Will “Meaningful Use” Bridge the Adoption Gap for Small Physician Practices? Results of a Survey of Hawaii Physicians

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Abstract

Thousands of U.S. physicians have reached the first stage of “meaningful use” and received incentive payments through the HITECH Act. Yet doubts have surfaced about the sustainability of EHR diffusion, as well as about which providers will benefit from program incentives. In this paper we report the findings of a survey conducted among Hawaii physicians, in which we assessed the views of EHR adopters and non-adopters on EHR effects on healthcare practices and on their plans to apply for meaningful use incentives. Our analysis suggests that meaningful use incentives will encourage assimilation among physicians who already have an EHR system but may be less effective to motivate non-adopters to adopt one. We discuss implications of these findings for EHR diffusion in the context of a multi-year action research program to help small, independent physician practices in Hawaii to adopt and assimilate EHRs and consider implications for policy and research.

1. Introduction

Health information technologies (HIT) advocates in medical societies, academia, government, and industry have attributed the historically low rate and slow pace of electronic health records (EHR) adoption in the U.S. healthcare industry to the high costs of implementation and the lack of financial incentives for health services providers who must invest in and adopt EHRs [1]. In addition to financial barriers, the lack of support services, and of a trained IT workforce to implement EHRs have been cited as barriers to adoption [2] particularly for small practices [7, 21]. Physicians in small, independent practices, who account for nearly 60% of U.S. physicians, have the lowest rates of EHR adoption [9, 14, 20].

In 2009, the U.S. government enacted the Health Information Technology for Economic and Clinical Health Act (HITECH) to promote widespread adoption and use of HIT [1, 2]. This program provides financial incentives to providers who adopt electronic health records and meet the criteria for “meaningful use,” which include a variety of software use practices and demonstrations of technology capabilities. (See [2] for a program summary.) Grants were also made to establish 62 regional extension centers (RECs) to provide implementation support for small practices. Three stages for the program’s implementation are planned through 2017. Stage one criteria were finalized in 2010, and the first incentive payments were paid in 2011. The Centers for Medicare Services (CMS) has set the goal of 100,000 eligible providers achieving stage one of meaningful use by 2012; as of March, 2012, over 59,000 eligible providers had attested that they met these criteria and received incentive payments, and 120,000 physicians in small practices had signed up to work with RECs [16, 23].

Such progress reports suggest that more physicians are adopting EHR systems and some are using the systems in more “meaningful” ways [15, 16, 17]. However, questions about the sustainability, pace, and consequences of EHR diffusion have also surfaced [13, 18, 20, 24, 25, 26]. The CMS goal for EHRs represents less than 15% of U.S. physicians1, and the timing for Stage 2 has been extended, in recognition that the industry-wide technological efforts and the organizational challenges to meet meaningful use criteria are substantial [19]. Whether HITECH incentives are spurring new adoptions and which types of physician practices are benefitting are also not clear [18]. Of particular concern is whether physicians in small practices will be left behind [3, 20, 24, 25]. Recent surveys suggest EHR adoption rates are increasing but adoption rates among small practices continue to lag behind large practices [14, 20].

In this paper we report on a survey of physicians in small, independent practices that investigated these questions. The survey was conducted as part of the Bridging the IT Adoption Gap Program, an action research project to promote HIT adoption among small physician practices in Hawaii [7, 8]. The survey asked physicians about their expectations for how EHR use would influence the practice of medicine, their knowledge of and plans for applying for meaningful use incentives, and their EHR adoption and use status.

Analysis of the survey results suggest that non-adopters remain significantly more skeptical about the value of EHRs than adopters and are less interested in meaningful use incentives, whereas physicians who are already using an EHR system extensively are more likely to apply for incentives. Regarding EHR diffusion, findings suggest that incentives may promote further assimilation of EHRs among existing adopters but may be less effective promoting initial adoption.

2. EHR adoption and assimilation

EHRs are complex IT-enabled organizational innovations. For such innovations, Fichman and Kemerer [11, 12] differentiate adoption (the purchase and installation of a software-enabled innovation) from assimilation (its integration and extensive use within the organization). Organizations typically expend considerable resources to fully exploit a complex IT innovation in ways that improve organizational outcomes [11]. For EHRs benefits to accrue, EHR software and hardware must be adopted and fully integrated into the day-to-day activities of physicians, nurses, and other healthcare providers. Importantly, for system-wide benefits in the U.S. healthcare system to accrue, not only must the rate of EHR adoption increase among all groups of healthcare providers, but physicians and other providers must also assimilate EHR use into their patient care, organizational and inter-organizational practices in ways that improve quality and safety and reduce costs.

Thus, stimulating adoption and assimilation of EHRs present related but distinct policy challenges. The HITECH meaningful use incentive programs provide financial compensation to physicians for adopting an EHR system, based on the practice’s revenue from government programs (Medicare, Medicaid). Incentives will be provided over three stages of advancing “meaningful use” to encourage adopters to also assimilate EHR features into their own practices and to engage in community-level exchanges of patient data. The Center for Medicare Services (CMS) plans to reduce compensation to healthcare providers that do not achieve meaningful use by 2017. Regional Extension Centers were commissioned via federal grants to help small practices to adopt EHRs and to qualify for meaningful use incentives.

Such policy programs address adoption and assimilation challenges to varying extents. Whether these programs will be effective among all physician populations, particularly those in small practices, has yet to be demonstrated [3, 18, 24]. All potential EHR adopters face initial costs for technology purchase and installation, but for small practices, these costs may represent more substantial barriers relative to organizational size [18]. Also important, organizational learning barriers to adopting a complex organizational technology differ substantially among organizations and the long-term pay-off to the adopting organizations may also vary considerably [11, 21]. For instance, physician practices that are growing and changing can spread the costs of EHR adoption over a larger activity base and eventually realize improved productivity from use, whereas physician practices that are stable or even declining in size or diversity may never recoup the costs of adoption [21, 25]. Case studies of EHR implementation projects in large organizations highlight the significant organizational resources and commitment needed to assimilate EHR systems successfully (cf. [4], [6]). Hospitals, large practice groups and clinics are more likely to have the organizational slack resources, such as an in-house IT department, trainers, and other support staff, to dedicate to EHR assimilation, whereas small physician practices are lean organizations. The physician-owner may need to divert time and attention from seeing patients to attend to an EHR system [4, 24].

Thus, some small physician practices might “pay the price” whether they adopt an EHR or choose not to adopt and accept Medicare penalties, whereas other practices might benefit both through EHR incentives and productivity gains. Even if RECs provide assistance for initial EHR adoption, achieving a high level of EHR assimilation will be challenging for small practices [5, 15, 20].

2.1 Regional variation and EHR diffusion

Regional studies are important to understand EHR diffusion in the U.S., because this process may vary significantly depending on the regional healthcare industry structure, mix of the physician practice population, and the effectiveness of organizations tasked with carrying out HITECH and other programs regionally. Assessing regional variation will also help researchers to evaluate HITECH outcomes with more specificity and nuance [14]. For instance, a report from Florida reported physician readiness and interest to apply for incentives to be very high in 2011, whereas a national survey conducted the same year indicated significant variation among states [14].

In this research, we are investigating EHR diffusion in the State of Hawaii. Data on meaningful use attestation in Hawaii suggests that significant barriers persist for small practices. As of March 31, 2

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2 As an example of regional variation, some states have implemented the Medicaid incentive program, whereas others have not.

3 Available at https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/DataAndReports.html
2012, only 178 eligible providers (EPs) had attested to stage 1 of meaningful use. One large practice group associated with the second-largest hospital organization in the state accounted for the large majority (69%) of attesting EPs. This organization has been implementing an EHR system for many years supported by the IT staff, similar to other large healthcare providers [5, 6]. In total, of those attesting to stage one in Hawaii, 76% were employed by hospital practice groups. The remaining 24% (42) appear to be EPs in small physician practices. Based on our experiences working in this physician community (and some attesting EPs), we expect most small practice attesters were EHR adopters prior to 2009.

This analysis illustrates the persistence of practice-size and regional variations in EHR diffusion [15, 16, 20]. To investigate these issues, we turn to our ongoing action research project in Hawaii to investigate and support EHR diffusion processes.

3. Bridging the IT Adoption Gap in Hawaii

The Bridging the IT Adoption Gap project was initiated in Honolulu, Hawaii in 2006 to help small physician practices adopt and use HIT to improve patient management [7]. Funded by the Physicians’ Foundation (www.physiciansfoundation.org) and operated through the Hawaii Medical Foundation, the research goals of this action research project are to assess the community-wide and practice-level changes needed to realize effective EHR assimilation among small practices. Since Fall, 2009 the project has facilitated a community of practice (CoP) among EHR adopters, as these physicians work to further assimilate the EHR into their practices. (See [5], [7], [8] for project reports.) This multi-year research project has evolved in response to the evolving EHR diffusion process in Hawaii, including an insurance-company financed incentive for EHR adoption in 2007-2009 and the HITECH program. In 2011, the project began assisting CoP members with process changes needed for meaningful use stage one attestation.

As a first step to better understand the situation in Hawaii since implementation of the HITECH program, we conducted a survey among the target population of physicians (small, independent physician practices). We hoped to gain insights into how these physicians expect widespread use of electronic health records will influence healthcare service delivery in ambulatory settings and thus their motivations (beyond financial incentives) to undertake the challenging task of adopting an EHR. We also wanted to assess how EHR adopter and non-adopter physicians were responding to the meaningful use program. The results of this survey will help us to transfer knowledge from our project activities to the broader community.

3.1 Survey design and methods

We developed the survey instrument by reviewing questions used in surveys conducted by professional associations [18], researchers [9], and the Center for Disease Control (CDC) [14] and selecting questions most relevant to our research project. The survey contains five sections: physicians’ expectations for EHR effects, knowledge of and plans to apply for meaningful use, open-ended questions about EHRs and meaningful use, EHR adoption status and experience, and physician practice demographic data. We pretested the survey with CoP physician members and adjusted the survey contents based on this feedback.

To create a sampling frame of physicians in small independent practices, we began with the directory of the Hawaii Medical Association, which contained contact information for 2686 physicians. We removed physicians employed by Health Maintenance Organizations (HMOs) and the U.S. Military. We also dropped from the sampling frame physicians in hospital-based specialties, such as anesthesia and radiology, and specialties such as psychiatry and ophthalmology, since our focus is on primary care and related specialties. We then randomly sampled 500 physicians from the remaining sample frame of 1791.

The U.S. mail survey was conducted from June – August, 2011, based on survey methods proposed by Dillman [10], with successive waves of (i) introductory letter; (ii) initial survey package; (iii) reminder postcard; (iv) reminder letter; (v) second survey package; and, (vi) second reminder postcard. When correspondences were returned due to bad addresses, we corrected the address and resent the package if another address could be found. We were unable to contact 33 of the randomly selected physicians. Of the 467 surveys that were delivered, we received 149 responses; 5 were returned incomplete, leaving 144 responses, for a 31% response rate. This response rate is reasonable for physician populations but the sample size limits generalizability to the sample frame. We compared the early (first round) and late (second round) responses and found no significant differences in the demographic characteristics of these groups. Numeric data were entered into SAS for analysis.

Table 1 provides demographic information on survey respondents, with a breakdown between those reporting using an EHR in their practice (adopters) and those who reported they did not (non-adopters). Although there are no publically available demographic data on Hawaii physicians, we believe the sample reasonably reflects the target population of
The demographic characteristics of our survey respondents (age, gender, and years of practice) are consistent with national surveys of small practices [20]. Respondents tended to be mature physicians (50 or over) with extensive experience in their profession (20 years or more). A large majority was male (75%). Younger physicians and female physicians are more frequently employed by HMOs or larger practice groups, which were excluded from the sample frame. Only 9 (6%) of respondents reported working in a hospital-based practice. The 63% of physicians reporting EHR use in their practice is slightly lower than the 70% adoption rate reported for Hawaii in a recent national survey [15]. However, because our sample frame excluded large practice groups, our sample may in fact be slightly biased towards EHR adopters among small physician practices.

### Table 1. Survey respondents

<table>
<thead>
<tr>
<th>Surveys returned</th>
<th>Total</th>
<th>EHR Adopters</th>
<th>EHR Non Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>106 (74%)</td>
<td>67 (74%)</td>
<td>39 (72%)</td>
</tr>
<tr>
<td>Female</td>
<td>36 (24%)</td>
<td>22 (25%)</td>
<td>14 (26%)</td>
</tr>
<tr>
<td>No answer</td>
<td>2 (2%)</td>
<td>1 (1%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

#### Age:

<table>
<thead>
<tr>
<th>Age</th>
<th>Total</th>
<th>EHR Adopters</th>
<th>EHR Non Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 40</td>
<td>11 (8%)</td>
<td>8 (9%)</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>40-49</td>
<td>23 (16%)</td>
<td>18 (20%)</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>50-59</td>
<td>67 (47%)</td>
<td>44 (49%)</td>
<td>23 (43%)</td>
</tr>
<tr>
<td>60 or older</td>
<td>41 (28%)</td>
<td>19 (21%)</td>
<td>22 (43%)</td>
</tr>
<tr>
<td>No answer</td>
<td>2 (2%)</td>
<td>1 (1%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

#### Yrs practice

<table>
<thead>
<tr>
<th>Yrs practice</th>
<th>Total</th>
<th>EHR Adopters</th>
<th>EHR Non Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 or more</td>
<td>98 (68%)</td>
<td>57 (63%)</td>
<td>41 (76%)</td>
</tr>
<tr>
<td>11 to 19</td>
<td>33 (23%)</td>
<td>23 (23%)</td>
<td>10 (19%)</td>
</tr>
<tr>
<td>Less than 10</td>
<td>11 (8%)</td>
<td>9 (9%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>No answer</td>
<td>2 (2%)</td>
<td>1 (1%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

#### Practice

<table>
<thead>
<tr>
<th>Practice</th>
<th>Total</th>
<th>EHR Adopters</th>
<th>EHR Non Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>82 (57%)</td>
<td>46 (51%)</td>
<td>36 (67%)</td>
</tr>
<tr>
<td>Private/hosp</td>
<td>26 (18%)</td>
<td>11 (12%)</td>
<td>15 (28%)</td>
</tr>
<tr>
<td>Clinic</td>
<td>23 (16%)</td>
<td>21 (23%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Hospital</td>
<td>9 (6%)</td>
<td>9 (10%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Other/NA</td>
<td>4 (3%)</td>
<td>3 (3%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

4. Survey Findings and Interpretation

When we conducted the survey in mid-2011, the HITECH Act was in its third year of implementation, and the first meaningful use incentive payments were underway. Thus, Hawaii physicians had had time to hear about this program through professional associations, publications, and colleagues and develop opinions about it, as well as to consider their views of EHR effects. Quantitative responses highlight statistically significant differences between adopters and non-adopters regarding EHR expectations and meaningful use plans. We examine these results below in the context of physicians’ open-ended comments.

### 4.1 Physicians’ expectations for EHR effects

Table 2 presents the survey responses for adopters, non-adopters and overall for 15 survey questions on physicians’ expectations about EHR effects. On average, adopters and non-adopters were moderately optimistic that EHRs can contribute to improvements in the delivery of patient care and in handling patient information. They agreed that EHRs are difficult and costly to implement, and that financial incentives are important to promote widespread adoption. These findings are consistent with national surveys [15, 20]. Non-adopters were more skeptical about the long-term implications of EHRs on the practice of medicine. These findings highlight motivational barriers to EHR adoption, in addition to expected financial barriers.

#### 4.1.1. Patient care practices. Promoters of EHRs argue that widespread adoption will address significant issues in the US healthcare system, i.e., quality of care and patient safety. On average, both adopters and non-adopters expected EHR use to have a positive influence on physicians’ decision support (Q1), application of standard care protocols (Q2), quality (Q3) and safety of care delivery (Q4). EHR adopters were significantly more positive on three aspects (decision support, quality, safety) than non-adopters.

However, physicians’ open-ended comments reflected a variety of opinions and concerns. Some adopters commented that EHR use could facilitate coordination of care between primary care and specialist physicians, reduce duplication of services and tests, and support evidence-based medicine. One physician noted, “I have experienced improved communication between PCP and specialists; ability to accurately monitor medications received/used; and, overall, I feel I am better able to deliver comprehensive care.” Others were decidedly skeptical. For example, one adopter commented, “The ‘US Health System’ is a fragmented collage. EMR will be another layer of fragmented, impenetrable smoke.” A non-adopter stated that the major advantage of EHRs would be tracking healthcare expenditures and commented, “The government is more concerned with financial matters than with quality of patient care.”

#### 4.1.2. Interactions with patients. Physician concerns that EHR use interferes with their patient interactions
are well known. Adopters and non-adopters agreed that EHR use could improve follow-up with patients between visits (Q6), and that patients would have better access to their healthcare data (Q7). In open-ended comments, physicians mentioned portability of health records and access to health data while traveling as EHR advantages. Though individuals in each group mentioned privacy and security as concerns in their open-ended comments, adopters were significantly more assured, on average, that patient privacy could be maintained adequately, whereas non-adopters were more likely to doubt privacy protection (Q8).

On average, EHR adopters were also significantly more optimistic than non-adopters that EHR use could improve communications with patients during office visits (Q5), but, like non-adopters, they were not enthused about this aspect of EHR use. Non-adopters commented that patients reacted negatively to physicians spending too much time on the computer. EMR adopters also voiced strong concerns, as did this physician: “Nothing is more unattractive than a physician tapping away on a keyboard during a patient encounter. Luckily I will retire before I need to do this in 2 or 3 years in the setting in which I work, and I NEVER enter information in the presence of the patient.” Another adopter commented: “Detracts from doctor patient relationship! Physicians pushed and incentivized to focus on EMR instead of patient.”

Thus, while experience in their own practices might abate physicians’ concerns about how EHR use affects patient interactions, adopters and non-adopters continue to have doubts about this aspect of EHR use.

4.1.3. EHR impact on physicians. Expectations that EHRs are hard to use, and that they reduce physicians’ efficiency are widespread. In small practices, the physician-owners are the revenue generators, and loss of efficiency results in lost income for the practice or requires physicians to spend longer hours documenting. On average, the adopter group was less negative about EHR ease-of-use than non-adopters, whereas non-adopters had negative expectations for EHR ease-of-use (Q9). Adopters were slightly positive about EHRs improving their efficiency whereas non-adopters were neutral on this question (Q10).

Physicians’ open-ended responses provide insights into these low values, even among EHR adopters. Adopters’ favorable comments centered on better-organized patient files, easier access to files and data, and saving office space. One adopter succinctly summarized these points: “easy to retrieve data (once you spend hours getting it in).” Another noted: “after the initial implementation, increased ease of use; more complete documentation, no ‘lost or misplaced’ paper charts, good INTRA office communication tools.” Such comments suggest benefits are related to a more efficient office staff and office arrangement rather than improving efficiency of physicians’ own activities.

While some non-adopters also commented that electronic files might be more manageable, others expressed strong opinions, even resentment, about physicians’ needing to document in an EHR, as did this physician: “extra time spent and lost plugging information into EMR and busy work requirements secondary to documenting requirements resulting in fluffed up & nice looking but totally useless records.” Some experienced EMR users had similar concerns, as did this adopter: “1) less face-to-face time with patients; 2) increase time needed to complete medical records for both physicians & staff; 3) decrease number of patients that can be seen per day.” Thus, experience using an EHR appeared to only slightly lesson physicians’ negative impressions of EHR ease-of-use and productivity implications.

4.1.4. EHR Implementation efforts. Many case studies and trade press reports emphasize the difficulties implementing EHRs and the costs for ongoing support. On average, adopters and non-adopters agreed with these expectations, but non-adopters were significantly more negative about these implementation barriers (Q11, Q12). Open-ended comments suggest that non-adopters, relying on word-of-mouth from colleagues and industry reports, focused on initial costs. For example, this non-adopter pointed to the variety of additional expenses a physician practice should expect: “expense of system itself, expense of time, staffing & implementing system & general upkeep. Since many of the old records need to be scanned w/reports & correspondence. Cannot afford these practice expenses.” Another outlined similar financial barriers: “financial cost to implement & transition. Not only acquisition & startup costs but loss of revenue as we will see less patients during the transition. I anticipate it will take 18-24 mos. before we are seeing as many patients as we currently do.”

Adopters were more concerned with ongoing expenses of maintaining their EHR systems. One adopter complained, “so many fragmented systems, no integrations or standardization. Some systems overly-engineered, making them full-featured but INEFFICIENT to use, slowing down flow.” Another expressed frustration dealing with the technology and need for support: “1) greedy IT people - they hike up costs of services (totally unreasonable in some cases); 2) inadequate info on systems; 3) lack of standardization of software.”

Overall, despite recognizing some benefits adopters and non-adopters remained pessimistic about the cost-benefit case for EHRs for their practices.
4.1.5. EHR implications over the long term. Adopters and non-adopters agreed that significant financial incentives would be needed to promote widespread adoption of EHRs (Q14). Indeed, it is likely that some of the survey respondents who were adopters had benefited from the Hawaii EHR incentive program in 2007-2009. However, physicians were not universally supportive of incentive programs. One non-adopter complained: “there have been inflated costs of EMRs BECAUSE of government subsidies ("incentives"); I object to attempts at changing clinical behaviors with monetary incentives and object to the government spending money it does not have.” Another complained, “It is bad enough what insurance companies are going to pay physicians, now we need to pay for a system that will throw us out of business due to cost!” Adopters were similarly skeptical, as this adopter’s comment about EHRs indicate: “does not accomplish its goal in any significant way. If it did you wouldn’t have to pay physicians to use it. My major concern is patients are not being helped & physicians are being bribed successfully in small numbers. Solo practices must survive this biased approach.”

<table>
<thead>
<tr>
<th>EHRs will ....</th>
<th>Overall</th>
<th>Adopters</th>
<th>Non-adopters</th>
<th>ANOVA Results</th>
</tr>
</thead>
</table>
| 1. Help increase decision support in patient care (e.g., providing adverse drug interactions). | 3.94 1.02 | 4.10 0.97 | 3.69 1.10 | 0.41* | F Value = 5.88  
P Value = 0.0195 |
| 2. Help physician apply standard care protocols more readily (e.g., foot exam or A1C for diabetics). | 3.85 1.02 | 3.96 0.98 | 3.67 1.06 | 0.29 | F Value = 2.74  
P Value = 0.0999 |
| 3. Improve the quality of health care delivered to patients. | 3.54 1.16 | 3.74 1.13 | 3.20 1.16 | 0.54* | F Value = 7.62  
P Value = 0.0055 |
| 4. Improve the safety of patient care. | 3.73 1.04 | 3.88 0.98 | 3.48 1.09 | 0.40* | F Value = 5.05  
P Value = 0.0262 |
| 5. Improve patient/physician communication during in-person office or clinic visits. | 2.94 1.34 | 3.18 1.32 | 2.54 1.30 | 0.64* | F Value = 8.04  
P Value = 0.0052 |
| 6. Improve patient follow-up (e.g., patient reminders, scheduled follow-ups, phone encounters). | 3.73 1.07 | 3.74 1.14 | 3.70 0.96 | 0.04 | F Value = 0.08  
P Value = 0.8262 |
| 7. Increase access to health information for patients. | 3.87 1.03 | 3.97 1.00 | 3.70 1.06 | 0.27 | F Value = 2.24  
P Value = 0.137 |
| 8. Adequately protect patient privacy. | 3.08 1.23 | 3.29 1.18 | 2.72 1.23 | 0.57* | F Value = 7.50  
P Value = 0.0070 |
| 9. Are relatively easy to use. | 2.78 1.22 | 3.04 1.21 | 2.35 1.14 | 0.69* | F Value = 11.60  
P Value = 0.0009 |
| 10. Help physicians become more efficient in their practice. | 3.23 1.28 | 3.37 1.27 | 3.00 1.27 | 0.37 | F Value = 2.81  
P Value = 0.0956 |
| 11. Are difficult to implement. | 4.08 0.89 | 3.93 0.90 | 4.31 0.84 | -0.38* | F Value = 6.83  
P Value = 0.0126 |
| 12. Require too much costly support. | 4.06 0.89 | 3.83 0.93 | 4.43 0.69 | -0.60* | F Value = 16.55  
P Value = 0.0001 |
| 13. Replace paper records in the next ten years. | 3.73 1.09 | 3.93 0.98 | 3.39 1.19 | 0.54* | F Value = 8.85  
P Value = 0.0034 |
| 14. Require significant financial incentives to encourage widespread use. | 4.19 1.00 | 4.14 0.94 | 4.26 1.08 | -0.12 | F Value = 0.45  
P Value = 0.5051 |
| 15. De-professionalize physician practice. | 3.01 1.22 | 2.82 1.15 | 3.34 1.27 | -0.52* | F Value = 6.28  
P Value = 0.0133 |

Table 2: Physician Responses to EHR Expectations Survey Questions
Despite such skepticism, on average adopters were significantly more confident that electronic records will replace paper records in the next ten years (Q13). EHR users may be more aware of and up-to-date on ongoing HIT developments. However, adopters were concerned about standardization and data exchange. One adopter commented: “The lack of standardization between systems means information cannot be exchanged electronically and means systems purchased today will be obsolete (even if the hardware is not) and will need to be re-purchased later. Requiring EHR right now makes no sense.”

Adopters were modestly (though significantly) less concerned that widespread EHR use would de-professionalize physicians’ practice (Q15). However, open-ended comments indicated few physicians embraced enthusiastically the professional implications of EHRs and many believed that EHRs represent and enable changes that are de-professionalizing. Typical comments by non-adopters claimed widespread EHR use would “keep track of physicians more easily; punish them when don’t follow ‘rules’ or ‘standards’;” and “will promote more ‘cookbook’ medicine rather than individualized medicine.” Some adopters agreed. One physician commented about expected widespread effects of EHRs: “external monitoring and directives of patients records and care; penalties and disincentives based on statistics derived from EMR data mining.” Another adopter made this impassioned comment, “Physicians ARE DOCTORS! We assess and treat medical issues for human. We are not paper pushers, techies, MBAs, or even the DMV! We are people connecting with other people to help them with their health!”

Thus, even those physicians with experience using an EHR in their practice appeared to have serious concerns about how widespread EHR diffusion may influence the practice of medicine, despite their recognition of improvements in records handling.

### 4.2 EHR adoption and meaningful use plans

Table 3 summarizes survey responses from Hawaii physicians in small practices about their knowledge of and intentions to apply for meaningful use incentives. These survey results are generally consistent with a 2011 national survey [14].

<table>
<thead>
<tr>
<th>Familiar with program:</th>
<th>EHR Adopters</th>
<th>EHR Non adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very familiar</td>
<td>30 (33%)</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>Somewhat familiar</td>
<td>35 (39%)</td>
<td>21 (39%)</td>
</tr>
<tr>
<td>Basic Awareness</td>
<td>16 (18%)</td>
<td>15 (28%)</td>
</tr>
<tr>
<td>Not followed</td>
<td>9 (10%)</td>
<td>13 (24%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning to apply:</th>
<th>EHR Adopters</th>
<th>EHR Non adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>51 (57%)</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>Uncertain</td>
<td>21 (23%)</td>
<td>7 (13%)</td>
</tr>
<tr>
<td>No</td>
<td>6 (7%)</td>
<td>30 (56%)</td>
</tr>
<tr>
<td>Need more information</td>
<td>2 (2%)</td>
<td>6 (11%)</td>
</tr>
<tr>
<td>Don’t know or not applicable</td>
<td>10 (11%)</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

Table 3. Intentions for meaningful use

Lack of information about the meaningful use program may contribute to these findings. However, 48% of non-adopters indicated they were somewhat or very familiar with the program and only 11% indicated they needed more information to decide. Among non-adopters, 15% who were somewhat or very familiar planned to apply and 54% planned not to apply. Among adopters, 72% were very or somewhat familiar with the program and only 2% indicated they needed more information to decide. Among adopters who were somewhat or very familiar with the meaningful use incentives, 66% planned to apply and only 8% planned not to apply. These results suggest that non-adopters in particular may be questioning the viability or relevance of the program to their practices; simply providing more information may be ineffective for stimulating their interest in adopting, given their overall negative expectations about EHR use (see survey results above).

Physician age appears to be a factor in plans to apply for meaningful use incentives. Of those physicians not planning to apply 53% were 60 or older (about twice the percentage of survey respondents in this age group). Although 30% of this age group did plan to apply for the incentives, all but two were

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4 Hsiao et al. [14] reported a national average of 51% of physicians planned to apply for meaningful use incentives (33-35% in Hawaii), 16% not planning to apply, and 33% uncertain. Our survey found 42% planned to apply, 25% planned not to apply, and 33% uncertain.
already EHR adopters and reported making extensive or limited but effective use of their EHR system.

Meaningful use incentives might not motivate many additional Hawaii independent physicians who do not already have an EHR to adopt, but responses from EHR adopters (Table 4) indicated incentives will motivate this group to change their system use practices to be consistent with the meaningful use guidelines in order to qualify for the program.

### Table 4. EMR use by adopters

<table>
<thead>
<tr>
<th>Level of use:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive, taking full advantage</td>
<td>21 (23%)</td>
</tr>
<tr>
<td>Limited but effective</td>
<td>45 (50%)</td>
</tr>
<tr>
<td>Limited, not significant value</td>
<td>10 (11%)</td>
</tr>
<tr>
<td>Using for practice management</td>
<td>7 ( 8%)</td>
</tr>
<tr>
<td>Other</td>
<td>7 ( 8%)</td>
</tr>
<tr>
<td>Years using EMR:</td>
<td></td>
</tr>
<tr>
<td>5 or less years</td>
<td>57 (63%)</td>
</tr>
<tr>
<td>6-10 years</td>
<td>25 (28%)</td>
</tr>
<tr>
<td>10 or more years</td>
<td>8 ( 9%)</td>
</tr>
</tbody>
</table>

Also notable, those EHR adopters planning to apply for incentives have an average of 4.6 years of EHR experience (range 0-20 years), and 35% have five or more years of EHR use. Among EHR adopters who had decided to apply for incentives (at the time the survey was conducted), 61% reported they were already making extensive use and taking full advantage of their EHR, and 20% reported limited but effective EHR use in the practice (total 81%). Of physicians reporting full use or limited but effective use, only 5% indicated they would not apply for incentives; others were not sure. Since adopters have already “paid the cost” of adoption, they would be able to dedicate incentive payments to the costs of furthering assimilation, for example, upgrading the EHR system or paying for extra training or add-on features needed for meaningful use attestation (such as e-prescribing).

### 5. Discussion

The results of our survey among small physician practices in Hawaii suggest that, in addition to financial concerns, physicians’ doubts about and lack of enthusiasm for EHRs present motivational barriers to sustained diffusion of EHRs in this population. Meaningful use incentives have the most appeal to those who have already adopted an EHR; incentives may motivate their further assimilation of EHR features to coincide with meaningful use criteria. Incentives appear less effective to motivate experienced physicians who have not yet adopted an EHR to do so. Open-ended comments and the high percent (56%) of these physicians who plan to forgo financial compensation from the program support this interpretation. CMS data on attestations to meaningful use in Hawaii to-date highlight the small number of eligible providers in small practices who have thus far benefited from the program and the disparities between the organizational capacity of large practices to benefit from the program compared to small practices. In particular, small practices with older, experienced physicians who have not yet adopted an EHR may be left behind in the HITECH movement to pervasive EHR adoption and assimilation.

Before we discuss the broader implications of our study, we note several limitations. By design, our study focused on a distinct physician population: small physician practices in Hawaii. Findings for large group or hospital-based practices are likely to differ. Findings in other regions with a different mix of healthcare industry organizations, physician practice types and populations, and community support for EHRs may also differ. Physicians responding to this survey might have been motivated by especially strong opinions about EHRs and thus may not represent the sampling frame. As the HITECH program proceeds, physicians’ plans for meaningful use and their adoption status may change, although EHR expectations are more likely to be stable. With these limitations in mind, we now consider key policy implications.

The proverb “you can bring a horse to water but you can’t make it drink” highlights the dilemma that government policy makers and other HIT advocates face. It is possible that many of the physicians in small practices who were most willing to adopt EHRs have already done so, either on their own or through earlier financial incentive programs, and that the non-adopters remaining represent a resistant pool of potential adopters. Such physicians did not respond to earlier incentives, which in Hawaii and elsewhere were more generous and had fewer requirements (e.g., upfront grants for EHR purchase). Non-adopters’ expectations about EHR use, evident in their survey responses and open-ended comments, indicate these physicians are very skeptical about the value of EHRs generally, are concerned about the negative effects of EHR use on their practices, and are not convinced that start-up and ongoing costs would be off-set by productivity benefits or incentives. As an adopter commented, if EHRs were “delivering on promises,” physicians would not need to be paid to use them. Even if physicians’
attitudes improve with EHR experience, motivating initial EHR adoption and use remains a challenge.

Simply providing more information on the meaningful use program is unlikely to stimulate a much higher adoption rate among such physicians. In our survey, the majority of physicians who did not plan to apply were already familiar with the program. Increasing the penalties for not adopting (such as reducing Medicare reimbursements) could be ineffective, as physicians might accelerate plans to retire or opt-out of federal health insurance programs, exacerbating projected physician shortages [22]. Such unintended outcomes have noted in U.S. congressional efforts to exempt small practices and physicians close to retirement from penalties [25].

One approach would be to ignore non-adopters and to focus on promoting deeper assimilation among existing adopters, essentially letting non-adopters work their way out of the U.S. healthcare system over time. As others have reported [20] as well, older physicians are less likely to adopt an EHR and may choose to wait out the EHR diffusion wave until their retirement. Yet physicians in this group represent a wealth of medical knowledge and experience, and in some communities they may be vital to maintaining an adequate level of medical services for the local population.

How then might non-adopters in small practices be encouraged to “drink the water” of EHRs and adopters be encouraged to assimilate EHRs more fully, given the negative expectations physicians reported in this survey? Physicians in large practice groups have access to organizational resources to facilitate EHR use [4, 6] whereas doctors in small practices do not [7, 20]. We agree with Rao et al. [20] that long-term support for physicians in small practices will be required for widespread EHR diffusion in this population and support for RECs beyond the four years initially funded might be beneficial [20]. However, when REC funding grants end, local communities may need to subsidize EHR support services.

CMS-commissioned evaluations and REC reports will provide insights on how to organize community-level support for physicians in small practices. Beyond the physician enrollment counts reported thus far, independent research will help to assess what types of REC activities were effective and in what types of settings, and how physicians responded to REC services, regionally and nationally. Action research projects may also serve as examples. The Bridging the IT Adoption Gap Project has had some success facilitating EHR adoption and assimilation, acting as a catalyst by leading a community of practice (CoP). As we report elsewhere [5, 8], physicians’ motivation to incorporate EHR features more extensively increased with ongoing support and training and, importantly, through interactions among physicians for problem solving, sharing ideas, and encouragement. Physicians are, we believe, the most credible spokespersons for EHRs to their peers. Interestingly, in contrast to expectations about age-related differences in EHR use, more experienced physicians sometimes serve as examples to younger physicians on how EHRs can improve practice efficiency. Our CoP is composed of adopters, but the CoP approach could include non-adopters to catalyze adoption. CoP members might also be encouraged to serve as EHR leaders in their communities in exchange for subsidized support. Indeed, members of our CoP report that colleagues look to them for advice on EHR decisions. We suggest that such an approach, though gradual, could be an effective way to diffuse EHR use among small physician practices in ways that physicians find acceptable and even professionally enhancing, rather than financial incentives, penalties, or mandates.

6. Concluding remarks

In the U.S. and elsewhere, policy makers are counting on health IT to engender substantial savings and quality improvements to the healthcare sector. Both widespread adoption and assimilation across all health services providers will be necessary to realize such industry-wide improvements [1, 12]. Will the HITECH program promote EHR adoption and stimulate assimilation among the small physician practices that provide a large percentage of primary care services in the U.S. healthcare system? Will its programs bridge the EHR adoption gap for this group?

The answers to these questions will develop over time, as programs are implemented and government-funded and independent research studies are carried out. Initial reports are encouraging. Yet, looking behind the numbers, there remain significant causes for concern, particularly on behalf of small physician practices. In addition to evaluation research on program outcomes, theory-informed research from the academic community on the institutional and professional dynamics of the national EHR diffusion process and variations within regions and populations of potential adopters will help us to fully appreciate the outcomes of this vast social experiment. The report on our survey of small physician practices in Hawaii highlights areas in which ongoing attention and further action will be need to bridge this gap in EHR diffusion.

10. References


ACKNOWLEDGMENTS

We thank the Physicians’ Foundation for their generous funding of this action research project and the Hawaii Medical Foundation for their organizational sponsorship.