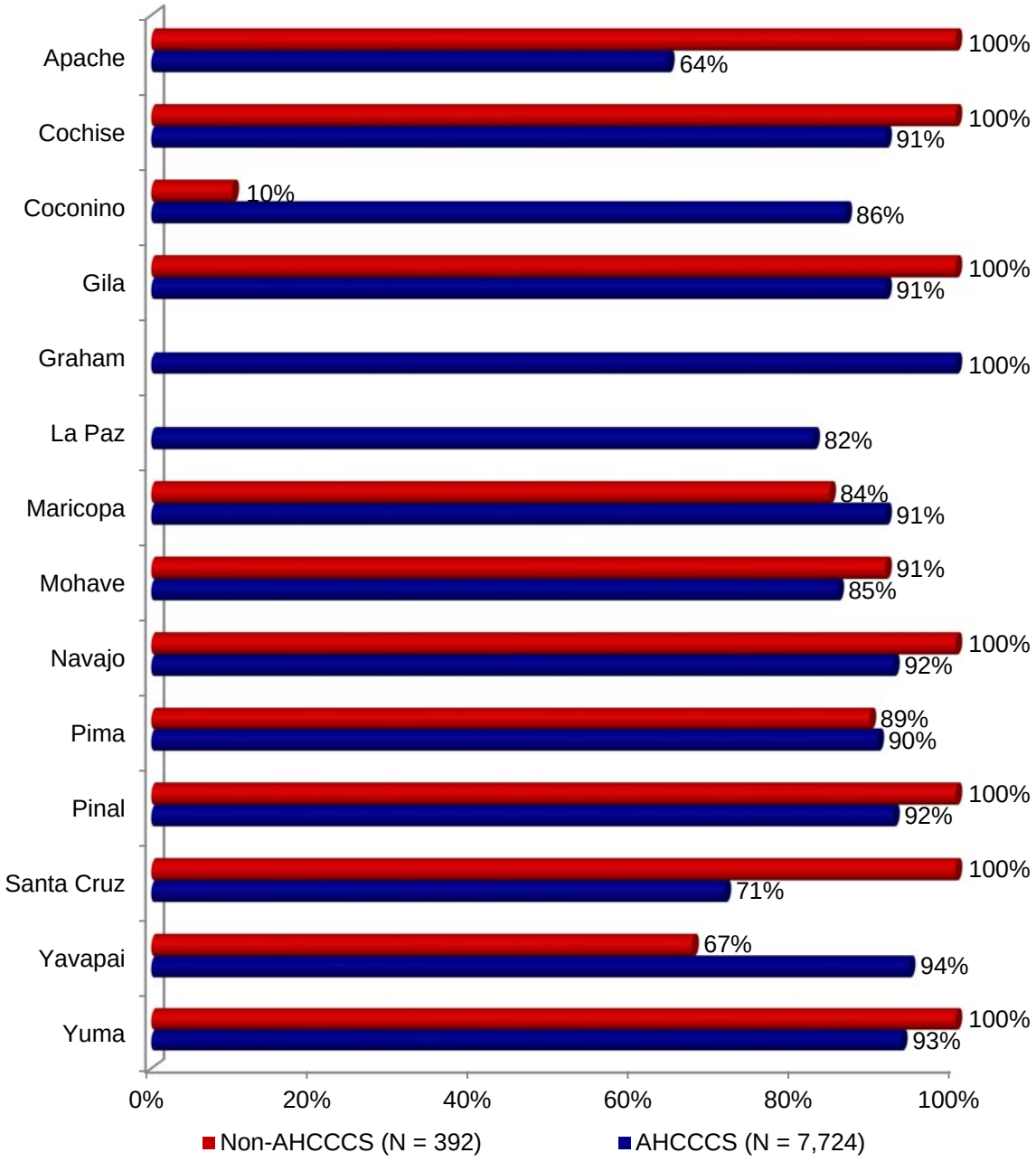


Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: 4,239 AHCCCS physicians and 442 non-AHCCCS physicians did not report type of practice (missing). Percentages are based on responses. The five practice types listed under the "Other" section are a subset of the total types included in the "Other" category.

Urban-Rural Distribution by AHCCCS and Non-AHCCCS Physicians

Figure 8. Physicians EMR Utilization by County AHCCCS vs. Non-AHCCCS, 2015-2017



Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: For AHCCCS physicians, 2,432 respondents did not identify a method of storing medical records and 355 respondents did not identify their county. For Non-AHCCCS physicians, 243 respondents did not identify a method of storing medical records and 63 respondents did not identify their county. Pima and Maricopa Counties represent the urban areas. All other counties represent the rural areas. Greenlee County had no respondents. Graham and La Paz had no Non-AHCCCS respondents.

The distribution of EMR users by County is described in Figure 8. We characterize Maricopa and Pima counties as urban areas because they include the largest metropolitan areas in Arizona. However, both counties are quite large and both include areas where population density is quite low.

The percentage of AHCCCS physicians who use EMRs ranges from 64% in Apache County to 100% in Graham County. The number of practicing physicians ranges from 9 in La Paz County to 4,739 in Maricopa County. The percentage of NAHC physicians who use EMRs ranges from 67% in Yavapai County to 100% in Apache, Cochise, Gila, Navajo, Pinal, Santa Cruz and Yuma counties. In Maricopa County, the utilization rate among AHCCCS physicians is tied at seventh highest in the state with Cochise County, but among non-AHCCCS physicians, utilization is the third lowest.

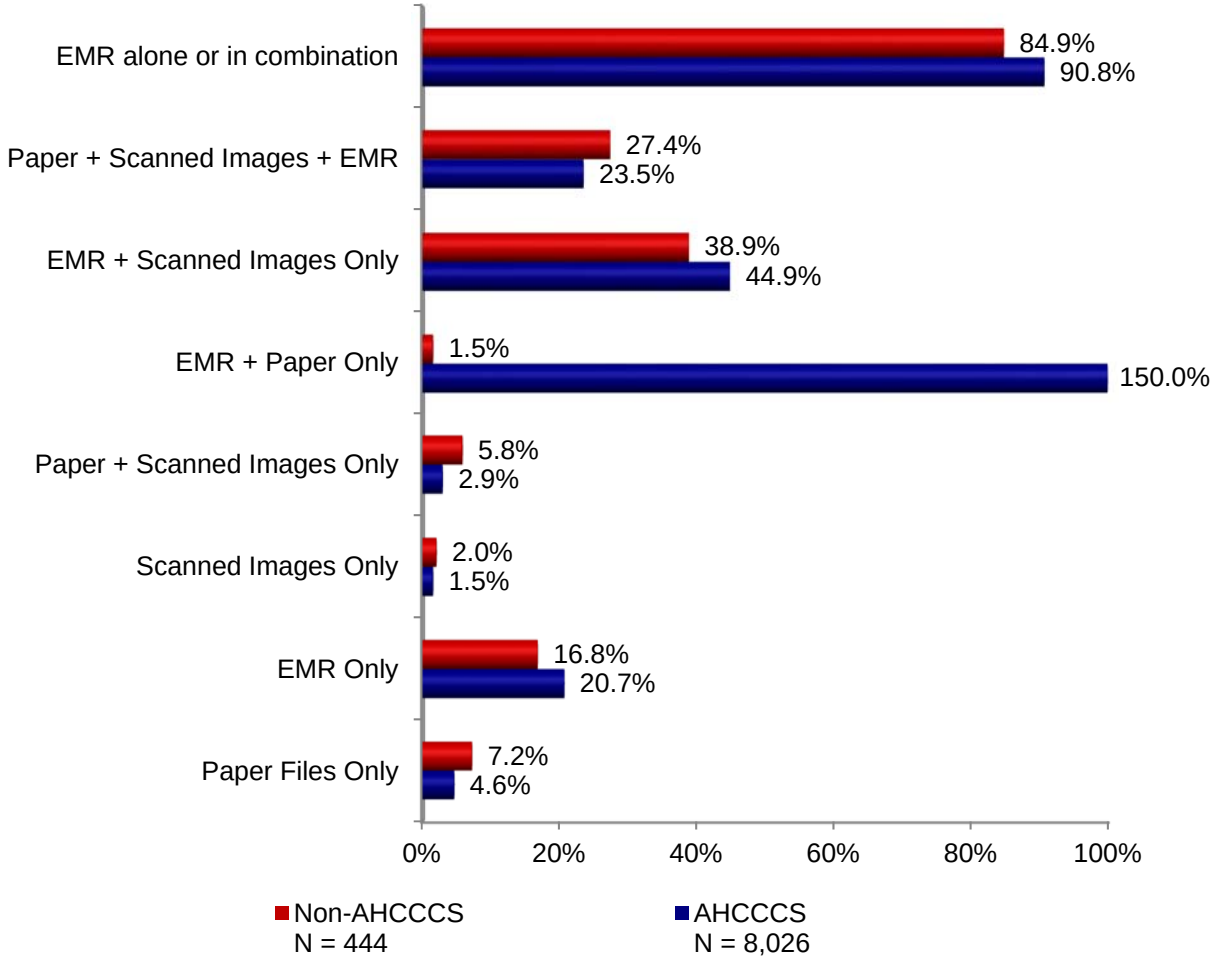
The Utilization of Electronic Medical Records

A previous section of the report described the methods of storing medical records on data including both AHCCCS and NAHC physicians. The dominance of AHCCCS physicians precludes comparisons of AHCCCS physicians to all physicians. It is useful however, to compare AHCCCS to NAHC physicians directly.

The results in Figure 9 show that AHCCCS physicians are more likely than NAHC physicians to use EMRs. These results are consistent with a recent study that evaluated whether persons in poverty were receiving a proportionate share of the benefits of EMRs. Butler, Harootunian and Johnson (2013) found that, controlling for a variety of characteristics, AHCCCS patients were more likely to be served by physicians with EMRs. That conclusion may not apply equally to all Medicaid plans in the United States.

There are, however, some marked similarities in the manner in which the two groups of physicians use EMRs. The percentage of AHCCCS and NAHC physicians who rely only on an EMR is essentially equal and equal percentages of the two types of physicians combine paper records and scanned records with EMRs. The differences that lead to the overall difference are found in those who rely solely on *paper records* (AHCCCS 5% vs, NAHC 7%) and *paper +scanned images only* (3% vs. 6%). The relatively higher reliance of paper records by NAHC physicians is partly a reflection of the higher likelihood of NAHC physicians to be solo practitioners, the type of practice known to have the lowest rates of EMR utilization.

Figure 9. Methods of Storing Medical Records AHCCCS vs. Non-AHCCCS, 2015-2017 (N = 8,470)



Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: Respondents who did not identify a method of storing medical records (missing): 2,485 AHCCCS and 254 non-AHCCCS.

*Data on "EMR alone or in combination" is not mutually exclusive from other categories.

Physicians' Evaluation of EMR Software

Several studies address physician attitudes toward the *adoption* of EMRs but there is relatively little information on physicians' perceptions of the effectiveness of EMRs in day-to-day practice. Some exceptions include a study of EMR related stress among physicians (Babbott, et al. 2014) and continued reliance on paper records among EMR users (Terry 2012).

There is also anecdotal information that some EMR contracts prohibit physicians from publically expressing their opinions of their EMRs. Evaluations of brand name specific EMRs are included in Appendix E, having been gathered on condition of physician confidentiality.

The results in this section describe how Arizona physicians rank their EMR software on five criteria, namely:

- Ease of use
- Effect on physician productivity
- Effect on staff productivity
- Reliability
- Performance vs. promise

Each physician rates the EMR that he or she uses on a scale from 1 to 5, where 1 represents "Awful" and 5 represents "Outstanding". The intermediate values are not defined but the mid-point in the range can be thought of as approximating "acceptable" or a neutral evaluation. Rankings greater than 3 can be interpreted as positive. A ranking greater than "3" for physician or staff productivity indicates, for example, that an EMR has increased productivity, while rankings less than "3" suggest that an EMR has reduced productivity.

This section begins with a description of the rankings assigned to each of the five criteria described above. The rankings across all EMRs are a representation of a general evaluation of EMRs of several different types by different types of practices and physicians. Thus, without further clarification, individual EMR packages should not be interpreted as substitutes for one another. Many EMRs, such as *eClinicalWorks,* are general purpose products while the *Gmed* EMR is specifically designed for gastroenterology specialists. Appendix F summarizes more well-known EMRs by vendor and intended use.

The fact that an EMR designed for primary care physicians might be ranked lower than an EMR designed for only one specialty does not imply that the primary care physicians could or should adopt the specialty EMR. Similarly, the finding that EMR brand A has a higher rating than EMR brand B should not imply that brand A is a better buy than brand B without reference to the cost (and thereby the cost effectiveness) of the two brands.

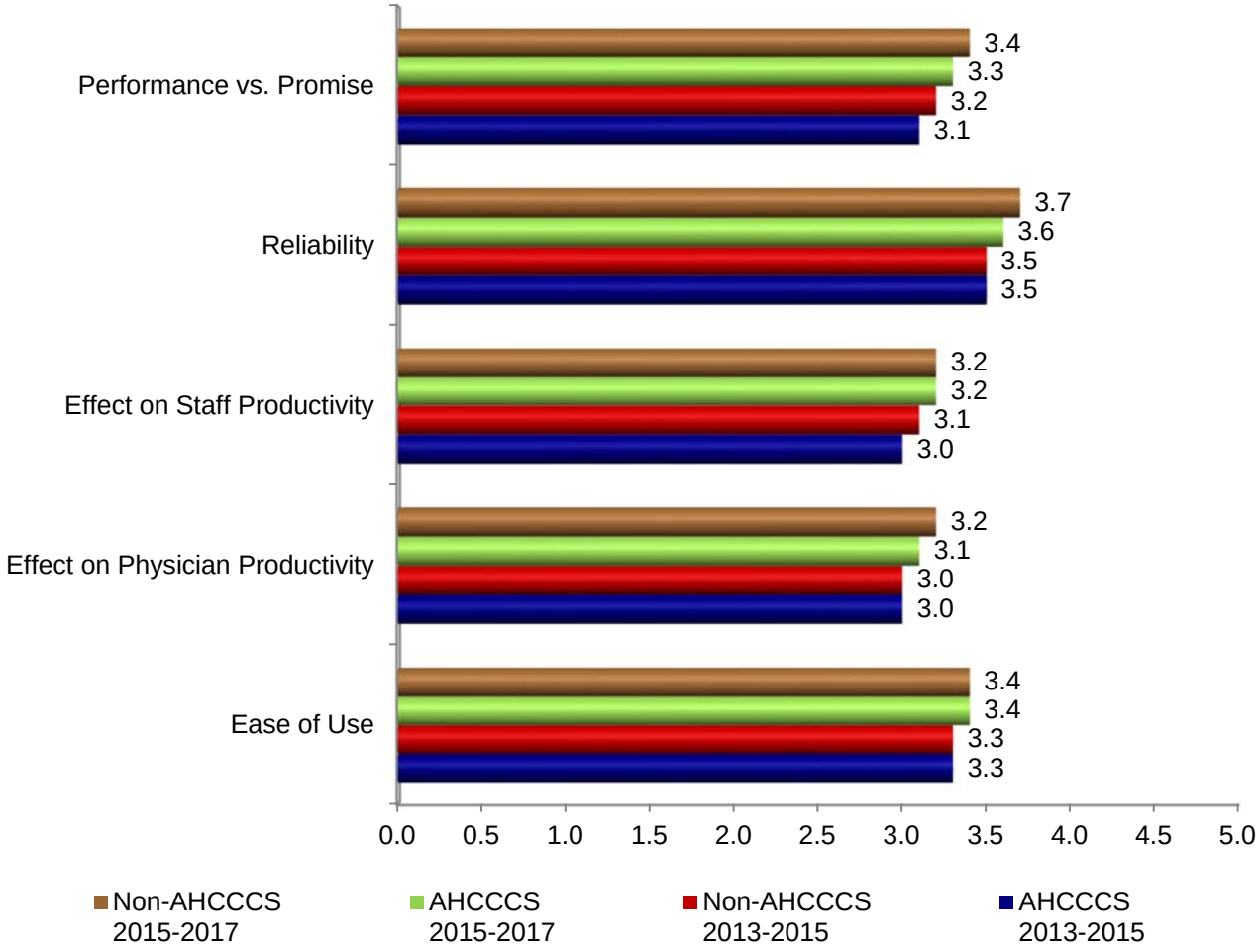
The survey does not ask if the physician respondent is using an EMR that replaced an EMR package that was not acceptable. In such cases, the rankings of the current EMR could reflect a choice that solved the problems with the previous EMR and would, presumably be more positive than a first time EMR that was acceptable, but perhaps not as well suited to the physician's

specific needs. Such situations are extremely costly, but the information on the prevalence of these problems in Arizona is not known.

The results presented next are restricted to the ten EMR packages that have the largest number of users because of the difficulty of presenting results for the very large number of vendors that serve physicians in Arizona.

A great deal of attention has been given to the shortcomings of EMRs, but the rankings described in the following tables have means equal to or slightly above the midpoint in the 1-5 scale. The results on physician satisfaction with EMRs are generally consistent with results from the NCHS survey of physicians in office-based practices. The NCHS results for 2011 show that 38% of the physicians were very satisfied with their EMRs and 46% were somewhat satisfied (Jamoom, et al. 2012). A 2014 report of a survey conducted by AmericanEHR and the American Medical Association found 34% of respondents (physicians, nurse practitioners, and physician assistants) were satisfied or very satisfied with their electronic health record systems (AmericanEHR Partners 2014).

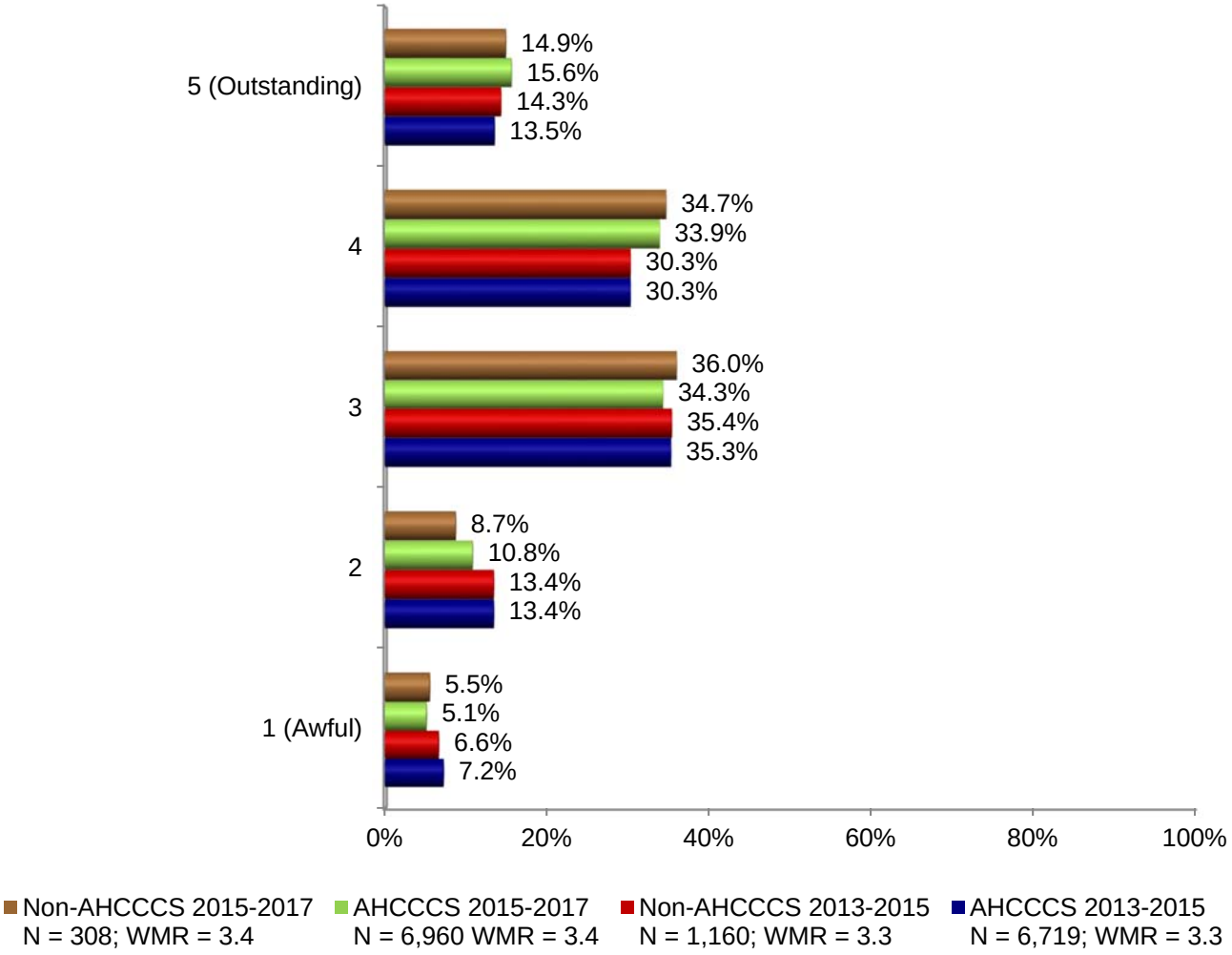
Figure 10. Summary of All EMR Rankings



Source: AMB, ABOE Survey Data, April 2013-March 2015; April 2015–March 2017.

We next consider the detailed data on the physicians' evaluations of each of the five criteria that are the components of the overall rankings for the EMRs. In general, non-AHCCCS physicians rank their EMRs slightly higher than AHCCCS physicians do on most of the five criteria.

Figure 11. Ranking of All EMRs by Ease of Use

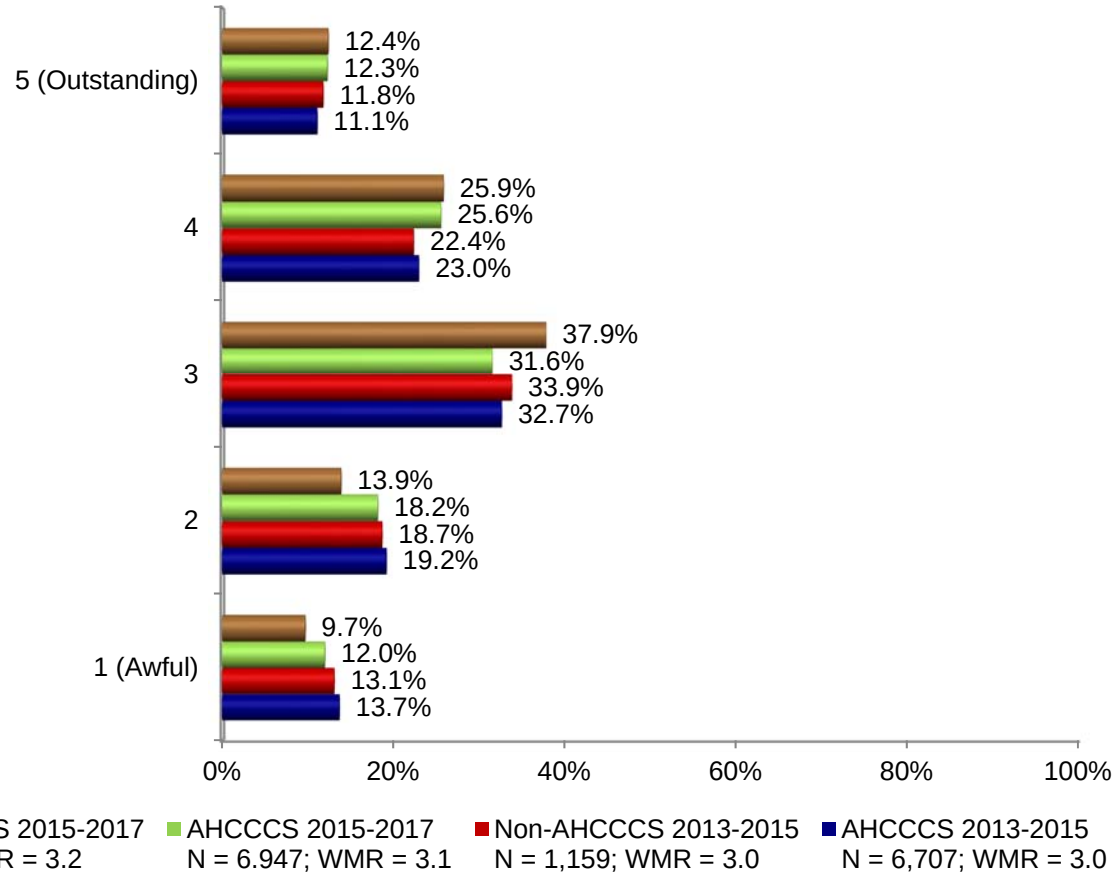


Source: AMB, ABOE Survey Data, April 2013-March 2015; April 2015–March 2017.

Note: WMR is Weighted Mean Rank. In 2013-2015, 371 AHCCCS physicians did not identify a brand name but answered the Ease of Use question. The WMR for those physicians is 3.11. In 2015-2017, 234 AHCCCS physicians and 19 non-AHCCCS physicians did not identify a brand name but answered the Ease of Use question. The WMR for those physicians is 3.33 (AHCCCS) and 3.47 (non-AHCCCS).

The weighted mean rank for the ease of using an EMR ranges from 3.3 – 3.4. As indicated in Figure 11, only 14%-16% of physicians in the most recent period give their EMR a rank less than 3, while approximately 50% rate their EMR as greater than 3. The distribution suggests that physicians are mostly positive about the ease with which the EMR can be used. Another interesting aspect of the results is the gradual improvement, among both AHCCCS and non-AHCCCS physicians, in the percentage of physicians ranking their EMRS as a 4 or 5 on the scale with corresponding reductions in the percentage of physicians in the lowest two rankings on the scale. This trend could represent the increases in learning with experience with EMRs, improvements in the structures of EMRs or a combination of both influences. Similar trends are observed for the other criteria used to rank EMRs.

Figure 12. Ranking of All EMRs by Physician Productivity



Source: AMB, ABOE Survey Data, April 2013-March 2015; April 2015–June 2016.

Note: WMR is Weighted Mean Rank. In 2013-2015, 368 AHCCCS physicians did not identify a brand name but answered the Physician Productivity question. The weighted mean for those physicians is 2.93. In 2015-2017, 233 AHCCCS physicians and 19 non-AHCCCS physicians did not identify a brand name but answered the Ease of Use question. The WMR for those physicians is 3.14 (AHCCCS) and 3.68 (non-AHCCCS).

The introduction of an EMR into a practice typically requires investments in physician and staff time to learn new procedures and make the transition from paper or scanned records to the EMR. In some instances, an EMR package does not fit well into a practice and must be replaced. Both situations imply a loss of physician and staff productivity, and both are often cited in critiques of EMRs. Increases in productivity attributable to the use of EMRs are much less discussed. The physician rankings of the effect of EMRs on physician and staff productivity, however, reveal an almost exact balance between increases and reductions in productivity creating an average rank approximately equal to the mid-point in the scale.

Although not a primary focus of this project, one question that arose was whether physicians' perceptions of the productivity effects of EMRs were a reflection of physicians' characteristics or whether they more reflected the characteristics of the EMRs that the physicians used. The

question was answered in a scholarly article, using the data from this project (Butler and Johnson 2016). The authors created a model that compared the desires of the physicians against the software features of the specific program, in order to highlight the demand and supply characteristics that influence physicians' perceptions of EMR productivity. The data included physicians' rankings of these same five criteria. The factors influencing the rankings were divided into three determinants, namely: physician characteristics, EMR characteristics (including vendor brand), and practice characteristics (type of practice, size, and location). They found that physician's characteristics matter for perceived ease of use and physicians' own productivity, but not for other productivity dimensions (i.e., not for staff productivity, reliability, or vendor's promised performance). For productivity and reliability perceptions, and vendors' promises, the type of practice and the EMR characteristics both had a statistically significant influence on productivity.

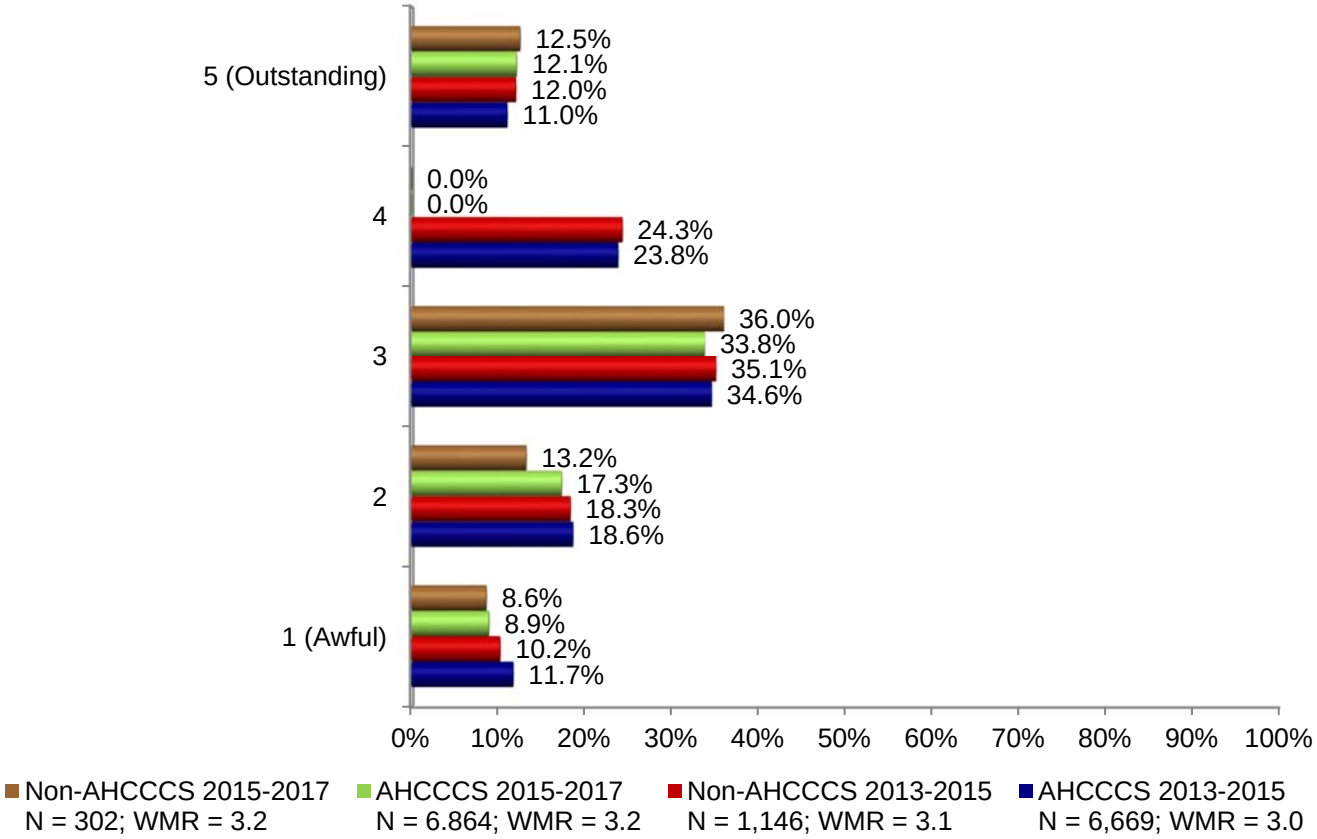
One of the problems that physicians faced in switching to EMRs was the loss of patient contact while a physician entered data on a keyboard. A response to this problem was the creation of the position of "scribe". That is, a person who either before or during the physician-patient portion of a visit does the data entry. Our information on the use of scribes is limited to the 2015-2017 survey. The current results are described in Table 7. The numbers are yet too small to usefully divide into AHCCCS and non-AHCCCS physicians, but we will continue to track trends in the use of scribes. Preliminary data are presented in Tables H-7 and I-7.

Table 7. Physicians Who Used a Scribe for Data Entry, 2015-2017 (N = 816)

Storage Method	*Number of Physicians*	*Percent*
EMR Only	238	15.0%
EMR + Paper Only	8	6.6%
EMR + Scanned Images Only	368	10.5%
Paper + Scanned Images + EMR	202	11.3%

Source: AMB, ABOE Survey data, April 2015-March 2017.

Figure 13. Ranking of All EMRs by Staff Productivity

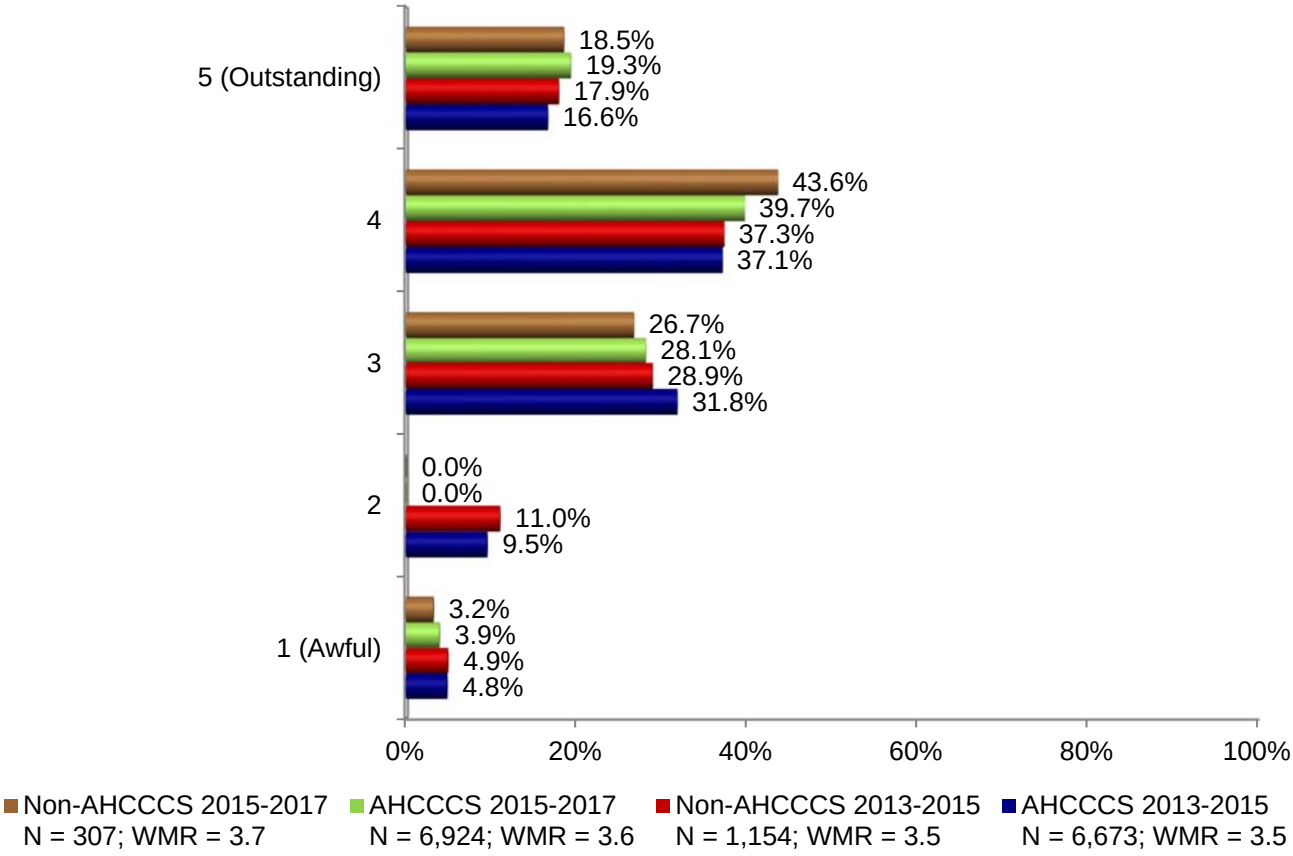


Source: AMB, ABOE Survey Data, April 2013-March 2015; April 2015–March 2017.

Note: WMR is Weighted Mean Rank. In 2013-2015, 363 AHCCCS physicians did not identify a brand name but answered the Staff Productivity question. The weighted mean for those physicians is 2.93. In 2015-2017, 231 AHCCCS physicians and 18 non-AHCCCS physicians did not identify a brand name but answered the Ease of Use question. The WMR for those physicians is 3.19 (AHCCCS) and 3.33 (non-AHCCCS).

The results on staff productivity include the gradual improvements in rankings seen for the other criteria. Although the absolute differences are small, the largest improvements are observed for the non-AHCCCS physicians. The mean rankings are, again, very slightly above the mid-points in the scale, indicating a modestly positive evaluation of the effect on staff productivity.

Figure 14. Ranking of All EMRs by Reliability

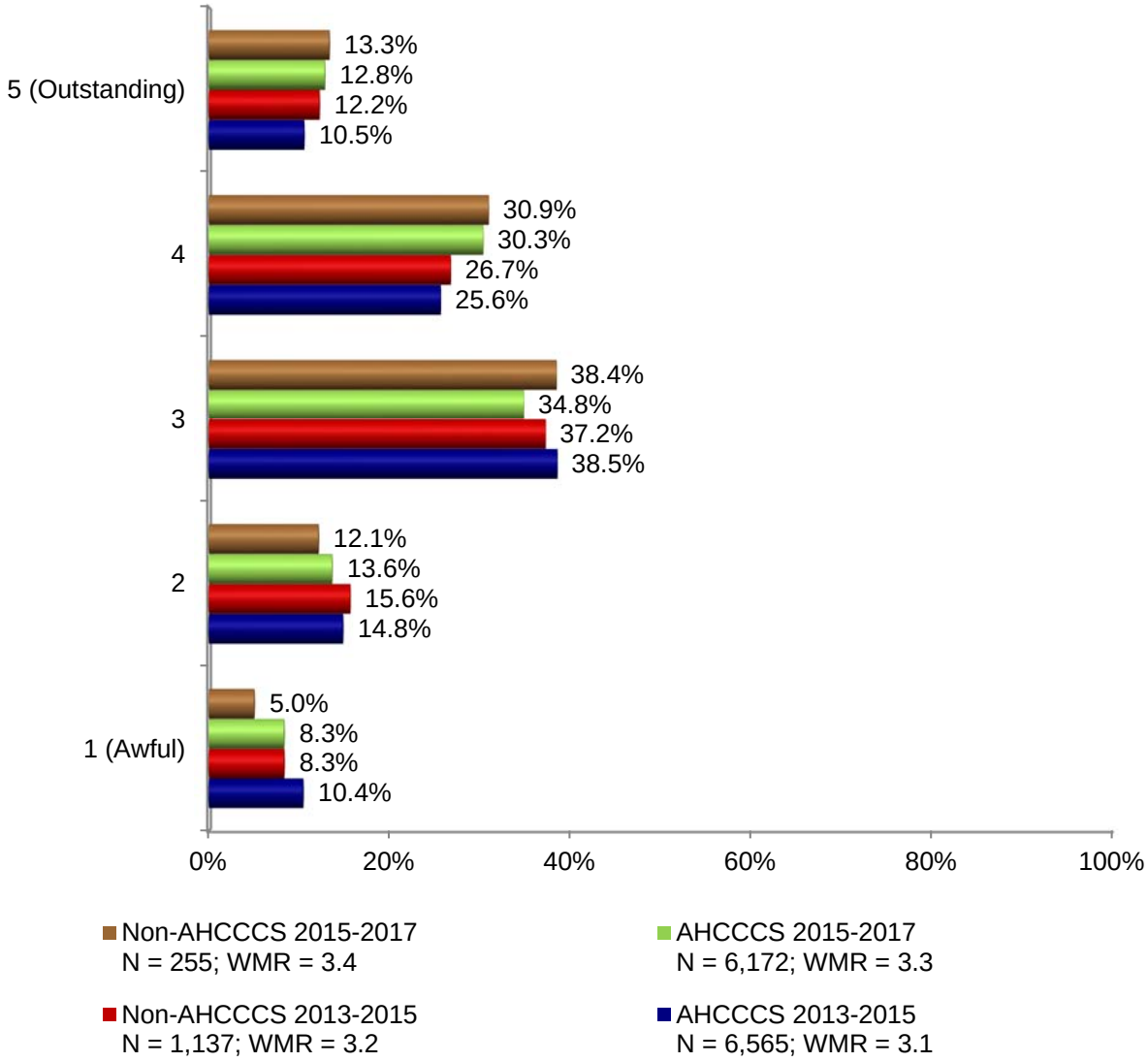


Source: AMB, ABOE Survey Data, April 2013-March 2015; April 2015–March 2017.

Note: WMR is Weighted Mean Rank. In 2013-2015, 363 AHCCCS physicians did not identify a brand name but answered the Reliability question. The weighted mean for those physicians is 3.31. In 2015-2017, 232 AHCCCS physicians and 19 non-AHCCCS physicians did not identify a brand name but answered the Ease of Use question. The WMR for those physicians is 3.44 (AHCCCS) and 3.84 (non-AHCCCS).

The reliability of EMRs receives the highest rankings of all the criteria. Given the current stage in the evolution of EMR software and the increasing experience with it by vendors and users, the result is not surprising. Further investigation into the circumstances and brand names of the software packages that receive rankings of less than 3, however, warrant further investigation.

Figure 15. Ranking of All EMRs by Performance vs. Promise



Source: AMB, ABOE Survey Data, April 2013-March 2015; April 2015–March 2017.

Note: WMR is Weighted Mean Rank. In 2013-2015, 351 AHCCCS physicians did not identify a brand name but answered the Performance vs. Promise question. The weighted mean for those physicians is 2.96. In 2015-2017, 189 AHCCCS physicians and 15 non-AHCCCS physicians did not identify a brand name but answered the Ease of Use question. The WMR for those physicians is 3.12 (AHCCCS) and 3.33 (non-AHCCCS).

Ease of use and reliability are more highly ranked than effects of EMRs on productivity or perceptions of performance versus vendor promises. The differences are small and one must recognize that physicians who were not involved in the decision to implement a system may not be aware of vendors' promises.

Table 8. Factors that Influenced Practice's Decision to Acquire an EMR, 2015-2017 (N = 2,511)

	AHCCCS N = 2,400		*Non-AHCCCS N = 111*	
Factors	*Number of Physicians*	*Percent*	*Number of Physicians*	*Percent*
Lower Costs	261	19.6%	13	17.5%
Medicare Incentives	385	29.0%	12	16.2%
Medicaid Incentives	227	17.1%	2	2.7%
Clear Direction	90	6.7%	3	4.0%
Easily Customizable	308	23.2%	17	22.9%
Cost Effective	161	12.1%	9	12.1%
Ease of Integration	147	11.0%	12	16.2%
Low Learning Curve	162	12.2%	9	12.1%
Agreed Upon and Published	209	15.7%	5	6.7%
Confidence in Security	235	17.7%	21	28.3%
Access to Technology Resources	215	16.2%	8	10.8%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Summary & Conclusion

The percentage of Arizona physicians using EMRs increased from approximately 45% in 2007-2009 to approximately 90% in 2015-2017. The current trend suggests that nearly all Arizona physicians will be using EMRs by 2018. The results from 2007-2017 consistently show that utilization of EMRs is lowest among older physicians and physicians in solo practices. The findings are similar to the results of national surveys. The increased use of EMRs in Arizona reflects the gradual replacement of retiring older physicians by younger physicians and the consolidation of solo practices into larger group practices or hospital based practices. The growth is also induced by Medicare and Medicaid incentive payments.

The introduction or replacement of an EMR in a practice typically implies a loss of physician and staff productivity, but increases in productivity are also attributable to the use of EMRs. Physicians ranked the effect of EMRs on physician and staff productivity to be approximately equal to the mid-point in the scale.

The comparisons of AHCCCS to non-AHCCCS physicians show that the types of care provided to AHCCCS enrollees is effectively the same as the care provided to privately insured patients. It is also true that AHCCCS patients are somewhat more likely to be served by physicians with EMRs than are the patients of non-AHCCCS providers.

Many discussions among HIE professionals suggest that physicians are very dissatisfied with their EMRs. Our results indicate that physicians are at least somewhat positive about their EMRs, ranking them slightly above the midpoint in the 1-5 scale. The more accurate conclusion may be that physicians seek to improve individual elements of their EMRs, but recognize that EMRs offer advantages not available from scanned records or paper medical records.

The use of EMRs increased more rapidly in the rural counties of Arizona than in the urbanized areas. The Medicare and Medicaid incentives and the support from organizations such as the Regional Extension Center are often directed to organizations with the most need, including smaller practices, which typify rural medicine. This appears to have had a very significant impact on the use of EMRs by rural health care providers and Community Health Centers.

The expected benefits of EMRs, such as the avoidance of duplicative tests, require the exchange of information among health care providers. The lack of communication networks is now a much more important obstacle to the realization of the benefits of EMRs than is underutilization of

EMRs. Among physicians with EMRs that include functions such as *e*-prescribing, patient summaries and others, slightly more than 20% to around 49% of the physicians share information with other providers. The data, however, include exchanges among providers within organizations such as hospital systems. Exchanges between hospital systems or among solo or group practices are much less frequent.

Health Current continues to expand rapidly with 353 participants enrolled. Its future is hopeful although data collection has not yet begun for all enrollees.

This report is the fifth in the CHiR series to include physician rankings of EMRs by brand. EMRs were ranked on a 1-5 scale where 1=Awful and 5=Outstanding. Specific EMR packages were ranked on each of five criteria. The results are included in Appendix E.

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Appendix A: Comparison to National Surveys

The results of a national survey of EMR use and attitudes toward the adoption of EMRs by physicians with the American Medical Association (AMA) memberships were published on July 3, 2008 (DesRoches, et al. 2008; Jha, DesRoches, et al. 2009). The results cannot be strictly compared to the results reported here because of differences in the structure of the sample and some differences in methods. For example, the sample design does not provide estimates for Arizona and is limited to members of the AMA.

The ASU study queries all physicians who renew their Arizona licenses. The practice began in 1992 and has continued until now with only a few interruptions. The data are not, therefore, a sample but rather a census of all physicians. Some characteristics, drawn from the information required for licensing, are obtained for all physicians while the survey questions are voluntary and obtained from those physicians who choose to respond. Fully retired physicians were not asked to respond to the survey questions.

The national survey results are restricted to non-federal, allopathic physicians directly involved in patient care who are members of the AMA. Doctors of Osteopathy were excluded. Other exclusions included physicians working in federally owned hospitals, those who requested not to be contacted; radiologists; anesthesiologists; pathologists; psychiatrists; no known address; medical school students and physicians not providing patient care.

The NCHS released the preliminary results of a mail survey of a national sample of office-based physicians in December 2008. The survey, conducted from April through August 2008 shows that 38.4% of physicians used full or partial EMR systems in their office based practices. Approximately 20.4% of the physicians used systems that included orders for prescriptions, orders for tests, results of lab or imaging tests and clinical notes (Hsiao and Hing 2012). As indicated in Table A – 1 below, our results are much closer to the NCHS study than the New England Journal of Medicine study. The difference between the two national studies is surprisingly large give the apparent similarities in sample design.

Table A - 1. Comparison of CHiR Survey vs. National EMR Surveys

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
Hing et al. (2007)	2006 National Ambulatory Medical Care Survey	1,311	Sample consists of non-federal, office-based physicians who see patients in an office setting.	29.2% (B) 12.4% (F)	Use of full or partial electronic records	NA	Can electronically order prescriptions & tests, report results to lab or radiology; manage clinical notes
DesRoches et al. (2008)	Survey created by the study team and Research Triangle Institute	2,758	Sample consists of US physicians who provide direct patient care. Exclusions: D.O.s, residents, physicians in federally owned hospitals, retired physicians, radiologists, anesthesiologists, pathologists, psychiatrists, hospitalists, part-time, physicians who worked < 20 hour per week.	13% (C) 4% (F)	NA	EMR can store demographic data, problem lists, medication lists, and clinical notes; can order prescriptions; can view laboratory results and imaging results. (Study authors refer to this type of record as a "basic EMR")	All capabilities listed in previous column, plus enhanced order-entry management and clinical-decision support
AHCCCS/ CHIR (2009)	Survey created by study team and Arizona Hospital and Health Care Association; Licensing data from Arizona Medical Board and Arizona Board of Osteopathic Examiners	10,813	This sample includes Arizona-based physicians who provide direct patient care and exclude the following: DOs, residents, retired/semi-retired, physicians in government settings, radiologists, anesthesiologists, pathologists, psychiatrists, hospitalists. Specialty exclusions were for Primary Specialty. (exclusions not part of full survey..applied to compare to DesRoches.	40.8% (B) 19.9% (C) 6.1% (F)	Use of electronic files as method of storing medical records	EMR that is connected to at least one of the following: hospital, radiology, lab, pharmacy	EMR that is connected to all of the following: radiology, lab, pharmacy

*B = basic EMR, C = connected EMR, F = fully functional EMR

Table A - 2. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
Jamoom et al. (2012)	2011 Physician Workflow Survey	3,180	Sample consists of non-federal, office-based physicians who see patients in an office setting. Excludes: radiologists, anesthesiologists and Pathologists	54%	Electronic medical records or electronic health records not including billing records	NA	?
CHiR/ AHCCCS (2010)	Survey created by CHIR and AHCCCS; Licensing data from Arizona Medical Board and Arizona Board of Osteopathic Examiners	6,777	Sample consists of all Arizona physicians with active licenses who renewed their license between July 17, 2007 and July 17, 2009. Exclusions: non-Arizona physicians, fully retired physicians.	45.1% (B) 24.1% (C) 9.3% (F)	Medical records stored electronically as any combination of scanned images of paper files or electronic files	EMRs connected to at least one other part of the health care system (hospital, pharmacy, lab, radiology)	An EMR that is connected to all of the following: hospital, radiology, lab, and pharmacy
CHiR/ AHCCCS/ ASET (2012)	Survey created by study team and Arizona Hospital and Health Care Association; Licensing data from Arizona Medical Board and Arizona Board of Osteopathic Examiners	12,181	Arizona-based physicians who provide direct patient care and exclude the following: DOs, residents, retired/semi-retired, physicians in government settings, radiologists, anesthesiologists, pathologists, psychiatrists, hospitalists. Specialty exclusions were for Primary Specialty.	40.8% (B) 19.9% (C) 6.1% (F)	Use of electronic files as method of storing medical records	EMR that is connected to at least one of the following: hospital, radiology, lab, pharmacy	EMR that is connected to all of the following: radiology, lab, pharmacy
			Sample consists of all Arizona physicians with active licenses who renewed their license between November 1, 2009 and November 1, 2011. Exclusions: non-Arizona physicians, fully retired physicians.	52.3% (B) 30.7% (C) 11.0% (F)			

Table A - 3. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
DesRoches et al. (2013)	American Medical Association Physician Masterfile.	1820 primary care physician and specialists in office-based practices	Primary care physicians. Board certified in adolescent medicine, family practice, general practice, general preventive medicine, internal medicine, or pediatrics.	43.5%	Computerized system that can view and manage patient demographics, patient problem lists, electronic lists of medications taken by patients, clinical notes, orders for prescriptions, laboratory results, and imaging results.	NA	NA
Geisler et al. (2010)	NHAMCS (2005-2006)	694 EDs	Non-Federal hospital EDs. No exclusions were made.	46% of EDs reported having an EMR	EMR systems that included demographic information, CPOE, lab and imaging results. 'Basic with Clinical Notes' was a separate classification.	NA	A comprehensive EMR system include characteristics from basic EMR, basic with clinical notes EMR, and also included electronic prescribing, radiographic image display, and decision support.

Table A - 4. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
Hing et al. (2010)	2007 National Ambulatory Medical Care Survey (NAMCS)	1,743	Sample of office-based physicians who reported they were direct patient care. Specialists in radiology, anesthesiology, and pathology were excluded.	34.8% of office-based physicians	Systems that included patient demographic information, patient problem lists, clinical notes, orders for prescriptions, and viewing laboratory and imaging results.	NA	Systems that included characteristics of basic system plus medical history and follow-ups, orders for tests, prescription and test orders sent electronically, warnings of drug interactions or contradictions, highlighting out-of-range test levels, electronic images returned, and reminders for guideline-based interventions.

Table A - 5. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
Hsaio et al. (2011)	2010, 2011 mail surveys of physicians of physicians in NAMCS	13,081 survey responses – 6,798 from 2010 and 6,283 from 2011	Physicians classified as providing direct patient care in office-based practices, including clinicians in community health centers. Radiologists, anesthesiologists, and pathologists are excluded.	34% of physicians reported having a basic system.	System which has the following functionalities: patient history and demographics, patient problem list, physician clinical notes, comprehensive list of patient's medications and allergies, computerized orders for prescriptions, and ability to view laboratory and imaging results electronically.	NA	NA

Table A - 6. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
Kazley et al. (2011)	2005-2008 HIMSS Analytics survey of integrated health delivery systems and 2007-2008 AHA Annual Survey of Hospitals.	3,388 hospitals from 2007 and 3.458 hospitals from 2008.	All hospitals in HIMSS Analytics survey of integrated health delivery systems and AHA Annual Survey of Hospitals.	HIMSS Data - 2005: 49% 2006: 45% 2007: 38% 2008: 39% AHA Data - 2007: 17% (Full), 44% (Partial) 2008: 18% (Full), 51% (Partial)	HIMSS definition was employed – "An application environment that is composed of the clinical data repository, clinical decision support, controlled medical vocabulary, order entry, computerized practitioner order entry, and clinical and physician documentation applications. This environment supports the patient's electronic medical record across inpatient modalities of care and may also support outpatient care services, and is used by healthcare practitioners to document, monitor, and manage health care delivery."	NA	NA

Table A - 7. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
Kokkonen et al. (2013)	2003-2010 NAMCS Data	102,965 primary care physician survey responses; 126,000 specialist survey responses	All physicians in NAMCS data.	Partial EMR: 2005: 25.2% 2009: 50.4% 2010: 52% Full EMR - 2005: 14.2% 2009: 37.8% 2010: 39%	No definition was given by the authors. Since NAMCS data was used it is assumed the definition used by Hsaio et al. (2011) was used in this study for the Basic EMR.	NA	NA

Table A - 8. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
(Adler-Milstein & Jha, 2012)	2008 - 2013 AHA Annual Survey—IT Supplement	All 2,674 short-term acute care general hospitals that responded to the 2013 AHA Annual Survey—IT Supplement	Key hospital Characteristics: Size, region, teaching status, ownership, and urban or rural location, Critical-access status and safety-net status	For 2013: Basic: 33.4% Full: 25.5% Partial: 41.1% (Less than basic)	ONC definition: full implementation of the following ten computerized functions in at least one clinical unit of the hospital: electronically maintaining patient demographic information, physician notes, nursing assessments, patient problem lists, patient medication lists, and discharge summaries; electronically viewing laboratory reports, radiologic reports, and diagnostic test results; and electronically ordering medications.	N/A	Comprehensive EHR if it reported that all ten basic functions and fourteen additional functions had been fully implemented in all major clinical units

Table A - 9. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
(Decker, Jamoom, & Sisk, 2012)	National Ambulatory Medical Care Survey, from 2002 through 2011	1,451 physicians in 2002; 4,026 in 2011; and 22,885 for the entire 2002–11 period	Office-based physicians: in-person interviews and mail surveys with telephone follow-up	Basic EMR: 15.4% in 2007 – 35.0% in 2011 Any EMR: 18.7% in 2002 to 54.2% in 2011	Ability to record information on patient demographics; compile problem lists; document medications; store clinical notes; view laboratory and imaging results; and execute computerized prescription ordering.	NA	NA
(Furukawa et al., 2014)	2009 National Ambulatory Medical Care Survey (NAMCS) and the 2009–13 Electronic Health Records Survey		Office based physicians who provided direct patient care, excluding radiologists, anesthesiologists, and pathologists.	78% had some EMR; 48% had basic EMR, 2013	System with the following seven electronic capabilities: recording patient history and demographic information; maintaining patient problem lists; recording clinical notes; recording medication and allergy lists; viewing laboratory results; viewing imaging reports; and using computerized prescription ordering.	HIE: share any patient health information electronically (not fax) with other providers, including hospitals, ambulatory providers, or labs	

Table A - 10. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
(Jamoom & Hing, 2015)	2006 – 2011 National Hospital Ambulatory Medical Care Survey(NHAMCS)		Emergency Departments and Outpatient departments	Basic EMR from 2007 - 2011 in EDs (19% to 54%) and OPDs (9% to 57%)	System with patient history and demographics, patient problem lists, physician clinical notes, comprehensive list of patients' medications and allergies, computerized orders for prescriptions, and ability to view laboratory and imaging results electronically	NA	NA

Table A - 11. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	*Data Source*	*Sample Size*	*Characteristics of Sample, Exclusions*	*Percent of Physicians with EMR**	*Definition of basic EMR*	*Definition of connected EMR*	*Definition of fully functional EMR*
(Singh, Lichter, Danzo, Taylor, & Rosenthal, 2012)	National mail survey of primary care offices between 2007-08. American Medical Information Database utilized.	1001 primary care officies	Primary care offices from AMI National Physician Database were stratified into four groups- Urban, Large Rural, Small Rural and Isolated utilizing ZIP code-level Rural-Urban Commuting Area (RUCA) classification. A random sample was then generated to locate 1300 offices in each stratum to generate address for 5200 offices. 144 were excluded as they were not primary care, 387 excluded as they were unreachable. 3668 did not respond.	31%	Demographics, problem list, medication list, clinical notes, orders for prescriptions, ability to view lab and imaging results.	Not defined.	In addition to basic EMR capability, had options for medical history and f/u notes, orders for labs, imaging and ability to send associated orders electronically, receive electronic images, clinical decision support systems with drug alerts, highlighting of abnormal results, guideline reminders.
(Patel, Jamoom, Hsiao, Furukawa, & Buntin, 2013)	National Ambulatory Medical Care Survey (NAMCS) 2008-11	10,889	National cross-sectional survey of non-federally employed physicians in direct patient care. 73% were >45 y; 26% were female; 77% in single specialty groups; 68% with fewer than five physicians; 48% were primary care.	37 (2008) 41(2009) 53(2010) 61(2011)	Demographics, medication liss, clinical notes, CPOE, viewing of lab and imaging results.	Not defined	Basic + meaningful use measures – e-prescribing, drug interaction checks, Active medication allergy list, guideline based reminders.

Table A - 12. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	Data Source	Sample Size	Characteristics of Sample, Exclusions	Percent of Physicians with EMR*	Definition of basic EMR	Definition of connected EMR	Definition of fully functional EMR
(Patel, Swain, King, & Furukawa, 2013)	National Ambulatory Medical Care Survey EMR Supplement 2011	4326	Non-federal physicians in direct patient care.	57%	Not defined	Capability to electronically exchange information with pharmacies (e-prescribing), labs(orders and recent labs); clinical summary exchange with patients and providers	Not defined.

Table A - 13. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	Data Source	Sample Size	Characteristics of Sample, Exclusions	Percent of Physicians with EMR*	Definition of basic EMR	Definition of connected EMR	Definition of fully functional EMR
(Grinspan, Banerjee, Kaushal, & Kern, 2013)	National Ambulatory Medical Care Survey (NAMCS) 2005-09	1058 (2005) 1220 (2006) 1291 (2007) 1188 (2008) 1291 (2009)	Exclusion criteria not specified. Data from 2005-09 stratified by office setting (private solo or group practice, freestanding clinic/urgcent center, community health center, HMO/other prepaid practice, or other), specialty and revenue source.	50%	Includes these six items - demographics, problem lists, clinical notes, prescription orders, laboratory results, and imaging results	Not defined	Basic EHR + 8 features- notes include medical history and follow up, computerized order entry, electronic transmission of laboratory orders and prescriptions, radiology image review, drug interaction checker , alerts for abnormal lab values, guideline reminders. ,
(Hsiao & Hing, 2012)	National Ambulatory Medical Care Survey (NAMCS) 2001-13	2013 – 10,302 physicians. Other years not specified.	National representative survey of non-federal office based physicians in direct patient care.	18.2 (2001) 17.3 (2002) 17.3 (2003) 20.8 (2004) 23.9 (2005) 29.2 (2006) 34.8 (2007) 42.0 (2008) 48.3 (2009) 51.0 (2010) 57.0 (2011) 71.8 (2012) 78.4 (2013)	Includes functionalities for patient history and demographics, problem lists, clinical notes, comprehensive list of medications and allergies, computerized orders for prescriptions, and ability to view laboratory and imaging results electronically.	Not defined	Not defined

Table A - 14. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	Data Source	Sample Size	Characteristics of Sample, Exclusions	Percent of Physicians with EMR*	Definition of basic EMR	Definition of connected EMR	Definition of fully functional EMR
(Whitacre, 2015)	SK&A private co. (2012)	270,000 physician sites with 1,280,000 physicians (2012)	Nationwide data on physician offices. Exclusion criteria not specified.	48.7 (Rural) 55.8 (Urban)	Not defined	Not defined	Not defined
(Van Eaton et al., 2014)	391 US Level I and II Trauma Centers	391	518 US level I and II trauma centers identified by reviewing the American College of Surgeons' listing of verified trauma programs, the American Trauma Society's Information Exchange information system, and other web-based searches. 391 (74%) responded to survey.	90% of trauma facilities	Not defined	Not defined	Not defined

Table A - 15. Comparison of CHiR Survey vs. National EMR Surveys (cont.)

Study	Data Source	Sample Size	Characteristics of Sample, Exclusions	Percent of Physicians with EMR*	Definition of basic EMR	Definition of connected EMR	Definition of fully functional EMR
(Hsiao, Hing, & Ashman, 2014)	NAMCS 2007 - 20012	2007: 1743 2008: 2338 2009: 2646 2010: 6121 2011: 4326 2012: 4545	2007: In-person 2008 – 2010: In person and mail in survey 2011-12: Mail survey	2007 vs. 2012 Any: 34.8% to 71.8% Basic: 11.8% to 39.6% Full: 3.8% to 23.5%	2007 – 2009: Patient history, demographics, clinical notes, patient problem lists; Viewing laboratory and imaging results and ordering prescriptions 2010: included medications 2011: included medications and allergy lists		2007 – 2009: , Basic Plus: medical history and follow-up notes; providing warnings for drug interactions or contraindications, electronically sending prescriptions to the pharmacy, ordering laboratory test, electronically sending test orders, providing reminders for guideline based interventions, providing out-of-range test levels

Appendix B: CHiR Health Care Workforce Reports and Articles

Johnson WG, Harootunian G, Sama TL, Dhandapani AK. (September 2016). *Physicians' use, exchange, and evaluation of electronic medical records 2013-2015*. Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Johnson WG, Butler R, Harootunian G, Wilson B, Linan M. (July 2016). Registered nurses: the curious case of a persistent shortage. *Journal of Nursing Scholarship.* 48:387–396. doi: 10.1111/jnu.12218.

Butler RJ, Johnson WG. (May 2016). Rating the digital help: electronic medical records, software providers, and physicians. *Int J Health Econ Manag.* 1-15. doi:10.1007/s10754-016-9190-8.

Johnson WG, Harootunian G, Sama TL, Sivanandam S. (September 2015). *Physicians' use, exchange, and evaluation of electronic medical records 2013-2015*. Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Johnson WG, Harootunian G, Sama TL, Caughey W. (November 2014). *Physicians' use, exchange, and evaluation of electronic medical records*. Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Johnson WG, Harootunian G, Sama TL, Caughey W. (April 2014). *Physicians' use, exchange, and evaluation of electronic medical records.* Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Johnson WG, Harootunian G, Sama TL. (October 2013). *Physicians' use, exchange, and evaluation of electronic medical records*. Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Butler MJ, Harootunian G, Johnson WG. (June 2013). Are low income patients receiving the benefits of electronic health records? A statewide survey. *Health Informatics Journal*. 19(2):91-100 doi: 10.1177/1460458212460846 PMID: 23715209.

Johnson WG, Harootunian G. (December 2012). W*hat Happened to the Shortage of Registered Nurses: The Arizona Experience 2008-2012.* (Prepared under contract for the Arizona Hospital and Healthcare Association.) Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Johnson WG, Harootunian G, Sama TL. (July 2012). *The use of electronic medical records and physicians' attitudes toward a health information exchange*. Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Johnson WG, Qiu Y, Harootunian G, Edge M. (2010). *The use of electronic medical records and physicians' attitudes towards a health information exchange.* Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Qiu Y, Johnson WG. (August 2009). *Arizona primary care workforce report*. Phoenix (AZ): Center for Health Information & Research, Arizona State University.

Wilson BL, Johnson WG. (July/August 2009). Using innovation to assess nursing workforce in Arizona: a collaborative approach. *Nursing Economics.* 27(4):233-238.

Johnson WG, Wilson BL, Edge M, Qiu Y, Oliver EL, Russell KM. (April 2009). *The Arizona health care workforce: nurses, pharmacists, & physician assistants.* (Prepared under contract with the Arizona Hospital and Healthcare Association.) Phoenix, AZ: Center for Health Information & Research.

Johnson WG, Bannister WM, Russell KM, Edge M, Gray H, Merritt R. (June 2008). *Arizona physician trends: reasons for leaving Arizona*. Phoenix (AZ): Arizona State University, Center for Health Information & Research.

Friedman AL, Basco WT, Hotaling AJ, Pletcher BA, Rimsza ME, Shipman SA, et al. (2007). Enhancing the diversity of the pediatrician workforce. *Pediatrics.* 119(4):833-7. PMID: 17403859.

Furukawa MF, Ketcham JD, Rimsza ME. (2007). Physician practice revenues and use of information technology in patient care. *Medical Care.* 45(2):168-76. PMID: 17224780.

Rimsza ME, Johnson WG, Speicher M, Grossman M. (2006) *The Arizona physician workforce study: part II*. Tempe (AZ): Arizona State University, Center for Health Information and Research.

Rimsza ME, Johnson WG, Speicher M, Grossman M. (2005). *The Arizona psychiatric physician workforce study*. Tempe (AZ): Arizona State University, Center for Health Information and Research.

Johnson WG, Rimsza ME, Garcy AM, Grossman M. (2005) *The Arizona physician workforce study - part I: the numbers of practicing physicians 1992-2004.* Tempe (AZ): Arizona State University, Center for Health Information and Research.

Johnson WG, Ptak BA, Casper K, Madsen B. (March 1996). The survey of physicians in residencies in Arizona academic year 1993-1994: a report to the Arizona Council for Graduate Medical Education. Tempe (AZ): Arizona State University.

Johnson WG, Meenan RT, Klett D, Ott J, Liddon M, Schneller ES. (1994). *The 1992 survey of physicians: a report to the Arizona Council for Graduate Medical Education*. Tempe (AZ): Arizona State University.

Johnson WG, Meenan RT, Preuss N, Schneller ES. (1993). The survey of medical residents: a report to the Arizona Council for Graduate Medical Education. Tempe (AZ): Arizona State University.

Schneller ES, Preuss N, Johnson WG, Klett D. (1993). The survey of medical residency programs: a report to the Arizona Council for Graduate Medical Education. Tempe (AZ): Arizona State University.

Appendix C: Survey Instrument (2012-2015)

Since 1991, the Arizona Physician Survey has, with the cooperation of physicians, their licensing boards and their professional associations, collected important information on the physician workforce. The current survey focuses on the use of medical records that are electronic (often called electronic medical records (EMRs) or electronic health records (EHRs)). Your participation is encouraged by the *Arizona Medical Association* and the *Arizona Osteopathic Medical Association*. Your answers are confidential and results are published only in aggregate form.

1. Which one of the following **best** describes your employment status ?(check one)
    a. Actively employed in Arizona in direct patient care ☐Yes ☐No {if yes ask:}
        i. I usually treat _____patients in a typical work week.
        ii. I usually work _____hours/day, _____days/week, and _____weeks/year.
    b. Actively employed in Arizona but not in direct patient care ☐Yes ☐No
    c. Actively employed outside of Arizona ☐Yes ☐No {*skip to separate survey questions*}
    d. Semi-retired/on leave ☐Yes ☐No *{go to end fill all intermediate questions with DNA}*
    e. Retired ☐Yes ☐No {go to end fill all intermediate questions with DNA}

2. Which one of the following **best** describes the organization in which you practice
    a. a physician owned solo practice ☐Yes ☐No *{if yes, auto fill 3a=yes; skip to 4}*
    b. A physician owned group practice ☐Yes ☐No
    {if yes then ask}
        i. Approximately how many physicians are associated with this practice?
            1. 2-5 physicians ☐Yes ☐No
            2. 6-50 physicians ☐Yes ☐No
            3. 51-94 physicians ☐Yes ☐No
            4. 95 or more physicians ☐Yes ☐No
    c. A hospital or medical school physician group practice ☐Yes ☐No
    if yes then ask}
        i. Approximately how many physicians are associated with this practice?
            1. 2-5 physicians ☐Yes ☐No
            2. 6-50 physicians ☐Yes ☐No o
            3. 51-94 physicians ☐Yes ☐No
            4. 95 or more physicians ☐Yes ☐No
    d. A community or rural health center(e.g. federally qualified CHC) ☐Yes ☐No
    {if yes then ask}
        i. Approximately how many physicians are associated with this center?
            1. 2-5 physicians ☐Yes ☐No
            2. 6-50 physicians ☐Yes ☐No
            3. 51-94 physicians ☐Yes ☐No
            4. 95 or more physicians ☐Yes ☐No
    e. Federal Government hospital or clinic (e.g. VA, IHS etc.) ☐Yes ☐No { *if yes skip to 5}*
    f. State or County hospital system ☐Yes ☐No *if yes skip to 4}*
    g. Private Hospital system ☐Yes ☐No
    h. Private Outpatient Facility not part of a hospital system (e.g. Urgent Care center, insurer owned clinic, etc.) ☐Yes ☐No

{if yes then ask}

i. Approximately how many physicians are associated with this facility?
   1. 2-5 physicians ☐Yes ☐No
   2. 6-50 physicians ☐Yes ☐No
   3. 51-94 physicians ☐Yes ☐No
   4. 95 or more physicians ☐ Yes ☐ No

i. Medical school ,university, research center ☐ Yes ☐ No

j. Public or private health Insurer, pharmaceutical company or other health related organization that does not provide care. ☐ Yes ☐ No *{if yes then skip to end; auto code intermediate questions as DNA}*

k. Other_____

3. Which of the following **best** describes your primary role in the organization in which you practice? *{(if 2d=yes or 2e=yes or 2f=yes) then set 3b=yes)}*
   a. Owner , partner, part-owner ☐ Yes ☐ No
      {if yes then ask}
      i. Approximately how many of each of the following providers are associated with this practice?
         1. ____ PAs
         2. ____RNs
         3. ____NPs
         4. ____Other Licensed Health Care Providers
   b. Employee/contractor/locum tenens ☐ Yes ☐ No
   c. Faculty ☐ Yes ☐ No
   d. Student (include residents, fellows etc.) ☐ Yes ☐ No

4. Which of the following are available at your practice location? (check all that apply)
   a. Email ☐ Yes ☐ No
   b. Internet (FTP etc.) ☐ Yes ☐ No
   c. Fax ☐ Yes ☐ No
   d. US Mail ☐ Yes ☐ No
   e. Don't know ☐ Yes ☐ No

5. How does the organization in which you practice submit bills/claims to insurers or other payers? (check all that apply)
   a. Email ☐ Yes ☐ No
   b. Internet (FTP etc.) ☐ Yes ☐ No
   c. Fax ☐ Yes ☐ No
   d. US Mail ☐ Yes ☐ No
   e. Don't know ☐ Yes ☐ No

6. How does the organization in which you practice store its medical records? (Check all that apply);
   a. Paper ☐ Yes ☐ No
   b. Scanned images of paper records ☐ Yes ☐ No
   c. Electronic files (an electronic version of a patient's medical history, including progress notes, problems, medications and other information used in treatment.) ☐ Yes ☐ No *{if yes then ask}*
      i. What is the name of your EMR/EHR system

      Allscripts ☐ Yes ☐ No Aprima ☐ Yes ☐ No
      Amazing Charts ☐ Yes ☐ No Athena Health ☐ Yes ☐ No

GE Centricity ☐ Yes ☐ No
Cerner ☐ Yes ☐ No
CHARTCARE ☐ Yes ☐ No
eClinicalWorks ☐ Yes ☐ No
Epic ☐ Yes ☐ No
eMDs ☐ Yes ☐ No
Epic ☐ Yes ☐ No
GE ☐ Yes ☐ No
Greenway Medical ☐ Yes ☐ No
HealthPort ☐ Yes ☐ No
McKesson ☐ Yes ☐ No
Meditech ☐ Yes ☐ No
NextGen ☐ Yes ☐ No
Noteworthy ☐ Yes ☐ No
Office Practic.com ☐ Yes ☐ No
Sage ☐ Yes ☐ No
SOAP ware ☐ Yes ☐ No
Other_____ ☐ Yes ☐ No
Don't know ☐ Yes ☐ No

7. On a scale of 1 (awful) to 5 (outstanding), how would you rate your EMR/EHR system in terms of:
   a. Ease of use ☐1 ☐2 ☐3 ☐4 ☐5
   b. Effect on your productivity ☐1 ☐2 ☐3 ☐4 ☐5
   c. Effect on staff productivity ☐1 ☐2 ☐3 ☐4 ☐5
   d. Reliability ☐1 ☐2 ☐3 ☐4 ☐5
   e. Performance versus vendor's promises ☐1 ☐2 ☐3 ☐4 ☐5

8. *{if 6c=yes} then ask:* Does the EMR/EHR system include the following functions? (CHECK ALL THAT APPLY) *{if 6c ne yes then auto fill DNA and skip to 8}*

Functions	**Is the Function Included in the EMR?**	**Do You Use the Function?**	**Do you exchange this information using your EMR/EHR to organizations outside your practice?"**
Patient Care Summary	☐Yes ☐No ☐Don't Know {If yes then go to next row}	☐ Yes ☐ No	☐Yes ☐No ☐Don't Know
Prescriptions (e-prescribing)	☐ Yes ☐ No ☐ Don't Know {If yes then go to next row}	☐ Yes ☐ No	☐Yes ☐No ☐Don't Know
Lab Test Results	☐Yes ☐No ☐Don't Know {If yes then go to next row}	☐ Yes ☐ No	☐Yes ☐No ☐Don't Know
Reminders for Guideline Based Interventions	☐Yes ☐No ☐Don't Know {If yes then go to next row}	☐ Yes ☐ No	☐Yes ☐No ☐Don't Know
Public Health Reports: immunizations, notifiable diseases	☐Yes ☐No ☐Don't Know {If yes then go to next row}	☐ Yes ☐ No	☐Yes ☐No ☐Don't Know
Quality Metrics (HEDIS, AQA etc.)	☐Yes ☐No ☐Don't Know {If yes then go to next row}	☐ Yes ☐ No	☐Yes ☐No ☐Don't Know

9. {if 6c=yes and (3a=yes or 3b=yes or 3c=yes or 3d=yes) then ask}: Are you aware of the incentive payments from Medicare and Medicaid to physicians who adopt EMRs/EHRs that meet **meaningful use criteria**?

a. ☐ Yes ☐ No {if no skip to c}
b. Have you applied OR are you planning to apply for the meaningful use incentives offered by Medicare and Medicaid? Medicare ☐Yes ☐No Medicaid ☐Yes ☐ No {if both No *skip to c}*
c. Is your EMR/EHR vendor helping you to meet the **meaningful use criteria**?
   i. ☐ *Yes*
   ii. ☐ *No*
d. Are you aware of the support offered by the Arizona Regional Extension Center?
   i. ☐ *Yes :workin*g with them {go to wind up question}
   ii. ☐ Yes but not working with them at present
   iii. ☐ No

   If you would like more information on the Arizona Regional Extension Center you can contact them at 602-688-7200 or *her@azhec.org* Or
   Would you like us to submit a request with your name and address but not reveal any other information included on this survey? ☐ Yes ☐ No

{if (3a=yes then code 9ai=yes skip to wind up question); else ask:

10. Are you the person who would decide to purchase an EMR/EHR system?
    a. Sole decision maker ☐Yes ☐No
    b. Shared decision ☐Yes ☐No
    c. Decided by others ☐Yes ☐No
11. Are there plans for installing an EMR/EHR system in the future?
    a. ☐No
    b. ☐Don't know
    c. ☐Yes, in the next ☐6 months ☐7-12 months ☐more than 12 months
       i. {if yes}What system are you planning to install?

Allscripts ☐Yes ☐No	Greenway Medical ☐Yes ☐No
Amazing Charts ☐Yes ☐No	HealthPort ☐Yes ☐No
Aprima ☐Yes ☐No	McKesson ☐Yes ☐No
Athena Health ☐Yes ☐No	Meditech ☐Yes ☐No
Centricity ☐Yes ☐No	NextGen ☐Yes ☐No
Cerner ☐Yes ☐No	Noteworthy ☐Yes ☐No
CHARTCARE ☐Yes ☐No	Office Practic.com ☐Yes ☐No
eClinicalWorks ☐Yes ☐No	Sage ☐Yes ☐No
Epic ☐Yes ☐No	SOAP ware ☐Yes ☐No
eMDs ☐Yes ☐No	Other_____
GE Centricity ☐Yes ☐No	Don't Know ☐Yes ☐No

Thank you very much for providing a physician's evaluation of the use and value of electronic health records. Any additional comments are most welcome:

_____

SURVEY QUESTIONS FOR PHYSICIANS WITH AZ LICENSES WHO DO NOT PRACTICE IN ARIZONA

1. When did you leave Arizona?
   a. ☐ I left Arizona in _____,(year) or
   b. ☐ I have never practiced in Arizona

   c. ☐I serve patients in multiple states via Telemedicine
   d. ☐ Travel among states at different times of year
      The states in which I serve patients
      i. ☐include Arizona
      ii. ☐ do not include Arizona

Please rate the importance of *each of the following* as an influence on your choice to practice in your current country/state/territory rather than Arizona

Code #	Factor	Important	Not Important	Does Not Apply
1.	To be Closer to Family/Friends……..	☐	☐	☐
2.	Better Elementary/Secondary Schools	☐	☐	☐No school age kids
3.	Better Climate	☐	☐	☐
4.	Better salary/compensation/career opportunity	☐	☐	☐
5.	Unable to find a position in my field in Arizona	☐	☐	☐
6.	Lower Medical Malpractice Premiums	☐	☐	☐
7.	Career Opportunity for Spouse/Partner	☐	☐	☐No spouse/partner
8.	Better Lifestyle	☐	☐	☐
9.	Better Political Climate	☐	☐	☐
10.	Transferred by the Military	☐	☐	☐
11.	To continue training (residency, fellowship)	☐	☐	☐
14.	To Practice near my Residency location	☐	☐	☐
15.	Availability of Part-time Positions/Locum Tenens	☐	☐	☐
16.	Fulfill loan repayment obligation	☐	☐	☐
17.	If other important factor, specify_____			

_____

2. Are you planning to return to practice in Arizona?
   ☐Yes ☐No
   {if yes then ask}
   a. When do you plan to return?
      i. ☐Upon completion of postgraduate training
      ii. ☐In the next 5 years.
      iii. ☐Other
3. Which one of the following **best** describes the organization in which you practice?
   a. A physician owned solo practice ☐Yes ☐No *{if yes, auto fill 3a=yes; skip to 4};*
   b. A physician owned group practice ☐Yes ☐No
      {if yes then ask}
      i. Approximately how many physicians are associated with this group?
         1. 2-5 physicians ☐Yes ☐No
         2. 6-50 physicians ☐Yes ☐No
         3. 51-94 physicians ☐Yes ☐No
         4. 95 or more physicians ☐Yes ☐No
   c. A hospital or medical school physician group practice ☐Yes ☐No
      {if yes then ask}
      i. Approximately how many physicians are associated with this center?

1. 2-5 physicians ☐Yes ☐No
2. 6-50 physicians ☐Yes ☐No
3. 51-94 physicians ☐Yes ☐No
4. 95 or more physicians ☐Yes ☐No

d. A community or rural health center(e.g. federally qualified CHC) ☐Yes ☐No
{if yes then ask}
   i. Approximately how many physicians are associated with this center?
      1. 2-5 physicians ☐Yes ☐No
      2. 6-50 physicians ☐Yes ☐No
      3. 51-94 physicians ☐Yes ☐No
      4. 95 or more physicians ☐Yes ☐No

e. Federal Government hospital or clinic (e.g. VA, HIS etc.) ☐Yes ☐No { *if yes skip to 5}*
f. State or County hospital system ☐Yes ☐No {*if yes skip to 4}*
g. Private Hospital system ☐Yes ☐No
h. Private Outpatient Facility not part of a hospital system (e.g. Urgent Care center, insurer owned clinic,) ☐Yes ☐No
{if yes then ask}
   i. Approximately how many physicians are associated with this facility?
      1. 2-5 physicians ☐Yes ☐No
      2. 6-50 physicians ☐Yes ☐No
      3. 51-94 physicians ☐Yes ☐No
      4. 95 or more physicians ☐Yes ☐No

i. Medical school ,university, research center ☐Yes ☐No
j. Public or private health Insurer, pharmaceutical company or other health related organization that does not provide care. ☐Yes ☐No *{if yes then skip to end; auto code intermediate q's as DNA}*
k. Other_____ ☐Yes ☐No

4. Which of the following **best** describes your primary role in the organization in which you practice? *{(if 5d=yes or 5e=yes or 5f=yes) then set 6a=yes)}*
   a. Owner, partner, part-owner ☐Yes ☐No
   {if yes then ask}
      i. Approximately how many of each of the following providers are associated with this practice:
         1. ____PAs
         2. ____RNs
         3. ____NPs
         4. ____Other licensed health care providers
      ii. Employee/contractor/locum tenens ☐Yes ☐No
      iii. Faculty ☐Yes ☐No
      iv. Student (include residents, fellows etc.) ☐Yes ☐No

5. Which of the following are available at your practice location? (check all that apply)
   a. Email ☐Yes ☐No
   b. Internet (FTP etc.) ☐Yes ☐No
   c. Fax ☐Yes ☐No
   d. US Mail ☐Yes ☐No
   e. Don't Know ☐Yes ☐No

6. How does the organization in which you practice submit bills/claims to insurers or other payers? (check all that apply)
   a. Email ☐Yes ☐No
   b. Internet (FTP etc.) ☐Yes ☐No
   c. Fax ☐Yes ☐No
   d. US Mail ☐Yes ☐No
   e. Don't Know ☐Yes ☐No

7. How does the organization in which you practice store its medical records? (Check all that apply);

a. Paper ☐Yes ☐No
b. Scanned images of paper records ☐Yes ☐No
c. Electronic files (an electronic version of a patient's medical history, including progress notes, problems, medications and other information used in treatment.) ☐Yes ☐No
{if yes then ask}
    i. What is the name of your EMR/EHR system*?*
        1. Allscripts ☐Yes ☐ No
        2. Amazing Charts ☐ Yes ☐No
        3. Aprima ☐Yes ☐ No
        4. Athena Health ☐ Yes ☐No
        5. Centricity ☐Yes ☐No
        6. Cerner ☐Yes ☐ No
        7. CHARTCARE ☐ Yes ☐No
        8. eClinicalWorks ☐ Yes ☐No
        9. Epic ☐Yes ☐No
        10. eMDs ☐Yes ☐No
        11. GE ☐Yes ☐No
        12. Greenway Medical ☐Yes ☐No
        13. HealthPort ☐Yes ☐No
        14. McKesson ☐Yes ☐No
        15. Meditech ☐Yes ☐ No
        16. NextGen ☐Yes ☐ No
        17. Noteworthy ☐Yes ☐No
        18. Office Practic.com ☐Yes ☐No
        19. Sage ☐Yes ☐No
        20. SOAP ware ☐Yes ☐No
        21. Other_____ _____ ☐Yes ☐ No
        22. Don't Know ☐Yes ☐No

8. On a scale of 1 (awful) to 5 (outstanding), how would you rate your EMR/HER system in terms of:
    a. Ease of use ☐1 ☐2 ☐3 ☐4 ☐5
    b. Effect on your productivity ☐1 ☐2 ☐3 ☐4 ☐5
    c. Effect on staff productivity ☐1 ☐2 ☐3 ☐4 ☐5
    d. Reliability ☐1 ☐2 ☐3 ☐4 ☐5
    e. Performance versus vendor's promises ☐1 ☐2 ☐3 ☐4 ☐5

Thank you very much for providing valuable insights into physicians' choice of practice locations and the use and value of electronic health records. Any additional comments are most welcome:

_____

Appendix D: New Survey Instrument April 2015-March 2017

Since 1991, the Arizona Physician Survey has, with the cooperation of physicians, their licensing boards and their professional associations, collected important information on the physician workforce. The current survey focuses on the use of medical records that are electronic (often called electronic medical records (EMRs) or electronic health records (EHRs). Your participation is encouraged by the ***Arizona Medical Association*** and the ***Arizona Osteopathic Medical Association***. The survey includes an opportunity for you to express your opinions on the benefits and limitations of EMRs. Your answers are confidential and results are published only in aggregate form.

1. Which one of the following **best** describes your employment status? **(check one)**

a) Actively employed in Arizona in direct patient care ☐ *{if checked ask:}*
   i. I usually treat _____patients in a typical work week.
   ii. I usually work _____hours/day, _____days/week, and _____weeks/year.

b) Provide telemedicine services to Arizona patients ☐

c) Actively employed in Arizona but not in direct patient care ☐

d) Actively employed outside of Arizona ☐ *{if checked skip to separate survey questions for out of state physicians*}

e) Retired/ Semi-retired/on leave ☐ *{if checked go to end fill all intermediate questions with DNA}*

2. Have you joined a different organization since your last licensing application?
☐ Yes ☐ No *{if yes, go to 3}*

3. Which one of the following **best** describes the organization in which you practice

a) ☐A physician owned solo practice *{if checked, skip to 4 d);*

b) ☐A physician owned group practice
   i. Approximately how many physicians are associated with this organization? [check one]
      i. 2-5 physicians ☐
      ii. 6-50 physicians ☐
      iii. 51-94 physicians ☐
      iv. 95 or more physicians ☐

c) ☐A hospital or medical school physician group practice ☐
   i. Approximately how many physicians are associated with this organization? [check one]
      i. 2-5 physicians ☐
      ii. 6-50 physicians ☐
      iii. 51-94 physician ☐
      iv. 95 or more physicians ☐

d) ☐A community or rural health center(e.g. federally qualified CHC) ☐
   i. Approximately how many physicians are associated with this organization? [check one]

i. 2-5 physicians ☐
ii. 6-50 physicians ☐
iii. 51-94 physician ☐
iv. 95 or more physicians ☐

e) ☐ Private Outpatient Facility not part of a hospital system (e.g. Urgent Care center, insurer owned clinic, etc.)

i. Approximately how many physicians are associated with this organization? [check one]

i. 2-5 physicians ☐
ii. 6-50 physicians ☐
iii. 51-94 physician ☐
iv. 95 or more physicians ☐

{*if 3f or 3g or 3h or 3i or 3j checked, then check 4a) and ask 6}*

f) ☐ Federal Government hospital or clinic (e.g. VA, IHS)
g) ☐ City, State or County clinic or hospital
h) ☐ Private For Profit Hospital system
i) ☐ Private Not for Profit Hospital System
j) ☐ Public or private health Insurer, pharmaceutical company or other health related organization that does **not** provide care. ☐ Medical school ,university, research center
k) ☐ Independent Consultant
l) ☐ Public Health Agency or Department *{if checked then check 4 a) & skip to 17; auto code intermediate questions as DNA}*
m) ☐ Other_____

4. Which of the following **best** describes your primary role in the organization in which you practice? **Please Check Only One Box**

a) ☐ Employee/contractor/locum tenens
b) ☐ Faculty
c) ☐ Student (include residents, fellows etc.)
d) ☐ Owner , partner, partner, part-owner *{if checked then ask}*

5. Are you the person who decides or would decide to purchase or replace an EMR/EHR system?

a) ☐ Sole decision maker
b) ☐ Shared decision
c) ☐ Decided by others

6. How does the organization in which you practice store its medical records**? (Please answer Yes or No to <u>each part</u> a, b, c)**

a) Paper ☐ Yes ☐ No
b) Scanned images of paper records ☐ Yes ☐ No

c) Electronic files (an electronic version of a patient's medical history, including progress notes, diagnosis, medications and other information used in treatment.)
☐ Yes ☐ No

{*if 6 c) checked no, skip to 11; code 6 c) i, ii, iii, iv, v and 7 (all parts) and 8 (all parts) as DNA; if yes, continue}*

i. What is the name of your current EMR/EHR system **Please check only one box**

1. ☐ ADP AdvancedMD
2. ☐ ALERT
3. ☐ Allscripts
4. ☐ AltaPoint
5. ☐ Amazing Charts
6. ☐ Aprima
7. ☐ Artemis/digiChart
8. ☐ Athena Health
9. ☐ Avatar
10. ☐ Cerner
11. ☐ Chart Logic
12. ☐ Chart Source
13. ☐ ClaimTrak
14. ☐ eClinicalWorks
15. ☐ Empower
16. ☐ Epic
17. ☐ eMDs
18. ☐ GE Centricity
19. ☐ Glo Stream
20. ☐ gMed/gGastro
21. ☐ Greenway Medical
22. ☐ HealthPort
23. ☐ MacPractice
24. ☐ McKesson
25. ☐ Medhost/HMS HealthTech/ PatientLogic
26. ☐ Meditech
27. ☐ NextGen
28. ☐ Noteworthy
29. ☐ Office Ally
30. ☐ Office Practice
31. ☐ Optum/CareTracker
32. ☐ Picis
33. ☐ Practice Fusion
34. ☐ Sage
35. ☐ SOAP ware
36. ☐ Sunrise
37. ☐ Other_____ (**please insert name**)
38. ☐ Don't Know

ii. On a scale of 1 (awful) to 5 (outstanding), how would you rate your EMR/EHR system in terms of:

a.	Ease of use	☐1	☐2	☐3	☐4	☐5
b.	Effect on your productivity	☐1	☐2	☐3	☐4	☐5
c.	Effect on staff productivity	☐1	☐2	☐3	☐4	☐5
d.	Effect on patient satisfaction	☐1	☐2	☐3	☐4	☐5
e.	Reliability	☐1	☐2	☐3	☐4	☐5
f.	Performance versus vendor's promises	☐1	☐2	☐3	☐4	☐5

iii. Do you have a scribe enter the data while you examine and communicate with the patient? ☐ Yes ☐ No

iv. In approximately what year did you first use your current electronic medical record?

☐Before 2005	☐2009	☐2013
☐2006	☐2010	☐2014
☐2007	☐2011	
☐2008	☐2012	

1. Was this a replacement for a different brand of electronic medical record? ☐ Yes {go to a} ☐ No ☐ Don't Know

7. Does your EMR/EHR system include the following functions? **(CHECK ALL THAT APPLY)**

Functions	**7 a) Is the Function Included in the EMR?**	**7 b) Do You Use the Function?**	**7 c) Do you exchange this information using your EMR/EHR to organizations outside your practice or the hospital system in which you practice?"**
i. Patient Care Summary	☐Yes ☐No ☐ Don't Know *{If ne yes set 7 b)i and 7 c) i equal No; then go to 7 a) ii else continue}*	☐ Yes ☐ No *{if No set 7 c) i to no and go to 7 a) ii}*	☐Yes ☐No ☐Don't Know *{if ne yes, go to 7 a) ii f yes then ask*: *A Health Information Exchange (HIE) an organization that provides for the electronic exchange of health information according to nationally recognized standards}* 7 c)-1: I exchange the information by ☐ email ☐ a health information exchange Other _____
ii.Prescriptions (e-prescribing)	☐ Yes ☐ No ☐ Don't Know *{If ne yes set 7 b)ii and 7 c) ii equal No then go to 7 a) iii else continue* }	☐ Yes ☐ No *{if No set 7 c) ii to no and go to 7 a) iii}*	☐Yes ☐No ☐Don't Know *{if ne yes, go to 7 a) iii if yes then ask* : *A Health Information Exchange (HIE) an organization that provides for the electronic exchange of health information according to nationally recognized standards}* 7 c)-2: I exchange the information by ☐ email ☐ a health information exchange Other _____
iii. Lab Test Results	☐Yes ☐No ☐ Don't Know *{If ne yes set 7 b)iii and 7 c) iii equal No; then go to 7a) iv else continue }*	☐ Yes ☐ No *{if No set 7 c) iii to no and go to 7 a) iv}*	☐Yes ☐No ☐Don't Know *{if ne yes, go to 7 a) iv. if yes then ask* : *A Health Information Exchange (HIE) an organization that provides for the electronic exchange of health information according to nationally recognized standards}* 7 c)-3: I exchange the information by ☐ email ☐ a health information exchange Other _____
iv. Reminders for Guideline Based Interventions	☐Yes ☐No ☐ Don't Know *{If ne yes set 7 b)ii and 7 c) iv equal No then go to 7 a) v else continue }*	☐ Yes ☐ No *{if No set 7 c) iv to no and go to 7 a) v}*	☐Yes ☐No ☐Don't Know *{if ne yes, go to 7a) v. if yes then ask*: *A Health Information Exchange (HIE) an organization that provides for the electronic exchange of health information according to nationally recognized standards }* 7 c)-4 : I exchange the information by ☐ email ☐ a health information exchange Other _____

v. Public Health Reports: immunizations, notifiable diseases	☐Yes ☐No ☐ Don't Know *{If ne yes set 7 b)v and 7 c) v equal No; then go to 8 else continue }*	☐ Yes ☐ No *{if No set 7 c) v to no and go to 8}*	☐Yes ☐No ☐Don't Know *{if ne yes, go to 8 if yes then ask: A Health Information Exchange (HIE) an organization that provides for the electronic exchange of health information according to nationally recognized standards}* 7 c)-5: I exchange the information by ☐ email ☐ a health information exchange Other _____

8. In your opinion, what are the most important obstacles to exchanging clinical information with other health care providers electronically (not fax)? (check all that apply)

a) ☐ Lack of a health information exchange
b) ☐ Concerns with maintaining patient confidentiality
c) ☐ Lack of technological support for problems
d) ☐ Cost
e) ☐ Other_____

☐ No

{Note: the next question is the first question to be answered by physicians without EMRs after they answer question #6)

9. Does the organization in which you practice plan to install an EMR/EHR system?

a) ☐ No *{go to 15}*
b) ☐ Yes, in the next:
i. ☐6 months ☐7-12 months ☐more than 12 months ☐Don't know the timing

c) What systems are you considering (check all that apply)?

1. ☐ ADP AdvancedMD
2. ☐ ALERT
3. ☐ Allscripts
4. ☐ AltaPoint
5. ☐ Amazing Charts
6. ☐ Aprima
7. ☐ Artemis/digiChart
8. ☐ Athena Health
9. ☐ Avatar
10. ☐ Cerner
11. ☐ Chart Logic
12. ☐ Chart Source
13. ☐ ClaimTrak
14. ☐ eClinicalWorks
15. ☐ Empower
16. ☐ Epic
17. ☐ eMDs
18. ☐ GE Centricity
19. ☐ Glo Stream
20. ☐ gMed/gGastro
21. ☐ Greenway Medical
22. ☐ HealthPort
23. ☐ MacPractice
24. ☐ McKesson
25. ☐ Medhost/HMS HealthTech/ PatientLogic
26. ☐ Meditech
27. ☐ NextGen
28. ☐ Noteworthy
29. ☐ Office Ally
30. ☐ Office Practice
31. ☐ Optum/CareTracker
32. ☐ Picis
33. ☐ Practice Fusion
34. ☐ Sage
35. ☐ SOAP ware
36. ☐ Sunrise
37. ☐ Other_____ (**please insert name**)
38. ☐ Don't Know

10. Which of the following factors influenced your practice's decision to acquire an EHR? **Check all that apply**.

a) ☐ Lower costs for implementation
b) ☐ Medicare based incentives
c) ☐ Medicaid based incentives
d) ☐ Clear direction on market leading vendors
e) ☐ Easily customizable systems to fit our needs
f) ☐ Cost effective access to EMR training
g) ☐ Ease of integration with our legacy systems
h) ☐ Low learning curve
i) ☐ Agreed upon and published industry standards for EMRs
j) ☐ Confidence in security and privacy of the system
k) ☐ Access to technical resources to support the system
l) ☐ Other (please specify) _____

11. In what ways do you use information from **EMRs**?

a. ☐ Population health management {if checked ask i)
   i. Do you have a separate vendor for population management
b. ☐ Tracking contagious diseases/infections
c. ☐ Outreach to patients based on analysis of EMR data
d. ☐ Evaluating appropriate utilization of care
e. ☐ Analyzing costs or cost effectiveness of care
f. ☐ Post market analysis of side effects of pharmaceuticals
g. ☐ Other_____

12. In what ways do you use information from **Claims Data**?

h. ☐ Population health management
i. ☐ Tracking contagious diseases/infections
j. ☐ Outreach to patients based on analysis of claims data
k. ☐ Evaluating appropriate utilization of care
l. ☐ Analyzing costs or cost effectiveness of care
m. ☐ Post market analysis of side effects of pharmaceuticals
n. ☐ Other_____

13. Please enter any comments that you would like to contribute.

Thank you very much for helping to create an accurate description of how practicing physicians use and rank electronic medical records.

THIS SECTION APPLIES TO PHYSICIANS WITH AZ LICENSES WHO DO NOT PRACTICE IN AZ

{Variable names should indicate that they apply to out of state physicians}

1. When did you leave Arizona?
   a. ☐ I left Arizona in _____,(year) or
   b. ☐ I have never practiced in Arizona

2. I serve patients in multiple states ☐Yes (if yes, check all that apply) ☐No (go to 3)
   a. ☐Telemedicine
   b. ☐Travel among states at different times of year
   c. The states in which I serve patients
      i. ☐include Arizona
      ii. ☐ do not include Arizona

3. Please rate the importance of *each of the following* as an influence on your choice to practice in your current country/state/territory rather than Arizona

		Important	Not Important	Not Applicable
a.	☐ To be Closer to Family/Friends……..	☐	☐	☐
b.	☐ Better Elementary/Secondary Schools	☐	☐	☐
c.	☐ Better Climate	☐	☐	☐
d.	☐ Better salary/compensation/career opportunity	☐	☐	☐
e.	☐ Unable to find a position in my field in Arizona	☐	☐	☐
f.	☐ Lower Medical Malpractice Premiums	☐	☐	☐
g.	☐ Career Opportunity for Spouse/Partner	☐	☐	☐
h.	☐ Better Lifestyle	☐	☐	☐
i.	☐ Better Political Climate	☐	☐	☐
j.	☐ Transferred by the Military	☐	☐	☐
k.	☐ To continue training (residency, fellowship)	☐	☐	☐
l.	☐ To Practice near my Residency location	☐	☐	☐
m.	☐ Availability of Part-time Positions/Locum Tenens	☐	☐	☐
n.	☐ Fulfill loan repayment obligation	☐	☐	☐

o. If other important factor,
specify_____

4. Which of the influences that you checked in #3 was the most important reason for practicing outside of Arizona? (please check only one)

   a. ☐ To be Closer to Family/Friends
   b. ☐ . Better Elementary/Secondary Schools
   c. ☐ . Better Climate
   d. ☐ . Better salary/compensation/career opportunity
   e. ☐ Unable to find a position in my field in Arizona
   f. ☐ . Lower Medical Malpractice Premiums
   g. ☐ . Career Opportunity for Spouse/Partner
   h. ☐ . Better Lifestyle
   i. ☐ . Better Political Climate
   j. ☐ . Transferred by the Military
   k. ☐ . To continue training (residency, fellowship)
   l. ☐ . To Practice near my Residency location
   m. ☐ . Availability of Part-time Positions/Locum Tenens
   n. ☐ . Fulfill loan repayment obligation
   o. ☐ Other important factor

5. Are you planning to return to practice in Arizona?
   a. ☐ Definitely yes
      i. When do you plan to return?
         1. ☐ Upon completion of postgraduate training
         2. ☐ In the next 5 years.
         3. ☐ Other(SPECIFY)_____
   b. ☐ Maybe
   c. ☐ Definitely no

6. In your opinion, what changes would make Arizona more attractive to physicians as a place in which to practice?

_____

Appendix E: Evaluations of EMRs by Vendor

Table E- 1. All Physicians' Summary Rankings of EMR Vendors, 2015-2017

Vendor	*Total Weighted Average Rank*	*Ease of Use N = 7,055*	*Physician Productivity N = 7,044*	*Staff Productivity N = 6,970*	*Reliability N = 7,024*	*Performance vs. Promise N = 6,256*	*Total Responses N = 7,063*
ADP AdvancedMD	3.3	3.3	3.0	3.4	3.6	3.3	36
AHLTA	2.4	2.4	2.4	2.5	1.8	2.1	8
ALERT	2.0	1.7	1.7	1.7	2.3	2.0	3
Allscripts	3.0	3.1	2.8	2.9	3.3	2.9	553
AltaPoint	3.3	3.5	3.2	3.6	3.5	2.8	6
Amazing Charts	3.6	4.0	3.4	3.5	3.7	3.7	48
Aprima	3.4	3.7	3.4	3.4	3.5	3.1	56
ARIA	3.7	3.7	3.4	3.5	4.0	3.8	13
Athena Health	3.7	3.8	3.4	3.6	4.1	3.7	238
Avatar	2.4	2.6	2.2	2.3	2.8	1.9	17
Centricity	3.4	3.6	3.2	3.4	3.6	3.4	189
Cerner	3.1	3.2	2.9	2.9	3.5	3.0	1,858
Chart Logic	3.2	3.6	3.1	3.3	3.3	2.8	23
CHARTCARE	3.4	3.5	3.5	3.5	3.0	3.0	2
ClaimTrak	2.1	2.3	2.1	1.9	2.4	1.9	20
digiChart	3.7	3.9	3.6	3.6	3.8	3.6	16
DocuTAB	3.7	4.0	3.9	3.8	3.5	3.3	13
EBIO	5.0	5.0	5.0	5.0	5.0	5.0	1
eClinicalWorks	3.7	3.8	3.4	3.6	3.9	3.7	525
EMA Modernizing	3.9	4.1	3.6	3.7	4.1	3.9	39
e-MDs	3.6	3.8	3.4	3.6	3.7	3.5	69
Empower	3.5	3.5	3.0	3.0	4.5	4.0	2
EncounterPro	2.7	4.0	2.0	2.0	3.0	3.0	1
Epic	3.5	3.7	3.2	3.3	3.9	3.4	947
GE	3.6	3.8	3.5	3.5	3.8	3.6	20
GE Centricity	3.2	3.5	3.1	3.1	3.5	2.9	11
gloStream	3.0	3.0	3.0	2.7	3.0	3.0	3
gMed/gGastro	3.8	4.1	3.7	3.8	4.1	3.6	45
Greenway Medical	3.2	3.3	3.0	3.3	3.5	3.1	145
Health Fusion	3.4	3.6	3.2	3.4	3.6	3.2	17
IC-Chart	5.0	5.0	5.0	5.0	5.0	5.0	16
IKnowMed	3.9	4.0	3.5	4.0	4.0	3.5	2
Indian Health Se	2.7	3.0	2.3	2.7	3.0	3.0	3
Intelligent Medi	3.6	3.7	3.3	3.5	3.8	3.6	11
MacPractice	3.5	3.6	3.4	3.4	3.6	3.4	14

Vendor	*Total Weighted Average Rank*	*Ease of Use N = 7,055*	*Physician Productivity N = 7,044*	*Staff Productivity N = 6,970*	*Reliability N = 7,024*	*Performance vs. Promise N = 6,256*	*Total Responses N = 7,063*
McKesson	3.1	3.2	2.8	3.0	3.4	3.0	118
MD Plus	3.7	4.0	4.0	4.0	3.0	3.0	1
MEDHOST	3	3.3	2.8	2.8	3.1	3.1	56
Medinformatix	3.3	3.3	3.3	3.3	3.5	3.5	4
Medinotes	3.0	3.0	3.0	3.0	3.0	3.0	1
Meditech	2.6	2.8	2.3	2.6	3.0	2.5	19
Modernizing Medi	3.7	3.9	3.6	3.4	4.0	3.9	25
NexTech	3.8	3.9	3.6	3.8	4.0	3.7	24
NextGen	2.9	3.0	2.6	2.8	3.2	2.8	500
Noteworthy	3.7	4.0	3.6	3.7	3.6	3.6	12
Office Ally	3.4	3.7	3.2	3.3	3.6	3.4	33
Office Practicum	3.7	3.9	3.4	3.6	3.9	3.9	41
ONCO	3.6	4.0	3.0	3.2	4.0	4.0	6
OptumInsight	3.3	3.3	3.1	3.1	3.6	3.2	27
Patient Now	3.6	3.9	3.5	3.6	3.6	3.3	8
Picis	3.7	4.0	3.3	3.5	4.1	3.8	16
Point N Click	3.9	4.5	3.7	3.8	4.4	3.7	15
Practice Fusion	3.7	4.0	3.4	3.5	4.0	3.9	163
Practice Partner	2.8	2.5	2.8	2.0	3.8	3.0	4
Praxis	3.3	3.3	3.1	3.2	3.3	3.3	12
PrognoCIS	3.4	3.6	3.3	3.7	3.4	3.3	9
Prorietary	3.8	3.7	3.7	3.0	4.0	4.0	3
Sage	3.5	3.7	3.2	3.4	3.9	3.4	39
SOAPware	3.8	3.7	3.5	3.6	4.0	4.2	11
SpringChart	4.2	4.0	3.5	4.0	4.5	4.5	2
Sunrise	2.9	2.9	2.6	2.4	3.7	2.7	21
Valant	3.7	3.7	3.5	3.8	3.9	3.9	15
VistA	3.4	3.5	3.1	3.1	3.8	3.3	67
Other	3.5	3.6	3.4	3.4	3.7	3.5	587
Don't Know	3.3	3.3	3.2	3.2	3.5	3.1	254
Average	3.3	3.4	3.1	3.2	3.6	3.3	

Source: AMB, ABOE Survey data, April 2015-March 2017.

Table E- 2. AHCCCS Physicians' Summary Rankings of EMR Vendors, 2015-2017

Vendor	*Total Weighted Average Rank*	*Ease of Use N = 6,764*	*Physician Productivity N = 6,753*	*Staff Productivity N = 6,683*	*Reliability N = 6,734*	*Performance vs. Promise N = 6,014*	*Total Respondents N = 6,772*
ADP AdvancedMD	3.3	3.3	3.0	3.3	3.6	3.3	35
AHLTA	2.0	2.0	2.0	1.7	1.3	2.0	3
ALERT	2.0	1.7	1.7	1.7	2.3	2.0	3
Allscripts	3.0	3.1	2.8	2.9	3.3	2.9	536
AltaPoint	3.3	3.5	3.2	3.6	3.5	2.8	6
Amazing Charts	3.6	4.0	3.4	3.6	3.7	3.8	47
Aprima	3.4	3.7	3.4	3.4	3.5	3.1	56
ARIA	3.7	3.7	3.4	3.5	4.0	3.8	12
Athena Health	3.7	3.8	3.4	3.6	4.1	3.7	232
Avatar	2.5	2.7	2.3	2.3	2.9	2.0	16
Centricity	3.4	3.6	3.2	3.4	3.6	3.4	185
Cerner	3.1	3.2	2.9	2.9	3.5	3.0	1,809
Chart Logic	3.2	3.6	3.1	3.3	3.3	2.8	23
CHARTCARE	3.4	3.5	3.5	3.5	3.0	3.0	2
ClaimTrak	2.1	2.3	2.1	1.9	2.4	1.9	20
digiChart	3.7	3.9	3.6	3.6	3.8	3.6	16
DocuTAB	3.7	4.0	3.9	3.8	3.5	3.3	13
EBIO	5.0	5.0	5.0	5.0	5.0	5.0	1
eClinicalWorks	3.7	3.9	3.4	3.6	3.9	3.7	506
EMA Modernizing	3.8	4.0	3.6	3.6	4.0	3.8	31
e-MDs	3.6	3.8	3.5	3.6	3.7	3.5	65
Empower	3.5	3.5	3.0	3.0	4.5	4.0	2
EncounterPro	2.7	4.0	2.0	2.0	3.0	3.0	1
Epic	3.5	3.7	3.2	3.3	3.9	3.4	915
GE	3.6	3.8	3.5	3.4	3.8	3.6	19
GE Centricity	3.2	3.5	3.1	3.1	3.5	2.9	11
gloStream	3.0	3.0	3.0	2.7	3.0	3.0	3
gMed/gGastro	3.8	4.1	3.7	3.8	4.1	3.6	45
Greenway Medical	3.2	3.3	2.9	3.3	3.5	3.1	142
Health Fusion	3.4	3.6	3.2	3.4	3.6	3.2	17
IC-Chart	5.0	5.0	5.0	5.0	5.0	5.0	16
IKnowMed	3.9	4.0	3.5	4.0	4.0	3.5	2
Indian Health Se	2.7	3.0	2.3	2.7	3.0	3.0	3
Intelligent Medi	3.6	3.7	3.3	3.5	3.8	3.6	11
MacPractice	3.6	3.8	3.5	3.5	3.6	3.5	13
McKesson	3.1	3.2	2.8	2.9	3.4	3.0	117
MD Plus	3.7	4.0	4.0	4.0	3.0	3.0	1
MEDHOST	3.0	3.3	2.8	2.8	3.1	3.1	55

Vendor	*Total Weighted Average Rank*	*Ease of Use N = 6,764*	*Physician Productivity N = 6,753*	*Staff Productivity N = 6,683*	*Reliability N = 6,734*	*Performance vs. Promise N = 6,014*	*Total Respondents N = 6,772*
Medinformatix	3.3	3.3	3.3	3.3	3.5	3.5	4
Medinotes	3.0	3.0	3.0	3.0	3.0	3.0	1
Meditech	2.6	2.8	2.3	2.6	3.0	2.5	19
Modernizing Medi	3.8	4.0	3.7	3.4	4.1	4.0	21
NexTech	3.8	3.8	3.6	3.6	4.2	3.8	18
NextGen	2.9	3.0	2.6	2.8	3.2	2.8	486
Noteworthy	3.7	4.0	3.6	3.7	3.6	3.6	12
Office Ally	3.4	3.7	3.2	3.3	3.6	3.4	32
Office Practicum	3.7	3.9	3.4	3.6	3.9	3.9	41
ONCO	3.6	4.0	3.0	3.2	4.0	4.0	6
OptumInsight	3.3	3.3	3.1	3.1	3.6	3.2	27
Patient Now	3.6	3.9	3.5	3.6	3.6	3.3	8
Picis	3.7	4.0	3.3	3.5	4.1	3.8	16
Point N Click	4.0	4.6	3.8	3.9	4.5	3.8	13
Practice Fusion	3.7	4.0	3.4	3.5	4.0	3.9	159
Practice Partner	2.8	2.5	2.8	2.0	3.8	3.0	4
Praxis	3.1	3.1	3.0	3.0	3.3	3.1	8
PrognoCIS	3.4	3.6	3.3	3.7	3.4	3.3	9
Prorietary	4.4	4.5	4.5	4.0	4.0	--	2
Sage	3.5	3.7	3.2	3.4	3.9	3.4	39
SOAPware	3.8	3.7	3.5	3.6	4.0	4.2	11
SpringChart	4.2	4.0	3.5	4.0	4.5	4.5	2
Sunrise	3.0	3.0	2.7	2.5	3.7	2.7	18
Valant	3.7	3.7	3.4	3.8	3.8	3.8	14
VistA	3.3	3.5	3.1	3.1	3.7	3.3	52
Other	3.5	3.7	3.4	3.4	3.7	3.5	525
Don't Know	3.2	3.3	3.1	3.2	3.4	3.1	235
Average	3.3	3.4	3.1	3.2	3.6	3.3	

Source: AMB, ABOE Survey data, April 2015-March 2017.

Table E- 3. Non-AHCCCS Physicians' Summary Rankings of EMR Vendors, 2015-2017

Vendor Name	*Total Weighted Average Rank*	*Ease of Use N = 291*	*Physician Productivity N = 291*	*Staff Productivity N = 287*	*Reliability N = 290*	*Performance vs. Promise N = 242*	*Total Responses N = 291*
ADP AdvancedMD	4.0	4.0	4.0	5.0	4.0	4.0	1
AHLTA	2.7	2.6	2.6	3.0	2.0	2.3	5
Allscripts	2.9	3.1	2.5	2.5	3.5	2.9	17
Amazing Charts	3.3	4.0	3.0	3.0	4.0	3.0	1
ARIA	3.5	4.0	3.0	3.0	4.0	4.0	1
Athena Health	3.7	3.8	3.3	3.7	3.8	4.3	6
Avatar	1.7	2.0	2.0	2.0	1.0	1.0	1
Centricity	3.2	3.8	3.0	3.0	3.3	3.0	4
Cerner	3.1	3.2	3.0	3.0	3.4	3.3	49
eClinicalWorks	3.5	3.5	2.9	3.6	3.9	3.5	19
EMA Modernizing	4.2	4.5	3.8	3.9	4.5	4.4	8
e-MDs	3.5	3.8	3.0	3.3	3.8	3.8	4
Epic	3.6	3.9	3.4	3.4	3.8	3.5	32
GE	3.5	4.0	4.0	4.0	4.0	3.0	1
Greenway Medical	3.8	3.7	3.7	4.0	4.0	3.7	3
MacPractice	2.2	2.0	2.0	2.0	3.0	2.0	1
McKesson	3.8	4.0	3.0	4.0	4.0	--	1
MEDHOST	3.5	4.0	4.0	4.0	3.0	3.0	1
Modernizing Medi	3.4	3.8	3.5	3.5	3.3	3.5	4
NexTech	3.8	4.2	3.5	4.2	3.7	3.5	6
NextGen	2.8	2.7	2.7	2.8	3.1	3.1	14
Office Ally	3.3	3.0	3.0	3.0	4.0	3.0	1
Point N Click	3.4	4.0	2.5	3.0	4.0	3.0	2
Practice Fusion	4.1	4.3	3.8	3.5	4.3	4.3	4
Praxis	3.6	3.5	3.3	3.5	3.5	3.8	4
Prorietary	2.7	2.0	2.0	2.0	4.0	4.0	1
Sunrise	2.6	2.0	2.3	2.0	3.7	--	3
Valant	4.3	4.0	4.0	5.0	5.0	5.0	1
VistA	3.6	3.6	3.4	3.3	4.1	3.3	15
Other	3.4	3.4	3.2	3.3	3.7	3.3	62
Don't Know	3.6	3.5	3.7	3.3	3.8	3.3	19
Average	3.4	3.4	3.2	3.2	3.7	3.4	

Source: AMB, ABOE Survey data, April 2015-March 2017.

Appendix F: EMR Software Descriptions

Table F - 1. Intended Use of EMR Software for Most Popular Vendors

EMR Vendor	*Intended Use*
ACOM Health	Fully web-based chiropractic EHR that is HIPAA compliant and scalable.
ADP advancedmd	Complete cloud software for independent medical practices includes e-prescribing, clinical decision support, mobile application, and physician dashboard.
Advanced Data Systems Corporation	Separate EHR, practice management system or all-in-one with cloud access, streamlined workflow, patient portal, Stage 2 Meaningful Use Certified, ICD-10 compliant.
AllegianceMD	Web-based EHR, billing and practice management software incorporates artificial intelligence for a system that learns and includes e-prescribing, patient portal, e-lab, e-fax.
Allscripts	Open platform EHR caters to small to mid-size ambulatory and physician practices or large ambulatory and multispecialty practices to create a fully connected community.
Amazing Charts	For solo or multi-clinician practices; Includes office flow, charting, scheduling, messaging, e-prescribing, reporting, billing & templates.
Aprima	Transcription/dictation; e-prescribing; diagnosis & payer Info; electronic lab orders & results; patient portal; patient compliance alerts; Meaningful Use stage 2 certified.
Athena Health	Quality management for Meaningful Use, pay-for-performance; cloud-based full-service solution; interfaces w/pharmacies, hospitals, registries and HIEs.
CareCloud	Cloud-based EHR fully functional for physician and practice, customizable and scalable for nine specific specialties.
Care360	Complete web-based practice and enterprise solution that includes a stand-alone e-prescribing system, lab management, clinical decision support, and clinical encounter documentation.
Centricity	Caters to physician practices of all sizes; Fully interoperable; meets Meaningful Use; automated workflows; ICD-9/ICD-10 compatible; clinical decision support; e-prescribing.
Cerner	Clinical summary; chart search; e-prescribe; computer assisted coding; electronic orders & results; pre-completed notes for documentation; electronic immunization download/upload; Meaningful Use.
CT|One (formerly ClaimTrak)	Behavioral health EHR fully integrating client intake through claims submission.
ClinicSource	Cloud-based EMR and practice management system designed and customized for therapy practices (physical, speech, occupational, etc.).
Compulink	Designed for specific specialties with e-prescribing, patient portal, automated coding and compliance reporting.
CureMD	EHR and practice management system with patient portal, medical billing service, mobile app, and customizable to multiple specialty types.
Drchrono	A patient care platform that offers customization at the point of care and on the go.
eClinicalWorks	Caters to all size private practices, CHCs & hospitals; ONC-HIT 2014 Complete EHR Certified, ICD-10 compliant, integrated voice to text capabilities, clinical decision support, e-prescribing, and meets Meaningful Use.
Eclipse	An all-inclusive practice management program including billing, EHR/documentation, scheduling and comprehensive reporting.
e-MDs	Adaptable to multiple clinical settings & sizes; clinical decision support; customizable templates & patient flow sheets; e-prescribing.

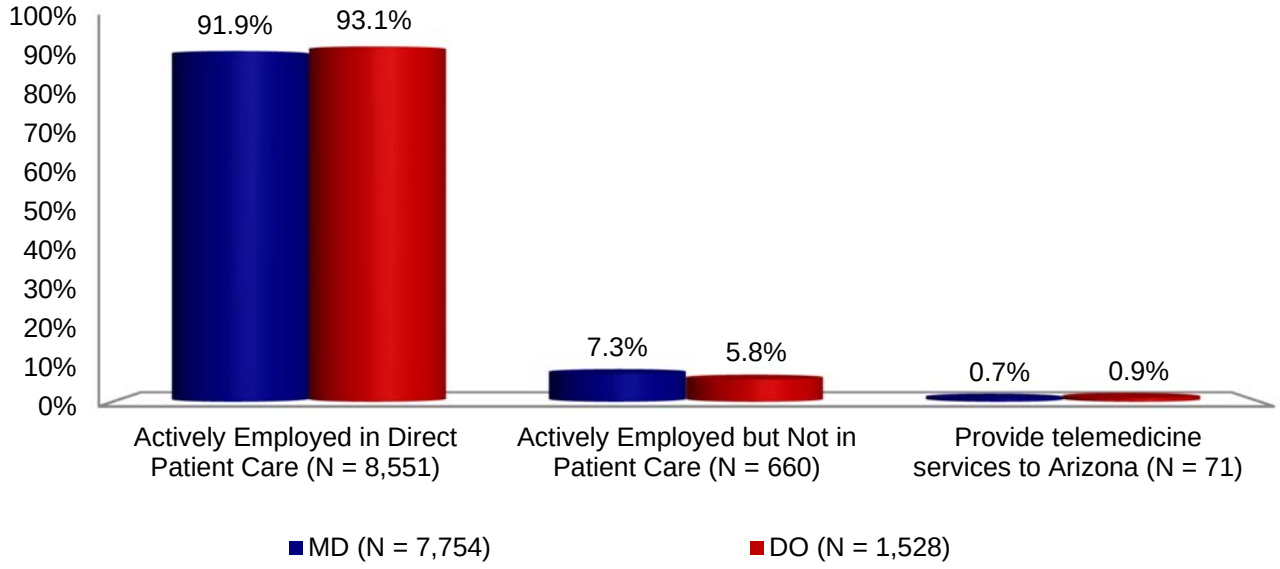
EMR Vendor	*Intended Use*
Epic	Meaningful Use stage 2 certified; accommodates >40 specialties; chart review; order management; documentation; clinical & financial decision support; telemedicine options.
gloStream	Customizable to individual physicians in a multi-physician setting; Cloud-based; Meaningful Use certified; e-prescribing; labs/orders; scheduling and tasking; note taking.
GMed	Caters to small, large & surgery centers and hospitals for gastro, cardio & urology practices; customizable workflow; interoperable; clinical decision support.
Greenway Health	Combined EHR/Practice Management solution integrating clinical/financial/administrative functions for primary care & >30 specialties in all types/sizes of practices; interoperable; Meaningful Use certified.
iSALUS	Key features include e-prescribing, orders & labs, Meaningful use certified for Stage 1 & 2; automated workflows.
Kareo	Cloud-based EHR focused on ease of use with a comprehensive dashboard, e-prescribing, e-labs, patient portal, Meaningful Use Stage 2 Certified.
McKesson	Certified Meaningful Use stage 1; separate web-based solutions for different types/sizes of practices; complete medical billing, scheduling & clinical functionality.
Meditab	Offer clients choice between cloud-based or on-site systems with solutions for PC and Mac devices in a suite of tools from the patient portal to practice management.
Meditech	Integrated medical and practice management solution for all types/sizes of practices which includes scheduling, labs, registration, EHRs, billing, ordering, reporting.
MediTouch	Web-based integrated health and medical records system customizable and Meaningful Use certified.
NextGen	Certified Meaningful Use stage 2; scalable; ICD-10 ready; accommodates 25 specialties; patient workflows/summaries; health information exchange.
Noteworthy	Certified Meaningful Use stage 1; full EHR/PM solution scalable for all physician practices.
NueMD	Cloud-based system with full EHR/PM solution scalable and accessible anywhere.
Office Practicum	Pediatric only EHR solution that includes encounters/flow sheets; prescriptions/diagnostic tests; vaccine recording/forecasting; billing; practice management.
OptumInsight	Offers a family of cloud-based products and services including practice management, EHR, patient portal and revenue cycle management.
PracticeEHR	A specialty-specific EHR/PM solution for small practices.
Practice Fusion	Free, web-based EHR/PM solution for >25 specialties; scalable to all practice types/sizes; includes e-prescribing; charting; scheduling mobile access; labs/imaging; patient health record; Meaningful Use certified.
PrognoCIS	Solutions for HER, PM, revenue cycle management and telemedicine with customizable workflow and content for your specialty, online payments, e-signing and e-prescribing.
Sage	Certified Meaningful Use; scalable for practice size and multiple specialties; charting; scheduling; orders; labs; e-prescribing; quality measure reporting; HL7 interoperable.
SOAPware	Scheduling; coding; integrate data from specific medical devices; order entry; e-prescribing; patient education/maintenance; additional practice management tools.
Sunrise	EHR solution specifically for hospitals and health systems; addresses Meaningful Use; contains interoperable, fully connected care with order entry, clinical decision support, e-prescribing/medication management.
WebPT	Web-based EMR for therapists.

Source: EMR Vendors' individual websites.

Appendix G: All Physician Results

All Physician Characteristics

Figure G - 1. Physicians Providing Patient Care, 2015-2017 (N = 9,282)



Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: Employment status was unknown for 1,927 of physicians.

Practice Settings

Table G - 1. Type of Practice by Physician Type, 2015-2017 (N = 6,528)

Type of Practice	*Number of Physicians*	*Percent*
Physician Owned Solo Practice	1,008	15.4%
Physician Owned Group Practice	2,135	32.7%
Hospital/Medical School Group Practice	1,207	18.4%
Community or Rural Health Center	335	5.1%
Federal Government Hospital or Clinic	336	5.1%
Private Hospital System	516	7.9%
Non-Hospital Private Outpatient Facility	277	4.2%
Medical School/University Research Center	266	4.0%
Health Insurer/Health Related Organization that does not provide care	136	2.0%
City, State or County Clinic or Hospital System	75	1.1%
Other	236	3.6%
Hospice or SNF	12	0.2%
Independent Contractor	14	0.2%
Medical Consultant	59	0.9%
Mental/Behavioral Health	6	0.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 4,681 physicians did not report type of practice (missing). Percentages are based on responses. The five practice types listed under the "Other" section are a subset of the total types included in the Other category.

Table G - 2. Type of Practice by Number of MDs, 2015-2017 (N = 2,865)

Type of Practice	*Number of Physicians*				*Total*
	2-5	*6-50*	*51-94*	*95+*	
Physician Owned Group Practice	624 81.5%	684 60.5%	74 42.8%	202 25.4%	1,584 55.3%
Hospital/Medical School Group Practice	48 6.3%	248 21.9%	61 35.3%	530 66.6%	887 31.0%
Community or Rural Health Center	47 6.1%	136 12.0%	31 17.9%	28 3.5%	242 8.4%
Non-Hospital Private Outpatient Facility	47 6.1%	62 5.5%	7 4.0%	36 4.5%	152 5.3%
Total	766 26.7%	1,130 39.4%	173 6.0%	796 27.8%	2,865 100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 3,855 MD's did not report practice type, and 4,270 MD's did not report the number of physicians in their practice for the above practice types.

Table G - 3. Type of Practice by Number of DOs, 2015-2017 (N = 595)

Type of Practice	*Number of Physicians*				*Total*
	2-5	*6-50*	*51-94*	*95+*	
Physician Owned Group Practice	128 78.0%	131 50.4%	23 48.9%	36 29.0%	328 53.4%
Hospital/Medical School Group Practice	8 5.5%	72 27.7%	19 40.4%	75 60.5%	175 29.4%
Community or Rural Health Center	14 8.5%	43 16.5%	4 8.5%	4 3.2%	65 10.9%
Non-Hospital Private Outpatient Facility	13 7.9%	14 5.4%	1 2.2%	9 7.3%	37 6.2%
Total	164 27.5%	260 43.6%	47 7.8%	124 20.8%	595 100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 826 DO's did not report practice type, and 934 DO's did not report the number of physicians in their practice for the above practice types.

Characteristics of EMR Users

Table G - 4. EMR Utilization by Type of Practice, 2015-2017 (N = 5,530)

Type of Practice	*Utilization Rates*
Physician Owned Solo Practice	73.3%
Physician Owned Group Practice	90.1%
Hospital/Medical School Group Practice	96.2%
Community or Rural Health Center	95.4%
Federal Government Hospital or Clinic	96.6%
Private Hospital System	93.3%
Non-Hospital Private Outpatient Facility	88.3%
Medical School/University Research Center	93.3%
Health Insurer/Health Related Organization that does not provide care	75.9%
City, State or County Clinic or Hospital System	89.0%
Other	84.6%
Hospice or SNF	100.0%
Independent Contractor	100.0%
Medical Consultant	88.0%
Mental/Behavioral Health	100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: Rates = % of physicians within each practice type. 4,681 respondents were missing type of practice. 2,675 respondents were missing EMR utilization.

The Utilization of Electronic Medical Records

Table G - 5. Methods of Storing Medical Records, 2015-2017

Method	*2015-2017 N = 8,470*		*2013-2015 N = 10,369*		*2012-2014 N = 10,780*		*2009-2011 N = 2,137; W = 8,996*		*2007-2009 N = 6,387*	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Weighted*	*Percent*	*Number*	*Percent*
Paper Files Only	403	4.7%	807	7.7%	1,229	11.4%	3,140	37.3%	2,911	45.6%
EMR Only	1,744	20.5%	1,602	15.4%	1,510	14.0%	1,565	17.4%	859	13.4%
Scanned Images Only	137	1.6%	164	1.5%	194	1.7%	204	2.3%	205	3.2%
Paper + Scanned Images Only	265	3.1%	444	4.2%	592	5.4%	404	4.5 %	393	6.2%
EMR + Paper Only	131	1.5%	276	2.6%	335	3.1%	559	6.2%	484	7.6%
EMR + Scanned Images Only	3,781	44.6%	3,709	35.7%	3,525	32.6%	1,411	15.7%	742	11.6%
Paper + Scanned Images + EMR	2,009	23.7%	3,367	32.4%	3,395	31.4%	1,126	12.5%	793	12.4%
EMR alone or in combination*	7,665	90.4%	8,954	86.3%	8,765	81.3%	4,700	52.3%	2,878	45.1%

Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: The 2011 weight = 4.21. The 2011 estimates are subject to substantially more uncertainty than the other renewal period data.

Respondents who did not identify a method of storing medical records (missing): 390 for 2007-2009; 2,177 for 2012-2014; 2,039 for 2013-2015; and 2,739 for 2015-2017.

*Data on "EMR alone or in combination" is not mutually exclusive from other categories.

A Multivariate Model of the Determinants of EMR Adoption & Information Exchange

Table G - 6. Predictors of Being an EMR User/Partially or Fully Connected EMR User, 2015-2017

Variable	*Odds Ratio (EMR User) N=5,760*	*Odds Ratio (Partially Connected EMR User) N=5,233*	*Odds Ratio (Fully Connected EMR User) N=5,233*
DO (vs. MD)	0.96	0.91	0.96
Type of Practice (vs. Federal Government)			
Physician Owned Solo Practice	0.08*	1.11	0.69
Physician Owned Group Practice	0.23*	1.20	0.85
Hospital/Med School Group Practice	0.62	1.15	0.78
Community or Rural Health Center	0.54	1.26	0.83
Private Hospital System	0.33*	1.06	0.60*
Non-Hospital Private Outpatient Facility	0.21*	0.93	0.54*
Medical School, University Research Center	0.31*	0.77	0.64
City, State or County Clinic or Hospital System	0.22*	1.10	0.46
Other	0.15*	0.56*	0.50*
Age (vs. 65 and older)			
25 to 34	3.41*	0.60*	1.41
35 to 44	3.52*	0.74*	0.97
45 to 54	2.45*	0.85	0.92
55 to 64	1.27	1.04	1.00
Gender (Female vs. Male)	0.82	1.04	0.96
Location (vs. all other AZ counties)			
Maricopa County	1.05	0.84*	0.88
Pima County	0.96	0.97	0.77
Specialty (vs. Hospital Based Specialists)			
Primary Care	2.01*	2.37*	4.28*
Medical Care	1.38*	2.12*	2.19*
Pediatric Care	2.03*	2.81*	3.89*
Surgical Care	1.19	1.50*	1.61*

Source: AMB, ABOE Survey & Licensing Data, April 2015-March 2017.

Note: 5,449 observations were deleted due to missing values for EMR Users and 2,572 observations were deleted for Partially Connected EMR Users and Fully Connected EMR Users. *Statistically significant at p less than or equal to 0 .05.

Utilization of EMR Functions

Table G - 7. Utilization of Available EMR Functions, 2015-2017

EMR Functions	*Included in EMR*	*Used by the Respondent Number/Percent*		*Exchanged with Other Providers Number/Percent*	
Patient Care Summary	5,122	4,517	88.2%	3,364	65.7%
Prescription "e-prescribing"	4,962	4,456	89.8%	3,482	70.2%
Lab Results	4,977	4,687	94.2%	3,543	71.2%
Reminders for Interventions	3,188	2,614	82.0%	1,881	59.0%
Public Health Reports	2,332	1,829	78.4%	1,476	63.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: *The data in this table effectively treat *"Don't Know"* answers as *"No"* since the questions ask for the respondent's experience, not for the practices of other physicians in the same organization.

The data in this table only include those physicians that answered *"Yes"* to the Include question for each EMR function. Furthermore, the data only includes those that answered both the Used and Exchanged questions for each EMR functions; if either question was left blank the physician was excluded from the table for that function.

Table G - 8. Most Important Obstacles to Exchanging Clinical Information, 2015-2017 (N = 12,048)

Obstacles to Exchange Information	*Number of Physicians*	*Percent*
Lack of Information	3,902	53.0%
Patient Confidentiality	2,715	36.9%
Lack of Technology	3,580	48.6%
Cost	1,851	25.1%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Utilization of EMRs by Vendor

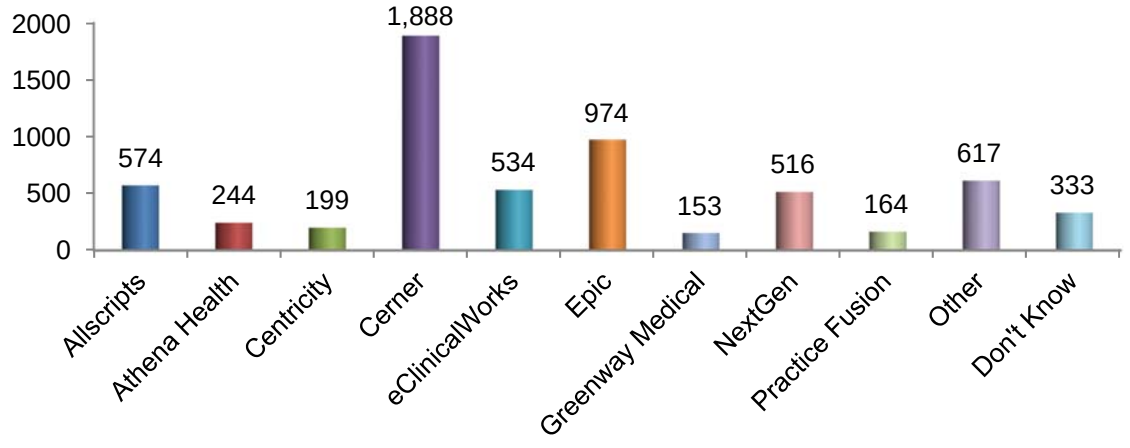
Table G - 9. EMR Users Unaware of EMR Vendor Name by Type of Practice, 2015-2017 (N = 239)

Type of Practice	*Number of Physicians*	*Percent*
Physician Owned Solo Practice	28	11.7%
Physician Owned Group Practice	83	34.7%
Hospital/Medical School Group Practice	19	7.9%
Community or Rural Health Center	15	6.2%
Private Hospital System	20	8.3%
Non-Hospital Private Outpatient Facility	17	7.1%
Medical School/University Research Center	6	2.5%
Health Insurer/Health Related Organization that does not provide care	14	5.8%
City, State or County Clinic or Hospital System	9	3.7%
Other	28	11.7%
Hospice or SNF	1	0.4%
Independent Contractor	4	1.6%
Medical Consultant	9	3.7%
Mental/Behavioral Health	1	0.4%
Total	239	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: N represents the number of physicians who answered "Don't Know" for this survey question. Governmental hospitals or clinics are excluded. There were 94 physicians who didn't respond to practice type.

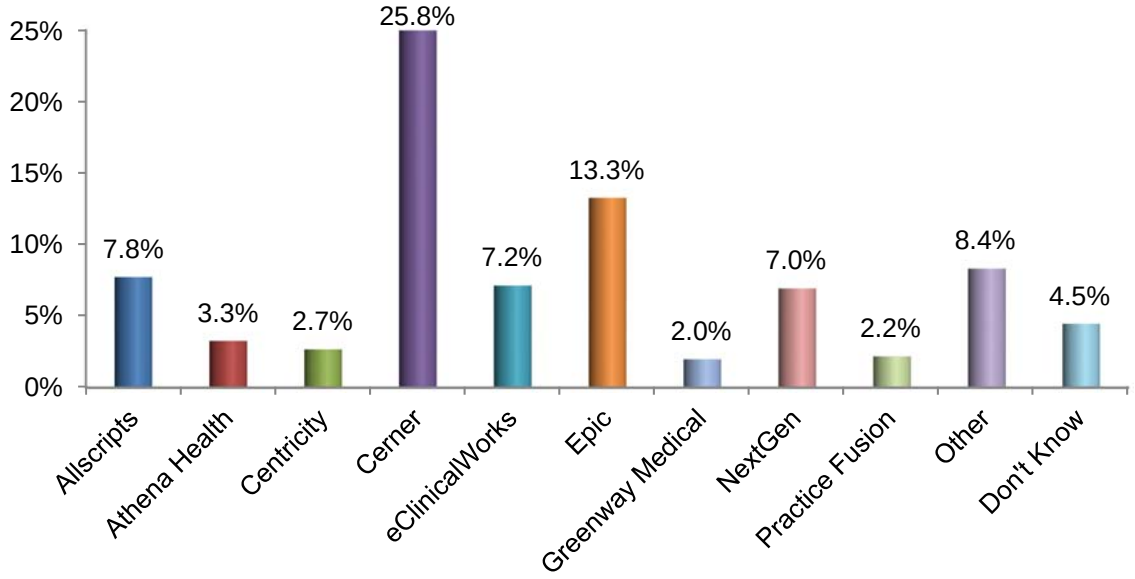
Figure G - 2. Number of EMR Users by Vendor ≥ 130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: The "Other" vendor excludes vendors contracted with government hospitals/clinics.

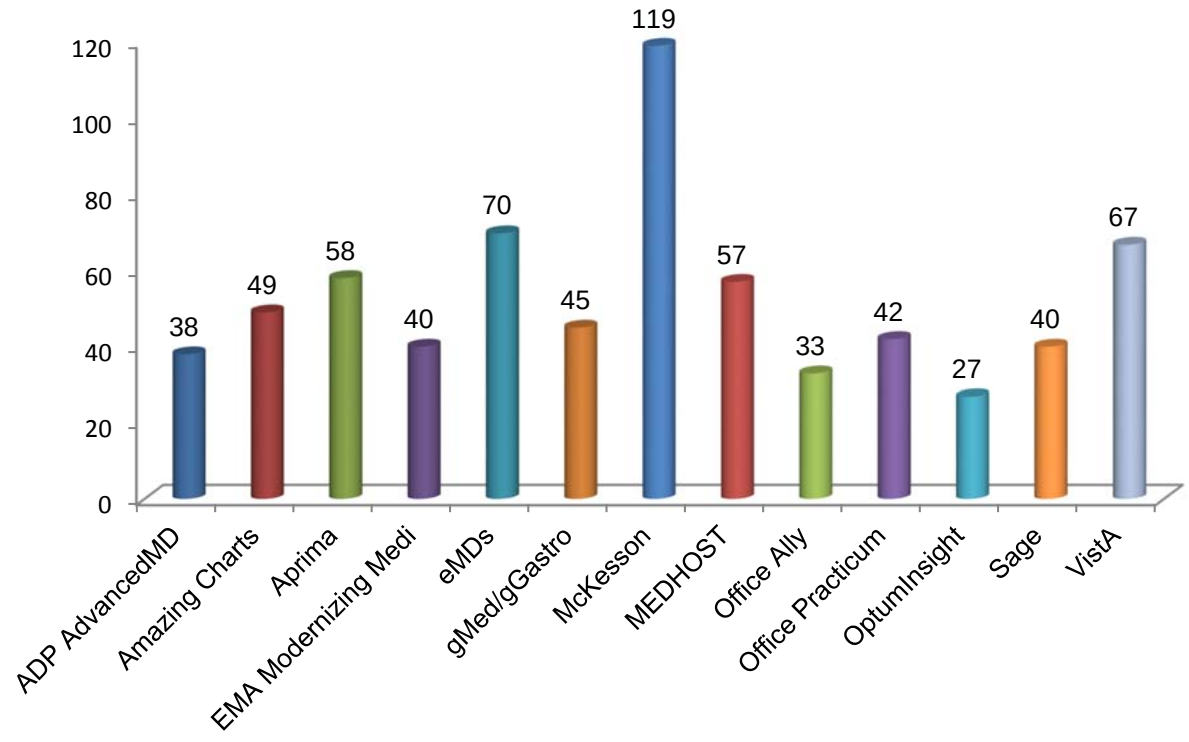
Figure G - 3. Percent of EMR Users by Vendor ≥ 130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: The "Other" vendor includes all vendors contracted with government hospitals/clinics.

Figure G - 4. Number of EMR Users by Vendor: 25-130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Physicians' Evaluation of EMR Software

Table G - 10. Ranking of All EMRs by Ease of Use, 2015-2017 (N = 7,268; WMR = 3.4)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	378	5.2%
2	783	10.7%
3	2,501	34.4%
4	2,469	33.9%
5 (Outstanding)	1,137	15.6%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

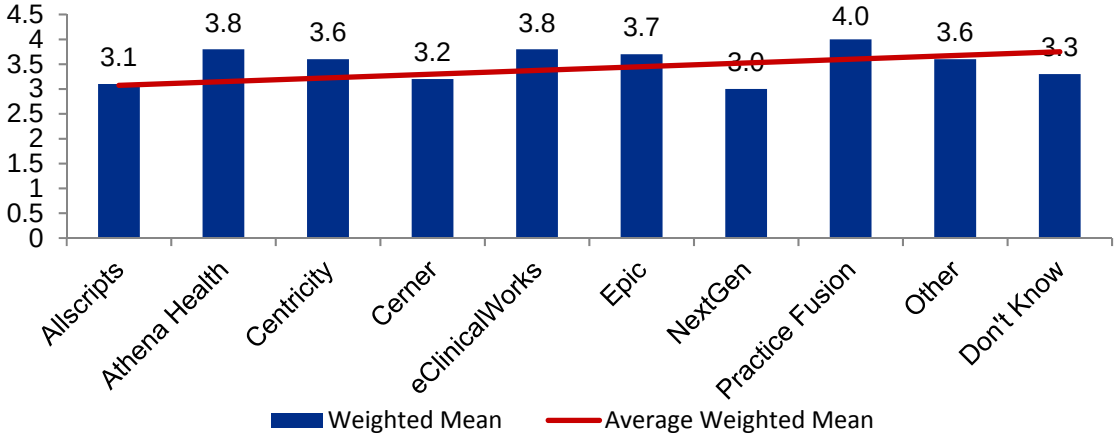
Table G - 11. Ease of Use by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	39 7.0%	97 17.5%	216 39.0%	146 26.4%	55 9.9%	553 9.5%	3.1
Athena Health	8 3.3%	11 4.6%	65 27.3%	79 33.1%	75 31.5%	238 4.0%	3.8
Centricity	7 3.7%	10 5.3%	56 29.7%	89 47.3%	26 13.8%	188 3.2%	3.6
Cerner	131 7.0%	282 15.1%	738 39.7%	563 30.3%	143 7.7%	1,857 31.9%	3.2
eClinicalWorks	7 1.3%	15 2.8%	159 30.2%	213 40.5%	131 24.9%	525 9.0%	3.8
Epic	31 3.2%	68 7.1%	269 28.4%	382 40.3%	197 20.8%	947 16.3%	3.7
NextGen	54 10.8%	98 19.6%	196 39.2%	120 24.0%	31 6.2%	499 8,5%	3.0
Practice Fusion	1 0.6%	7 4.2%	33 20.2%	77 47.2%	45 27.6%	163 2.8%	4.0
Other	22 3.7%	49 8.3%	184 31.3%	196 33.4%	135 23.0%	586 10.0%	3.6
Don't Know	15 5.9%	21 8.3%	112 44.2%	72 28.4%	33 13.0%	253 4.3%	3.3
Top 10 Total	315 5.4%	658 11.3%	2,028 34.9%	1,937 33.3%	871 14.9%	5,809 100.0%	3.4

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 253 physicians answered 'Don't Know' for the Ease of Use question. The weighted mean for those physicians is 3.34.

Figure G - 5. Weighted Mean Rank of Ease of Use by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 12. Ranking of All EMRs by Physician Productivity, 2015-2017 (N = 7,255; WMR = 3.1)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	866	11.9%
2	1,314	18.1%
3	2,317	31.9%
4	1,862	25.6%
5 (Outstanding)	896	12.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

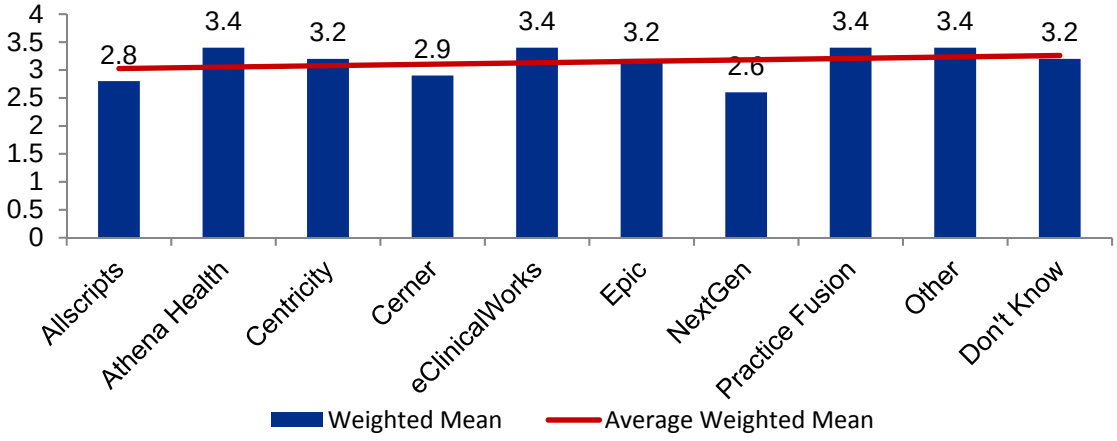
Table G - 13. Physician Productivity by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean**
Allscripts	86 15.5%	157 28.4%	157 28.4%	108 19.5%	44 7.9%	552 9.5%	2.8
Athena Health	19 8.0%	32 13.5%	71 29.9%	60 25.3%	55 23.2%	237 4.0%	3.4
Centricity	15 7.9%	28 14.8%	65 34.3%	61 32.2%	20 10.5%	189 3.2%	3.2
Cerner	285 15.3%	393 21.2%	594 32.0%	452 24.4%	128 6.9%	1,852 31.9%	2.9
eClinicalWorks	36 6.8%	80 15.2%	166 31.6%	144 27.4%	98 18.7%	524 9.0%	3.4
Epic	94 9.9%	151 15.9%	279 29.5%	269 28.4%	151 15.9%	944 16.2%	3.2
NextGen	101 20.2%	125 25.0%	161 32.2%	87 17.4%	26 5.2%	500 8.6%	2.6
Practice Fusion	12 7.3%	21 12.8%	49 30.0%	54 33.1%	27 16.5%	163 2.8%	3.4
Other	42 7.1%	76 12.9%	195 33.2%	157 28.4%	106 18.0%	586 10.1%	3.4
Don't Know	29 11.5%	32 12.6%	88 34.9%	70 27.7%	33 13.0%	252 4.3%	3.2
Top 10 Total	719 12.3%	1,095 18.8%	1,825 31.4%	1,472 25.3%	688 11.8%	5,799 100.0%	3.1

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 252 physicians answered 'Don't Know' for the Physician Productivity question. The weighted mean for those physicians is 3.18.

Figure G - 6. Weighted Mean Rank of Physician Productivity by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 14. Ranking of All EMRs by Staff Productivity, 2015-2017 (N = 7,166; WMR = 3.2)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	638	8.9%
2	1,230	17.1%
3	2,435	33.9%
4	1,988	27.7%
5 (Outstanding)	875	12.2%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

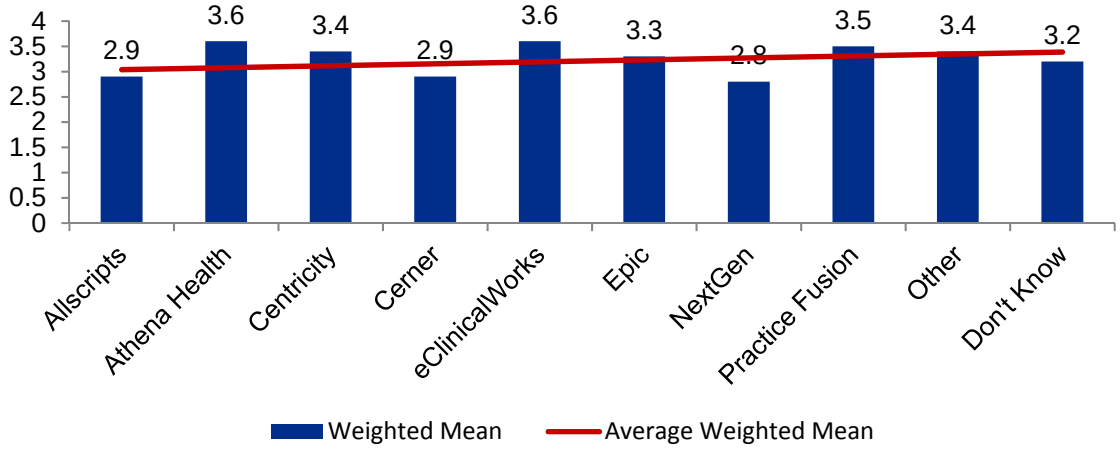
Table G - 15. Staff Productivity by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	54 9.7%	141 25.5%	186 33.6%	132 23.9%	39 7.0%	552 9.6%	2.9
Athena Health	14 5.8%	22 9.2%	70 29.4%	62 26.0%	70 29.4%	238 4.1%	3.6
Centricity	7 3.7%	23 12.2%	74 39.3%	64 34.0%	20 10.6%	188 3.2%	3.4
Cerner	237 12.9%	427 23.3%	633 34.6%	410 22.4%	118 6.4%	1,825 31.8%	2.9
eClinicalWorks	16 3.0%	42 8.0%	175 33.3%	185 35.3%	106 20.2%	524 9.1%	3.6
Epic	66 7.1%	152 16.3%	307 33.0%	274 29.5%	129 13.9%	928 16.1%	3.3
NextGen	67 13.5%	116 23.4%	184 37.2%	107 21.6%	20 4.0%	494 8.6%	2.8
Practice Fusion	6 3.7%	18 11.3%	48 30.1%	57 35.8%	30 18.8%	159 2.7%	3.5
Other	41 7.0%	71 12.2%	180 31.0%	182 31.4%	105 18.1%	579 10.0%	3.4
Don't Know	27 10.8%	30 12.0%	88 35.3%	73 29.3%	31 12.4%	249 4.3%	3.2
Top 10 Total	535 9.3%	1,042 18.1%	1,945 33.9%	1,546 26.9%	668 11.6%	5,736 100.0%	3.1

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 249 physicians answered 'Don't Know' for the Staff Productivity question. The weighted mean for those physicians is 3.20.

Figure G - 7. Weighted Mean Rank of Staff Productivity by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 16. Ranking of All EMRs by Reliability, 2015-2017 (N = 7,231; WMR = 3.6)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	284	3.9%
2	631	8.7%
3	2,034	28.1%
4	2,887	39.9%
5 (Outstanding)	1,395	19.2%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

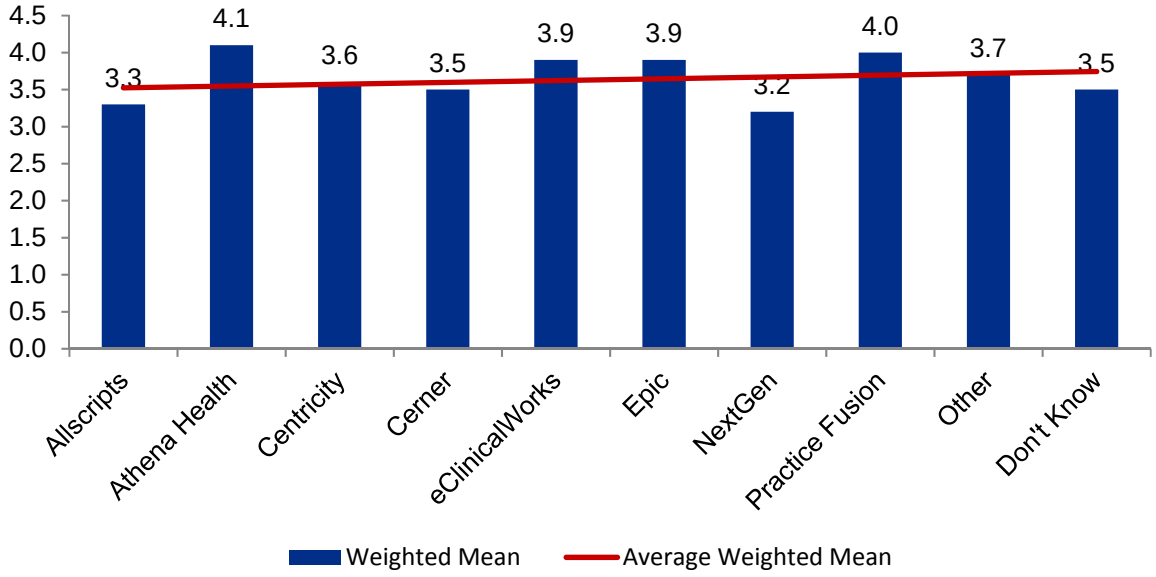
Table G - 17. Reliability by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	36 6.5%	78 14.2%	190 34.6%	185 33.7%	59 10.7%	548 9.1%	3.3
Athena Health	7 2.9%	5 2.1%	46 19.3%	82 34.4%	98 41.1%	238 4.1%	4.1
Centricity	4 2.1%	22 11.7%	48 25.6%	81 43.3%	32 17.1%	187 3.2%	3.6
Cerner	75 4.0%	190 10.2%	586 31.7%	758 41.0%	237 12.8%	1,846 31.9%	3.5
eClinicalWorks	5 0.9%	18 3.4%	123 23.4%	232 44.2%	146 27.8%	524 9.0%	3.9
Epic	14 1.4%	54 5.7%	211 22.4%	423 45.0%	238 25.3%	940 16.2%	3.9
NextGen	44 8.8%	70 14.0%	170 34.1%	162 32.5%	52 10.4%	498 8.6%	3.2
Practice Fusion	-	6 3.6%	36 22.0%	74 45.3%	47 28.8%	163 2.8%	4.0
Other	23 3.9%	48 8.2%	141 24.2%	217 37.2%	153 26.2%	582 10.0%	3.7
Don't Know	12 4.7%	22 8.7%	95 37.8%	80 31.8%	42 16.7%	251 4.3%	3.5
Top 10 Total	220 3.8%	513 8.8%	1,646 28.4%	2,294 39.7%	1,104 19.1%	5,777 100.0%	3.6

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 251 physicians did not identify a brand name but answered the Reliability question. The weighted mean for those physicians is 3.47.

Figure G - 8. Weighted Mean Rank of Reliability by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 18. Ranking of All EMRs by Performance vs. Promise, 2015-2017 (N = 6,427; WMR = 3.3)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	528	8.2%
2	871	13.5%
3	2,247	34.9%
4	1,952	30.3%
5 (Outstanding)	829	12.8%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

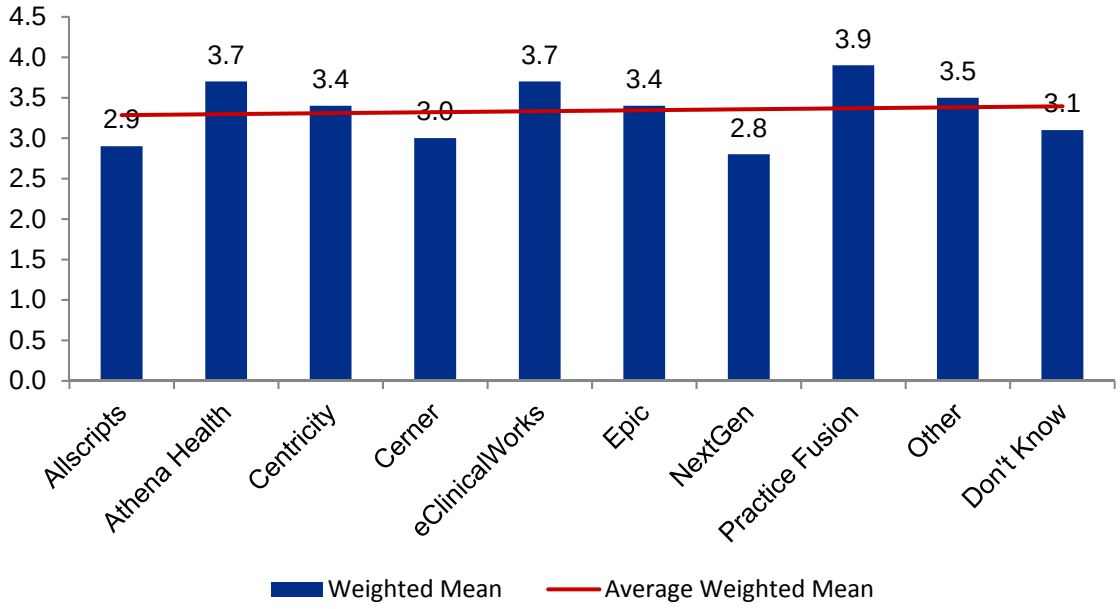
Table G - 19. Performance vs. Promise by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	63 12.6%	95 19.1%	199 40.0%	99 19.9%	41 8.2%	497 9.7%	2.9
Athena Health	13 5.8%	19 8.5%	55 24.7%	66 29.7%	69 31.0%	222 4.3%	3.7
Centricity	6 3.7%	19 11.9%	62 38.9%	57 35.8%	15 9.4%	159 3.1%	3.4
Cerner	173 10.9%	251 15.9%	621 39.4%	427 27.1%	102 6.4%	1,574 30.8%	3.0
eClinicalWorks	9 1.7%	30 5.9%	156 31.0%	211 42.0%	96 19.1%	502 9.8%	3.7
Epic	43 5.2%	95 11.5%	284 34.4%	278 33.6%	125 15.1%	825 16.1%	3.4
NextGen	70 15.6%	90 20.1%	172 38.5%	96 21.5%	18 4.0%	446 8.7%	2.8
Practice Fusion	3 1.8%	8 5.0%	33 20.8%	64 40.5%	50 31.6%	158 3.0%	3.9
Other	39 7.5%	60 11.6%	145 28.0%	172 33.6%	99 19.1%	517 10.1%	3.5
Don't Know	19 9.3%	22 10.7%	93 45.5%	52 25.4%	18 8.8%	204 3.9%	3.1
Top 10 Total	438 8.5%	689 13.4%	1,820 35.6%	1,524 29.8%	633 12.4%	5,104 100.0%	3.2

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 204 physicians did not identify a brand name but answered the Performance vs Promise question. The weighted mean for those physicians is 3.14.

Figure G - 9. Weighted Mean Rank of Performance vs. Promise by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 20. Summary of All EMR Ranking Criterion, 2015-2017

Criterion	*Weighted Mean*	*Number of Physicians*
Ease of Use	3.4	7,268
Effect on Physician Productivity	3.1	7,255
Effect on Staff Productivity	3.2	7,166
Reliability	3.6	7,231
Performance vs. Promise	3.3	6,427

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Installation/Replacement of EMRs

Table G - 21. Plans to Install EMRs by Vendor for Non-EMR Users, 2015-2017 (N = 228)

Vendor	*Number of Physicians*	*Percent*
Advanced MD	14	6.1%
Allscripts	21	9.2%
Alta Point	1	0.4%
Amazing Charts	11	4.8%
Athena Health	3	1.3%
Cerner	22	9.6%
Chart Logic	3	1.3%
eClinicalWorks	14	6.1%
e-MDs	3	1.3%
Epic	17	7.5%
Greenway Medical	5	2.2%
MacPractice	3	1.3%
McKesson	6	2.6%
Meditech	3	1.3%
NextGen	9	3.9%
Office Ally	3	1.3%
Office Practicum	1	0.4%
Practice Fusion	14	6.1%
Don't Know	75	32.9%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Physicians practicing in government settings are excluded from these results. Selection of EMR systems are not mutually exclusive.

Table G - 22. Plans to Install EMRs by Vendor for EMR Users, 2015-2017 (N = 965)

Vendor	*Number of Physicians*	*Percent*
Advanced MD	3	0.3%
ALERT	1	0.1%
Allscripts	42	4.4%
Amazing Charts	4	0.4%
Aprima	4	0.4%
Athena Health	19	2.0%
Avatar	2	0.2%
Care Tracker	2	0.2%
Cerner	265	27.5%
Chart Logic	1	0.1%
ClaimTrak	1	0.1%
eClinicalWorks	35	3.6%
e-MDs	13	1.3%
Epic	260	26.9%

Vendor	*Number of Physicians*	*Percent*
GMed	2	0.2%
Greenway Medical	6	0.6%
MacPractice	1	0.1%
McKesson	19	2.0%
Meditech	17	1.8%
MedHost	2	0.2%
NextGen	52	5.4%
Office Ally	2	0.2%
Office Practicum	2	0.2%
PICIS	2	0.2%
Practice Fusion	17	1.8%
Sage	1	0.1%
Sunrise	3	0.3%
Don't Know	187	19.4%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Physicians practicing in government settings are excluded from these results. Selection of EMR systems are not mutually exclusive.

Table G - 23. Factors That Influenced Practice's Decision to Acquire an EHR, 2015-2017 (N = 2,511)

Factors	*Number of Physicians*	*Percent*
Lower Costs	274	10.9%
Medicare Incentives	397	15.8%
Medicaid Incentives	229	9.1%
Clear Direction	93	3.7%
Easily Customizable	325	12.9%
Cost Effective	170	6.8%
Ease of Integration	159	6.3%
Low Learning Curve	171	6.8%
Agreed Upon and Published	214	8.5%
Confidence in Security	256	10.2%
Access to Technology Resources	223	8.9%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 24. Uses of Information from Claims Data, 2015-2017 (N = 756)

Uses	*Number of Physicians*	*Percent*
Population Health Management	152	20.1%
Tracking Contagious Diseases	65	8.6%
Outreach to Patients	115	15.2%
Evaluate Appropriate Metrics	201	26.6%
Analyzing Costs	192	25.4%
Post Market Analysis	31	4.1%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table G - 25. Uses of Information from EMRs, 2015-2017 (N = 1,223)

Uses	*Number of Physicians*	*Percent*
Population Health Management	203	16.6%
Tracking Contagious Diseases	122	10.0%
Outreach to Patients	221	18.1%
Evaluate Appropriate Metrics	414	33.9%
Analyzing Costs	220	18.0%
Post Market Analysis	43	3.5%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

The Target Population

Table G - 26. The Target Population of Physicians without EMRs by County, 2015-2017 (N = 8,210)

Location	*All Survey Respondents (N)*	*Survey Respondents EMR Users (N)*	*Survey Respondents Non-EMR Users (N)*	*Projected Target Population (W*N)*
Apache	21	13	8	9
Cochise	75	68	7	8
Coconino	196	163	33	36
Gila	35	32	3	3
Graham	23	23	-	0
Greenlee	-	-	-	-
La Paz	10	8	2	2
Maricopa	5,330	4,794	536	590
Mohave	204	175	29	32
Navajo	69	62	7	8
Pima	1,359	1,211	148	163
Pinal	116	107	9	10
Santa Cruz	15	11	4	4
Yavapai	202	187	15	17
Yuma	154	143	11	12
Missing	237	207	30	33
Unknown	164	148	16	18
Total	8,210	7,352	858	994

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Table does not include physicians practicing in government settings.

The target population is calculated as the number of non-EMR users multiplied by the population weight.

Table G - 27. Trends in the Target Population of Physicians without EMRs by County, 2013-2015 vs. 2012-2014 vs. 2007-2009

Location	*Non-Users of EMRs as a Percent of Physicians*		
	2013-2015	*2012-2014*	*2007-2009*
Apache	25.0%	31.6%	47.1%
Cochise	8.3%	17.0%	56.6%
Coconino	11.7%	16.7%	56.8%
Gila	13.0%	18.2%	67.7%
Graham	12.0%	13.3%	57.9%
Greenlee	0.0%	0.0%	57.9%
La Paz	0.0%	36.4%	66.7%
Maricopa	14.9%	20.3%	57.2%
Mohave	14.6%	16.9%	64.1%
Navajo	12.5%	29.2%	52.9%
Pima	15.5%	19.7%	56.0%
Pinal	15.9%	14.3%	52.1%
Santa Cruz	11.8%	5.3%	77.8%
Yavapai	10.4%	13.6%	62.6%
Yuma	7.4%	16.5%	73.3%
Total	14.8%	20.5%	57.6%

Source: AMB, ABOE Survey Data, 2007-2009; 2012-2014, 2013-2015.

Appendix H: AHCCCS Physician Results

AHCCCS Physician Characteristics

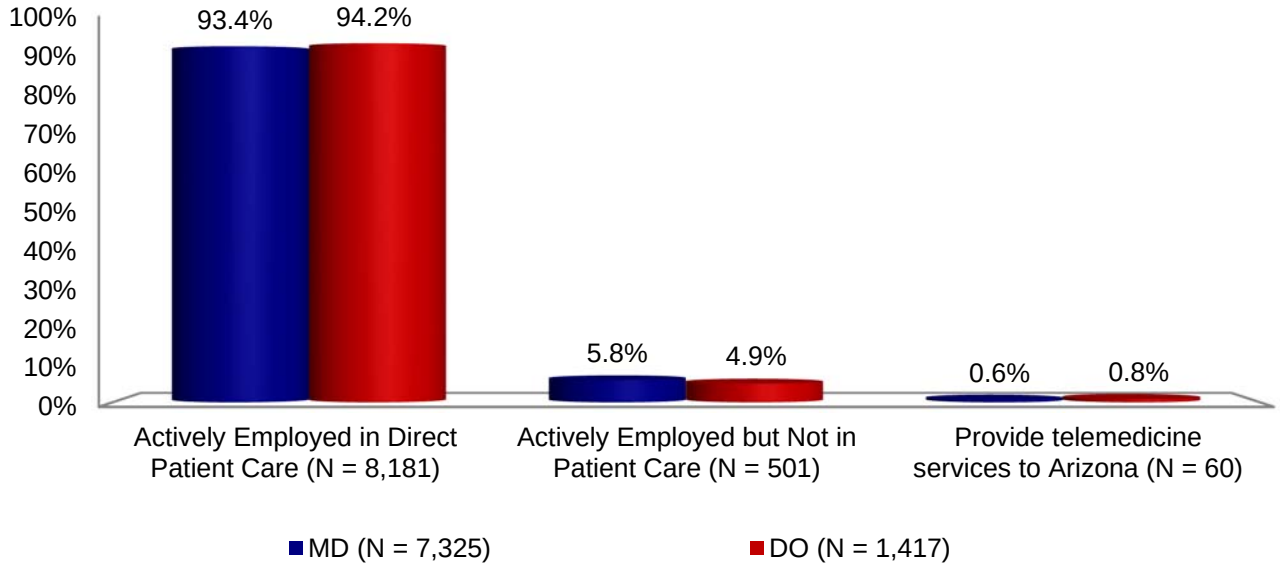
Table H - 1. Comparison of AHCCCS Respondents to Non-Respondents, 2015-2017

Characteristic	*Respondents (N = 10,511)*		*Non-Respondents (N = 4,008)*		*P-Value*
Sex					
Female	3,179	30.2%	1,160	28.9%	<0.01
Male	7,026	66.8%	2,730	68.1%	<0.01
Total	10,205	97.0%	3,890	97.0%	
Age Group					
25 - 34	378	3.5%	339	8.4%	NS
35 - 44	2,736	26.0%	971	24.2%	<0.01
45 - 54	3,010	28.6%	966	24.1%	<0.01
55 - 64	2,528	24.0%	935	23.3%	NS
65+	1,384	13.1%	762	19.0%	<0.01
Total	10,036	95.4%	3,973	99.1%	
Specialty					
Primary Care	3,888	36.9%	1,328	33.1%	<0.01
Medical	2,260	21.5%	1,070	26.6%	<0.01
Hospital-Based	2,433	23.1%	791	19.7%	<0.01
Pediatric	953	9.0%	379	9.4%	NS
Surgical	947	9.0%	434	10.8%	<0.05
Total	10,481	99.7%	4,002	99.8%	
Location					
Maricopa County	6,710	63.8%	2,569	64.0%	NS
Pima County	1,841	17.5%	758	18.9%	NS
All Other Counties	1,960	18.6%	681	16.9%	<0.01
Total	10,511	100.0%	4,008	100.0%	

Source: AMB, ABOE Administrative/Survey Data, April 2015-March 2017.

Note: Data include retired and semi-retired physicians. A p-value of .05 or less implies only a 5% probability of declaring the relationship significant when in fact it is not. NS = no significant difference. Gender was unknown for 306 (2.9%) respondents and 118 (2.9%) non-respondents. Age was unknown for 474 (4.5%) respondents and 35 (0.8%) non-respondents. Specialty was unknown for 30 (0.2%) respondents and 6 (0.1%) non-respondents.

Figure H - 1. AHCCCS Physicians Providing Patient Care, 2015-2017 (N = 8,742)



Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: Employment status was unknown for 1,769 of physicians.

Practice Settings of AHCCCS Physicians

Table H - 2. Type of Practice by Physician Type, 2015-2017 (N = 6,528)

Type of Practice	*Number of Physicians*	*Percent*
Physician Owned Solo Practice	1,008	15.4%
Physician Owned Group Practice	2,135	32.7%
Hospital/Medical School Group Practice	1,207	18.4%
Community or Rural Health Center	335	5.1%
Federal Government Hospital or Clinic	336	5.1%
Private Hospital System	516	7.9%
Non-Hospital Private Outpatient Facility	277	4.2%
Medical School/University Research Center	266	4.0%
Health Insurer/Health Related Organization that does not provide care	136	2.0%
City, State or County Clinic or Hospital System	75	1.1%
Other	236	3.6%
Hospice or SNF	14	0.2%
Independent Contractor	59	0.9%
Medical Consultant	6	0.0%
Mental/Behavioral Health	3	0.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 4,681 physicians did not report type of practice (missing). Percentages are based on responses. The five practice types listed under the "Other" section are a subset of the total types included in the Other category.

Table H - 3. Type of Practice by Number of MDs, 2015-2017 (N = 2,820)

Type of Practice	*Number of Physicians*				*Total*
	2-5	*6-50*	*51-94*	*95+*	
Physician Owned Group Practice	607 39.0%	677 43.5%	72 4.6%	199 12.7%	1,584 55.1%
Hospital/Medical School Group Practice	47 5.3%	244 27.8%	60 6.8%	526 59.9%	887 31.1%
Community or Rural Health Center	47 19.4%	136 56.1%	31 12.8%	28 11.5%	242 8.6%
Non-Hospital Private Outpatient Facility	36 31.5%	60 41.0%	7 4.7%	33 22.6%	152 5.2%
Total	747 26.4%	1,117 39.6%	170 6.0%	786 27.8%	2,820 100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 3,520 MD's did not report practice type, and 3,925 MD's did not report the number of physicians in their practice for the above practice types.

Table H - 4. Type of Practice by Number of DOs, 2015-2017 (N = 580)

Type of Practice	*Number of Physicians*				*Total*
	2-5	*6-50*	*51-94*	*95+*	
Physician Owned Group Practice	124 40.1%	127 41.1%	23 7.4%	35 11.3%	309 53.3%
Hospital/Medical School Group Practice	9 5.2%	72 42.1%	19 11.1%	71 41.5%	171 29.5%
Community or Rural Health Center	13 20.6%	42 66.6%	4 6.3%	4 6.3%	63 10.9%
Non-Hospital Private Outpatient Facility	13 35.1%	14 37.8%	1 2.7%	9 24.3%	37 6.4%
Total	159 27.4%	255 43.9%	47 8.1%	119 20.5%	580 100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 719 DO's did not report practice type, and 821 DO's did not report the number of physicians in their practice for the above practice types.

Characteristics of AHCCCS EMR Users

Table H - 5. EMR Utilization by Type of Practice, 2015-2017 (N = 5,356)

Type of Practice	*Utilization Rates*
Physician Owned Solo Practice	74.0%
Physician Owned Group Practice	90.2%
Hospital/Medical School Group Practice	96.2%
Community or Rural Health Center	95.9%
Federal Government Hospital or Clinic	96.7%
Private Hospital System	93.2%
Non-Hospital Private Outpatient Facility	88.6%
Medical School/University Research Center	94.2%
Health Insurer/Health Related Organization that does not provide care	84.4%
City, State or County Clinic or Hospital System	89.0%
Other	86.4%
Hospice or SNF	100.0%
Independent Contractor	100.0%
Medical Consultant	89.4%
Mental/Behavioral Health	100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: Rates = % of physicians within each practice type. 4,239 respondents were missing type of practice. 2,432 respondents were missing EMR utilization.

The Utilization of Electronic Medical Records by AHCCCS Physicians

Table H - 6. Methods of Storing Medical Records, 2015-2017 (N = 8,026)

Method	*Number*	*Percent*
Paper Files Only	371	4.6%
EMR Only	1,669	20.7%
Scanned Images Only	128	1.5%
Paper + Scanned Images Only	239	2.9%
EMR + Paper Only	124	1.5%
EMR + Scanned Images Only	3,608	44.9%
Paper + Scanned Images + EMR	1,887	23.5%
EMR alone or in combination*	7,288	90.8%

Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: 2,485 respondents did not identify a method of storing medical records (missing). *Data on "EMR alone or in combination" is not mutually exclusive from other categories.

Table H - 7. Physicians Who Used a Scribe for Data Entry, 2015-2017 (N = 550)

Storage Method	*Number of Physicians*	*Percent*
EMR Only	227	14.9%
EMR + Paper Only	5	6.1%
EMR + Scanned Images Only	7	6.1%
Paper + Scanned Images + EMR	354	10.6%

Source: AMB, ABOE Survey data, April 2015-March 2017.

A Multivariate Model of the Determinants of EMR Adoption & Information Exchange

Table H - 8. Predictors of Being an EMR User/Partially or Fully Connected EMR User, 2015-2017

Variable	*Odds Ratio (EMR User) N=5,580*	*Odds Ratio (Partially Connected EMR User) N=5,084*	*Odds Ratio (Fully Connected EMR User) N=5,084*
DO (vs. MD)	0.96	0.92	0.95
Type of Practice (vs. Federal Government)			
Physician Owned Solo Practice	0.08*	1.19	0.68
Physician Owned Group Practice	0.24*	1.23	0.82
Hospital/Med School Group Practice	0.63	1.18	0.75
Community or Rural Health Center	0.60	1.27	0.81
Private Hospital System	0.34*	1.13	0.60*
Non-Hospital Private Outpatient Facility	0.22*	0.99	0.52*
Medical School, University Research Center	0.38*	0.87	0.64
City, State or County Clinic or Hospital System	0.23*	1.24	0.50
Other	0.18*	0.59*	0.52
Age (vs. 65 and older)			
25 to 34	3.74*	0.61*	1.52
35 to 44	3.63*	0.70*	1.00
45 to 54	2.55*	0.83	0.95
55 to 64	1.27	1.02	1.05
Gender (Female vs. Male)	0.85	1.06	0.95
Location (vs. all other AZ counties)			
Maricopa County	1.01	0.84*	0.87
Pima County	0.91	0.98	0.78
Specialty (vs. Hospital Based Specialists)			
Primary Care	2.01*	2.36*	4.39*
Medical Care	1.36*	2.21*	2.24*
Pediatric Care	2.02*	2.81*	3.94*
Surgical Care	1.24	1.52*	1.64*

Source: AMB, ABOE Survey & Licensing Data, April 2015-March 2017.

Note: 4,931 observations were deleted due to missing values for EMR Users and 2,339 observations were deleted for Partially Connected EMR Users and Fully Connected EMR Users. *Statistically significant at p less than or equal to 0 .05.

Utilization of EMR Functions by AHCCCS Physicians

Table H - 9. Utilization of Available EMR Functions, 2015-2017*

EMR Functions	*Included in EMR*	*Used by the Respondent Number/Percent*		*Exchanged with Other Providers Number/Percent*	
Patient Care Summary	4,941	4,368	88.4%	3,266	66.1%
Prescription "e-prescribing"	4,779	4,304	90.1%	3,376	70.6%
Lab Results	4,788	4,520	94.4%	3,431	71.7%
Reminders for Interventions	3,084	2,533	82.1%	1,828	59.3%
Public Health Reports	2,250	1,764	78.4%	1,429	63.5%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: *The data in this table effectively treat *"Don't Know"* answers as *"No"* since the questions ask for the respondent's experience, not for the practices of other physicians in the same organization.

The data in this table only include those physicians that answered *"Yes"* to the Include question for each EMR function. Furthermore, the data only includes those that answered both the Used and Exchanged questions for each EMR functions; if either question was left blank the physician was excluded from the table for that function.

Table H - 10. Most Important Obstacles to Exchanging Clinical Information, 2015-2017

Obstacles to Exchange Information	*Number of Physicians*	*Percent*
Lack of Information	3,740	53.2%
Patient Confidentiality	2,579	36.7%
Lack of Technology	3,440	49.0%
Cost	1,778	25.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Utilization of EMRs by Vendor

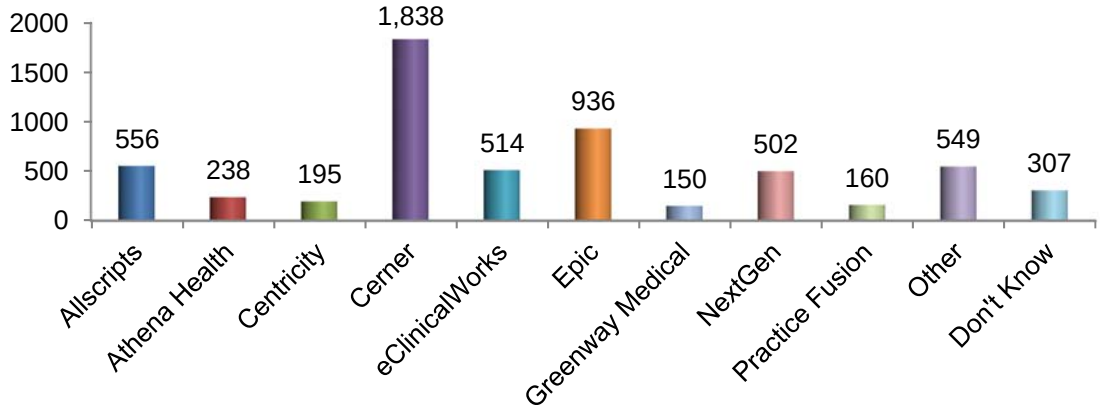
Table H - 11. EMR Users Unaware of EMR Vendor Name by Type of Practice, 2015-2017 (N = 227)

Type of Practice	*Number of Physicians*	*Percent*
Physician Owned Solo Practice	26	11.4%
Physician Owned Group Practice	82	36.1%
Hospital/Medical School Group Practice	19	8.3%
Community or Rural Health Center	15	6.6%
Private Hospital System	-	-
Non-Hospital Private Outpatient Facility	18	7.9%
Medical School/University Research Center	15	6.6%
Health Insurer/Health Related Organization that does not provide care	6	2.6%
City, State or County Clinic or Hospital System	11	4.8%
Other	8	3.5%
Hospice or SNF	1	0.4%
Independent Contractor	3	1.3%
Medical Consultant	9	3.9%
Mental/Behavioral Health	1	0.4%
Total	227	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: N represents the number of physicians who answered "Don't Know" for this survey question. Governmental hospitals or clinics are excluded. There were 39 physician that didn't respond to practice type.

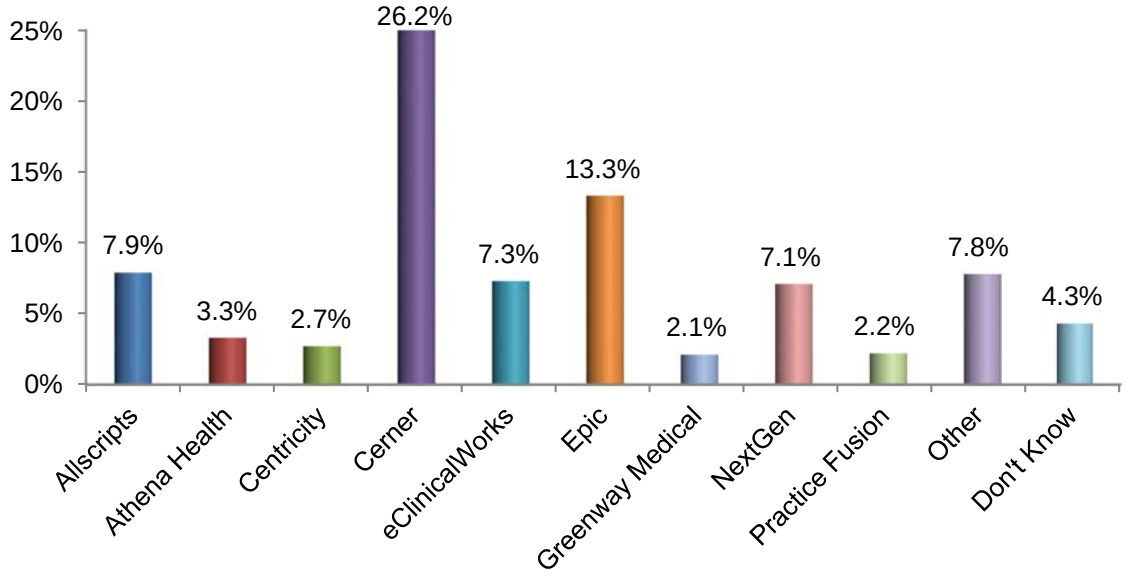
Figure H - 2. Number of EMR Users by Vendor ≥ 130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: The "Other" vendor excludes vendors contracted with government hospitals/clinics.

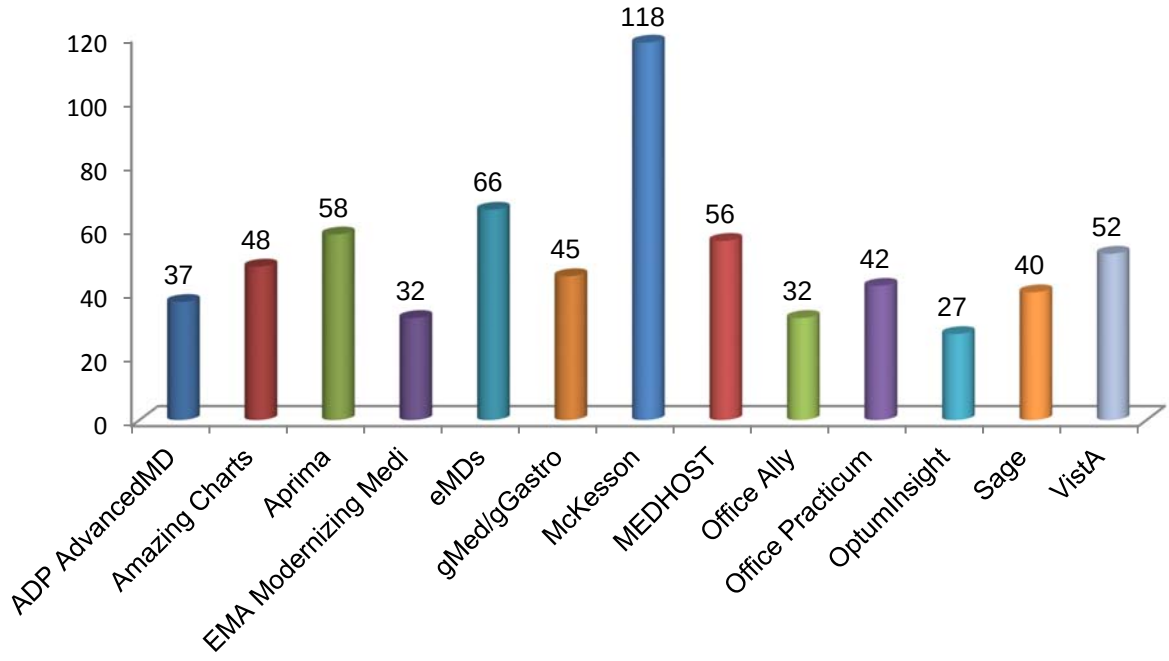
Figure H - 3. Percent of EMR Users by Vendor ≥ 130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: The "Other" vendor includes all vendors contracted with government hospitals/clinics.

Figure H - 4. Number of EMR Users by Vendor 25-130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

AHCCCS Physicians' Evaluation of EMR Software

Table H - 12. Ranking of All EMRs by Ease of Use, 2015-2017 (N = 6,960; WMR = 3.4)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	361	5.1%
2	756	10.8%
3	2,390	34.3%
4	2,362	33.9%
5 (Outstanding)	1,091	15.6%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

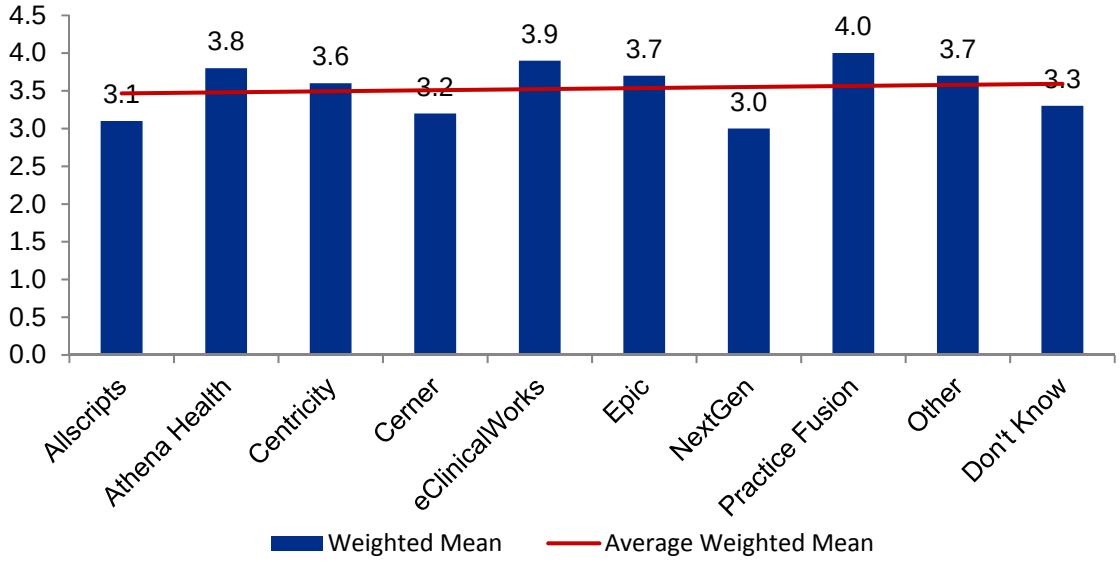
Table H - 13. Ease of Use by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	37 6.9%	96 17.9%	206 38.4%	144 26.8%	53 9.8%	536 9.6%	3.1
Athena Health	8 3.4%	11 4.7%	63 27.1%	76 32.7%	74 31.8%	232 4.1%	3.8
Centricity	7 3.8%	10 5.4%	55 29.8%	86 46.7%	26 14.1%	184 3.2%	3.6
Cerner	130 7.1%	273 15.0%	715 39.5%	550 30.4%	140 7.7%	1,808 32.3%	3.2
eClinicalWorks	6 1.1%	14 2.7%	153 30.2%	203 40.1%	130 25.6%	506 9.0%	3.9
Epic	30 3.2%	68 7.4%	263 28.7%	362 39.5%	192 20.9%	915 16.3%	3.7
NextGen	51 10.5%	94 19.3%	193 39.7%	118 24.3%	29 5.9%	485 8.6%	3.0
Practice Fusion	1 0.6%	7 4.4%	32 20.1%	76 47.7%	43 27.0%	159 2.8%	4.0
Other	17 3.2%	45 8.5%	162 30.9%	175 33.3%	125 23.8%	524 9.3%	3.7
Don't Know	15 6.4%	19 8.1%	102 43.5%	69 29.4%	29 12.3%	234 4.1%	3.3
Top 10 Total	302 5.4%	637 11.4%	1,944 34.8%	1,859 33.2%	841 15.0%	5,583 100.0%	3.4

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 234 physicians answered 'Don't Know' for the Ease of Use question. The weighted mean for those physicians is 3.33.

Figure H - 5. Weighted Mean Rank of Ease of Use by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 14. Ranking of All EMRs by Physician Productivity, 2015-2017 (N = 6,947; WMR = 3.1)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	836	12.0%
2	1,271	18.2%
3	2,200	31.6%
4	1,782	25.6%
5 (Outstanding)	858	12.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

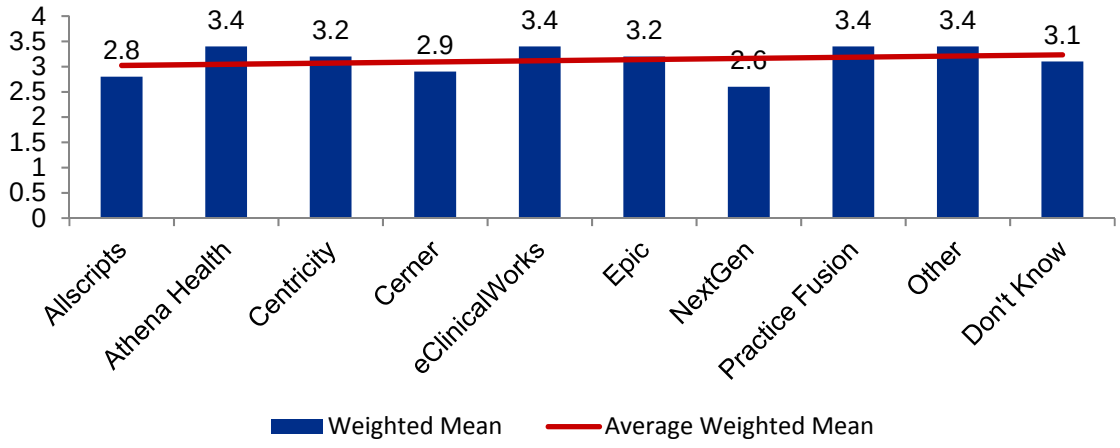
Table H - 15. Physician Productivity by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean**
Allscripts	82 15.3%	153 28.5%	151 28.2%	105 19.6%	44 8.2%	535 9.5%	2.8
Athena Health	19 8.2%	31 13.4%	69 29.8%	57 24.6%	55 23.8%	231 4.1%	3.4
Centricity	15 8.1%	28 15.1%	61 32.9%	61 32.9%	20 10.8%	185 3.3%	3.2
Cerner	281 15.5%	382 21.1%	575 31.8%	439 24.3%	126 6.9%	1,803 32.3%	2.9
eClinicalWorks	33 6.5%	77 15.2%	160 31.6%	138 27.3%	97 19.2%	505 9.0%	3.4
Epic	93 10.1%	150 16.4%	263 28.8%	258 28.2%	148 16.2%	912 16.3%	3.2
NextGen	99 20.3%	121 24.8%	156 32.0%	85 17.4%	25 5.1%	486 8.7%	2.6
Practice Fusion	12 7.5%	21 13.2%	47 29.5%	53 33.3%	26 16.3%	159 2.8%	3.4
Other	35 6.6%	68 12.9%	173 33.0%	153 29.1%	95 18.1%	524 9.4%	3.4
Don't Know	28 12.0%	32 13.7%	80 34.3%	65 27.8%	28 12.0%	233 4.1%	3.1
Top 10 Total	697 12.5%	1,063 19.0%	1,735 31.1%	1,414 25.3%	664 11.9%	5,573 100.0%	3.1

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 233 physicians answered 'Don't Know' for the Physician Productivity question. The weighted mean for those physicians is 3.14.

Figure H - 6. Weighted Mean Rank of Physician Productivity by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 16. Ranking of All EMRs by Staff Productivity, 2015-2017 (N = 6,864; WMR = 3.2)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	612	8.9%
2	1,190	17.3%
3	2,326	33.8%
4	1,899	27.6%
5 (Outstanding)	837	12.1%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

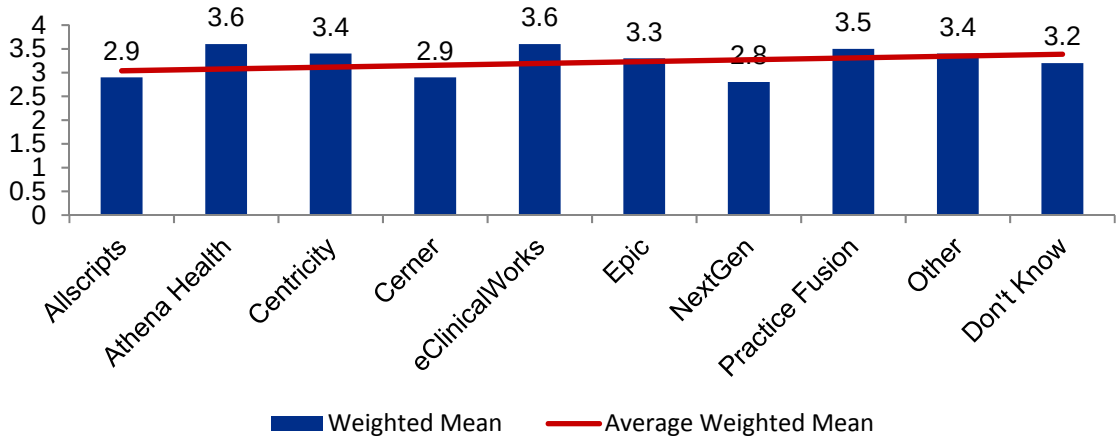
Table H - 17. Staff Productivity by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	50 9.3%	137 25.6%	180 33.6%	129 24.1%	39 7.2%	535 9.7%	2.9
Athena Health	14 6.0%	22 9.4%	68 29.3%	58 25.0%	70 30.1%	232 4.2%	3.6
Centricity	7 3.8%	23 12.5%	70 38.0%	64 34.7%	20 10.8%	184 3.3%	3.4
Cerner	233 13.1%	417 23.4%	611 34.4%	400 22.5%	115 6.4%	1,776 32.2%	2.9
eClinicalWorks	16 3.1%	41 8.1%	169 33.3%	175 34.5%	105 20.7%	506 9.1%	3.6
Epic	65 7.2%	151 16.8%	291 32.4%	264 29.4%	126 14.0%	897 16.2%	3.3
NextGen	65 13.5%	112 23.3%	180 37.5%	104 21.6%	19 3.9%	480 8.7%	2.8
Practice Fusion	6 3.8%	17 10.9%	47 30.3%	56 36.1%	29 18.7%	155 2.8%	3.5
Other	32 6.1%	66 12.7%	162 31.2%	163 31.4%	95 18.3%	518 9.3%	3.4
Don't Know	26 11.2%	27 11.6%	81 35.0%	70 30.3%	27 11.6%	231 4.1%	3.2
Top 10 Total	514 9.3%	1,013 18.3%	1,859 33.7%	1,483 26.8%	645 11.6%	5,514 100.0%	3.1

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 231 physicians answered 'Don't Know' for the Staff Productivity question. The weighted mean for those physicians is 3.19.

Figure H - 7. Weighted Mean Rank of Staff Productivity by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 18. Ranking of All EMRs by Reliability, 2015-2017 (N = 6,924; WMR = 3.6)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	274	3.9%
2	607	8.7%
3	1,952	28.1%
4	2,753	39.7%
5 (Outstanding)	1,338	19.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

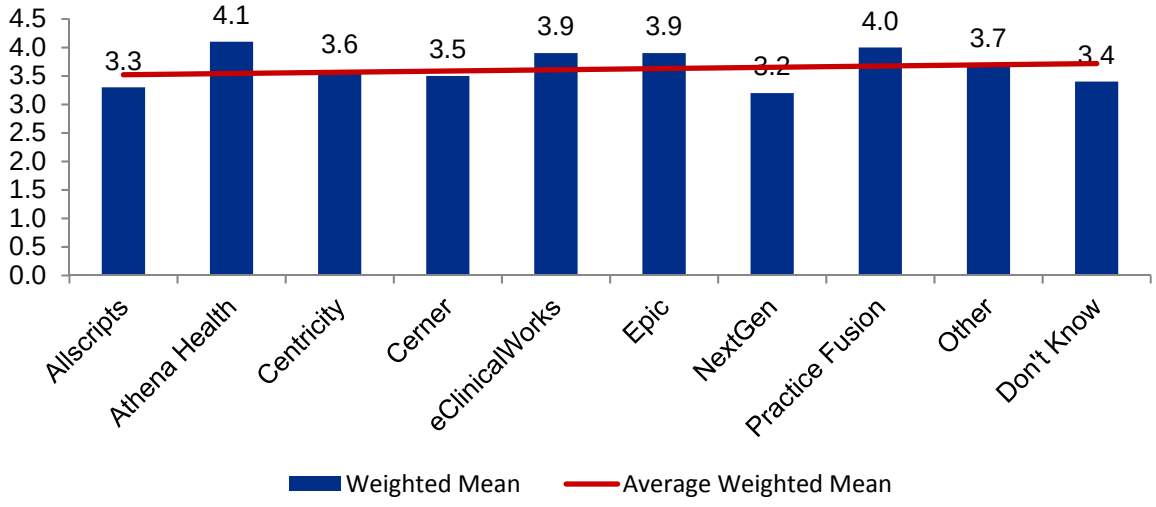
Table H - 19. Reliability by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	36 6.7%	78 14.6%	180 33.8%	179 33.7%	58 10.9%	531 9.5%	3.3
Athena Health	7 3.0%	4 1.7%	46 19.8%	78 33.6%	97 41.8%	232 4.1%	4.1
Centricity	4 2.1%	21 11.4%	46 25.1%	81 44.2%	31 16.9%	183 3.2%	3.6
Cerner	74 4.1%	185 10.2%	566 31.4%	742 41.2%	231 12.8%	1,798 32.3%	3.5
eClinicalWorks	5 0.9%	18 3.5%	118 23.3%	221 43.7%	143 28.3%	505 9.0%	3.9
Epic	14 1.5%	52 5.7%	203 22.3%	406 44.7%	233 25.6%	908 16.3%	3.9
NextGen	44 9.0%	65 13.4%	166 34.2%	159 32.8%	50 10.3%	484 8.7%	3.2
Practice Fusion	- -	6 3.7%	35 22.0%	73 45.9%	45 28.3%	159 2.8%	4.0
Other	21 4.0%	42 8.0%	126 24.2%	193 37.1%	138 26.5%	520 9.3%	3.7
Don't Know	11 4.7%	21 9.0%	91 39.2%	73 31.4%	36 15.5%	232 4.1%	3.4
Top 10 Total	216 3.8%	492 8.8%	1,577 28.4%	2,205 39.7%	1,062 19.1%	5,552 100.0%	3.6

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 232 physicians did not identify a brand name but answered the Reliability question. The weighted mean for those physicians is 3.44.

Figure H - 8. Weighted Mean Rank of Reliability by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 20. Ranking of All EMRs by Performance vs. Promise, 2015-2017 (N = 6,172; WMR = 3.3)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	515	8.3%
2	840	13.6%
3	2,149	34.8%
4	1,873	30.3%
5 (Outstanding)	795	12.8%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

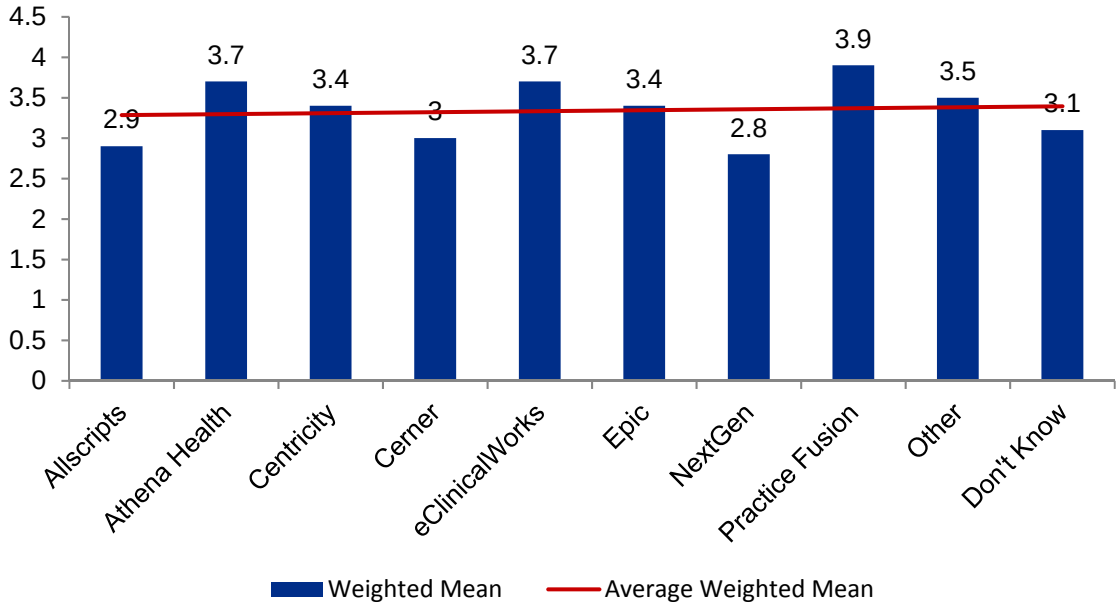
Table H - 21. Performance vs. Promise by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	61 12.6%	94 19.5%	189 39.2%	96 19.9%	41 8.5%	481 9.7%	2.9
Athena Health	13 5.9%	19 8.7%	55 25.2%	63 28.8%	68 31.1%	218 4.4%	3.7
Centricity	6 3.8%	18 11.6%	60 38.7%	56 36.1%	15 9.6%	155 3.1%	3.4
Cerner	172 11.1%	245 15.9%	606 39.4%	417 27.1%	97 6.3%	1,537 31.2%	3.0
eClinicalWorks	9 1.8%	28 5.7%	150 30.8%	205 42.1%	94 19.3%	486 9.8%	3.7
Epic	43 5.3%	93 11.6%	273 34.0%	269 33.5%	123 15.3%	801 16.2%	3.4
NextGen	69 15.8%	87 20.0%	168 38.7%	94 21.6%	16 3.6%	434 8.8%	2.8
Practice Fusion	3 1.9%	8 5.1%	32 20.7%	63 40.9%	48 31.1%	154 3.1%	3.9
Other	34 7.3%	54 11.6%	125 27.0%	157 33.9%	92 19.9%	462 9.3%	3.5
Don't Know	18 9.5%	20 10.5%	87 46.0%	49 25.9%	15 7.9%	189 3.8%	3.1
Top 10 Total	428 8.7%	666 13.5%	1,745 35.4%	1,469 29.8%	609 12.3%	4,917 100.0%	3.2

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 189 physicians did not identify a brand name but answered the Performance vs Promise question. The weighted mean for those physicians is 3.12.

Figure H - 9. Weighted Mean Rank of Performance vs. Promise by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 22. Summary of All EMR Ranking Criterion, 2015-2017

Criterion	*Weighted Mean*	*Number of Physicians*
Ease of Use	3.4	6,960
Effect on Physician Productivity	3.1	6,947
Effect on Staff Productivity	3.2	6,864
Reliability	3.6	6,924
Performance vs. Promise	3.3	6,172

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Installation/Replacement of EMRs by AHCCCS Physicians

Table H - 23. Plans to Install EMRs by Vendor for Non-EMR Users, 2015-2017 (N = 217)

Vendor	*Number of Physicians*	*Percent*
Advanced MD	14	6.2%
Allscripts	18	8.0%
Alta Point	1	0.4%
Amazing Charts	11	4.8%
Athena Health	3	1.3%
Cerner	22	9.7%
Chart Logic	3	1.3%
eClinicalWorks	14	6.2%
e-MDs	3	1.3%
Epic	16	7.1%
Greenway Medical	5	2.2%
MacPractice	3	1.3%
McKesson	6	2.6%
Meditech	3	1.3%
NextGen	9	4.0%
Office Ally	3	1.3%
Office Practicum	1	0.4%
Practice Fusion	14	6.2%
Don't Know	68	30.2%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Physicians practicing in government settings are excluded from these results. Selection of EMR systems are not mutually exclusive.

Table H - 24. Plans to Install EMRs by Vendor for EMR Users, 2015-2017 (N = 920)

Vendor	*Number of Physicians*	*Percent*
Advanced MD	3	0.2%
ALERT	1	0.0%
Allscripts	40	3.7%
Amazing Charts	4	0.3%
Aprima	4	0.3%
Athena Health	19	1.7%
Avatar	2	0.1%
Care Tracker	2	0.1%
Cerner	255	23.6%
Chart Logic	1	0.0%
ClaimTrak	1	0.0%
eClinicalWorks	35	3.2%
e-MDs	13	1.2%
Epic	243	22.5%
GMed	2	0.1%
Greenway Medical	6	0.5%
MacPractice	1	0.0%
McKesson	19	1.7%
Meditech	17	1.5%
MedHost	2	0.1%
NextGen	50	4.6%
Office Ally	2	0.1%
Office Practicum	2	0.1%
PICIS	2	0.1%
Practice Fusion	15	1.3%
Sage	1	0.0%
Sunrise	3	0.2%
Don't Know	175	16.2%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Physicians practicing in government settings are excluded from these results. Selection of EMR systems are not mutually exclusive.

Table H - 25. Duration of EMR System Use and Whether a Replacement, 2015-2017 (N = 6,093)

Duration of EMR use	*Replacement for Different Brand of EMR*						*Total (Includes don't know responses)*	
	Yes		*No*		*Total*			
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
<1 Year	138	8.3%	98	3.0%	236	4.8%	287	4.7%
1-3 Years	859	51.9%	1,092	33.8%	1,951	39.9%	2,421	39.7%
4-6 Years	355	21.4%	972	30.1%	1,327	27.1%	1,647	27.0%
7-9 Years	117	7.0%	569	17.6%	686	14.0%	856	14.0%
10 Years or More	186	11.2%	493	15.2%	679	13.9%	882	14.4%
Total	1,655	100.0%	3,224	100.0%	4,879	100.0%	6,093	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 26. Effect of EMR Replacement on AHCCCS Physician Productivity Ranking, 2015-2017 (N = 6,099)

Physician Productivity Ranking	*Replacement for Different Brand of EMR*						*Total*	
	Yes		*No*		*Don't Know*			
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
1 (Awful)	249	34.0%	355	48.5%	127	17.3%	731	11.9%
2	333	29.7%	581	51.9%	205	18.3%	1,119	18.3%
3	530	27.3%	1,025	52.8%	386	19.8%	1,941	31.8%
4	357	23.1%	843	54.5%	345	22.3%	1,545	25.3%
5 (Outstanding)	197	25.8%	407	53.3%	159	20.8%	763	12.5%
Total	1,666	27.3%	3,211	52.6%	1,222	20.0%	6,099	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 27. Duration of EMR Use Effects on AHCCCS Physician Productivity Ranking, 2015-2017 (6,531)

Duration of EMR Use	*Physician Productivity Ranking*										*Total*	
	1 (Awful)		*2*		*3*		*4*		*5 (Outstanding)*			
<1 Year	34	11.1%	64	20.9%	106	34.6%	69	22.5%	33	10.7%	306	4.6%
1-3 Years	371	14.2%	514	19.7%	819	31.4%	625	24.0%	273	10.4%	2,602	39.8%
4-6 Years	201	11.5%	308	17.6%	569	32.5%	442	25.3%	226	12.9%	1,746	26.7%
7-9 Years	91	10.0%	135	14.8%	263	28.9%	287	31.6%	132	14.5%	908	13.9%
10 Years or More	87	8.9%	173	17.8%	309	31.8%	245	25.2%	155	15.9%	969	14.8%
Total	784	12.0%	1,194	18.2%	2,066	31.6%	1,668	25.5%	819	12.5%	6,531	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 28. Uses of Information from Claims Data, 2015-2017 (N = 719)

Uses	*Number of Physicians*	*Percent*
Population Health Management	145	10.9%
Tracking Contagious Diseases	62	4.6%
Outreach to Patients	111	8.3%
Evaluate Appropriate Metrics	192	14.4%
Analyzing Costs	182	13.7%
Post Market Analysis	27	2.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table H - 29. Uses of Information from EMRs, 2015-2017 (N = 1,165)

Uses	*Number of Physicians*	*Percent*
Population Health Management	194	14.6%
Tracking Contagious Diseases	114	8.6%
Outreach to Patients	211	15.9%
Evaluate Appropriate Metrics	397	29.9%
Analyzing Costs	208	15.6%
Post Market Analysis	41	3.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

The Target Population of AHCCCS Physicians

Table H - 30. The Target Population of Physicians without EMRs by County, 2015-2017 (N = 7,800)

Location	*All Survey Respondents (N)*	*Survey Respondents EMR Users (N)*	*Survey Respondents Non-EMR Users (N)*	*Projected Target Population (W*N)*
Apache	19	11	8	9
Cochise	72	65	7	8
Coconino	186	162	24	26
Gila	34	31	3	3
Graham	23	23	-	0
Greenlee	-	-	-	-
La Paz	10	8	2	2
Maricopa	5,089	4,596	493	542
Mohave	193	165	28	31
Navajo	68	61	7	8
Pima	1,290	1,151	139	153
Pinal	113	104	9	10
Santa Cruz	14	10	4	4
Yavapai	196	183	13	14
Yuma	150	139	11	12
Missing	217	192	25	28
Unknown	126	117	9	10
Total	7,800	7,018	782	860

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Table does not include physicians practicing in government settings.

The target population is calculated as the number of non-EMR users multiplied by the population weight.

Appendix I: Non-AHCCCS Physician Results

Non-AHCCCS Physician Characteristics

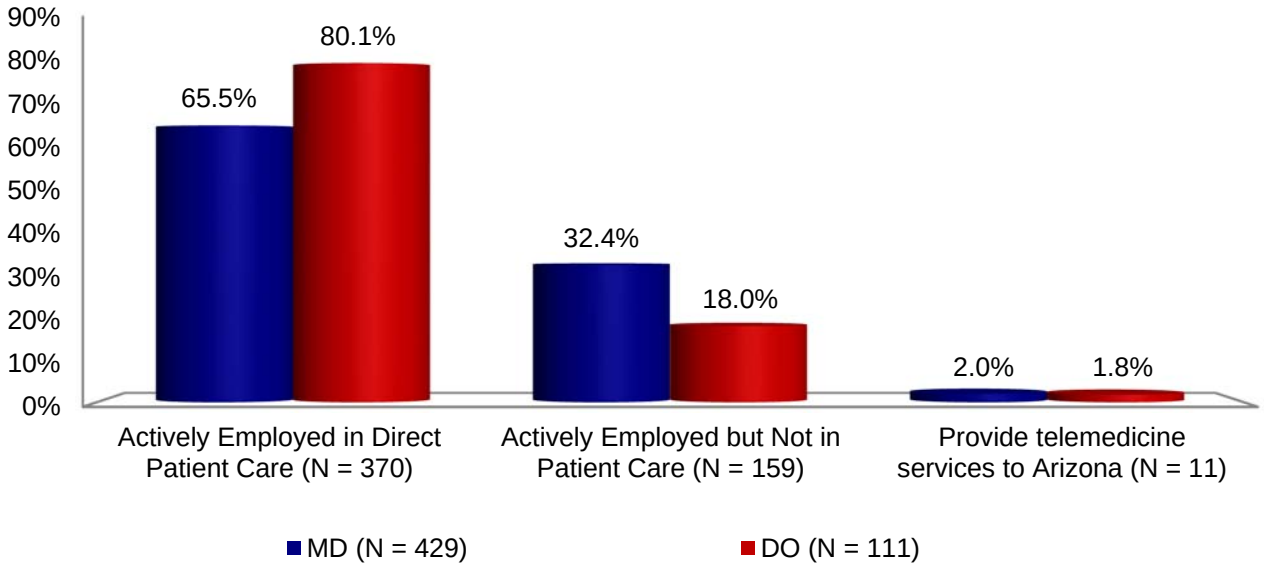
Table I - 1. Comparison of Respondents to Non-Respondents, 2015-2017

Characteristic	*Respondents (N = 698)*		*Non-Respondents (N = 596)*		*P-Value*
Sex					
Female	231	33.0%	210	35.2%	NS
Male	456	65.3%	374	62.7%	NS
Total	687	98.4%	584	97.9%	
Age Group					
25 - 34	89	12.7%	197	33.0%	<0.01
35 - 44	127	18.1%	111	18.6%	NS
45 - 54	139	19.9%	79	13.2%	<0.01
55 - 64	146	20.9%	80	13.4%	<0.01
65+	105	15.0%	71	11.9%	NS
Total	606	86.8%	538	90.2%	
Specialty					
Primary Care	235	33.6%	183	30.7%	<0.01
Medical	180	25.7%	132	22.1%	NS
Hospital-Based	173	24.7%	152	25.5%	NS
Pediatric	27	3.8%	39	6.5%	<0.01
Surgical	77	11.0%	82	13.7%	<0.01
Total	692	99.1%	588	98.6%	
Location					
Maricopa County	430	61.6%	389	65.2%	<0.01
Pima County	114	16.3%	115	19.2%	NS
All Other Counties	154	22.0%	92	15.4%	<0.01
Total	698	100.0%	596	100.0%	

Source: AMB, ABOE Administrative/Survey Data, April 2015-March 2017.

Note: Data include retired and semi-retired physicians. A p-value of .05 or less implies only a 5% probability of declaring the relationship significant when in fact it is not. NS = no significant difference. Gender was unknown for 11 (1.5%) respondents and 12 (2.0%) non-respondents. Age was unknown for 92 (13.1%) respondents and 57 (9.5%) non-respondents. Specialty was unknown for 6 (0.8%) respondents and 8 (1.3%) non-respondents.

Figure I - 1. Non-AHCCCS Physicians Providing Patient Care, 2015-2017 (N = 540)



Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: Employment status was unknown for 158 of physicians.

Practice Settings

Table I - 2. Type of Practice by Physician Type, 2015-2017 (N = 256)

Type of Practice	*Number of Physicians*	*Percent*
Physician Owned Solo Practice	32	12.5%
Physician Owned Group Practice	41	16.0%
Hospital/Medical School Group Practice	15	5.8%
Community or Rural Health Center	3	1.1%
Federal Government Hospital or Clinic	49	19.1%
Private Hospital System	11	4.2%
Non-Hospital Private Outpatient Facility	12	4.6%
Medical School/University Research Center	19	7.4%
Health Insurer/Health Related Organization that does not provide care	43	16.7%
City, State or County Clinic or Hospital System	9	3.5%
Other	22	8.5%
Hospice or SNF	-	0.0%
Independent Contractor	1	0.3%
Medical Consultant	7	2.7%
Mental/Behavioral Health	-	0.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 442 physicians did not report type of practice (missing). Percentages are based on responses. The five practice types listed under the "Other" section are a subset of the total types included in the Other category.

Table I - 3. Type of Practice by Number of MDs, 2015-2017 (N = 45)

Type of Practice	*Number of Physicians*				*Total*
	2-5	*6-50*	*51-94*	*95+*	
Physician Owned Group Practice	17 58.6%	7 24.1%	2 6.8%	3 10.3%	29 64.4%
Hospital/Medical School Group Practice	1 10.0%	4 40.0%	1 10.0%	4 40.0%	10 22.2%
Community or Rural Health Center	-	-	-	-	-
Non-Hospital Private Outpatient Facility	1 16.6%	2 33.3%	-	3 50.0%	6 13.3%
Total	19 42.2%	13 28.8%	3 6.6%	10 22.2%	45 100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 335 MD's did not report practice type, and 345 MD's did not report the number of physicians in their practice for the above practice types.

Table I - 4. Type of Practice by Number of DOs, 2015-2017 (N = 15)

Type of Practice	*Number of Physicians*				*Total*
	2-5	*6-50*	*51-94*	*95+*	
Physician Owned Group Practice	4 44.4%	4 44.4%	-	1 11.1%	9 60.0%
Hospital/Medical School Group Practice	-	-	-	4 100.0%	4 26.7%
Community or Rural Health Center	1 50.0%	1 50.0%	-	-	2 13.3%
Non-Hospital Private Outpatient Facility	-	-	-	-	0 0.0%
Total	5 33.3%	5 33.3%	-	5 33.3%	15 100.0%

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: 107 DO's did not report practice type, and 113 DO's did not report the number of physicians in their practice for the above practice types.

Characteristics of Non-AHCCCS EMR Users

Table I - 5. EMR Utilization by Type of Practice, 2015-2017 (N = 174)

Type of Practice	*Utilization Rates*
Physician Owned Solo Practice	54.8%
Physician Owned Group Practice	87.8%
Hospital/Medical School Group Practice	100.0%
Community or Rural Health Center	33.3%
Federal Government Hospital or Clinic	95.5%
Private Hospital System	100.0%
Non-Hospital Private Outpatient Facility	81.8%
Medical School/University Research Center	80.0%
Health Insurer/Health Related Organization that does not provide care	56.0%
City, State or County Clinic or Hospital System	88.8%
Other	64.7%
Hospice or SNF	-
Independent Contractor	100.0%
Medical Consultant	75.0%
Mental/Behavioral Health	-

Source: AMB, ABOE Survey Data, April 2015-March 2017.

Note: Rates = % of physicians within each practice type. 442 respondents were missing type of practice. 243 respondents were missing EMR utilization.

The Utilization of Electronic Medical Records by Non-AHCCCS Physicians

Table I - 6. Methods of Storing Medical Records, 2015-2017 (N = 444)

Method	*Number*	*Percent*
Paper Files Only	32	7.2%
EMR Only	75	16.8%
Scanned Images Only	9	2.0%
Paper + Scanned Images Only	26	5.8%
EMR + Paper Only	7	1.5%
EMR + Scanned Images Only	173	38.9%
Paper + Scanned Images + EMR	122	27.4%
EMR alone or in combination*	377	84.9%

Source: AMB, ABOE Survey data, April 2015-March 2017.

Note: 254 respondents did not identify a method of storing medical records (missing). *Data on "EMR alone or in combination" is not mutually exclusive from other categories.

Table I - 7. Physicians Who Used a Scribe for Data Entry, 2015-2017 (N = 28)

Storage Method	*Number of Physicians*	*Percent*
EMR Only	11	17.7%
EMR + Paper Only	2	3.3%
EMR + Scanned Images Only	1	14.2%
Paper + Scanned Images + EMR	14	10.5%

Source: AMB, ABOE Survey data, April 2015-March 2017.

Utilization of EMR Functions by Non-AHCCCS Physicians

Table I - 8. Utilization of Available EMR Functions, 2015-2017*

EMR Functions	*Included in EMR*	*Used by the Respondent Number/Percent*		*Exchanged with Other Providers Number/Percent*	
Patient Care Summary	181	149	88.4%	98	59.3%
Prescription "e-prescribing"	183	152	82.3%	106	54.1%
Lab Results	189	167	79.3%	112	57.3%
Reminders for Interventions	104	81	83.1%	53	57.9%
Public Health Reports	82	65	77.9%	47	51.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: *The data in this table effectively treat *"Don't Know"* answers as *"No"* since the questions ask for the respondent's experience, not for the practices of other physicians in the same organization.

The data in this table only include those physicians that answered *"Yes"* to the Include question for each EMR function. Furthermore, the data only includes those that answered both the Used and Exchanged questions for each EMR functions; if either question was left blank the physician was excluded from the table for that function.

Table I - 9. Most Important Obstacles to Exchanging Clinical Information, 2015-2017 (N = 511)

Obstacles to Exchange Information	*Number of Physicians*	*Percent*
Lack of Information	162	48.5%
Patient Confidentiality	136	40.7%
Lack of Technology	140	41.9%
Cost	73	21.8%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Utilization of EMRs by Vendor

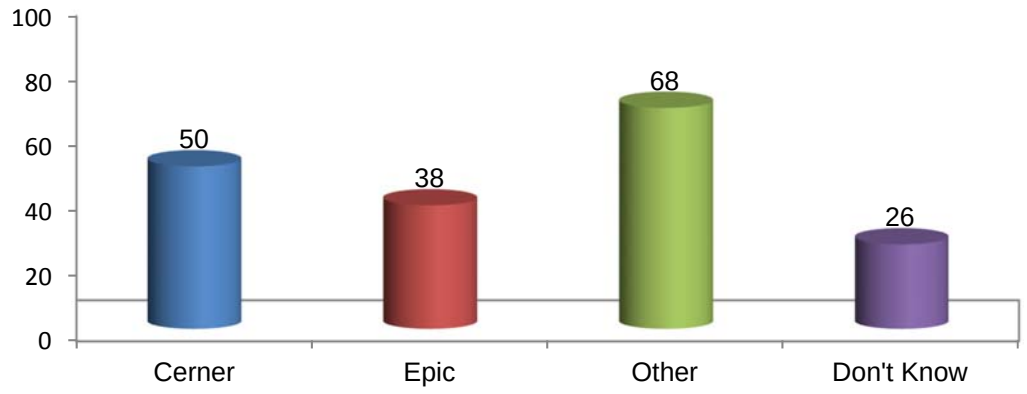
Table I - 10. EMR Users Unaware of EMR Vendor Name by Type of Practice, 2015-2017 (N = 12)

Type of Practice	*Number of Physicians*	*Percent*
Physician Owned Solo Practice	2	16.6%
Physician Owned Group Practice	1	8.3%
Hospital/Medical School Group Practice	-	-
Community or Rural Health Center	-	-
Private Hospital System	-	-
Non-Hospital Private Outpatient Facility	2	16.6%
Medical School/University Research Center	2	16.6%
Health Insurer/Health Related Organization that does not provide care	-	-
City, State or County Clinic or Hospital System	3	25.0%
Other	1	8.3%
Hospice or SNF	1	8.3%
Independent Contractor	-	-
Medical Consultant	1	8.3%
Mental/Behavioral Health	-	-

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: N represents the number of physicians who answered "Don't Know" for this survey question. Governmental hospitals or clinics are excluded. There were 14 physicians that didn't respond to practice type.

Figure I - 2. Number of EMR Users by Vendor 25-130 Users, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: The "Other" vendor includes all vendors contracted with government hospitals/clinics. There were no EMR vendors with users >130 for Non-AHCCCS physicians.

Non-AHCCCS Physicians' Evaluation of EMR Software

Table I - 11. Ranking of All EMRs by Ease of Use, 2015-2017 (N = 308; WMR = 3.4)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	17	5.5%
2	27	8.7%
3	111	36.0%
4	107	34.7%
5 (Outstanding)	46	14.9%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

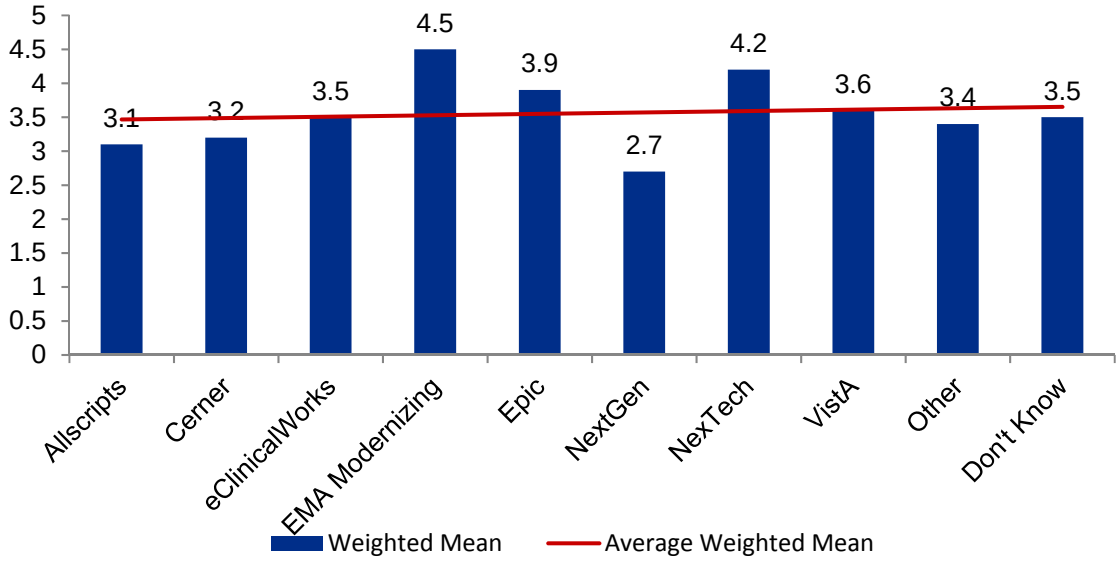
Table I - 12. Ease of Use by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	2 11.7%	1 5.8%	10 58.8%	2 11.7%	2 11.7%	17 7.0%	3.1
Cerner	1 2.0%	9 18.3%	23 46.9%	13 26.5%	3 6.1%	49 20.3%	3.2
eClinicalWorks	1 5.2%	1 5.2%	6 31.5%	10 52.6%	1 5.2%	19 7.8%	3.5
EMA Modernizing	- -	- -	1 12.5%	2 25.0%	5 62.5%	8 3.3%	4.5
Epic	1 3.1%	- -	6 18.7%	20 62.5%	5 15.6%	32 13.2%	3.9
NextGen	3 21.4%	4 28.5%	3 21.4%	2 14.2%	2 14.2%	14 5.8%	2.7
NexTech	- -	- -	2 33.3%	1 16.6%	3 50.0%	6 2.4%	4.2
VistA	1 6.6%	- -	6 40.0%	5 33.3%	3 20.0%	15 6.2%	3.6
Other	5 8.0%	4 6.4%	22 35.4%	21 33.8%	10 16.1%	62 25.7%	3.4
Don't Know	- -	2 10.5%	10 52.6%	3 15.7%	4 21.0%	19 7.8%	3.5
Top 10 Total	14 5.8%	21 8.7%	89 36.9%	79 32.7%	38 15.7%	241 100.0%	3.4

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 19 physicians answered 'Don't Know' for the Ease of Use question. The weighted mean for those physicians is 3.47.

Figure I - 3. Weighted Mean Rank of Ease of Use by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 13. Ranking of All EMRs by Physician Productivity, 2015-2017 (N = 308; WMR = 3.2)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	30	9.7%
2	43	13.9%
3	117	37.9%
4	80	25.9%
5 (Outstanding)	38	12.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

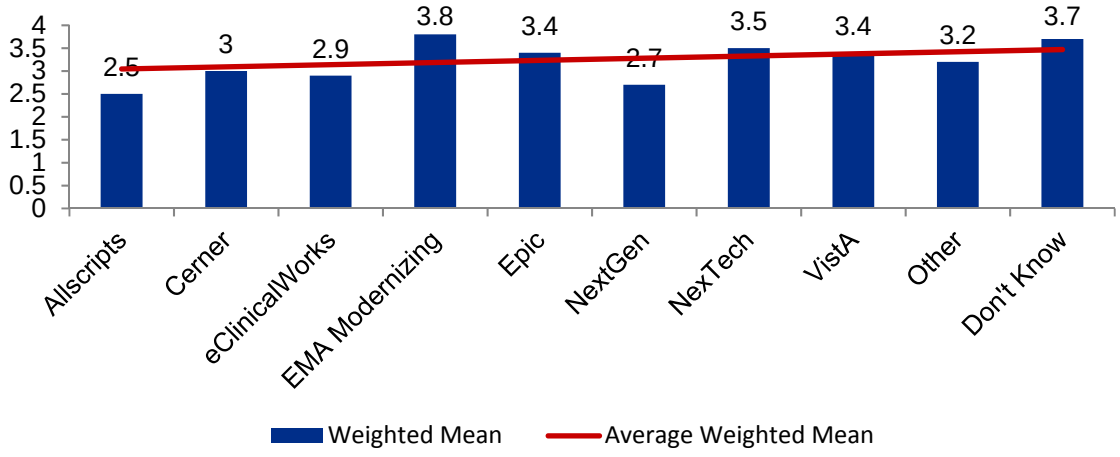
Table I - 14. Physician Productivity by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	4 23.5%	4 23.5%	6 35.2%	3 17.6%	- -	17 7.0%	2.5
Cerner	4 8.1%	11 22.4%	19 38.7%	13 26.5%	2 4.0%	49 20.3%	3.0
eClinicalWorks	3 15.7%	3 15.7%	6 31.5%	6 31.5%	1 5.2%	19 7.8%	2.9
EMA Modernizing	- -	2 25.0%	1 12.5%	2 25.0%	3 37.5%	8 3.3%	3.8
Epic	1 3.1%	1 3.1%	16 50.0%	11 34.3%	3 9.3%	32 13.2%	3.4
NextGen	2 14.2%	4 28.5%	5 35.7%	2 14.2%	1 7.1%	14 5.8%	2.7
NexTech	1 16.6%	1 16.6%	1 16.6%	- -	3 50.0%	6 2.4%	3.5
VistA	1 6.6%	2 13.3%	3 20.0%	8 53.3%	1 6.6%	15 6.2%	3.4
Other	7 11.2%	8 12.9%	22 35.4%	14 22.5%	11 17.7%	62 25.7%	3.2
Don't Know	1 5.2%	- -	8 42.1%	5 26.3%	5 26.3%	19 7.8%	3.7
Top 10 Total	24 9.9%	36 14.9%	87 36.0%	64 26.5%	30 12.4%	241 100.0%	3.2

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 19 physicians answered 'Don't Know' for the Physician Productivity question. The weighted mean for those physicians is 3.68.

Figure I - 4. Weighted Mean Rank of Physician Productivity by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 15. Ranking of All EMRs by Staff Productivity, 2015-2017 (N = 302; WMR = 3.2)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	26	8.6%
2	40	13.2%
3	109	36.0%
4	89	29.4%
5 (Outstanding)	38	12.5%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

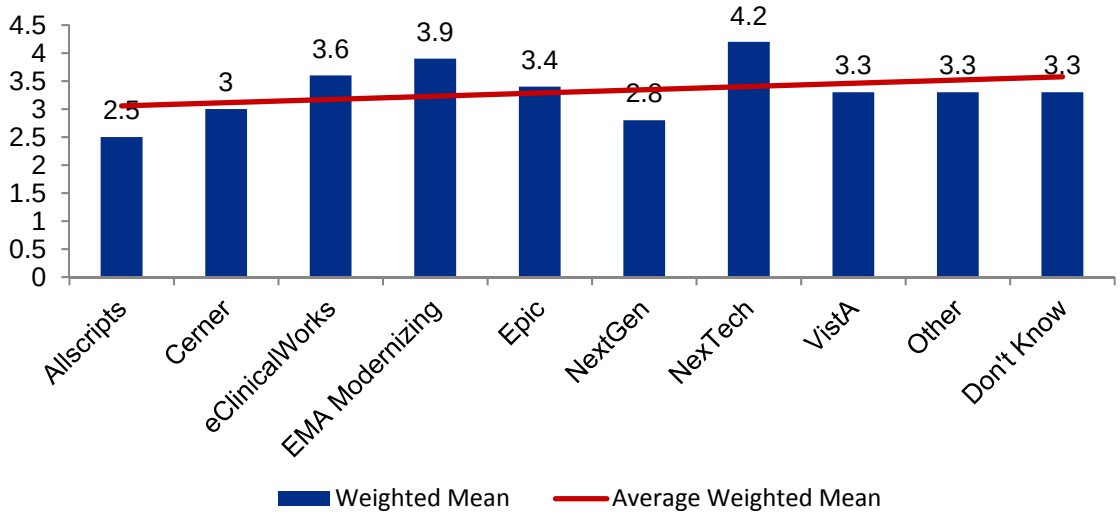
Table I - 16. Staff Productivity by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	4 23.5%	4 23.5%	6 35.2%	3 17.6%	- -	17 7.1%	2.5
Cerner	4 8.1%	10 20.4%	22 44.8%	10 20.4%	3 6.1%	49 20.6%	3.0
eClinicalWorks	- -	1 5.5%	6 33.3%	10 55.5%	1 5.5%	18 7.5%	3.6
EMA Modernizing	- -	2 25.0%	- -	3 37.5%	3 37.5%	8 3.3%	3.9
Epic	1 3.2%	1 3.2%	16 51.6%	10 32.2%	3 9.6%	31 13.0%	3.4
NextGen	2 14.2%	4 28.5%	4 28.5%	3 21.4%	1 7.1%	14 5.9%	2.8
NexTech	- -	- -	2 33.3%	1 16.6%	3 50.0%	6 2.5%	4.2
VistA	2 13.3%	- -	5 33.3%	8 53.3%	- -	15 6.3%	3.3
Other	9 14.7%	5 8.1%	18 29.5%	19 31.1%	10 16.3%	61 25.7%	3.3
Don't Know	1 5.5%	3 16.6%	7 38.8%	3 16.6%	4 22.2%	18 7.5%	3.3
Top 10 Total	23 9.7%	30 12.6%	86 36.2%	70 29.5%	28 11.8%	237 100.0%	3.2

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 18 physicians answered 'Don't Know' for the Staff Productivity question. The weighted mean for those physicians is 3.33.

Figure I - 5. Weighted Mean Rank of Staff Productivity by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 17. Ranking of All EMRs by Reliability, 2015-2017 (N = 307; WMR = 3.7)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	10	3.2%
2	24	7.8%
3	82	26.7%
4	134	43.6%
5 (Outstanding)	57	18.5%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

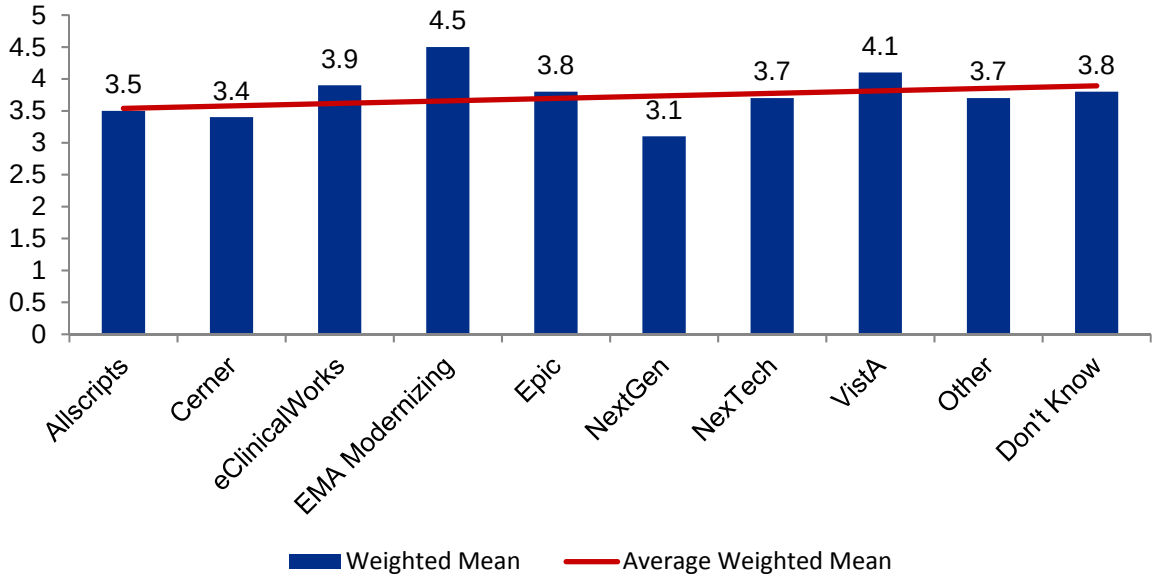
Table I - 18. Reliability by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	- -	- -	10 58.8%	6 35.2%	1 5.8%	17 7.0%	3.5
Cerner	1 2.0%	5 10.4%	20 41.6%	16 33.3%	6 12.5%	48 20.0%	3.4
eClinicalWorks	- -	- -	5 26.3%	11 57.8%	3 15.7%	19 7.9%	3.9
EMA Modernizing	- -	- -	- -	4 50.0%	4 50.0%	8 3.3%	4.5
Epic	- -	2 6.2%	8 25.0%	17 53.1%	5 15.6%	32 13.3%	3.8
NextGen	- -	5 35.7%	4 28.5%	3 21.4%	2 14.2%	14 5.8%	3.1
NexTech	- -	1 16.6%	- -	5 83.3%	- -	6 2.5%	3.7
VistA	1 6.6%	- -	- -	10 66.6%	4 26.6%	15 6.2%	4.1
Other	2 3.2%	6 9.6%	15 24.1%	24 38.7%	15 24.1%	62 25.8%	3.7
Don't Know	1 5.2%	1 5.2%	4 21.0%	7 36.8%	6 31.5%	19 7.9%	3.8
Top 10 Total	5 2.0%	20 8.3%	66 27.5%	103 42.9%	46 19.1%	240 100.0%	3.7

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 19 physicians did not identify a brand name but answered the Reliability question. The weighted mean for those physicians is 3.84.

Figure I - 6. Weighted Mean Rank of Reliability by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 19. Ranking of All EMRs by Performance vs. Promise, 2015-2017 (N = 255; WMR = 3.4)

Ranking	*Number of Physicians*	*Percent*
1 (Awful)	13	5.0%
2	31	12.1%
3	98	38.4%
4	79	30.9%
5 (Outstanding)	34	13.3%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: WMR is Weighted Mean Rank.

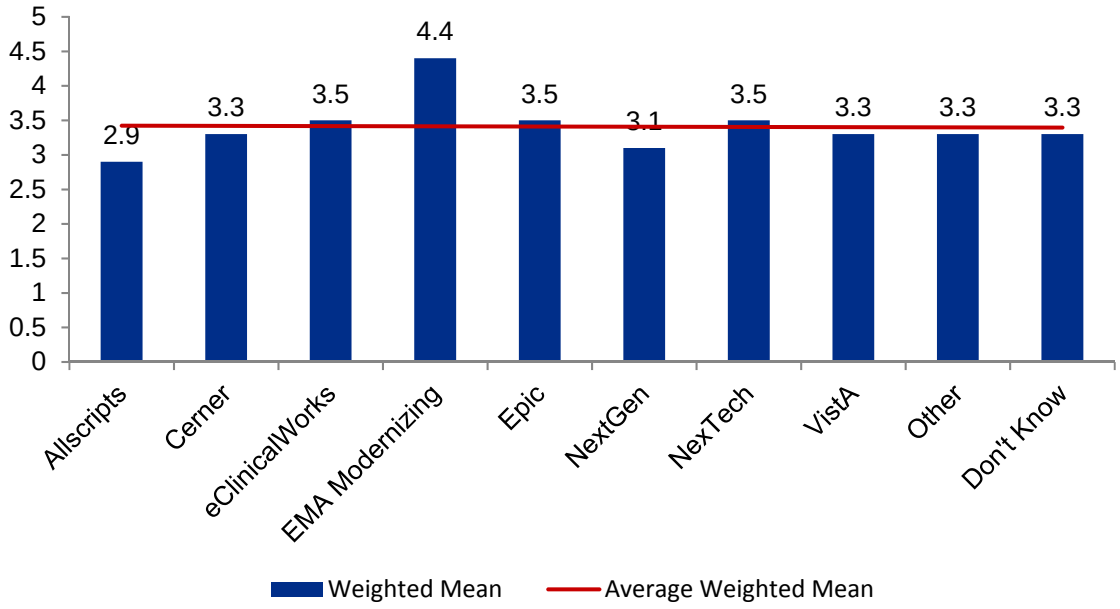
Table I - 20. Performance vs. Promise by Top 10 Vendors, 2015-2017

Vendor	*1 Awful*	*2*	*3*	*4*	*5 Outstanding*	*Total*	*Weighted Mean*
Allscripts	2 12.5%	1 6.2%	10 62.5%	3 18.7%	- -	16 8.0%	2.9
Cerner	1 2.7%	6 16.2%	15 40.5%	10 27.0%	5 13.5%	37 18.5%	3.3
eClinicalWorks	- -	2 12.5%	6 37.5%	6 37.5%	2 12.5%	16 8.0%	3.5
EMA Modernizing	- -	- -	1 12.5%	3 37.5%	4 50.0%	8 4.0%	4.4
Epic	- -	2 8.3%	11 45.8%	9 37.5%	2 8.3%	24 12.0%	3.5
NextGen	1 8.3%	3 25.0%	4 33.3%	2 16.6%	2 16.6%	12 6.0%	3.1
NexTech	- -	1 16.6%	2 33.3%	2 33.3%	1 16.6%	6 3.0%	3.5
VistA	1 10.0%	- -	5 50.0%	3 30.0%	1 10.0%	10 5.0%	3.3
Other	5 9.0%	6 10.9%	20 36.3%	17 30.9%	7 12.7%	55 27.6%	3.3
Don't Know	1 6.6%	2 13.3%	6 40.0%	3 20.0%	3 20.0%	15 7.5%	3.3
Top 10 Total	11 5.5%	23 11.5%	80 40.2%	58 29.1%	27 13.5%	199 100.0%	3.3

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: 15 physicians did not identify a brand name but answered the Performance vs Promise question. The weighted mean for those physicians is 3.33.

Figure I - 7. Weighted Mean Rank of Performance vs. Promise by Top 10 Vendors, 2015-2017



Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 21. Summary of All EMR Ranking Criterion, 2015-2017

Criterion	*Weighted Mean*	*Number of Physicians*
Ease of Use	3.4	308
Effect on Physician Productivity	3.2	308
Effect on Staff Productivity	3.2	302
Reliability	3.7	307
Performance vs. Promise	3.4	255

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Installation/Replacement of EMRs by Non-AHCCCS Physicians

Table I - 22. Plans to Install EMRs by Vendor for Non-EMR Users, 2015-2017 (N = 11)

Vendor	*Number of Physicians*	*Percent*
Allscripts	3	17.6%
Epic	1	5.8%
Don't Know	7	41.1%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Physicians practicing in government settings are excluded from these results. Selection of EMR systems are not mutually exclusive.

Table I - 23. Plans to Install EMRs by Vendor for EMR Users, 2015-2017 (N = 45)

Vendor	*Number of Physicians*	*Percent*
ALERT	2	3.6%
Allscripts	10	18.1%
Cerner	17	30.9%
Epic	2	3.6%
NextGen	2	3.6%
Practice Fusion	12	21.8%
Don't Know	2	3.6%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Physicians practicing in government settings are excluded from these results. Selection of EMR systems are not mutually exclusive.

Table I - 24. Duration of EMR System Use and Whether a Replacement, 2015-2017 (N = 270)

Duration of EMR use	*Replacement for Different Brand of EMR*						*Total (includes don't know responses)*	
	Yes		*No*		*Total*			
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
<1 Year	2	4.2%	5	3.6%	7	3.8%	10	3.7%
1-3 Years	21	44.6%	61	44.8%	82	44.8%	124	45.9%
4-6 Years	12	25.5%	27	19.8%	39	21.3%	52	19.2%
7-9 Years	6	12.7%	17	12.5%	23	12.5%	36	13.3%
10 Years or More	6	12.7%	26	19.1%	32	17.4%	48	17.7%
Total	47	100.0%	136	100.0%	183	100.0%	270	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 25. Effect of EMR Replacement on Non-AHCCCS Physician Productivity Ranking, 2015-2017 (N = 266)

Physician Productivity Ranking	*Replacement for Different Brand of EMR*						*Total*	
	Yes		*No*		*Don't Know*			
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
1 (Awful)	6	20.6%	11	37.9%	12	41.3%	29	10.9%
2	4	12.1%	19	57.5%	10	30.3%	33	12.4%
3	13	13.0%	48	48.0%	39	39.0%	100	37.5%
4	17	23.9%	38	53.5%	16	22.5%	71	26.6%
5 (Outstanding)	4	12.1%	19	57.5%	10	30.3%	33	12.4%
Total	44	100.0%	135	100.0%	87	100.0%	266	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 26. Duration of EMR Use Effects on Non-AHCCCS Physician Productivity Ranking, 2015-2017 (N = 281)

Duration of EMR Use	*Physician Productivity Ranking*										*Total*	
	1 (Awful)		*2*		*3*		*4*		*5 (Outstanding)*			
<1 Year	-	-	-	-	5	50.0%	4	40.0%	1	10.0%	10	3.5%
1-3 Years	10	7.6%	16	12.3%	55	42.3%	35	26.9%	14	10.7%	130	46.2%
4-6 Years	7	12.2%	11	19.2%	19	33.3%	14	24.5%	6	10.5%	57	20.2%
7-9 Years	8	21.6%	4	10.8%	11	29.7%	9	24.3%	5	13.5%	37	13.1%
10 Years or More	4	8.5%	6	12.7%	17	36.1%	12	25.5%	8	17.0%	47	16.7%
Total	29	100.0%	37	100.0%	107	100.0%	74	100.0%	34	100.0%	281	100.0%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 27. Uses of Information from Claims Data, 2015-2017 (N = 37)

Uses	*Number of Physicians*	*Percent*
Population Health Management	7	9.4%
Tracking Contagious Diseases	3	4.0%
Outreach to Patients	4	5.4%
Evaluate Appropriate Metrics	9	12.1%
Analyzing Costs	10	13.5%
Post Market Analysis	4	5.4%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Table I - 28. Uses of Information from EMRs, 2015-2017 (N = 58)

Uses	*Number of Physicians*	*Percent*
Population Health Management	9	12.1%
Tracking Contagious Diseases	8	10.8%
Outreach to Patients	10	13.5%
Evaluate Appropriate Metrics	17	22.9%
Analyzing Costs	12	16.2%
Post Market Analysis	2	2.7%

Source: AMB, ABOE Survey Data, April 2015–March 2017.

The Target Population of Non-AHCCCS Physicians

Table I - 29. The Target Population of Physicians without EMRs by County, 2015-2017 (N = 410)

Location	*All Survey Respondents (N)*	*Survey Respondents EMR Users (N)*	*Survey Respondents Non-EMR Users (N)*	*Target Population (W*N)*
Apache	2	2	-	0
Cochise	3	3	-	0
Coconino	10	1	9	10
Gila	1	1	-	0
Graham	-	-	-	-
Greenlee	-	-	-	-
La Paz	-	-	-	-
Maricopa	241	198	43	47
Mohave	11	10	1	1
Navajo	1	1	-	0
Pima	69	60	9	10
Pinal	3	3	-	0
Santa Cruz	1	1	-	0
Yavapai	6	4	2	2
Yuma	4	4	-	0
Missing	20	15	5	6
Unknown	38	31	7	8
Total	410	334	76	84

Source: AMB, ABOE Survey Data, April 2015–March 2017.

Note: Table does not include physicians practicing in government settings.

The target population is calculated as the number of non-EMR users multiplied by the population weight.