

**THE USE OF ELECTRONIC MEDICAL RECORDS AND PHYSICIANS' ATTITUDES
TOWARD A HEALTH INFORMATION EXCHANGE**

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Executive Summary

This report compares the utilization of electronic medical records among physicians in Arizona in 2009-2011 and 2007-2009. This report contains results from a complete two year license renewal cycle for Arizona allopathic physicians and osteopathic physicians. The results presented here include the data collected for licensing allopathic and osteopathic physicians who renewed their licenses between November 1, 2009 and November 1, 2011 (23,276 eligible physicians) of which 15,788 physicians lived in Arizona. Approximately 77% or 12,181 physician residents of Arizona who are in active practice completed the optional survey questions.

The comparisons show a very marked increase in the use of electronic medical records and a (less than proportional) reduction in reliance on paper records. The transmission of EMRs among organization remains much less prevalent than the use of EMRs, but it is also increasing.

Approximately 52% of physicians practicing in Arizona during the most recent license renewal cycle use some form of electronic medical record (EMR) storage compared to approximately 45% of physicians practicing in the 2007-2009 renewal cycle.

Physicians in training (medical school, residency or fellowships), physicians in government settings and practicing physicians in academic settings were, in that order, most likely to use basic electronic medical records (76%, 72% and 72% respectively), while EMR use was lowest among solo practitioners (25%) in the 2009-2011 cycle.

In the 2007-2009 cycle, the rankings were slightly different with the highest utilization rates belonging to physicians in government settings (71%), those in training (medical school, residency, or fellowships) (69%) and physicians in academia or research (63%). The utilization rate of EMRs among solo practitioners was 25% in the 2007-2009 cycle as well as in the subsequent period.

Slightly less than 58% of EMR users exchanged some data with one or more health related organizations. The top three groups in terms of percentage of physicians transferring information were hospital based physicians (75%), physicians in training (95%) and physicians in academic settings (71%). Only 34% of solo practitioners with EMRs exchanged information electronically.

In the 2007-2009 cycle, approximately one-half half (54%) of EMR users transmitted some medical data electronically to other parts of the health care system, such as labs or pharmacies. The top three organizations were physicians in government settings (51%), physicians in training (50%) and

physicians in academia or research (45%). Only 8% of solo practitioners with EMRs exchanged information electronically.

In 2007-2009, slightly more than one-half (51%) of physicians who used EMRs in government settings also exchanged information electronically compared to only 8% of solo practitioners with EMRs. The respective results in 2009-2011 were 49% and 8%.

It is a mistake to assume that all physicians have some influence on whether or not their practice setting uses EMRs. In 2007-2009, only slightly more than one quarter (26%) of physicians in non-EMR practices would decide whether or not to purchase an EMR. An additional 29% would be part of a shared decision. The respective proportions in 2009-2011 were 22% and 24%.

In both 2007-2009 and 2009-2011, the most trusted organization by physicians to manage a web-based health information exchange system is a “hospital system” with a RHIO as a close second. Health insurers/managed care organizations were the least trusted.

Nearly 13% of physicians in Arizona have neither internet or email access at their practice setting.

Paper files remain the most prevalent method for medical records storage: only 28% of Arizona physicians have eliminated the use of paper medical records.

We estimate that there are approximately 5,748 physicians in Arizona who do not use EMRs. That represents a substantial decline from the 2007-2009 estimate of 7,665 physicians in Arizona who do not have access to an EMR.

All of the results in regard to the details of EMR use and electronic exchange of information describe significant increases in the rate of adoption of EMRs and the exchange of information using EMRs.

Introduction

It is widely believed that increased use of electronic medical records (EMRs) will improve the quality of health care and the efficiency with which it is delivered (Chaudhry, et al. 2006; Sequist, et al. 2007). That belief led to the creation of the Arizona Health-e Connection and is one of the major objectives of The State of Arizona Health Information Exchange awarded in 2010 to the Arizona Governor's Office of Economic Recovery. Funds from this award were distributed to Arizona's single Medicaid agency, the Arizona Health Care Cost Containment System (AHCCCS).

This report is part of a continuing series of reports designed to assist AHCCCS and other stakeholders in creating strategies for the expansion of EMR use and the development of regional health information exchanges. It describes patterns of EMR utilization, the extent to which EMRs are used to exchange information among health care entities, and the values placed on EMRs by users and non-users. It also distinguishes between those who decide on the implementation of EMRs and those who use EMRs, but who are not decision makers.

This report contains results from a complete two year license renewal cycle for Arizona allopathic physicians and osteopathic physicians. The results presented here include the data collected for licensing allopathic and osteopathic physicians who renewed their licenses between November 1, 2009 and November 1, 2011 (23,276 eligible physicians) of which 15,788 physicians lived in Arizona. Approximately 77% or 12,181 physician residents of Arizona who are in active practice completed the optional survey questions (Figure 1). The detailed results presented in this report refer only to physician respondents who live in Arizona and who are not retired.

Background

Some studies of EMR adoption identify the *number of practices* with EMRs, while this report counts the *number of physicians* in practices with EMRs. Thus, multiple physicians within a group practice with EMRs each report utilization of an EMR, producing a higher estimate than one which simply compares practices. The responses not affected by this methodology are those from physicians in solo practice.

Estimates of EMR adoption vary among studies with differences in design and definitions (Jha, Ferris, et al. 2006; Bates 2005). Jha, Ferris, et al. (2006) compared results of surveys about EMR adoption that were deemed medium or high-quality from 1994 through 2005. The best estimates from their meta-analysis indicated that approximately 24% of physicians use EMRs, and only 9% have EMR systems that have functionality such as electronic prescribing. EMR adoption ranged from 13% among solo practitioners to 57% among physicians in large physician offices (50 or more physicians) (Jha, Ferris, et al. 2006). It was reported that almost half of Massachusetts physicians used EMRs, but less than one-quarter of practices in Massachusetts have adopted EMRs (Simon, et al. 2007). The adoption rates are lower in smaller practices, especially those that are not affiliated with hospitals and do not teach medical students or residents.

The most frequently cited barriers to adoption were start-up financial costs (84%), ongoing financial costs (82%), and loss of productivity (81%). It was suggested that interventions to expand EMR use must address both financial and non-financial barriers, especially among smaller practices (Simon, et al. 2007). A more recent study of a national sample of office based physicians by DesRoches, et al. (2008) estimates that only 13% of office based physicians have a basic EMR system, while approximately 4% of physicians have a fully functional EMR system (DesRoches, et al. 2008; Jha, DesRoches, et al. 2009).

The study also found that EMR adoption was more common in the Western U.S. than in other regions. However, the study cannot provide an estimate for Arizona due to the limited sample size for Arizona (communication with the first author). In addition, the survey sample excluded osteopathic physicians, physicians who were not members of the American Medical Association. Also excluded were residents, physicians in federally owned hospitals, retired physicians, radiologists, anesthesiologists, pathologists, psychiatrists, hospitalists, and part-time physicians who worked less than 20 hours per week (DesRoches, et al. 2008).

A Robert Wood Johnson Foundation study indicated that the proportion of physicians with access to EMRs in 2005 was closer to 24% than to 17% (Blumenthal, et al. 2006; DesRoches, et al. 2008). The National Center for Health Statistics (NCHS) used the 2006 National Ambulatory Medical Care Survey to measure adoption of EMRs, and found that 29% of physicians had at least a partial EMR, while 12% had a “comprehensive EMR” (Hing, Burt and Woodwell 2007). The NCHS also 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% of physicians used full or partial EMR systems in their office based practices. Approximately 20% of the physicians used systems that included orders for prescriptions, orders for tests, results of lab or imaging tests, and clinical notes (Hsiao, et al. 2008).

The most recent survey in the NCHS series indicates that 48.3% of office based physicians used some form of an EMR/EHR system in 2009, an increase of more than six percentage points from the previous year. Approximately 21.8% of the physicians sampled used a “basic” system and 6.9% had fully functional systems (Hsiao, Hing, et al. 2010). Preliminary estimates from the same survey for 2010 show continuing increases in utilization with “any system” utilization increasing to 50.7%; “basic system” increasing to 24.9% and “fully functional” increasing to 10.1%.

Comparisons among studies are difficult because of inconsistent definitions of EMRs and differences in study and/or sample design (Jha, Ferris, et al. 2006; DesRoches, et al. 2008; Jha, DesRoches, et al. 2009). Another problem is that many studies rely on small numbers of respondents (DesRoches, et al. 2008; Jha, DesRoches, et al. 2009). Although the rates found by the NCHS are not substantially different than the rates we estimate for group practices, their sample is a national sample and not directly comparable to our data. The characteristics of the physicians included in the DesRoches, et al. (2008) study are even more different from the characteristics of the physicians in our study because they exclude many types of physicians, including specialists and osteopathic physicians who are included in our study. We have, therefore, provided an additional set of results using, to the degree possible, the exclusions used by the other studies. For a detailed comparison of the other studies to the findings of this report, please see Appendix A.

Methods

The information in this report and its predecessors is made possible by an ongoing partnership between the physician licensing boards in Arizona and ASU's Center for Health Information & Research (CHiR). Beginning in 1992, the boards have permitted CHiR to add a set of survey questions to license applications by physicians. The survey responses, which are voluntary, are then merged with the complete set of licensing data collected by the boards. With few exceptions, the data have been collected since 1992.

The types of analysis that have been done from the data have varied over time and among different project sponsors. The reports and articles produced from these analyses are listed in Appendix D to this report.

Since 2007, the data collection has focused on the use and characteristics of electronic medical records and that is the focus of this report. The data in this report include two complete license renewal cycles, namely from November 1, 2009 to November 1, 2011 and from July 2007-July 2009. All physicians with Arizona licenses who are actively practicing in the state are, therefore, included in the data set.

Comparisons are presented for selected results from the 2007-2009 renewal cycle. The complete results for 2007-2009 are available in a previous report (Johnson, et al. 2010).

The Survey Process

During the period from July 2007 through July 2009, the allopathic data were collected from paper survey forms which were transmitted to CHiR for coding and data entry. The use of paper renewal forms greatly restricted the number and complexity of the survey questions. The licensing board converted to electronic applications, but a large number of physicians continued the use of paper surveys. The short survey form was continued to maintain comparability between the two forms of data collection through 2011.

The short form survey questions accompanied the forms (either electronic or paper) that physicians used to apply for a license. The survey consists of six questions with sub-parts. (See Appendix B for a copy of the 2007-2011 survey instrument.) The survey was originally implemented in July 2007 with minimal pre-testing to initiate the accumulation of information as early in the allopathic renewal

cycle as possible and to capture the “once in every two year” renewals for osteopathic physicians that occurred beginning fall 2007. The objective was to provide AHCCCS with estimates for targeting its campaign to expand the use of EMRs as early in the process as possible. The rapid implementation of the survey would not have been possible without the close and enthusiastic cooperation of the Directors and staff of the AMB and the ABOE.

Changes in the AMB data processing system provided an opportunity to make a slight modification to the survey questions. An additional sub question was added for license applications that were submitted after September 24, 2007, namely:

What best describes the barriers to adoption of electronic medical records in your practice/organization?
☐ Cost ☐ Insufficient Return on Investment ☐ Time/Training ☐ Lack of Interoperability ☐ Attitudes

As noted, the need to use paper applications has greatly restricted the number and complexity of survey questions.

Complete results for the period July 2007 to July 2009 are described in a previous CHiR report (Johnson, et al. 2010).

A new electronic survey was designed and placed in the field in early 2012. It includes a much larger number of decision trees permitting a greatly expanded set of information, including a completely different set of survey questions for physicians with Arizona licenses who practice outside the state. (A copy of the new survey is included in Appendix C.)

Concepts and Definitions

Active license: We adopted the definitions used by the licensing boards, namely that physicians with an active license are those who maintain their license in an “active” status. The active license status however does not necessarily mean that a physician is actively practicing medicine. Some physicians with active licenses are, for example, retired or on temporary work absences. Retired 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:

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

Physicians who included "Electronic files" in their responses are assumed to have access to an electronic medical record. Separate questions were asked concerning the exchange of information using their electronic files to distinguish between intra-office electronic medical records and records used to transfer information between a practice or hospital system and other users. The specific survey questions on information exchange are:

Is your EMR system connected to: (CHECK ALL THAT APPLY)

- ☐ Hospital ☐ Pharmacy ☐ Lab ☐ Radiology Center ☐ None of these

Primary care vs. specialty care: Physicians are permitted to report more than one specialty 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. Primary care is defined to include physicians whose specialty is family care, general practice, geriatrics, internal medicine, or pediatrics. The primary care definition does not include Obstetrics and Gynecology, following the conventions used by the AHCCCS program.

Type of Practice: Physicians were asked to select no more than two of ten types of practice organizations to characterize their practice. The categories were chosen to distinguish among types of practice or organizations likely to differ in rates of adoption of electronic medical records. Although information on physicians who listed more than one type of practice has been retained, the number of potential combinations of practice type became unwieldy, leading us to adopt a classification scheme that ordered physician choices to better obtain mutually exclusive, single categories of practice types. The ordering is as follows:

First: If physician checks **fully retired** or **semi-retired** or **med school/resident** or **locum tenens**, then s/he is assigned to the category checked and not included in any other category.

Second: If a physician is not included in the first step above and lists **government**, then s/he is included only in the government category.

Third: If a physician is not included in the first or second steps and lists **administrative medicine**, then s/he is included only in the administrative medicine category.

Fourth: If a physician is not included in steps 1-3 and lists **solo practice**, then s/he is included only in the solo practice category.

Fifth: If a physician is not included in steps 1-4 and lists **group practice**, then s/he is included only in the group practice category.

Sixth: If a physician is not included in steps 1-5 and lists **community health center**, then s/he is included only in the community health center category.

Seventh: If a physician is not included in steps 1-6 and lists **solo practice**, then s/he is included only in the solo practice category.

Eighth: If a physician is not included in steps 1-7 and lists **academic research/teaching**, then s/he is included only in the academic research/teaching category.

Ninth: If a physician is not included in steps 1-8 and lists **hospitalist**, then s/he is included only in the hospitalist category.

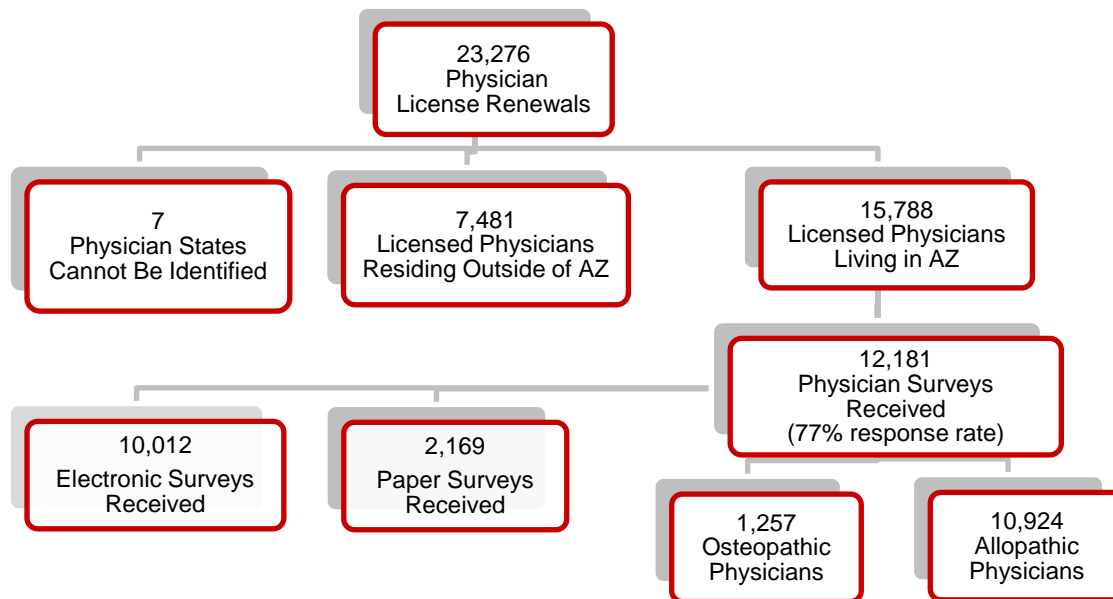
Tenth: any remaining cases are listed as **missing** for type of practice.

Data

The number of physician renewals and survey respondents are described in Figure 1. A total of 23,276 physicians renewed their licenses between November 1, 2009 and November 1, 2011. The renewals included 15,788 physicians who live in Arizona and an additional 7,481 physicians with Arizona licenses who live outside Arizona. There were 7 physicians whose state of residence could not be identified. The data described from this point forward are limited to non-retired physicians with active licenses who live in Arizona.

Survey responses were received from 12,181 physicians living in Arizona of whom: 10,924 were allopathic physicians and 1,257 were osteopathic physicians for an average response rate of 77.2%.

Figure 1. Data Collection November 1, 2009 to November 1, 2011



Source: Arizona Medical Board (AMB), Arizona Board of Osteopathic Examiners (ABOE) Survey and Administrative Data, November 2009-November 2011.

Note: For 1,915 physicians, only mailing address was available for determining residing location. Of the 1,915 physicians, 1,068 were determined to be AZ residents.

Response Bias

Although the sample is quite large and the response rate is high, the best test of the extent to which a survey represents a population is to compare the characteristics of the respondents to the characteristics of the non-respondents. Since we have licensing data on all physicians, we can make that comparison. In 2007-2009, the comparisons shown in Table 1 suggest that there are no significant differences of geographic location between respondents and non-respondents. There are statistically significant but very small absolute differences between respondents and non-respondents in regard to gender, and primary care physicians vs. specialists. The results for 2009-2011 are similar to the 2007-2009 results regarding gender, geographic location and specialty. In both time periods, response rates tend to be higher among physicians age 35-64 (although they decrease with increases in age) and quite low among the youngest (25-34) and oldest (65+) physicians.

One potential source of response bias stems from the fact that physicians in the VA health care system or the Indian Health Service (IHS) are not required to have an Arizona license unless they also practice outside the federal system.

To test for potential omissions of federal physicians, we compared physicians who indicated employment in a government setting to a recent HRSA report shows that 500 physicians are employed in the VA or IHS systems in Arizona (Health Resources and Services Administration (HRSA) 2007). The HRSA database also shows that 38.8% (194/500) of Arizona physicians (MD) with a federal license practiced in primary care during 2007. The number of Arizona physicians who reported working in a government setting on the CHiR/AHCCCS survey is 390 MDs and 43 DOs.

Weighting the survey responses to population totals indicates that approximately 853 physicians $[(390+43)*1.97]$ with Arizona licenses work in a government setting. The estimate includes all government settings, not just the VA and IHS, but comparisons with the HRSA report suggest that the relatively large number from the survey data implies that most of the federally employed physicians have Arizona licenses. We have no reason to assume that there was a significant change in this situation in 2009-2011.

The survey results are, therefore, reasonably representative of all osteopathic physicians and allopathic physicians who were eligible for renewal between November 1, 2009 and November 1, 2011.

Table 1. Comparison of Respondents to Non-Respondents, 2009-2011 vs. 2007-2009

Characteristic	2009-2011					2007-2009				
	Respondents N = 12,181		Non- Respondents N = 3,607		P- Value	Respondents N = 6,777		Non- Respondents N = 6,594		P- Value
Sex					N.S					<0.05
Female	3,325	28.3%	932	26.4%		1,791	27.3%	1,640	25.9%	
Male	8,418	71.7%	2,595	73.6%		4,769	72.7%	4,689	74.1%	
Total	11,743	100.0%	3,527	100.0%		6,560	100.0%	6,329	100.0%	
Age Group										
25-34	749	6.2%	372	10.3%	<0.01	438	6.5%	758	11.5%	<0.01
35-44	3,682	30.2%	840	23.3%	<0.01	1,976	29.2%	2,024	30.7%	<0.01
45-54	3,422	28.1%	720	20.0%	<0.01	2,012	29.7%	1,855	28.1%	<0.05
55-64	2,873	23.6%	758	21.0%	<0.01	1,590	23.5%	1,328	20.1%	
65+	1,455	11.9%	916	25.4%		758	11.2%	627	9.5%	
Total	12,181	100.0%	3,606	100.0%		6,774	100.0%	6,592	100.0%	
Specialty					<0.01					<0.01
Primary Care*	5,753	47.3%	1,566	43.7%		2,945	43.6%	2,501	38.2%	
Specialty Care	6,401	52.7%	2,016	56.3%		3,812	56.4%	4,053	61.8%	
Total	12,154	100.0%	3,582	100.0%		6,757	100.0%	6,554	100.0%	
Location					N.S					N.S.
Maricopa County	7,990	65.6%	2,365	65.6%		4,371	64.5%	4,421	67.0%	
Pima County	2,416	19.8%	757	21.0%		1,376	20.3%	1,250	19.0%	
All Other Counties	1,775	14.6%	485	13.5%		1,030	15.2%	923	14.0%	
Total	12,181	100.0%	3,607	100.0%		6,777	100.0%	6,594	100.0%	

Source: AMB, ABOE Administrative data, July 2007-July 2009; November 2009–November 2011.

Note: Percentages are calculated on numbers of cases with non-missing values. A p-value of .05 or less implies only a 5% probability of declaring the relationship significant when in fact it is not. N.S. =no significant difference.

There was one non-respondent under age 25.

* Primary care is defined to include physicians who report their specialty to the licensing board as family care, general practice, geriatrics, internal medicine, or pediatrics, but does not include Obstetrics and Gynecology.

Item Response Problems

Although survey response rates are very high, a problem developed in regard to the responses to some questions on the survey, the most notable of which was the question on the use of EMRs. An undetected software error created a serious flaw in the data capture of information on the use of electronic medical records as recorded in the electronic surveys. Because the data collection was not part of the sponsored project, the error was discovered late in the cycle. It had been assumed that since there were no changes from the short form survey that the transition to electronic submittals would be straightforward. The error made it impossible to rely on the information on EMRs from the electronic records. Fortunately, the very large number of paper surveys permitted us to circumvent the problem. The problem does not occur on the new electronic survey. All of the questions have been reviewed and errors that were discovered have been corrected.

The following procedure was adopted as a solution to the problem.

The results of previous surveys clearly demonstrated that differences in the type of organization in which a physician practiced were a major influence on the rates of utilization of EMRs. The highest utilization rates are, for example, found in government settings and the lowest rates are found in solo practices.

The survey questions on type of organization were not affected by the problems with the EMR question. Valid responses using the electronic renewal forms totaled 8,996 physicians in active practice in Arizona. Valid responses, using the paper renewal form, to both the organization question and the EMR question were obtained from 2,137 physicians in active practice in Arizona.

The distribution of physicians among the different types of organizations differed between the two groups. We assumed that the utilization rates of EMRs would, however, be approximately the same for a given type of organization. That is, that the percentage of physicians employed in, for example, a solo practice would be different but the utilization of EMRs in solo practices would be approximately the same for the paper survey responders as for the electronic responders.

This approach does not consider other determinants of EMR use, but we believe that the errors of those omissions are relatively small.

We re-weighted the paper survey respondents in each organizational group to equal the number of electronic survey respondents in that group and applied the paper survey, organization specific EMR utilization rate to the weighted totals.

In effect, we have treated the paper survey respondents as a sample of all survey respondents in regard to the EMR question but not to any other questions on the surveys. The differences between the weighted and not weighted totals (the non EMR questions) are indicated at various points in the text by the symbols W (the weighted totals) and N (the counts from the combined paper and electronic surveys on the non-EMR questions).

The results on the surveys represent just the survey responses, including the revisions that required re-weighting to solve the EMR error problem. The translation of survey responses into population totals, however, requires an additional step. We reserve the use of population weights to those results where a population count is needed for policy making purposes.

Population Weights

Because response rates for our survey are very high, the population weight for each survey respondent is relatively low, namely 1.3. In other words, each respondent represents approximately 1.30 physicians in the total population of active Arizona physicians. Results drawn from most samples necessarily require much larger population weights. A recent national survey of EMR use in the United States, for example, uses a sample of 2,607 respondents to represent 494,742 physicians in the eligible population (DesRoches, et al. 2008; Jha, DesRoches, et al. 2009). Thus, if the weighting was simple (which it is not), each national survey respondent would represent 239.4 physicians.

Results

All Survey Respondents

Table 2. Survey Respondents by Type of Practice, 2009-2011 (N = 11,133) vs. 2007-2009 (N = 6,686)

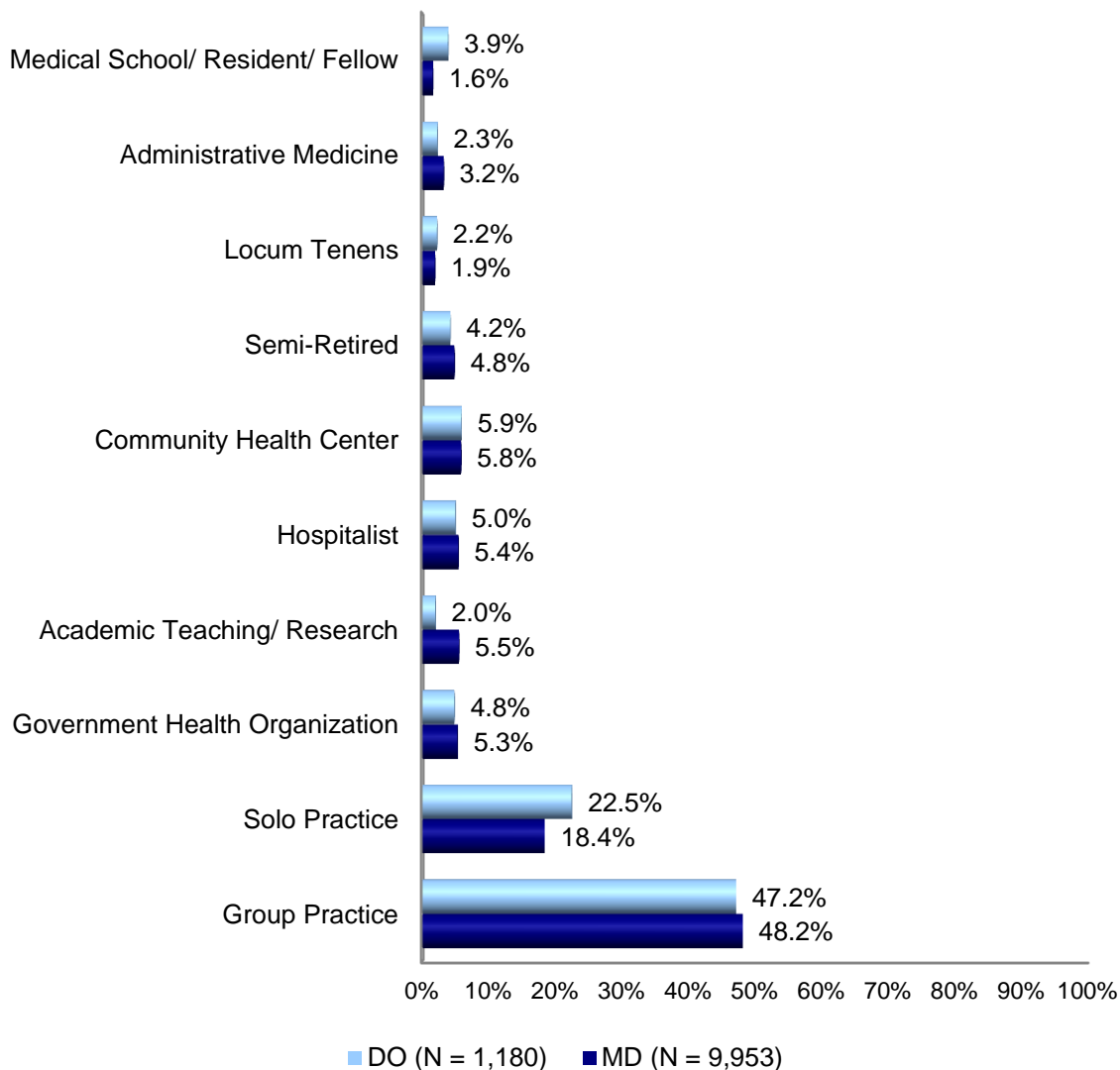
<i>Type of Practice</i>	<i>2009-2011</i>				<i>2007-2009</i>			
	<i>MD N = 9,953</i>		<i>DO N = 1,180</i>		<i>MD N = 5,940</i>		<i>DO N = 746</i>	
Group Practice	4,793	48.2%	557	47.2%	2,722	45.8%	332	44.5%
Solo Practice	1,832	18.4%	266	22.5%	1,335	22.5%	209	28.0%
Government Health Organization (VA, Indian Health Service, etc.)	527	5.3%	57	4.8%	360	6.1%	42	5.6%
Academic Teaching/Research	548	5.5%	23	2.0%	336	5.7%	21	2.8%
Hospitalist	532	5.4%	59	5.0%	250	4.2%	31	4.2%
Community Health Center	581	5.8%	69	5.9%	243	4.1%	20	2.7%
Semi-Retired	477	4.8%	50	4.2%	239	4.0%	20	2.7%
Locum Tenens	184	1.9%	26	2.2%	196	3.3%	16	2.1%
Administrative Medicine	316	3.2%	27	2.3%	137	2.3%	24	3.2%
Medical School/Resident/Fellow	163	1.6%	46	3.9%	122	2.1%	31	4.2%

Source: AMB, ABOE Survey data, July 2007-July 2009; November 2009-November 2011.

Note: 1,048 physicians in 2009-2011 and 91 physicians in 2007-2009 did not report type of practice (missing). Percents are based on responses.

Table 2 shows the distribution of physicians by type of practice among MDs and DOs who live in Arizona and who responded to the survey. Fully retired physicians and physicians practicing outside Arizona are excluded from the results.

Figure 2. Survey Respondents by Type of Practice, 2009-2011 (N = 11,133)



Source: AMB, ABOE Survey data, July 2007-July 2009; November 2009-November 2011.

Note: 1,048 physicians in 2009-2011 and 91 physicians in 2007-2009 did not report type of practice (missing). Percents are based on responses.

Communications and Medical Records

The survey asks physicians about the methods of communication, billing, and record storage in their practices. The results are shown in the next two tables. Table 3 shows that nearly all physicians have access to a fax machine, but approximately thirteen percent of physicians do not have access to email and/or the internet. A small percentage use Medifax, and a few physicians report that none of these methods of external communication are available in their practice environment.

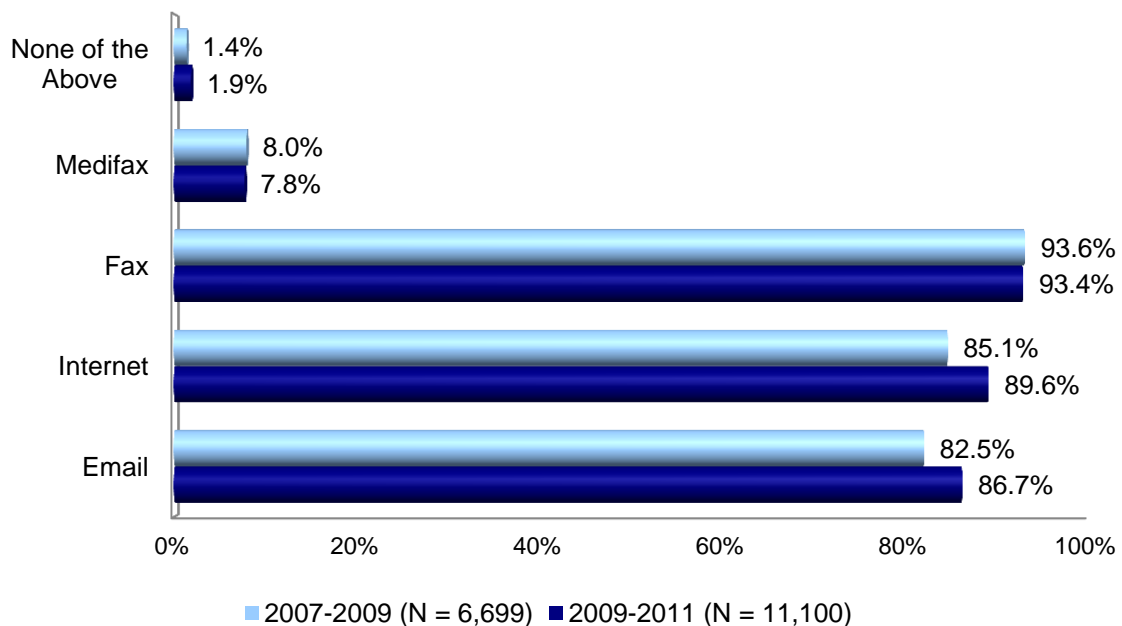
Table 3. Methods of Communication Available to Physician in Practice Environment, 2009-2011 (N = 11,100) vs. 2007-2009 (N = 6,699)

<i>Method</i>	<i>2009-2011</i>		<i>2007-2009</i>	
	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>
Email	9,634	86.7%	5,530	82.5%
Internet	9,947	89.6%	5,702	85.1%
Fax	10,365	93.4%	6,273	93.6%
Medifax	869	7.8%	536	8.0%
None of the Above	211	1.9%	96	1.4%

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: Categories are **not mutually exclusive**. 78 physicians did not respond to this question 2007-2009; 1,081 physicians did not respond 2009-2011.

Figure 3. Methods of Communication Available to Physician in Practice Environment, 2009-2011 vs. 2007-2009



Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: Categories are **not mutually exclusive**. 78 physicians did not respond to this question 2007-2009; 1,081 physicians did not respond in 2009-2011.

Table 4. Methods of Billing, 2009-2011 (N = 12,181) vs. 2007-2009 (N = 6,777)

<i>Method</i>	<i>2009-2011</i>		<i>2007-2009</i>	
	<i>Number</i>	<i>% Yes</i>	<i>Number</i>	<i>% Yes</i>
Fax	1,072	8.8%	474	7.0%
Email	585	4.8%	326	4.8%
Internet	4,422	36.3%	2,437	36.0%
Mail	3,634	29.8%	2,463	36.3%
Don't know	3,934	32.3%	2,544	37.5%
Billing not applicable to practice type	1,414	11.6%	185	2.7%

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: Categories are **not mutually exclusive**. There were no missing responses for this question.

The results in Table 4 describe the methods used for billing by physicians. More than one-third of the respondents did not know how their practice managed the billing process. Postal mail and/or the internet are the most prevalent billing methods, while a minority of physicians uses fax and email in their billing process.

Table 5 examines methods of records storage among physicians. Paper Files are the single most prevalent storage method. Approximately 37% of physicians used paper files as their sole method of storing medical records, and only 19% of the physicians rely solely on EMRs. However, the proportion of paper only cases dropped from 46% to 37% between 2007-2009 and 2009-2011, and the percentage with EMRs only increased from 13.4% to 18.6%. The most prevalent use of EMRs is in combination with paper files or with scanned files or both. In total, approximately 52% of the physicians are in practices that use EMRs; an increase of nearly seven percentage points over the previous renewal cycle.

Table 5. Methods of Storing Medical Records, 2009-2011 (N= 2,137; W = 8,996) vs. 2007-2009 (N = 6,387)

<i>Method</i>	<i>2009-2011</i>		<i>2007-2009</i>	
	<i>Number Yes</i>	<i>% of total</i>	<i>Number Yes</i>	<i>% of total</i>
Paper Files Only	3,140	37.3%	2,911	45.6%
EMR Only	1,565	18.6%	859	13.4%
Scanned Images Only	204	2.4%	205	3.2%
Paper + Scanned Images Only	404	4.8%	393	6.2%
EMR + Paper Only	559	6.6%	484	7.6%
EMR + Scanned Images Only	1,411	16.8%	742	11.6%
Paper + Scanned Images + EMR	1,126	13.4%	793	12.4%
EMR alone or in combination*	4,700	52.3%	2,878	45.1%

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: In 2007-2009, 390 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.

Figure 4. Comparing Methods of Storing Medical Records, 2009-2011 (N = 2,137; W = 8,997) vs. 2007-2009 (N = 6,387)

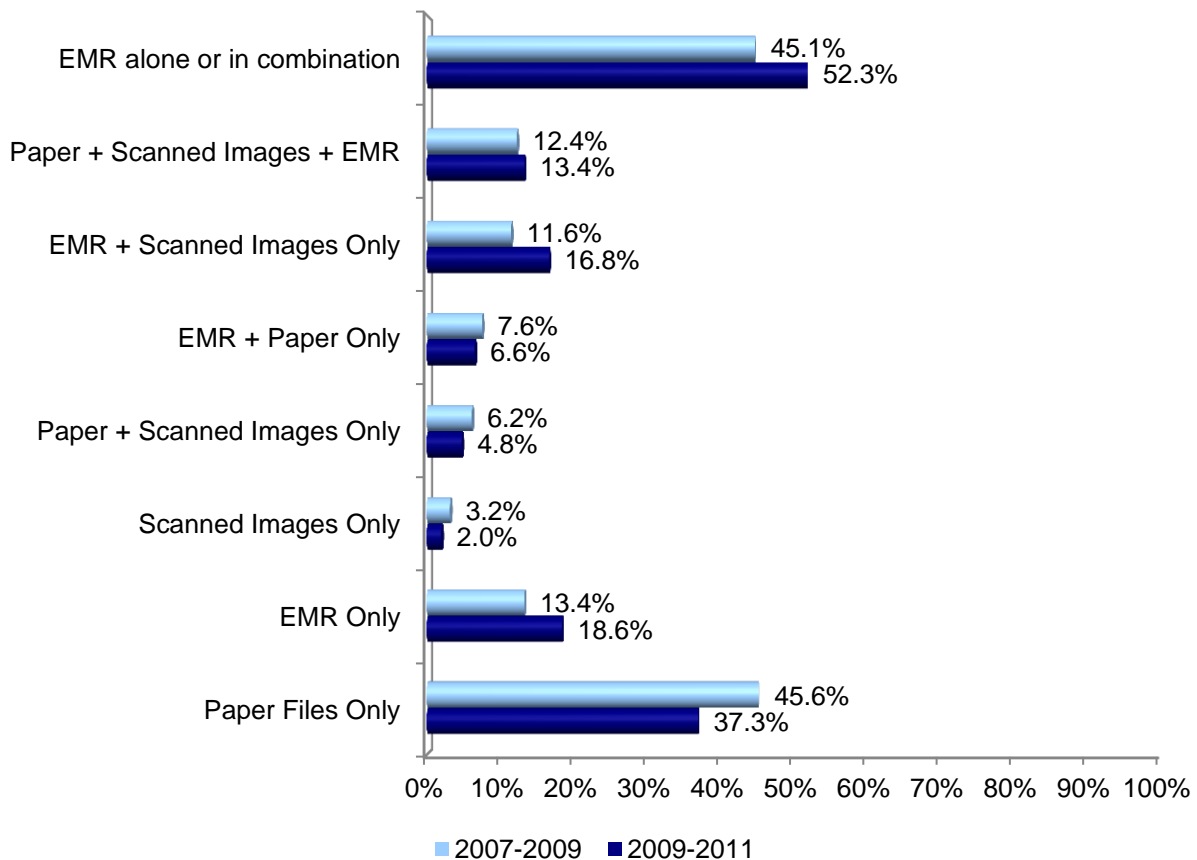


Figure 4 graphically depicts a clear trend in which the use of non-EMR files is declining and EMR utilization is increasing. Paper Files Only declined by almost eight percentage point, Scanned Images Only dropped by more than one percentage point, but that was a drop of almost one third of the original value; Paper + Scanned Images Only was reduced from 6.2% to 4.8%.

Storing medical records electronically does not mean that a physician uses EMRs to exchange clinical information or has integrated the EMR into his or her practice. The information in Table 6 and Table 7 describes how physicians use EMRs to exchange information. The survey asked if physicians with EMRs were connected to other parts of the health care system, such as to a hospital, pharmacy, lab, or to radiology. Overall, approximately 58% of EMR users or approximately 31% of all physicians report they can connect to at least one of these areas, with laboratory connectivity the most common connection. Radiology results were least likely to be connected to EMRs, with only 32% of physicians with EMRs or approximately 17% of all physicians able to transmit medical data to or from a radiology facility. These results were essentially unchanged between 2007-2009 and 2009-2011. There were, however, some rather large changes within the distribution with the percentage of EMR users connected to hospital dropping from 82.3% to 64%. These differences may be casualties of our weighting scheme, but no final conclusion can be reached until we accumulate sufficient results from the new survey to make some comparisons.

If we define a “fully functional” EMR as one that allows connectivity with hospital(s), radiology, lab, and pharmacy data electronically, then approximately 11% of physicians in Arizona use fully functional EMRs. That is an increase of almost two percentage points since 2007-2009.

Table 6. Use of EMRs to Exchange Information, 2009-2011 (W = 4,700) vs. 2007-2009 (N = 2,878)

<i>Method</i>	<i>2009-2011</i>				<i>2007-2009</i>			
	<i>W</i>	<i>% of Connected EMR Users</i>	<i>% of EMR Users</i>	<i>% of All Eligible Physicians</i>	<i>N</i>	<i>% of Connected EMR Users</i>	<i>% of EMR Users</i>	<i>% of All Eligible Physicians</i>
Electronic File*	4,700	-	100.0%	52.3%	2,878	-	100.0%	45.1%
Electronic & Connected EMR System	2,719	100.0%	57.9%	30.7%	1,558	100.0%	54.1%	24.1%
Connected to:								
Hospital**	1,740	64.0%	37.0%	19.3%	1,283	82.3%	44.6%	19.8%
Pharmacy**	1,829	67.3%	38.9%	20.3%	1,008	64.7%	35.0%	15.6%
Lab**	2,026	74.5%	43.1%	22.5%	1,341	86.1%	46.6%	20.7%
Radiology**	1,507	55.4%	32.1%	16.7%	1,027	65.9%	35.7%	15.9%
“Fully Functional” EMR**	992	36.5%	21.1%	11.0%	601	38.6%	20.9%	9.3%

Source: AMB, ABOE Survey Data, July 2007-July 2009, November 2009-November 2011.

Note: *% of Electronic File was based on the calculation in table 5.

**These percentages are not mutually exclusive. % based on all survey respondents. 310 respondents did not answer the question on files in 2007-2009 and (W = 375) in 2009-2011.

A “fully functional” EMR is one that can exchange information with each of these segments of the health care system: hospital, pharmacy, lab and radiology.

The results in Table 7 show that approximately 48% of EMR systems are stand-alone systems that operate solely within a practice; a slight reduction since 2007-2009.

Table 7. On-site vs. Off-site Storage of EMRs, 2009-2011 (W = 3,831) vs. 2007-2009 (N = 2,293)

<i>Method of Storage</i>	<i>2009-2011</i>		<i>2007-2009</i>	
	<i>Weight</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
PC/server located in your organization	1,828	47.7%	1,156	50.4%
Server to which you connect via the internet	997	26.0%	555	24.2%
Don't know	1,006	26.3%	582	25.4%
Total	3,831	100.0%	2,293	100.0%

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: 585 physicians with EMRs did not respond (missing) in 2007-2009 and (Weight = 869) in 2009-2011.

As indicated in Table 8 and Figures 5 & 6, the highest utilization rate of EMRs occurs in government settings, probably reflecting the Veteran's Administration (VA) system. Among physicians in non-governmental settings, physicians in academic positions were much more likely to have access to EMRs than in non-academic practices. Approximately 72% of physicians in governmental practices used EMRs, while the corresponding estimate for solo practitioners is approximately 25% (Table 8, Figure 5 & Figure 6). It is interesting to note that about half of Arizona physicians who practice in a governmental group practice setting can exchange medical information electronically, while less than 8% of solo practitioners have that ability. The results for 2009-2011 are consistent with the results for 2007-2009 in terms of the boundary numbers, but there are substantial increases in many of the organizational groups other than government and solo practitioners.

Table 8. EMR Utilization Rates Distributed by Type of Practice, 2009-2011 (N = 2,137; W = 8,996) vs. 2007-2009 (N = 6,412)

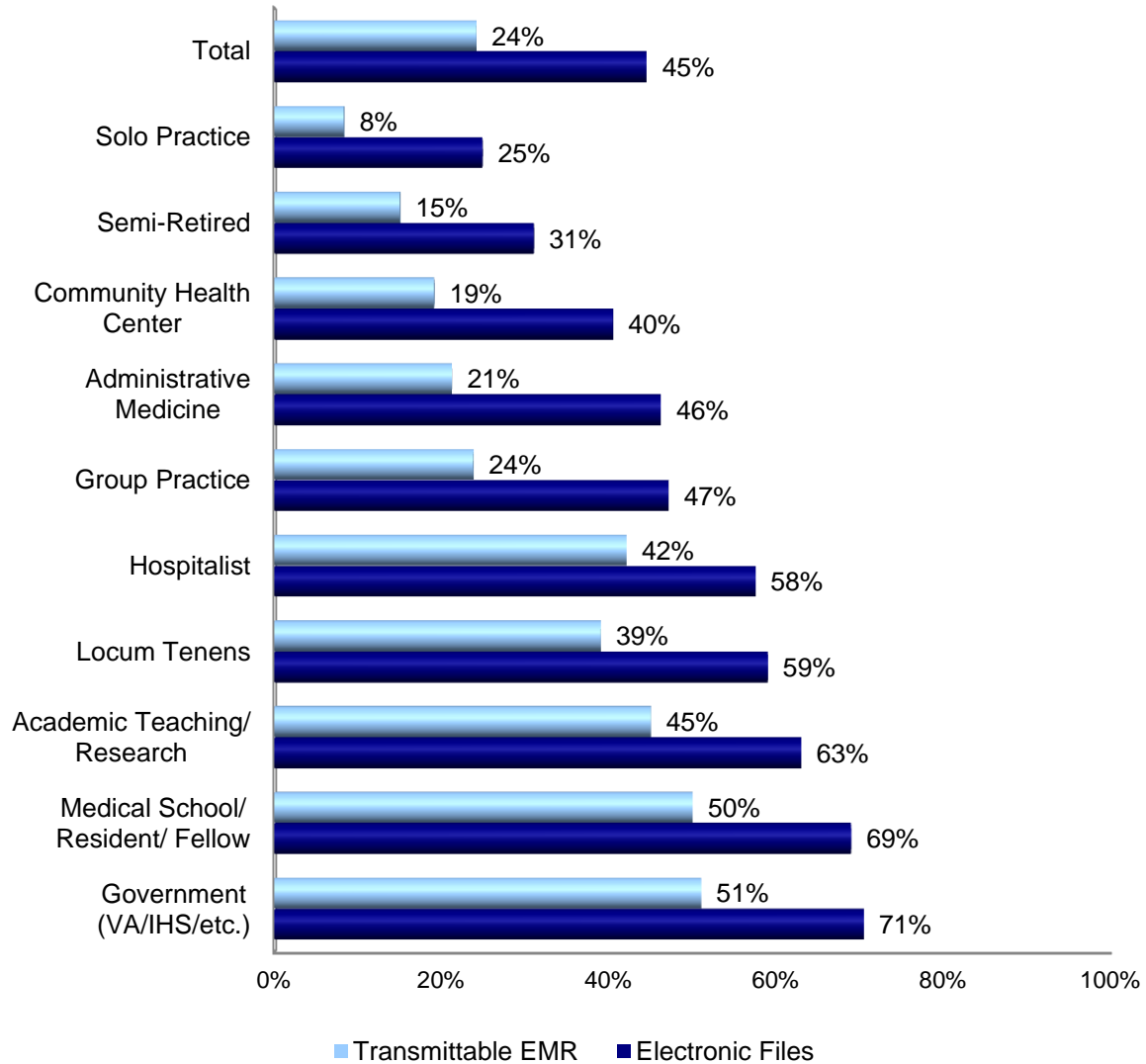
<i>Type of Practice</i>	<i>EMR Utilization Rates 2009-11 W (%)</i>	<i>EMR Utilization Rates 2007-09 N (%)</i>	<i>EMR with Exchange (Connected) 2009-11 W (%)</i>	<i>EMR with Exchange (Connected) 2007-09 N (%)</i>
Government Health Organization (VA, Indian Health Service, etc.)	349 (72%)	275 (71%)	239 (49%)	199 (51%)
Medical School/Resident/Fellow	140 (76%)	99 (69%)	132 (72%)	72 (50%)
Academic Teaching/Research	358 (72%)	209 (63%)	254 (51%)	150 (45%)
Locum Tenens	99 (61%)	119 (59%)	66 (41)	79 (39%)
Hospitalist	327 (63%)	149 (58%)	246 (47%)	109 (42%)
Group Practice	2,402 (55%)	1,386 (47%)	1,324 (30%)	699 (24%)
Administrative Medicine	168 (57%)	61 (46%)	116 (39%)	28 (21%)
Community Health Center	369 (67%)	104 (40%)	173 (31%)	49 (19%)
Semi-Retired	91 (27%)	74 (31%)	36 (11%)	35 (15%)
Solo Practice	397 (25%)	378 (25%)	44 (8%)	127 (8%)
Total	4,700 (52%)	2,854 (45%)	2,719 (30%)	1,547 (24%)

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009- November 2011. Rates = % of physicians within each practice type that use an electrical medical record.

Note: 365 physicians did not respond (missing) in 2007-2009 and (W = 375) in 2009-2011.

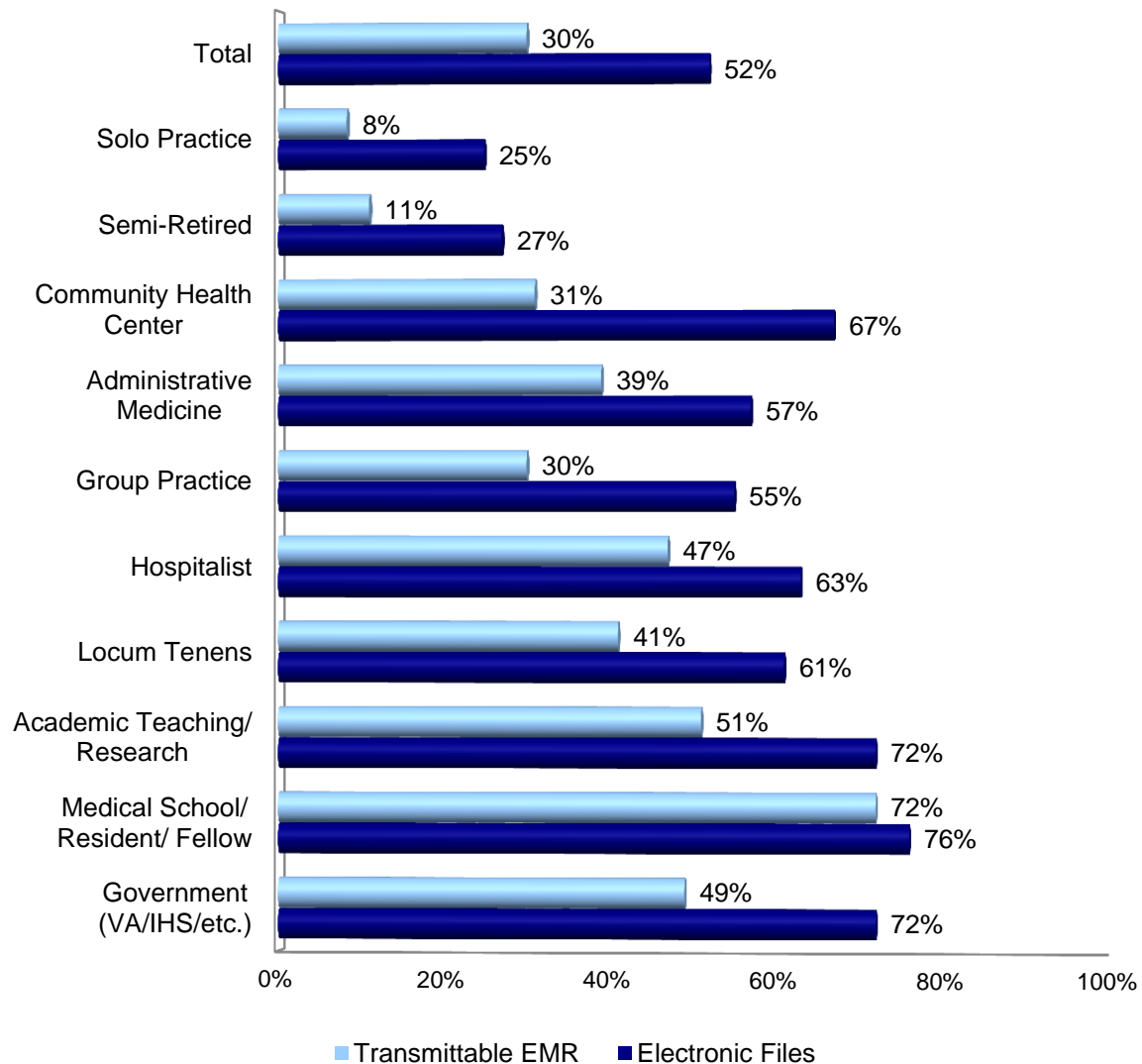
W is the weight to make estimate of total respondents in full survey and does not weight up to the population totals.

Figure 5. Distribution of EMR Utilization by Type of Practice: Arizona Physicians, 2007-2009 (N=6,412)



Source: AMB, ABOE Survey Data, July 2007-July 2009.

Figure 6. Distribution of EMR Utilization by Type of Practice: Arizona Physicians, 2009-2011 (W = 8,996)



Source: AMB, ABOE Survey Data, November 1, 2009 - November 1, 2011.

The distribution of EMR users by county is described in Table 9 (2007-2009) and Table 10 (2009-2011). The weighting scheme standardizes the distribution of physicians by practice type because it is an important determinant of EMR use. The weighting does not, however standardize for the distribution of EMR users by county and the county specific results for 2009-2011 may not be strictly comparable to the results for 2007-2009 and should be interpreted as subject to a higher level of uncertainty.

Table 9. Distribution of EMR Utilization by County 2007-2009 (N = 6,742)

<i>Location</i>	<i>All Survey Respondents</i>	<i>EMR Users</i>	<i>% EMR Users</i>	<i>EMR with Exchange Users</i>	<i>% EMR with Exchange Users*</i>
Apache	17	9	52.9%	7	41.2%
Cochise	76	33	43.4%	15	19.7%
Coconino	176	76	43.2%	29	16.5%
Gila	31	10	32.2%	5	16.1%
Graham	19	8	42.1%	3	15.8%
Greenlee	5	1	20.0%	1	20.0%
La Paz	9	3	33.3%	2	22.2%
Maricopa	4,371	1,871	42.8%	982	22.5%
Mohave	184	66	35.9%	29	15.8%
Navajo	68	32	47.0%	19	27.9%
Pima	1,376	605	44.0%	370	26.9%
Pinal	94	45	47.9%	29	30.9%
Santa Cruz	18	4	22.2%	0	0.0%
Yavapai	163	61	37.4%	33	20.2%
Yuma	135	36	26.7%	20	14.8%
Total	6,742	2,860	42.4%	1,544	22.9%

Source: AMB, ABOE Survey Data, July 2007–July 2009.

Note: Table does not include fully retired physicians. Additionally, 342 respondents did not identify a method of storing medical records.

*As a percentage of survey respondents.

Table 10. Distribution of EMR Utilization by County 2009-2011 (W = 8,577)

<i>Location</i>	<i>Survey Respondents (W)</i>	<i>EMR Users (W)</i>	<i>% EMR Users</i>	<i>EMR with Exchange Users (W)</i>	<i>% EMR with Exchange Users*</i>
Apache	54	27	50.0%	17	31.5%
Cochise	110	68	61.8%	16	14.5%
Coconino	231	123	53.2%	60	26.0%
Gila	49	32	65.3%	23	46.9%
Graham	26	12	46.2%	12	46.2%
Greenlee	9	0	0.0%	0	0%
La Paz	9	0	0.0%	0	0%
Maricopa	5,229	2,370	45.3%	1,568	30.0%
Mohave	188	75	56.2%	37	19.7%
Navajo	105	59	56.2%	55	52.4%
Pima	1,965	1,108	56.4%	699	35.6%
Pinal	153	63	41.2%	22	14.4%
Santa Cruz	47	32	68.1%	18	38.3%
Yavapai	262	140	53.4%	68	26.0%
Yuma	149	50	33.6%	36	24.2%
Total	8,586	4,159	48.4%	2,631	30.7%

Source: AMB, ABOE Survey Data, November 2009–November 2011.

*As a percentage of survey respondents

Note: Table does not include fully retired physicians. Approximately (weighted) 419 physicians did not answer the questions.

The distribution by county is not adequately represented by weighting by practice type.

Physician Characteristics Associated with EMR Use

We used a multivariate logistic regression model on six variables to identify characteristics that affect the probability that a physician will be an EMR user (Table 10). The odds ratios are a measure of the strength of the relationship between two variables, holding other characteristics constant. To use an example from Table 11 below, physicians age 25 to 34 are, all else equal, 2.6 times *more* likely to utilize EMRs in their practice than physicians age 65 and older. An odds ratio less than 1.0

indicates that physicians in a particular group are *less* likely than those in the comparison group to utilize EMRs.

Table 11. Multivariate Predictors of Being an EMR User/Connected EMR User

<i>Variable</i>	<i>2009-2011</i>		<i>2007-2009</i>	
	<i>Odds Ratio (EMR User)</i>	<i>Odds Ratio (Fully Connected EMR User)</i>	<i>Odds Ratio (EMR User)</i>	<i>Odds Ratio (Fully Connected EMR User)</i>
Type of Practice (vs. Government)				
Group Practice	0.38*	0.43*	0.28	0.13
Community Health Center	0.66	0.45*	0.23	0.08
Hospitalist	0.52**	0.80	0.54	0.46
Solo Practice	0.11*	0.09*	0.08	0.02
Academic Teaching/Research	1.10	1.19	0.76	0.72
DO (vs. MD)	1.02	1.14	1.60*	1.04
Age (vs. 65 and older)				
25 to 34	2.63*	1.99	3.16*	2.12*
35 to 44	3.19*	1.85*	2.49*	1.69*
45 to 54	2.36*	1.75*	2.12*	1.90*
55 to 64	1.35**	1.24	2.07*	1.92*
Gender (Female vs. Male)	0.75*	0.84	0.92	0.94
Location (vs. all AZ counties except Maricopa and Pima)				
Maricopa County	0.98	0.93	1.12	1.28
Pima County	0.92	0.92	1.18	0.89
Primary Care (vs. Specialty Care)	1.20**	1.85*	1.20*	0.89

Source: AMB, ABOE Survey Data, July 2007–July 2009; November 2009–November 2011.

Note: 1,284 observations were deleted due to missing values.

*Statistically significant at p less than or equal to 0.05. **Statistically significant at less than or equal to 0.10.

There is a clear age gradient in the results. The odds that a physician will use an EMR are consistently lower among older physicians. The result occurs with slightly different variations in both 2007-2009 and 2009-2011. One can speculate that differences in culture, established work

habits, facility with computerized applications, and training experiences are similarly correlated with aging. The results confirm that physicians in government settings are, all else equal, more likely to utilize EMRs than physicians in group practice, solo practice, and community health centers. While DOs are more likely than MDs to have EMRs in 2007-2009, the odds of utilizing a connected EMR are similar among MDs and DOs with EMRs. There are no significant differences between DOs and MDs in 2009-2011.

It is interesting to note the absence of significant differences between EMR use by Maricopa and Pima County physicians, as well as between physicians practicing in more rural counties. The two urban counties show only slightly larger odds ratios than the rural counties in 2007-2009 but the results are not statically significant. The lack of significance re-occurs in the 2009-2011 results. This question requires more detailed analysis.

The Decision to Implement an EMR

One objective of this survey is to identify the appropriate targets for interventions designed to increase the use of EMRs. Physicians who are not in a position to significantly influence the decision to implement should not be included in primary target group. Nevertheless, they can have a collective effect on the probability of adoption and should not, therefore, be ignored.

The data in Table 12 suggest that the average survey respondent has little influence over the decision. In 2009-2011, approximately 70% of the physicians in practices that used EMRs had no part in decisions concerning the purchase of an EMR system. In part, that reflects the fact that the decisions in some practices could have occurred before the physician joined the practice. It is also true that in very large organizations, such as large hospital systems, very few physicians are likely to be part of the decision making process. In both time periods 30% or more of the physicians in practices with EMRs had no part in the decision making. In 2007-2009, only 12% of the physicians using EMRs made the decision to implement the EMR, and an additional 20% were part of a shared decision process. The participation in decision making declined in 2009-2011 to approximately 9% decision makers with a slight increase to 23% of physicians part of a shared decision making process. Among physicians without EMRs, the percentage of potential physician decision makers was 27% in 2007-2009, and an additional 29% of the respondents would be part of a shared decision. These proportions also decrease in 2009-2011 to 22% and 24% respectively. The higher proportion of decision makers among those without an EMR represents the lower prevalence of EMR use among solo practitioners and smaller group practices.

These results suggest that it will be beneficial to identify the decision makers (both sole and shared) among the practices that have not yet adopted EMRs.

Table 12. EMR System Purchase Decision Makers, 2009-2011 (W = 4,032) vs. 2007-2009 (N = 5,901)

<i>Decision maker for potential purchase of EMR system</i>	<i>2009-2011</i>				<i>2007-2009</i>			
	<i># of EMR Users</i>	<i>% of EMR Users</i>	<i># of non-EMR Users</i>	<i>% of non-EMR Users</i>	<i># of EMR Users</i>	<i>% of EMR Users</i>	<i># of non-EMR Users</i>	<i>% of non-EMR Users</i>
Respondent was/would be decision maker	347	8.6%	166	21.8%	284	12.2%	875	26.8%
Shared decision	823	22.9%	180	23.7%	454	19.6%	950	29.1%
Decided by others	2,862	70.0%	414	54.5%	1,584	68.2%	1,444	44.2%
Total	4,032	100.0%	760	100.0%	2,322	100.0%	3,269	100.0%

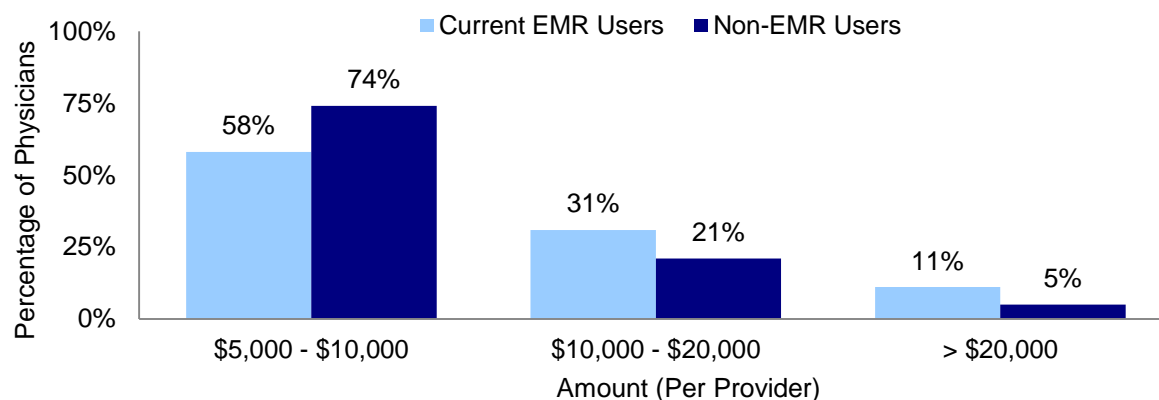
Source: AMB, ABOE Survey Data, July 2007-July 2009, November 2009-November 2011.

Note: There were 556 missing responses among EMR users and 320 missing responses among non-users in 2007-2009.

Attitudes towards Costs

Figure 7 and Figure 8 display the attitudes of physicians towards the costs of an EMR system. The responses indicate that physicians who use EMRs place a higher value on an EMR system than physicians who do not have an EMR. Alternatively, the EMR users may simply be better informed on the actual cost of an EMR system.

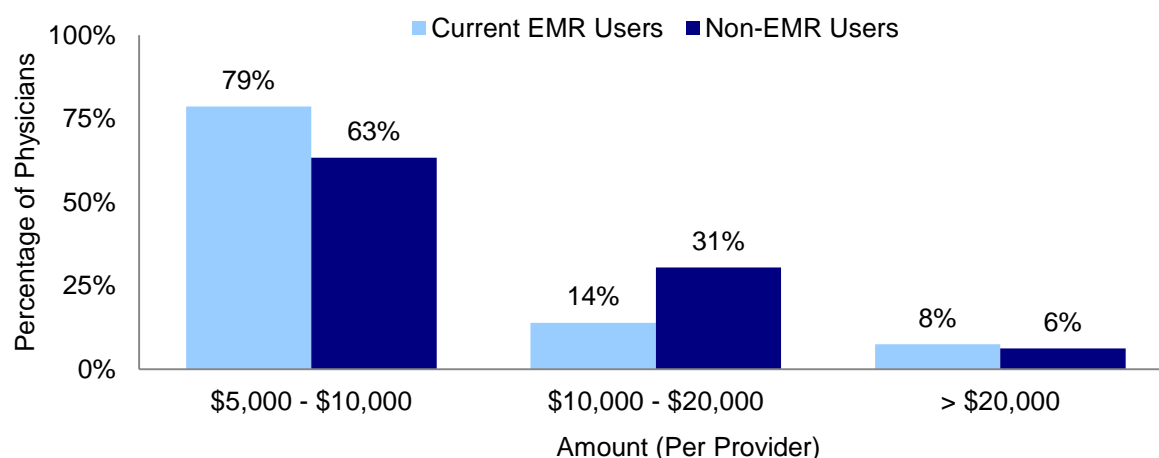
Figure 7. Perceived Reasonable Amount to Pay for an EMR System among Providers, 2007-2009 (N = 1,672)



Source: AMB, ABOE Survey Data, July 2007-July 2009.

Note: 3,225 physicians without EMRs did not answer this question (missing). There were 1,570 missing responses of EMR users. Percentages reflect non-missing responses only.

Figure 8. Perceived Reasonable Amount to Pay for an EMR System among Providers, 2009-2011 (W = 4,617)



Source: AMB, ABOE Survey Data, November 2009-November 2011.

Very few physicians, in either of the two renewal cycles, expressed opinions on a reasonable cost for an EMR system. The results described in Figure 7 and Figure 8 should be interpreted as subject to considerable uncertainty. The comparisons between the years should also be considered to be approximations. Among those who responded in 2007-2009, only 26% of non-EMR users said that \$10,000 or more per physician was a reasonable amount to pay for an EMR. Among physicians who practice in an organization that utilizes EMRs, 42% believe that a reasonable price to pay for an EMR system would be over \$10,000 per physician. This is similar to the percentage of physicians who said they would invest at least \$10,000 per full-time physician (46%), according to the *AHCCCS HIE/EHR Utility Project: Provider Focus Groups* report, conducted from October through December 2007 (Arizona Health Care Cost Containment System 2007). It may be that the physicians represented in the focus groups were more representative of EMR users.

The results for 2009-2011 are not consistent with the results for the previous period. They show that nearly 80% of current EMR users select the \$5,000 to \$10,000 range and, among non-users only 63% select that range, compared to 74% in 2007-2009. Approximately 14% of current users and 31% of non-users select the \$10,000 to \$20,000 range in 2009-2011.

Trust and Health Information Exchange

The adoption of an EMR system by a practice is not synonymous with participation in health information exchange (HIE). The results in Table 6 show that approximately 58% of the physicians with access to EMRs report that they exchange information electronically with others. There is large

variation in physicians' level of trust in the types of organizations that might manage a health information exchange, with Commercial Vendor, Regional Health Information Organization (RHIO) and State of Arizona (AHCCCS) garnering similar levels of trust. The results, in Table 13, show that hospital systems are the most trusted organization to manage an HIE and private health insurers are the least trusted. Beyond the substantial trust gap between hospitals and health insurers, the differences between hospital systems and most of the other alternatives are relatively small. The ranking of organizations by level of trust was nearly the same in 2009-2011 as in 2007-2009. When asked a similar question, physicians in the *Provider Focus Groups* report gave a different response, namely that RHIOs and AHCCCS were more trustworthy entities than hospital systems (Arizona Health Care Cost Containment System 2007).

Table 13. Who Would You Trust to Manage the Health Information Exchange? 2009-2011 vs. 2007-2009

Type of Organization	2009-2011				2007-2009			
	EMR W = 4,361		Non-EMR W = 2,880		EMR N = 2,405		Non-EMR N = 2,371	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Hospital System	1,117	25.6%	662	23.0%	591	24.6%	567	23.9%
Commercial Vendor	714	16.4%	515	17.9%	437	18.2%	490	20.7%
Regional Health Information Organization	1,014	23.3%	732	25.4%	542	22.5%	470	19.8%
State of Arizona (AHCCCS)	782	17.9%	456	15.8%	457	19.0%	431	18.2%
Other	426	9.8%	314	10.9%	217	9.0%	237	10.0%
Health Insurer/Managed Care Plan	308	7.1%	201	7.0%	161	6.7%	176	7.4%

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: Of the 10,813 survey respondents 3,957 did not answer this question in 2007-2009. Percentages reflect non-missing responses only.

The Target Population

One of the important objectives of this report is to provide information on the size and nature of the population of Arizona physicians who do not use EMRs. The data presented to this point are good profiles of the characteristics of the non-EMR users. It remains to estimate the numbers of the physicians who represent the object of efforts to increase EMR utilization. The numbers are estimated by applying the population weights (1.97 per respondent in 2007-2009 and 1.30 in 2009-2011) to the numbers of survey respondents.

The distribution described in Table 14 can be viewed as a ranking of areas in terms of the likely yield per unit of effort for initiatives designed to broaden the spread of EMRs in the physician community. The smaller the potential increase in terms of numbers of physicians per amount expended, the lower the priority for a project with a fixed budget. Some of the potentially low yield areas also are the areas where the costs of some interventions will be relatively high. If, for example, an initiative includes the provision of IT support services on an ongoing basis, counties such as Apache, Greenlee or La Paz offer small payoffs and relatively high costs in terms of travel time for support personnel.

Table 14. The Target Population of Physicians without EMRs by County, 2009-2011 vs. 2007-2009

<i>Location</i>	<i>2009-2011</i>			<i>2007-2009</i>		
	<i>All Survey Respondents (W)</i>	<i>Survey Respondents: Non-EMR Users (W)</i>	<i>The Target Population (W)</i>	<i>All Survey Respondents (N)</i>	<i>Survey Respondents: Non-EMR Users (N)</i>	<i>The Target Population (W)</i>
Apache	54	27	35	17	8	16
Cochise	110	42	55	76	43	85
Coconino	231	108	140	176	100	197
Gila	49	17	22	31	21	41
Graham	26	14	18	19	11	22
Greenlee	9	9	12	5	4	8
La Paz	9	9	12	9	6	12
Maricopa	5,229	2,859	3,717	4,371	2,500	4,925
Mohave	188	113	147	184	118	232
Navajo	105	46	60	68	36	71
Pima	1,965	857	1,114	1,376	771	1,519
Pinal	153	90	117	94	49	97
Santa Cruz	47	15	20	18	14	28
Yavapai	262	122	159	163	102	201
Yuma	149	92	120	135	99	195
Total	8,586	4,420	5,746	6,742	3,882	7,648

Source: AMB, ABOE Survey Data, July 2007-July 2009; November 2009-November 2011.

Note: Table does not include fully retired physicians. Additionally, 342 respondents did not identify a method of storing medical records in 2007-2009.

The target population is calculated as the number of non-EMR users multiplied by the population weight (1.97 in 07-09 and 1.3 in 09-11)

The results also suggest consideration of different approaches to increase EMR utilization for different geographic areas. We know from our multivariate results, for example, that the rate of EMR use is, all else equal, at its lowest among older physicians. It seems equally likely that the required investments and the relatively short period for the return on investment will make their potential rates of adoption much lower than among younger physicians. The age and other criteria can be added to the definition of the target population to sharpen the focus of planned interventions. The numbers of physicians that are described in Table 14 provide estimates of the target population that can be used as the baseline against which to compare the success of interventions designed to increase the use of EMRs. It should be noted that approximately 299 members of the target population in 2009-2011 are “semi-retired” and are, therefore unlikely prospects for the adoption of EMRs.

Conclusion

The results show that paper records are the dominant method of storing medical records, whether as the sole medium of storage or in combination with EMRs or scanned files. EMR use is most prevalent in government practice settings and least prevalent in private solo practices.

Approximately 52% of the physicians surveyed use some form of EMR in their practice. This comparatively high percentage is driven by the relatively large number of physicians in group practices and governmental organizations. High utilization rates also occur among academic physicians and medical school students, residents and fellows.

Additionally, we have found that older physicians (over age 45) in non-governmental practice environments, especially those in solo practices, have the lowest EMR use prevalence. As sole decision-makers, interventions that target solo practitioners may prove most fruitful, as well as initiatives aimed at the non-EMR user group practice community. Adoption efforts will need effective strategies to target these strata, as well as to identify the decision makers in a multiple physician practice.

We estimate that there are approximately 5,748 physicians in Arizona who do not use EMRs. That represents a substantial decline from the 2007-2009 estimate of 7,665 physicians in Arizona who do not have access to an EMR.

All of the results in regard to the details of EMR use and electronic exchange of information describe significant increases in the rate of adoption of EMRs and the exchange of information using EMRs.

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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. The sample design does not, for example, 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 with a few interruptions has continued. 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, et al. 2008). As indicated in Table A – 1 below, our results are much closer to the NCHS study than the NEJM study. The difference between the two national studies is surprisingly large given the apparent similarities in sample design.

Table A - 1. Comparison of ASU 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.	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.	44.5% (B) 24.1% (C) 9.3% (F)			

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

Appendix B: The Survey Instrument (2007-2011)

1. How would you best characterize your practice? (PLEASE DO NOT CHECK MORE THAN TWO)

- | | | |
|--|---|--|
| <input type="radio"/> Fully retired (skip to end) | <input type="radio"/> Community health center | <input type="radio"/> Government (VA, IHS, etc.) |
| <input type="radio"/> Semi-retired/On Leave | <input type="radio"/> Group Practice | <input type="radio"/> Administrative Medicine |
| <input type="radio"/> Med school, intern, resident, fellow | <input type="radio"/> Solo Practice | <input type="radio"/> Academic/Teaching/Research |
| | <input type="radio"/> Hospitalist | <input type="radio"/> Locum Tenens |

2. Which of the following are available at your practice location? (CHECK ALL THAT APPLY)

- ☐ Email ☐ Internet ☐ Fax ☐ Medifax ☐ None of the above

3. How do you submit your bills to payers? (CHECK ALL THAT APPLY)

- ☐ Email ☐ Internet ☐ Fax ☐ US Mail ☐ Don't Know ☐ N/A

4. Are patients' medical records in your practice/organization stored as:

- Paper files ☐ 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

b. Is your EMR system connected to: (CHECK ALL THAT APPLY)

- ☐ Hospital ☐ Pharmacy ☐ Lab ☐ Radiology Center ☐ None of these

Are you the person who decided to purchase an electronic medical record system?

- ☐ Sole Decisionmaker ☐ Shared Decision ☐ Decided by Others

What is a reasonable amount to pay for an electronic medical record system (per individual provider within a practice setting)?

- ☐ \$5,000-\$10,000/provider ☐ \$10,000-\$20,000/provider ☐ >\$20,000/provider

GO TO QUESTION #6

5. Are you the person who would decide to purchase an electronic medical record system?

- a. ☐ Sole Decisionmaker ☐ Shared Decision ☐ Decided by Others

b. What best describes the barriers to adoption of electronic medical records in your practice/organization?

- ☐ Cost ☐ Insufficient Return on Investment ☐ Time/Training ☐ Lack of Interoperability ☐ Attitudes

c. Would you consider an internet-based system (patient records stored offsite) rather than one where the records are stored in your office PC or server? ☐ Yes ☐ No

d. What is a reasonable amount to pay for an electronic medical record system (per individual provider within a practice setting)? ☐ \$5,000-\$10,000/provider ☐ \$10,000-\$20,000/provider ☐ >\$20,000/provider

6. Would you be willing to participate in a web-based system that permits the exchanges of medical records among health care providers? ☐ Yes ☐ No (if no, SKIP TO #7)

a. Who would you trust to manage the health information exchange system? (CHECK ALL THAT APPLY)

- | | |
|---|---|
| <input type="radio"/> Commercial Vendor | <input type="radio"/> Health Insurer/Managed Care Plan |
| <input type="radio"/> Hospital System | <input type="radio"/> Regional Health Information Organization (RHIO) |
| <input type="radio"/> State of Arizona (AHCCCS) | <input type="radio"/> Other |

7. ☐ PLEASE SEND ME A COPY OF THE RESULTS

Thank you for completing this survey.

Appendix C: The Survey Instrument (2012)

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
 - i. {if yes then ask} Approximately how many physicians are associated with this practice?
 - I. 2-5 physicians ☐Yes ☐No
 - II. 6-50 physicians ☐Yes ☐No
 - III. 51-94 physicians ☐Yes ☐No
 - IV. 95 or more physicians ☐Yes ☐No
 - c) A hospital or medical school physician group practice ☐Yes ☐No
 - i. if yes then ask} Approximately how many physicians are associated with this practice?
 - I. 2-5 physicians ☐Yes ☐No
 - II. 6-50 physicians ☐Yes ☐No o
 - III. 51-94 physicians ☐Yes ☐No
 - IV. 95 or more physicians ☐Yes ☐No
 - d) A community or rural health center(e.g. federally qualified CHC) ☐Yes ☐No

- a. *{if yes then ask}* Approximately how many physicians are associated with this center?
 - i. 2-5 physicians ☐ Yes ☐ No
 - ii. 6-50 physicians ☐ Yes ☐ No
 - iii. 51-94 physicians ☐ Yes ☐ No
 - iv. 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
 - a. *{if yes then ask}* Approximately how many physicians are associated with this facility?
 - I. 2-5 physicians ☐ Yes ☐ No
 - II. 6-50 physicians ☐ Yes ☐ No
 - III. 51-94 physicians ☐ Yes ☐ No
 - IV. 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} Approximately how many of each of the following providers are associated with this practice?

- i. _____ PAs
- ii. _____ RNs
- iii. _____ NPs
- iv. _____ 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
- i. *{if yes then ask}* What is the name of your EMR/EHR system
- | | |
|--|---|
| 1. Allscripts <input type="checkbox"/> Yes <input type="checkbox"/> No | 13. Greenway Medical <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 2. Amazing Charts <input type="checkbox"/> Yes <input type="checkbox"/> No | 14. HealthPort <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 3. Aprima <input type="checkbox"/> Yes <input type="checkbox"/> No | 15. McKesson <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 4. Athena Health <input type="checkbox"/> Yes <input type="checkbox"/> No | 16. Meditech <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 5. GE Centricity <input type="checkbox"/> Yes <input type="checkbox"/> No | 17. NextGen <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 6. Cerner <input type="checkbox"/> Yes <input type="checkbox"/> No | 18. Noteworthy <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7. CHARTCARE <input type="checkbox"/> Yes <input type="checkbox"/> No | 19. Office Practic.com <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 8. eClinicalWorks <input type="checkbox"/> Yes <input type="checkbox"/> No | 20. Sage <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 9. Epic <input type="checkbox"/> Yes <input type="checkbox"/> No | 21. SOAP ware <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 10. eMDs <input type="checkbox"/> Yes <input type="checkbox"/> No | 22. Other _____ |
| 11. Epic <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 12. GE <input type="checkbox"/> Yes <input type="checkbox"/> No | 23. Don't know <input type="checkbox"/> Yes <input type="checkbox"/> No |
- ii. On a scale of 1 (awful) to 5 (outstanding), how would you rate your EMR/EHR system in terms of:
1. Ease of use ☐1 ☐2 ☐3 ☐4 ☐5
2. Effect on your productivity ☐1 ☐2 ☐3 ☐4 ☐5
3. Effect on staff productivity ☐1 ☐2 ☐3 ☐4 ☐5
4. Reliability ☐1 ☐2 ☐3 ☐4 ☐5

5. Performance versus vendor's promises ☐1 ☐2 ☐3 ☐4 ☐5

7. *{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	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Prescriptions (e-prescribing)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Lab Test Results	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Reminders for Guideline Based Interventions	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Public Health Reports: immunizations, notifiable diseases	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Quality Metrics (HEDIS, AQA etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know

8. *{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}

i. *Is your EMR/EHR vendor helping you to meet the **meaningful use criteria**?*

1. ☐ Yes

2. ☐ No

c) *Are you aware of the support offered by the Arizona Regional Extension Center?*

1. ☐ Yes :working with them {go to wind up question}
2. ☐ Yes but not working with them at present
3. ☐ No

d) If you would like more information on the Arizona Regional Extension Center you can contact them at 602-688-7200 or her@azhecc.org Or

- i. 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

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

a. Are you the person who would decide to purchase an EMR/EHR system?

- i. Sole decision maker ☐Yes ☐No
- ii. Shared decision ☐Yes ☐No
- iii. Decided by others ☐Yes ☐No

b. Are there plans for installing an EMR/EHR system in the future?

- i. ☐No
- ii. ☐Don't know
- iii. ☐Yes, in the next ☐6 months ☐7-12 months ☐more than 12 months

a.{if yes}What system are you planning to install?

- | | |
|--|---|
| 1. Allscripts <input type="checkbox"/> Yes <input type="checkbox"/> No | 12. Greenway Medical <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 2. Amazing Charts <input type="checkbox"/> Yes <input type="checkbox"/> No | 13. HealthPort <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 3. Aprima <input type="checkbox"/> Yes <input type="checkbox"/> No | 14. McKesson <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 4. Athena Health <input type="checkbox"/> Yes <input type="checkbox"/> No | 15. Meditech <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 5. Centricity <input type="checkbox"/> Yes <input type="checkbox"/> No | 16. NextGen <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 6. Cerner <input type="checkbox"/> Yes <input type="checkbox"/> No | 17. Noteworthy <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 7. CHARTCARE <input type="checkbox"/> Yes <input type="checkbox"/> No | 18. Office Practic.com <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 8. eClinicalWorks <input type="checkbox"/> Yes <input type="checkbox"/> No | 19. Sage <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 9. Epic <input type="checkbox"/> Yes <input type="checkbox"/> No | 20. SOAP ware <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 10. eMDs <input type="checkbox"/> Yes <input type="checkbox"/> No | 21. Other _____ |
| 11. GE Centricity <input type="checkbox"/> Yes <input type="checkbox"/> No | 22. Don't Know <input type="checkbox"/> Yes <input type="checkbox"/> 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:

10. _____

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

2. ☐ I serve patients in multiple states via
 - 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

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

4. Are you planning to return to practice in Arizona?

- a) ☐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
- a) Which one of the following **best** describes the organization in which you practice? A physician owned solo practice ☐Yes ☐No {if yes, auto fill 3a=yes; skip to 4};
- b) A physician owned group practice ☐Yes ☐No
- a. {if yes then ask} Approximately how many physicians are associated with this group?
- a. 2-5 physicians ☐Yes ☐No
- b. 6-50 physicians ☐Yes ☐No
- c. 51-94 physicians ☐Yes ☐No
- d. 95 or more physicians ☐Yes ☐No
- c) A hospital or medical school physician group practice ☐Yes ☐No
- a. {if yes then ask} Approximately how many physicians are associated with this center?
- i. 2-5 physicians ☐Yes ☐No
- ii. 6-50 physicians ☐Yes ☐No
- iii. 51-94 physicians ☐Yes ☐No
- iv. 95 or more physicians ☐Yes ☐No
- d) A community or rural health center(e.g. federally qualified CHC) ☐Yes ☐No
- a. {if yes then ask} Approximately how many physicians are associated with this center?
- i. 2-5 physicians ☐Yes ☐No
- ii. 6-50 physicians ☐Yes ☐No
- iii. 51-94 physicians ☐Yes ☐No
- iv. 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
- a. {if yes then ask} Approximately how many physicians are associated with this facility?
- i. 2-5 physicians ☐Yes ☐No
- ii. 6-50 physicians ☐Yes ☐No
- iii. 51-94 physicians ☐Yes ☐No
- iv. 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

5. 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
 - a. *{{if yes then ask}}* Approximately how many of each of the following providers are associated with this practice:
 - i. ____ PAs
 - ii. ____ RNs
 - iii. ____ NPs
 - iv. ____ Other licensed health care providers
 - b) Employee/contractor/locum tenens ☐Yes ☐No
 - c) Faculty ☐Yes ☐No
 - d) Student (include residents, fellows etc.) ☐Yes ☐No
6. 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
7. 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
8. 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
 - i. *{{if yes then ask}}* 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

- ii. On a scale of 1 (awful) to 5 (outstanding), how would you rate your EMR/HER system in terms of:
 1. Ease of use ☐1 ☐2 ☐3 ☐4 ☐5
 2. Effect on your productivity ☐1 ☐2 ☐3 ☐4 ☐5
 3. Effect on staff productivity ☐1 ☐2 ☐3 ☐4 ☐5
 4. Reliability ☐1 ☐2 ☐3 ☐4 ☐5
 5. Performance versus vendors 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:

9. _____

AHCCCS Gov Paper Survey Version 2012

Name _____

License No. _____

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 {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
- c) Actively employed outside of Arizona ☐ Yes
- d) Retired/Semi-retired/on leave ☐ Yes

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

- a) a physician owned solo practice ☐ Yes
 - i. A physician owned group practice ☐ Yes **If yes:** Approximately how many physicians are associated with this practice?
 - a. 2-5 physicians ☐ 6-50 physicians ☐ 51+ physicians ☐
- b) A hospital or medical school physician group practice ☐ Yes
 - i. **If yes:** Approximately how many physicians are associated with this practice?
 - a. 2-5 physicians ☐ 6-50 physicians ☐ 51+ physicians ☐
- c) A community or rural health center(e.g. federally qualified CHC) ☐ Yes
- d) Federal Government hospital or clinic (e.g. VA, IHS etc.) ☐ Yes
- e) State or County hospital system ☐ Yes
- f) Private Hospital system ☐ Yes
- g) Private Outpatient Facility not part of a hospital system (e.g. Urgent Care center, insurer owned clinic, etc.) ☐ Yes
- h) Medical school ,university, research center ☐ Yes
- i) Public or private health Insurer, pharmaceutical company or other health related organization that does not provide care. ☐ Yes
- j) Other _____

3. Which of the following **best** describes your primary role in the organization in which you practice?
- a) Owner, partner, part-owner ☐ *{if yes then ask}* Approximately how many of each of the following providers are associated with this practice?
 - i. PAs RNs NPs
 - ii. Other Licensed Health Care Providers
 - b) Employee/contractor/locum tenens ☐
 - c) Faculty ☐
 - d) Student (include residents, fellows etc.) ☐
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 store its medical records? (**Check all that apply**);
- d) *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
 - i. *{if yes then ask}* **What is the name of your EMR/EHR system?**

1. Allscripts <input type="checkbox"/>	12. GE <input type="checkbox"/>
2. Amazing Charts <input type="checkbox"/>	13. Greenway Medical <input type="checkbox"/>
3. Aprima <input type="checkbox"/>	14. HealthPort <input type="checkbox"/>
4. Athena Health <input type="checkbox"/>	15. McKesson <input type="checkbox"/>
5. GE Centricity <input type="checkbox"/>	16. Meditech <input type="checkbox"/>
6. Cerner <input type="checkbox"/>	17. NextGen <input type="checkbox"/>
7. CHARTCARE <input type="checkbox"/>	18. Noteworthy <input type="checkbox"/>
8. eClinicalWorks <input type="checkbox"/>	19. Office Practic.com <input type="checkbox"/>
9. Epic <input type="checkbox"/>	20. Sage <input type="checkbox"/>
10. eMDs <input type="checkbox"/>	21. SOAP ware <input type="checkbox"/>
11. Epic <input type="checkbox"/>	22. Other _____
	_ Don't know <input type="checkbox"/> Yes <input type="checkbox"/> No

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

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

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	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Prescriptions (e-prescribing)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Lab Test Results	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Reminders for Guideline Based Interventions	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Public Health Reports: immunizations, notifiable diseases	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know
Quality Metrics (HEDIS, AQA etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know <i>{If ne yes then go to next row}</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know

6. 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

- 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**?
3. ☐ Yes
4. ☐ No
7. Are you aware of the support offered by the Arizona Regional Extension Center?
2. ☐ Yes :working with them {go to wind up question}
4. ☐ Yes but not working with them at present
5. ☐ No
8. 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

Appendix D: ASU Physician Workforce Reports and Articles

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

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

Johnson, William G, Bannister, Wade M, Russell, Kathleen M, Edge, Miwa, Gray, Heather, Merritt, Ross. *Arizona physician trends: reasons for leaving Arizona*. Phoenix (AZ): Arizona State University, Center for Health Information & Research, June 2008.

Friedman, Aaron L, Basco, William T, Hotaling, Andrew J, Pletcher, Beth A, Rimsza, Mary E, Shipman, Scott A, et al. "Enhancing the diversity of the pediatrician workforce." *Pediatrics* 119, no. 4 (2007):833-7. PMID: 17403859.

Furukawa, Michael F, Ketcham, Jonathan D, Rimsza, Mary E. "Physician practice revenues and use of information technology in patient care." *Medical Care* 45, no. 2 (2007):168-76. PMID: 17224780.

Rimsza, Mary E, Johnson, William G, Speicher, Mark, Grossman, Michael. *The Arizona physician workforce study: part II*. Tempe (AZ): Arizona State University, Center for Health Information and Research, 2006.

Rimsza, Mary E, Johnson, William G, Speicher, Mark, Grossman, Michael. *The Arizona psychiatric physician workforce study*. Tempe (AZ): Arizona State University, Center for Health Information and Research, 2005.

Johnson, William G, Rimsza, Mary E, Garcy, Anthony M, Grossman, Michael. *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, 2005.

Johnson, William G, Ptak, Beth A, Casper, Kathleen, Madsen, Bruce. *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, March 1996.

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

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

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