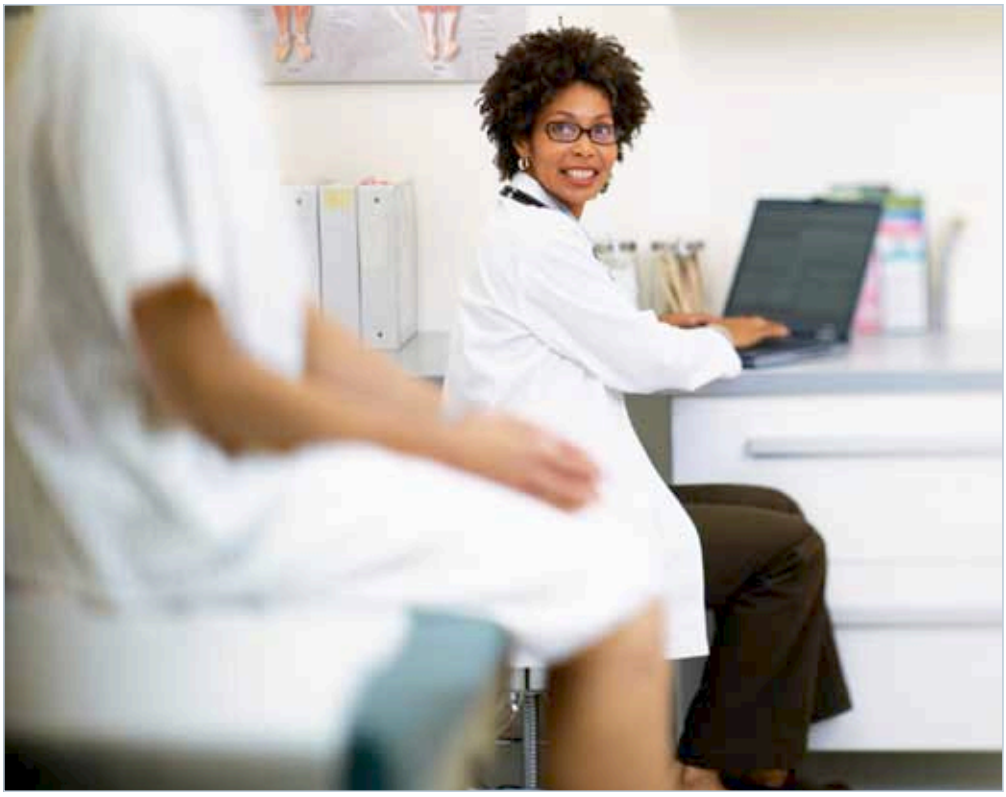
California HealthCare Foundation



On the Road to Meaningful Use of EHRs:

A Survey of California Physicians

June 2012

On the Road to Meaningful Use of EHRs:

A Survey of California Physicians

Prepared for

California HealthCare Foundation

by

Janet M. Coffman, MA, MPP, PhD
Kevin Grumbach, MD
Margaret Fix, MPH
Leon Traister
Andrew B. Bindman, MD
University of California, San Francisco

June 2012

About the Authors

Janet M. Coffman, MA, MPP, PhD, is an assistant professor at the Philip R. Lee Institute for Health Policy Studies and Department of Family and Community Medicine at the University of California, San Francisco.

Kevin Grumbach, MD, is a professor and chair of the Department of Family and Community Medicine at the University of California, San Francisco.

Margaret Fix, MPH, is a research associate at the Philip R. Lee Institute for Health Policy Studies at the University of California, San Francisco.

Leon Traister is a programmer/analyst at the Philip R. Lee Institute for Health Policy Studies at the University of California, San Francisco.

Andrew B. Bindman, MD, is a professor at the Philip R. Lee Institute for Health Policy Studies and Department of Medicine at the University of California, San Francisco.

Acknowledgments

The authors thank Linda Whitney, executive director of the California Medical Board, and her staff for distributing the survey, performing data entry, and transmitting the data to the authors. We also thank Raul Ramirez and Larry Dickey, MD, MPH, of the California Department of Health Care Services for their thoughtful comments on drafts of this report. Catherine Hoffman, PhD, and Arash Ebrahimi, JD, of the California Medicaid Research Institute (CaMRI), provided invaluable support with regard to project administration.

This project was supported by funds received from the State of California, Department of Health Care Services, Office of Health Information Technology and the California HealthCare Foundation. This report was prepared by the University of California, San Francisco, under contract with CaMRI for the California Department of Health Care Services.

About the Foundation

The **California HealthCare Foundation** works as a catalyst to fulfill the promise of better health care for all Californians. We support ideas and innovations that improve quality, increase efficiency, and lower the costs of care. For more information, visit us online at www.chcf.org.

Contents

I. Executive Summary

To encourage the meaningful use of EHRs, the federal government created an incentive program for clinicians and hospitals.

While use of electronic health records (EHRs) can improve coordination and quality of care, patient safety, outcomes reporting, and provider efficiency, some physicians have been slow to adopt the technology. To encourage the meaningful use of EHRs, the federal government created an incentive program for clinicians and hospitals. This report summarizes findings from a survey of California physicians about their current use of EHRs and their eligibility for the incentive program.

The Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Recovery and Reinvestment Act of 2009, authorizes Medicare and Medicaid (Medi-Cal in California) to make incentive payments to clinicians and hospitals for EHR use to improve health care delivery. HITECH incentive payments will total up to $27 billion over 10 years, with $2 billion to $3 billion going to California hospitals and providers.[1] The Centers for Medicare and Medicaid Services (CMS) has given the California Department of Health Care Services (DHCS) responsibility for identifying California physicians who are eligible to receive Medi-Cal EHR incentive payments.

In 2011, faculty at the University of California, San Francisco, working on behalf of the California Medicaid Research Institute, developed and conducted a survey to help DHCS estimate the extent to which California physicians currently use EHRs and the number of physicians in California who would be eligible for Medi-Cal incentive payments. Responses to this survey can be considered baseline data on EHR availability and use prior to implementation of Medi-Cal EHR incentive payments because all responses were submitted several months before DHCS began registering individual providers, group practices, clinics, and hospitals for the program.

Major Findings

Findings for All Respondents

Prevalence

- Seventy-one percent of physicians who responded to the survey report having an EHR at their main practice location.
- Only 30% have an EHR at their main practice location that can achieve all 12 of the meaningful use objectives measured in this survey.
- The EHR systems used by physicians vary in their availability of functions meeting the CMS meaningful use objectives. At the low end, only 40% of responding physicians have an EHR with the capacity to provide patients with access to their own electronic records; at the high end, 61% of all physicians have an EHR with the ability to take clinical notes. Physicians are more likely to use EHR functions that give them information they can use during patient encounters than functions associated with assessing quality of care or exchanging information electronically with patients or other providers.

Satisfaction

- Thirty-five percent of physicians with EHRs are very satisfied with them, 38% are somewhat satisfied, 13% are somewhat dissatisfied, and 14% are very dissatisfied.
- Physicians who indicate that their EHRs can meet the 12 meaningful use objectives measured are more likely to be satisfied with their EHRs than physicians with EHRs that cannot meet all of those objectives.

Factors Associated with EHR Use at Main Practice Location

- Practice type is the strongest predictor of EHR availability. Physicians who practice in large organizations, including Kaiser Permanente, are much more likely to have an EHR at their main practice location than physicians in solo practice, small partnerships, or community/public clinics.
- Kaiser Permanente physicians are also more likely to have an EHR that can meet the 12 meaningful use objectives measured than non-Kaiser physicians.
- Physicians under age 46 are more likely to have EHRs at their main practice location than physicians 46 years of age or older, largely because they are more likely to practice in large organizations.
- Hospital-based physicians are more likely to have EHRs than office-based physicians.
- Urban physicians are more likely to have EHRs than rural physicians.
- Specialty is not a strong predictor of having an EHR. Primary care physicians are only slightly more likely to have EHRs than specialist physicians.

Physicians' Plans Regarding EHR Incentive Payments

- According to the survey, 37% of physicians plan to apply for either Medi-Cal or Medicare incentive payments for meaningful use of EHRs.
- Many physicians are not well-informed about the eligibility criteria for Medi-Cal incentive payments. More than half of physicians who are eligible based on their payer mix, practice setting, and practice type do not believe they are eligible,

do not plan to apply, or need further information about the program. Eight percent of ineligible physicians state that they plan to apply.

Findings for Respondents Eligible for Medi-Cal EHR Incentive Payments

Number of Eligible Physicians

- Findings from this survey suggest that of all physicians with active California licenses, 21,598 (17%) will be eligible for Medi-Cal EHR incentive payments based on their payer mix, practice setting, and practice type. This number could increase if the expansion of Medicaid under the Patient Protection and Affordable Care Act is implemented in 2014 as planned.

Characteristics of Eligible Physicians

- According to the survey, 92% of eligible physicians qualify based on the percentage of their patients who are enrolled in Medi-Cal (≥20% for pediatricians, ≥30% for non-pediatricians). Eight percent of physicians are eligible because they practice in community/public clinics and the combined percentage of their patients who are on Medi-Cal, on Healthy Families, or who are uninsured is ≥30%.
- Eligible physicians are more likely to practice in community/public clinics than physicians who are not eligible (33% versus 6%) and are less likely to practice in Kaiser Permanente's medical group (9% versus 17%) or to be in solo practices (10% versus 18%).
- Primary care physicians are more likely to be eligible for Medi-Cal EHR incentive payments than specialists, probably because hospital-based physicians, who are predominantly specialists, are not eligible for these payments.
- Compared with physicians who are not eligible, physicians who, based on their survey responses, are eligible for Medi-Cal incentive payments are somewhat less likely to report having any sort of EHR (68% versus 72%) or an EHR that can meet the 12 meaningful use objectives measured (30% versus 33%).
- Eligible physicians who practice at Kaiser Permanente or in other large organizations are much more likely to have an EHR than physicians in solo practice, small partnerships, or community/public clinics.

Discussion

The survey's findings suggest that EHRs are widely available in California physicians' practices, but that many of these EHRs are not currently configured to meet CMS objectives for meaningful use. Although 71% of physicians responding to the survey have some sort of EHR, only 30% have EHRs that are currently configured to meet all 12 of the meaningful use objectives measured in the study. Rates of EHR availability are lowest among physicians who work in solo practice, small partnerships, and community/public clinics. Office-based physicians are less likely to have EHRs than hospital-based physicians, and rural physicians are less likely to have them than urban physicians.

The survey results suggest that the Medi-Cal incentive payments are well-targeted to increase meaningful use of EHRs. The majority of respondents who are eligible for the incentive payments (70%) do not currently have EHRs that can meet all 12 of the meaningful use objectives measured in the survey. Twenty-four percent do not have any sort of EHR.

However, many respondents are not familiar with the rules governing eligibility for Medi-Cal EHR

incentive payments. A substantial percentage of respondents who are eligible for Medi-Cal incentive payments believe that they are not eligible, do not plan to apply, or need further information before deciding to apply. Conversely, a large percentage of respondents who plan to apply are not eligible.

These findings have several implications for the Medi-Cal EHR incentive program:

- Ongoing efforts are needed to educate physicians about the eligibility criteria for Medi-Cal incentive payments and to encourage eligible physicians to apply.
- A high priority should be placed on outreach to physicians in community/public clinics, solo practice, and small partnerships because these physicians are least likely to have EHRs.
- Expanding meaningful use among eligible physicians will require outreach to physicians with EHRs that, as currently configured, lack the capacity to meet all of the CMS meaningful use objectives. All physicians eligible for the incentive program need to be educated about the importance of obtaining an EHR that has been certified as capable of meeting all meaningful use objectives.
- DHCS should consider collaborating with the Medical Board on a follow-up survey to assess whether rates of EHR availability and meaningful use increase after the implementation of the Medi-Cal incentive payments.

II. Introduction

Electronic health records (EHRs) — longitudinal electronic records of information about the health of individual patients — can facilitate improvement in coordination of care, patient safety, quality management, outcomes reporting, and provider efficiency. Despite these benefits, EHR adoption has been slow for certain groups of physicians who are concerned about privacy, the lack of certification and standardization, and the high cost of implementation and maintenance.[2]

With the goal of improving health care delivery, the Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Recovery and Reinvestment Act of 2009, is promoting the use of EHRs by clinicians and hospitals through an incentive program. HITECH incentive payments could total up to $27 billion over 10 years, or as much as $44,000 (through Medicare) and $63,750 (through Medicaid) per clinician.[3]

The California Department of Health Care Services (DHCS) was tasked by the Centers for Medicare and Medicaid Services (CMS) to identify California physicians who are eligible to receive Medicaid EHR incentive payments. In 2011, researchers at the University of California, San Francisco (UCSF), on behalf of the California Medicaid Research Institute, developed and conducted a survey to help DHCS understand the extent to which EHRs are currently available in California physician practices and estimate the number of physicians in California who would be eligible for Medicaid incentive payments. This study provides the most detailed information available to date on California physicians' experiences with EHRs.

Responses to this survey can be considered baseline data on EHR availability and use prior to implementation of Medi-Cal EHR incentive payments because all responses were submitted several months before DHCS began registering providers for the Medi-Cal incentive program on January 3, 2012. Registration for hospitals opened on October 3, 2011, and registration for clinics and groups opened on November 15, 2011.

Funding for the study was provided by DHCS and the California HealthCare Foundation. The Medical Board of California distributed the survey, performed data entry, and provided data sets to the research team at UCSF.

III. Background

Recent research shows measurable benefits from the adoption of health information technology such as EHRs.[4] Broad adoption of EHRs may save costs, reduce medical errors, increase prevention and early diagnosis of disease, and improve chronic disease management.[5–7] Studies have found higher rates of adoption of key EHR functions, such as clinical decision support functions, among hospitals that rank highly on the Hospital Quality Alliance's criteria for measuring the quality of hospital care, suggesting that EHRs may improve the quality of patient care.[8]

Incentive Programs for Meaningful Use

To further increase the adoption and use of EHRs, the federal government will provide incentive payments to hospitals and providers that achieve "meaningful use" of the technology as defined by federal regulations.

The goal of HITECH's incentive programs is to facilitate significant improvements in care. This funding will provide an important basis for the creation of a nationwide network of EHRs. The regulations issued by CMS to implement the HITECH Act include three categories of objectives aimed at achieving meaningful use of the technology: core objectives, menu objectives, and electronic reporting on the quality of care. There are a total of 25 meaningful use objectives for providers and 24 for hospitals. To qualify for an incentive payment in the first year of the Medicaid program, hospitals and providers only need to demonstrate that they have adopted, implemented, or upgraded certified EHR technology. In the second through sixth years of the program, providers must demonstrate meaningful use by satisfying 20 of the 25 objectives. Of these, all 15 core objectives must be satisfied, and five of 10 menu objectives must be satisfied. To qualify for Medicare incentive payments, physicians must demonstrate meaningful use for each year they participate in the program.[9]

Core objectives are composed of 15 basic functions that can help health professionals improve care. These functions include collection of basic medical information such as vital signs, demographics, medications, allergies, up-to-date lists of current and past medical diagnoses, and smoking status. Other core objectives concern functions that help clinicians make better clinical decisions and avoid errors.

The menu objectives include 10 additional functions of which the provider can choose five. These include functions such as conducting drug formulary checks, incorporating clinical laboratory tests into EHRs as structured data, generating lists of patients by conditions to reduce disparities and improve quality, submitting electronic immunization data, and submitting electronic surveillance data.

To further demonstrate meaningful use of EHRs, the third component of meaningful use is a requirement for electronic reporting of quality-of-care data. In 2011 and 2012, clinicians are required to report three core quality measures: blood pressure, tobacco status, and adult weight status, as well as three additional clinical quality measures of the clinician's choice.

Eligibility Requirements

Physicians who have at least one encounter with a Medicaid patient per representative 90-day period and who spend less than 90% of their patient care hours in inpatient or emergency department settings may be eligible for Medicaid incentive payments for meaningful use of EHRs for up to six years. This includes residents and fellows with medical licenses. Dentists, nurse midwives, nurse practitioners, and physician assistants are also eligible for Medicaid EHR incentive payments. Physicians who spend 90% or more of their patient care hours in inpatient or emergency department settings are not eligible because hospitals are also eligible for incentive payments as institutions through the Medicaid and Medicare EHR incentive programs. Physicians may accept either the Medicaid or Medicare incentives, but not both in the same year. Providers may switch once between programs.[10] It is expected that physicians who qualify for both programs will take the Medicaid incentives because they are larger and have less stringent requirements.

Physicians are eligible for Medicaid incentive payments if a minimum of 30% of their patients are enrolled in Medicaid, except for pediatricians, for whom the minimum Medicaid patient volume is 20%. CMS set a lower eligibility threshold for pediatricians to increase the number of pediatricians who receive incentive payments for EHR use. Pediatricians are less likely than other physicians to qualify for Medicare incentive payments because very few of their patients have Medicare coverage. Physicians who practice mainly in a Federally Qualified Health Center or a Rural Health Clinic and who have a minimum 30% patient volume made up of needy individuals (those receiving Medicaid or Children's Health Insurance Program benefits or who are uninsured) also qualify.

Physicians who provide care to Medicare enrollees are also eligible for incentive payments over a five-year period through Medicare Part B. Unlike the Medicaid incentive program, eligibility for the Medicare incentive program generally does not depend on the percentage of a physician's patients enrolled in Medicare. All physicians who provide care to Medicare beneficiaries with fee-for-service benefits are eligible for Medicare incentive payments. Physicians who provide care to beneficiaries enrolled in Medicare Advantage plans are eligible for Medicare EHR incentive payments if they provide an average of at least 20 hours of patient care per week to Medicare Advantage enrollees. These physicians must also be employed by a Medicare Advantage plan that is licensed as a health maintenance organization or be an employee or partner of an entity that furnishes at least 80% of the Medicare patient care services it provides to enrollees of the Medicare Advantage plans with which it contracts. Eligible providers who predominantly practice in a designated Health Professional Shortage Area can receive a 10% increase in the maximum incentive payment amount.[11] As with Medi-Cal's EHR incentive program, hospital-based physicians are not eligible for Medicare's EHR incentive program. Medicare payments to eligible physicians for medical care will be reduced beginning in 2015 if they do not meaningfully use certified EHRs. Certified EHRs have been acknowledged by the Office of the National Coordinator for Health Information Technology as having the capability of meeting the meaningful use objectives described above.

IV. Results

This report presents data from a 2011 survey of a sample of physicians. For this study, UCSF developed a supplemental questionnaire that was included in the materials sent to physicians whose license renewals were due to the Medical Board of California between June 1 and July 31, 2011. The supplemental surveys were mailed to 10,353 physicians and completed by 5,384 physicians who were eligible for the study. This represents a response rate of 68% among physicians who will be eligible for Medi-Cal EHR incentive payments if they meet the requirement for minimum participation in Medi-Cal and do not practice primarily in hospitals. (See Table 1.)

Table 1. Response Rate

Number of physicians with license renewal due in June or July 2011	10,353
Number of physicians with practice location in California	8,321
Number of California physicians with at least 1 hour per week in patient care (eligible study group)	7,931
Number (percentage) of eligible California physicians who completed EHR supplemental survey	5,384 (68%)

The findings presented in this report are based on physicians' responses to the survey. These self-reported data cannot be verified. Some physicians may not have complete information about the capabilities of their EHRs or the characteristics of their practices.

Characteristics of Respondents

Respondents were more likely to be primary care physicians than nonrespondents. They were also slightly older and slightly more likely to practice in rural areas. The proportions of men and women were similar among respondents and nonrespondents.

Table 2. Comparison of Survey Respondents and Nonrespondents

	RESPONDENTS (n = 5,384)	NONRESPONDENTS (n = 2,547)
Age (mean)*	51.4 years	50.5 years
Gender		
Male	67%	67%
Female	33%	33%
Specialty*		
Primary care†	37%	33%
Specialty care	63%	66%
Practice location*		
Urban	92%	93%
Rural	8%	7%

*Indicates that the difference between respondents and nonrespondents is statistically significant at $p < 0.05$.

†Encompass physicians in family practice, general practice, geriatrics, internal medicine, and pediatrics.

Note: Percentages may not sum to 100% due to rounding.

Findings for All Respondents

Availability and Use

EHR at physician's main practice location. The majority of physicians who responded to the survey (71%) report having some form of EHR at their main practice location; 23% report that they do not have an EHR. (See Figure 1 on the following page.)

Figure 1. Physicians with Any EHR at Their Practice

(n = 5,384)

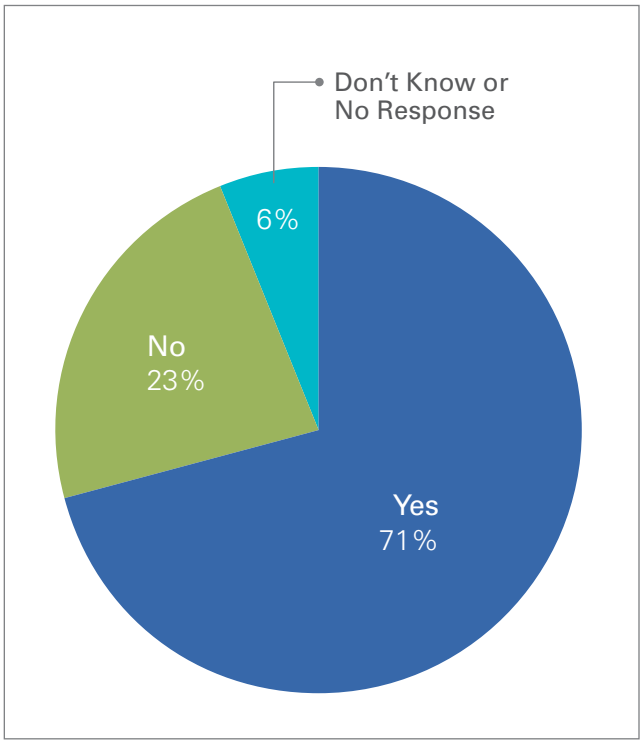


Table 3. CMS Meaningful Use Objectives Measured

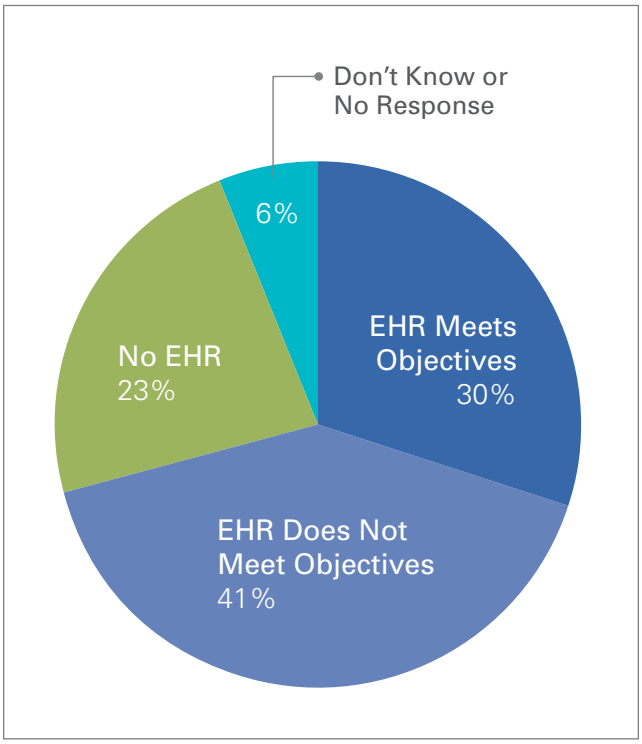
Core Objectives
Collect patient demographics (e.g., age, race/ethnicity)
Take clinical notes
Generate patient problem list
Generate list of patient medications
Generate list of medication allergies
Order/transmit prescriptions electronically
Generate routine reports of quality indicators
Transmit information electronically to/from providers to whom a physician's patients are referred
Menu Objectives
View or receive lab test results
Generate lists of patients by condition (e.g., all patients with diabetes)
Transmit data to immunization registries
Patients access their own electronic health record

EHRs with functionality needed to achieve meaningful use. EHRs vary in how they are configured to provide physicians with access to functions necessary to achieve meaningful use as defined by CMS. The survey asked about the availability of functions needed to achieve eight of the 15 core meaningful use objectives and four of the 10 menu objectives established by CMS.[12] The objectives measured are listed in Table 3. The survey also asked about the availability of four features not specifically enumerated among the CMS core or menu meaningful use objectives: electronic ordering of laboratory tests, electronic ordering of imaging tests, viewing written records of imaging tests, and viewing images from imaging tests.

The survey question regarding lab test results is phrased more broadly than the meaningful use standard set forth by CMS. The question asks respondents whether their EHRs have features that permit "viewing or receiving laboratory test results." The CMS objective calls for incorporation of clinical laboratory test results into EHRs as structured data.[13] Thus, this survey may overestimate the percentage of respondents who meet the CMS meaningful use objective with regard to laboratory test results.

As Figure 2 illustrates, only 30% of physicians have EHRs with the functions necessary to achieve all 12 of the meaningful use objectives measured (see page 11). Many physicians (41%) have EHRs that do not meet all 12 meaningful use objectives as presently configured. Physicians are more likely to have EHRs that meet the eight core meaningful use objectives measured than the four menu meaningful use

Figure 2. Physicians with EHRs That Meet the 12 Meaningful Use Objectives (n = 5,384)



objectives measured (38% versus 32% of physicians). This finding is statistically significant.[14]

Physicians were more likely to report that their EHRs have functions that are used in patient encounters, such as taking clinical notes and generating lists of patient medications, than functions that are used to assess the quality of care or to exchange information with other providers. Table 4 shows the percentages of physicians who have EHRs that can achieve specific core and menu objectives for meaningful use. (See page 12.) Physicians' EHRs ranged in their ability to provide specific core functions. At the low end, only 45% of all physicians have EHRs with the functionality to generate quality indicators (73% of physicians with EHRs), and at the high end, 61% have EHRs with the functionality to take clinical notes (95% of physicians with EHRs). Availability of specific menu functions also ranged. At the low end, only 40% of physicians have EHRs with the functionality to provide patients with access to their own electronic records (64% of physicians with EHRs) and at the high end, 58% have EHRs with the functionality to view or receive laboratory test results (94% of physicians with EHRs).

These findings reflect physicians' knowledge of their EHRs. It is possible that some physicians have EHRs that are not configured to provide access to all available features. Unless physicians were actively engaged in the planning for their EHRs, they may not be aware of functions of their EHRs that are "turned off," and thus, may have reported that their EHRs did not have the capacity to perform these functions. As a consequence, these findings may underestimate the percentage of physicians who have EHRs that can meet specific meaningful use objectives.

The survey also assessed the availability of other EHR functions that may be helpful in providing patient care. (See bottom section of Table 4 on page 12.) These functions were generally more widely available than functions associated with menu meaningful use objectives, but less widely available than functions associated with core meaningful use objectives. At the low end, 52% of all physicians have EHRs with the functionality to order radiology tests (84% of physicians with EHRs), and at the high end, 58% of physicians have EHRs with the functionality to view written records of radiology tests (94% of physicians with EHRs). These findings suggest that physicians are more likely to have the capacity to view test results electronically than to order tests electronically.

Use of specific EHR functions. The survey assessed the extent to which physicians used specific functions of their EHRs. (See Table 4.) As with availability, use was greater for functions that pertained to patient encounters than for functions related to quality of care or exchange of information.

For core functions, at the low end, only 26% of all physicians (42% of physicians with EHRs) report that they generate data on quality indicators and transmit information to other providers, and at the high end, 54% of all physicians (85% of physicians with EHRs) use their EHR to take clinical notes. With regard to menu functions, physicians were much more likely to report using their EHRs to view or receive lab test results (52% of all physicians, 84% of physicians with EHRs) than to generate lists of patients by condition, transmit data to immunization registries, or provide patients with access to their electronic records.

Table 4. Availability of Specific EHR Functions (n = 5,384)

	YES, THE FEATURE IS AVAILABLE AND...				NO, THE FEATURE IS NOT AVAILABLE	DON'T KNOW	DO NOT HAVE EHR/NO RESPONSE
	USED ALL OR MOST OF THE TIME	USED SOME OF THE TIME	NOT USED	N/A			
Core Objectives							
Collect patient demographics	25%	16%	11%	3%	4%	4%	37%
Take clinical notes	43%	11%	4%	3%	2%	1%	37%
Generate patient problem list	37%	13%	5%	3%	3%	1%	38%
Generate list of patient medications	40%	12%	3%	4%	3%	1%	37%
Generate list of medication allergies	42%	12%	3%	3%	2%	1%	37%
Order/transmit prescriptions electronically	32%	9%	9%	5%	7%	1%	38%
Generate routine report of quality indicators	16%	10%	14%	5%	9%	7%	38%
Transmit info electronically to/from providers to whom a patient is referred	16%	10%	15%	5%	11%	6%	38%
Menu Objectives							
View or receive lab test results	42%	10%	3%	3%	3%	1%	38%
Generate lists of patients by conditions	18%	8%	15%	6%	9%	6%	38%
Transmit data to immunization registries	11%	4%	18%	8%	11%	9%	38%
Patients able to access their own electronic health record	12%	7%	14%	7%	15%	8%	38%
Other EHR Functions							
Order laboratory tests	30%	9%	8%	5%	8%	1%	38%
Order radiology tests	30%	8%	9%	5%	9%	1%	38%
View written records of radiology tests	40%	11%	4%	3%	3%	1%	38%
View images of radiology tests	34%	10%	6%	4%	7%	1%	38%

Note: N/A stands for "not applicable."

These findings do not necessarily mean that EHR functions for monitoring quality of care or exchanging information are not being used. Particularly in large practices, it is possible that other medical professionals, such as registered nurses, are using EHRs to assess the health of patients with specific conditions or to monitor the practice's compliance with quality indicators. Other personnel may also be exchanging information with other providers, although the feasibility of doing so depends largely on the interoperability of EHRs across health care providers.

Satisfaction

Physicians with an EHR in their main practice location were asked to indicate their level of satisfaction with it. (See Figure 3.) Of physicians with EHRs, 35% are very satisfied with their EHR, and 38% are somewhat satisfied. Physician satisfaction is associated with the range of functions their EHRs can perform. (See Table 5.) Physicians who report that their EHRs can meet the 12 meaningful use objectives measured are almost 1.5 times more likely to be very satisfied with their EHRs than physicians with EHRs that cannot meet these objectives (43% versus 29%).

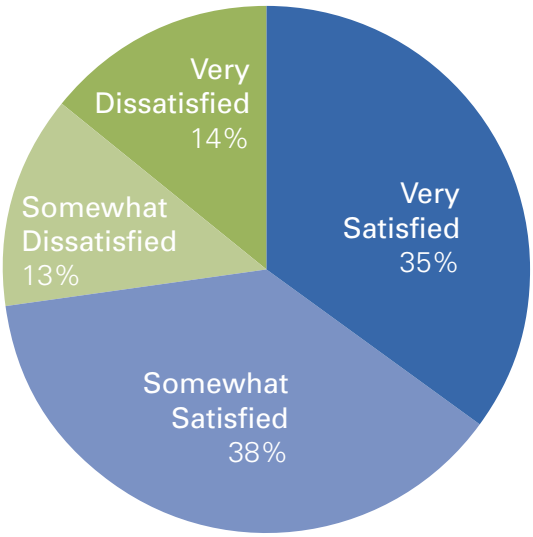
Table 5. Physician Satisfaction with EHRs, by Ability to Meet All 12 Meaningful Use Criteria (n = 3,239)*

LEVEL OF SATISFACTION	MEET	DO NOT MEET
Very satisfied†	43%	29%
Somewhat satisfied	40%	35%
Somewhat dissatisfied	9%	16%
Very dissatisfied	8%	20%

*Analysis based on respondents who reported having an EHR at their main practice location and who reported their level of satisfaction.

†Differences between physicians whose EHRs do and do not meet the 12 meaningful use objectives measured are statistically significant at $p < 0.0001$.

Figure 3. Physician Satisfaction with EHRs (n = 3,239)*



*Analysis based on respondents who reported having an EHR at their main practice location and who answered the question about satisfaction with EHRs.

These findings do not necessarily imply that increasing an EHR's functionality will result in increased physician satisfaction with that EHR. Due to the self-reporting nature of the survey, these findings could be confounded by physicians' overall comfort using an EHR. For example, physicians who are more comfortable using their EHRs may have a better understanding of their functionality and report that they are more satisfied with them compared with physicians who are less comfortable with their EHR and not aware of their full range of functionality. Physician satisfaction with EHRs is likely linked to several factors, including the EHR's functionality, its ease of use, the quality of the training provided to physicians (both initial and ongoing), and network connectivity (both speed and reliability).

Factors Associated with EHR Use

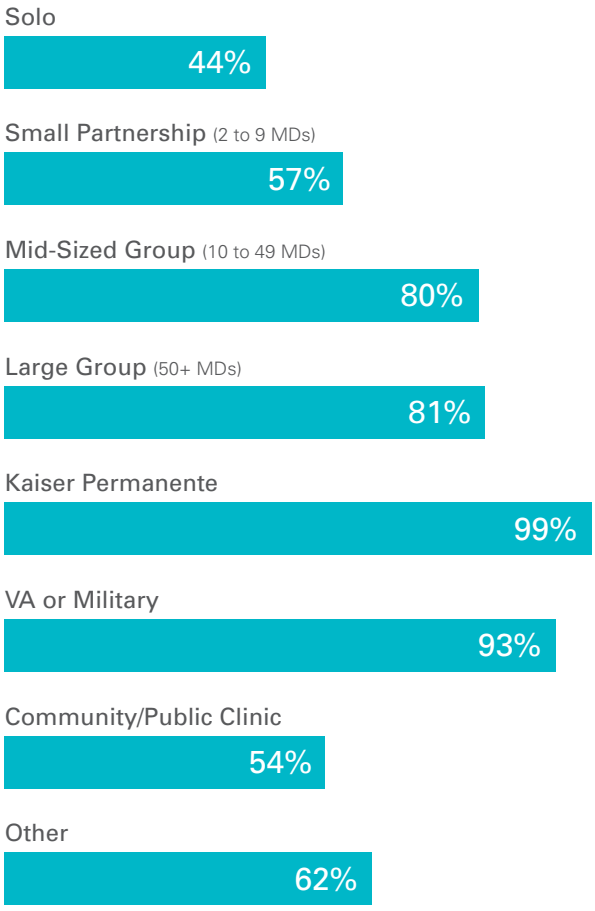
The survey responses were analyzed to understand how characteristics of physicians and their practices relate to EHR use.

Practice type. The type of organization physicians practice in is the strongest predictor of whether EHRs are available at their main practice location. As Figure 4 illustrates, physicians who belong to Kaiser Permanente's medical group have the highest rate of EHR availability (99%). Physicians who are employed by the Department of Veterans Affairs (VA) or the military also report very high rates of EHR availability. These findings reflect the substantial investments that the military, VA, and Kaiser Permanente have made in EHRs over the past decade. The lowest rates of EHR availability are among physicians in solo practice (44%), small partnerships (57%), and community/public health clinics (54%).

Compared with all other physicians, Kaiser physicians are also more likely to have an EHR that meets the 12 meaningful use objectives measured. Fifty-nine percent of Kaiser physicians report having EHRs that can meet the 12 meaningful use criteria. In contrast, 25% of physicians in small partnerships and 15% of physicians in solo practices report having EHRs that meet the same criteria. These differences are statistically significant.[15]

Age. A physician's age is also strongly associated with EHR availability. Younger physicians are more likely to have an EHR at their main practice locations than older physicians. (See Table 6.) Seventy-eight percent of physicians under age 46 report having some type of EHR versus 69% of physicians between ages 46 and 65 and 62% of physicians over age 65. Younger physicians are more likely than older physicians to practice in large organizations where EHRs are prevalent. Among physicians under age 46, 50% report that their main practice location is

Figure 4. EHR Availability, by Practice Type, All Physicians (n = 5,004)*



*Analysis based on respondents who answered the question regarding practice type and the question regarding EHR availability. Differences in EHR availability among physicians with different types of main practice locations are statistically significant at $p < 0.0001$.

Table 6. EHR Availability, by Physician Age (n = 5,384)*

	YES	NO	DON'T KNOW/ NO RESPONSE
< 46 years	78%	18%	5%
46 to 65 years	69%	25%	6%
> 65 years	62%	29%	9%

*Differences among physicians in the three age groups are statistically significant at $p < 0.0001$.

Note: Percentages may not sum to 100% due to rounding.

the military, VA, Kaiser Permanente, or another large group practice versus 31% of physicians between ages 46 and 65 and 29% of physicians over age 65. These differences are statistically significant.[16]

Office-based versus hospital-based practice. Rates of EHR availability also differed between office-based and hospital-based physicians. (See Table 7.) Following the eligibility criteria for Medi-Cal EHR incentive payments, hospital-based physicians are defined as physicians who report that they spend 90% or more of their patient care hours in inpatient or emergency department settings. Using this definition, 16% of physicians in the sample are hospital-based, and 84% are office-based. Hospital-based physicians are more likely to have an EHR at their main practice location than physicians who practice primarily in office-based settings (83% versus 70%). The greater availability of EHRs among physicians who practice primarily in hospitals may reflect hospitals' access to capital to invest in EHRs and other technologies.

Table 7. EHR Availability, by Practice Setting (n = 4,827)*

	YES	NO	DON'T KNOW/ NO RESPONSE
Office-based	70%	24%	6%
Hospital-based	83%	12%	5%

*Analysis based on data from respondents who provided valid data on allocation of their time across five practice settings (office, inpatient, emergency department, diagnostic services, other). Data on practice setting were considered valid if the sum across the five practice settings was not missing and fell within the range of plausible responses. Difference between office-based and hospital-based physicians is statistically significant at $p < 0.0001$.

Urban versus rural practice. EHR availability also differs between physicians who practice in urban versus rural areas. (See Table 8.) Of the physicians in the sample, 92% practice in an urban setting, and 8% practice in a rural setting. (The criteria used to determine whether a physician practices in an urban or a rural area are discussed in Appendix B.) Urban physicians are more likely to have an EHR at their main practice site than rural physicians (73% versus 58%). This finding may reflect differences in the size and revenue streams of rural and urban practices. Compared with urban practices, rural practices are generally smaller and serve higher percentages of patients who are uninsured or enrolled in Medi-Cal or other public programs. Since Medi-Cal reimburses physicians at lower rates than most other payers, rural practices are often limited in their ability to invest in EHRs and other technologies.

Table 8. EHR Availability, by Geographic Area (n = 5,384)*

	YES	NO	DON'T KNOW/ NO RESPONSE
Urban	73%	21%	5%
Rural	58%	32%	10%

*Difference between urban and rural physicians is statistically significant at $p = 0.0001$.

Note: Percentages may not sum to 100% due to rounding.

Specialty. Specialty is not a strong predictor of EHR availability. (See Table 9.) Primary care physicians are only slightly more likely to have an EHR than specialist physicians (73% versus 70%). Primary care physicians are defined as those physicians who reported their primary specialty as family practice, general practice, geriatrics, internal medicine, or pediatrics.

Table 9. EHR Availability, by Specialty (n = 5,368)*

	YES	NO	DON'T KNOW/ NO RESPONSE
Primary care	73%	25%	3%
Specialty care	70%	22%	8%

*The number of observations equals 5,368 because 16 physicians did not answer the question on the Medical Board's mandatory survey regarding specialty. Difference between primary care and specialist physicians is statistically significant at $p < 0.0001$.

Note: Percentages may not sum to 100% due to rounding.

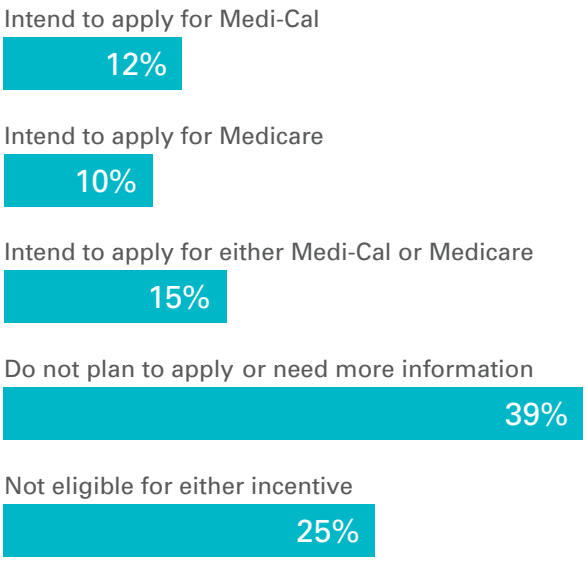
Intentions Regarding EHR Incentive Payments

Physicians were asked to indicate their plans to apply for Medi-Cal or Medicare incentive payments for EHR use. Twelve percent of physicians intend to apply for Medi-Cal incentive payments, and 10% plan to apply for Medicare incentive payments. An additional 15% report that they plan to apply for either the Medi-Cal or the Medicare incentive payment but are not sure which one. (See Figure 5.)

The survey findings may understate the extent to which physicians will apply for Medi-Cal or Medicare incentive payments. The survey was conducted five months before the Department of Health Care Services began registering clinics and groups in the Medi-Cal incentive program and seven months before it began registering individual physicians. Some additional physicians may have decided to apply as they learned more about the program. In other cases, physicians in large practices may not have been aware of efforts by administrators to obtain incentive payments on their behalf.

Many physicians were not familiar with the rules governing eligibility for Medi-Cal EHR incentive payments at the time they completed the survey. (See Table 10.) Fifty-three percent of physicians who, based on their payer mix, practice setting, and practice type, are eligible for Medi-Cal incentive payments do not believe they are eligible, do not plan to apply, or state that they need further information about the program. Conversely, 8% of respondents who are not eligible for Medi-Cal incentive payments plan to apply for them. These findings suggest that ongoing efforts are needed to educate physicians about the eligibility criteria for Medi-Cal incentive payments and to encourage potentially eligible physicians to apply.

Figure 5. Plans Regarding EHR Incentive Payments*



*The number of observations equals 5,230 because 154 respondents did not answer the question about intention to apply for Medi-Cal or Medicare EHR incentive payments.

Table 10. Eligibility for Medi-Cal EHR Incentive Payments, by Plan of Action (n = 4,563)*

	ELIGIBLE	NOT ELIGIBLE
Intend to apply for Medi-Cal†	26%	8%
Intend to apply for Medicare	4%	12%
Intend to apply for either Medi-Cal or Medicare	16%	14%
Do not plan to apply or need more information	37%	40%
Not eligible for either incentive	16%	26%

*The analysis was limited to respondents for whom sufficient data were available on payer mix, practice, setting, and practice type to determine eligibility for Medi-Cal incentive payments and who answered the question about intention to apply.

†Difference between the intentions of physicians who do and do not appear eligible for Medi-Cal incentive payments are statistically significant at $p < 0.0001$.

Comparison with Findings from the National Ambulatory Medical Care Survey

Findings from this California Medical Board survey were compared to findings for California from a supplement to the National Ambulatory Medical Care Survey (NAMCS) regarding EHR use to learn whether findings from these two surveys were similar to one another. Medical Board survey findings were also compared to NAMCS estimates for the entire United States and other states to learn how the availability of EHRs compares across states. The NAMCS EHR supplement is administered by mail to a stratified sample of non-federally employed, office-based physicians, excluding residents and fellows, in specialties other than anesthesiology, pathology, and radiology.[17] For this comparison, data from the Medical Board survey were analyzed on the subset of respondents who were likely to meet inclusion criteria for the NAMCS survey.

The 2011 NAMCS EHR supplement found that 59% of non-federal, office-based physicians in California have some type of EHR at their main practice location.[18] Respondents to the Medical Board survey are more likely to have an EHR at their main practice location (68%) than respondents to the NAMCS survey. The differences in rates of EHR availability may reflect differences in the characteristics of the two samples. Although both surveys were conducted in California during 2011, a higher percentage of the Medical Board survey respondents practice in Kaiser Permanente's medical group or other large medical groups.[19] As discussed previously, physicians in large practices are more likely to report having an EHR than physicians in small practices.

Findings for having a basic EHR were similar across the two surveys. NAMCS defines a basic EHR as one configured to enable physicians to perform the following functions: record patient demographics, record clinical notes, list patients' problems, list patients' medications, list patients' allergies, order and transmit prescriptions electronically, view laboratory test results, and view radiology test results. The 2011 NAMCS EHR supplement found that 40% of respondents have a basic EHR; the Medical Board survey found that 44% of respondents have one.[20]

The two surveys also yielded similar findings with regard to physicians' plans to apply for Medi-Cal or Medicare EHR incentive payments. Forty percent of respondents to the 2010 NAMCS EHR supplement indicate that they plan to apply for either Medi-Cal or Medicare incentives, whereas 37% of respondents to the Medical Board survey plan to apply.[21] (Findings from the 2010 NAMCS were used for this comparison because findings from the 2011 NAMCS regarding plans to apply for Medi-Cal or Medicare EHR incentives had not been released at the time this report was prepared.)

According to the 2011 NAMCS, California physicians are similar to US physicians overall in terms of the availability of any sort of EHR in their main practice location. However, California physicians are more likely to have basic EHRs than US physicians overall. The NAMCS found that 57% of non-federally employed, office-based physicians in the US have some sort of EHR, and 34% have a basic EHR.[22] It also shows that rates of having a basic EHR range widely from state to state, from a low of 16% in Louisiana and New Jersey to a high of 61% in Minnesota.[23] California ranks 11th among the 50 states and the District of Columbia with regard to the percentage of office-based physicians with a basic EHR.

Findings for Respondents Eligible for Medi-Cal EHR Incentive Payments

Number and Percentage Eligible

One goal of this project was to estimate the number of physicians with active California licenses who may be eligible for Medi-Cal EHR incentive payments. As discussed in the introduction, eligibility for Medi-Cal incentive payments is determined by the setting in which a physician practices and the percentage of that physician's patients who are enrolled in Medi-Cal. To estimate the number and percentage of California physicians who could be eligible for Medi-Cal EHR incentive payments, respondents who provide at least one hour of patient care per week and who spend less than 90% of their patient care hours in hospital settings were identified. Physicians were considered eligible for Medi-Cal incentive payments if a minimum of 30% of their patients were enrolled in Medi-Cal; for pediatricians, the minimum Medi-Cal patient volume is 20%. Physicians were also considered eligible if they practiced mainly in a Federally Qualified Health Center or a Rural Health Clinic and served a minimum of 30% of patients who are uninsured, enrolled in Healthy Families, and/or enrolled in Medi-Cal.

According to this survey, 21,598 physicians are eligible for Medi-Cal EHR incentive payments based on payer mix, practice setting, and practice type. These physicians constitute approximately 17% of the 125,135 physicians who had active California licenses as of September 1, 2011. The vast majority (92%) of physicians who are eligible for Medi-Cal incentive payments qualify because they meet the applicable threshold for service to Medi-Cal enrollees (i.e., ≥ 30% for non-pediatricians, ≥ 20% for pediatricians). Eight percent consist of physicians practicing in Federally Qualified Health Centers or Rural Health Clinics who do not meet the eligibility thresholds for Medi-Cal patients but qualify because 30% or more of their patients are uninsured, enrolled in Healthy Families, and/or enrolled in Medi-Cal. In keeping with the intent of CMS, pediatricians are more likely to qualify for Medi-Cal incentive payments than non-pediatricians (39% versus 15% of physicians in office-based practice).[24]

Characteristics

According to this survey, physicians who are eligible for Medi-Cal incentive payments based on payer mix, practice setting, and practice type differ from the general sample in several important respects. Most notably, the distribution of physicians across practice types varies. As illustrated in Table 11, physicians who are eligible for Medi-Cal EHR incentive payments are much more likely to practice in community/public clinics than physicians who are not eligible (33% versus 6%). They are less likely to practice in Kaiser Permanente's medical group (9% versus 17%) or to be in solo practices (10% versus 18%). The high percentage of eligible physicians who work in community/public clinics is likely associated

Table 11. Eligibility for Medi-Cal EHR Incentive Payments, by Practice Type (n = 4,354)

	ELIGIBLE*	NOT ELIGIBLE
Solo	10%	18%
Small partnership (2 to 9 MDs)	9%	12%
Mid-sized group (10 to 49 MDs)	5%	7%
Large group (50+ MDs)	15%	16%
Kaiser Permanente	9%	17%
VA or military	2%	1%
Community/public clinic	33%	6%
Other	17%	23%

*Differences in distribution across practice types are statistically significant at $p < 0.0001$.

with the mission of these clinics, which is to serve low-income individuals, including those who are uninsured or enrolled in Medi-Cal, Healthy Families, and other public programs.

According to this survey, physicians who are eligible for Medi-Cal EHR incentive payments are also more likely to practice in rural areas than those who are not eligible (19% versus 11%).[25] This finding may stem from differences in Medi-Cal enrollment in rural and urban areas of California. Many rural areas within the state have higher rates of enrollment in Medi-Cal than urban and suburban areas, which may lead physicians in rural areas to provide care to greater numbers of Medi-Cal enrollees than their colleagues in urban areas.

In addition, eligible physicians are less likely to be specialists than those who are not eligible (56% versus 65%).[26] This difference is probably associated with the eligibility requirements for Medi-Cal incentive payments. Physicians who spend more than 90% of their patient care hours in hospital settings are not eligible, and most of these physicians are specialists. Thus, the eligibility criteria reduce the likelihood that specialists would qualify for the Medi-Cal incentive program.

EHR Availability

Table 12 compares EHR availability of physicians who are eligible for Medi-Cal EHR incentive payments based on payer mix, practice setting, and practice type to that of physicians who are not eligible. Differences between the two groups are small but statistically significant. Eligible physicians are less likely to have an EHR at their main practice sites than physicians who are not eligible (68% versus 72%). They are also less likely to have EHRs that meet all 12 of the meaningful use objectives measured (30% versus 33%).

Table 12. Eligibility for Medi-Cal Incentive Payments, by EHR Availability (n = 4,621)*

	ELIGIBLE	NOT ELIGIBLE
Any EHR	68%	72%
EHR that can meet 12 meaningful use objectives	30%	33%

*Analysis based on respondents who reported valid data for both practice setting and payer mix. The differences in rates of availability of any EHR and of an EHR that can meet the 12 meaningful use objectives measured is statistically significant at $p < 0.0001$.

Rates of EHR availability among physicians who are eligible for Medi-Cal EHR incentive payments vary across practice settings. As Table 13 illustrates, eligible physicians who work for Kaiser Permanente or other large group practices are more likely to have some sort of EHR at their main practice location than physicians in solo practice, small partnerships, or community/public clinics (92% versus 48%).

Table 13. EHR Availability Among Physicians Eligible for Medi-Cal Incentive Payments, by Practice Type (n = 743)*

	EHR AT MAIN PRACTICE LOCATION	
	ANY	THOSE MEETING MEANINGFUL USE CRITERIA
Solo	48%	16%
Small partnership (2 to 9 MDs)	58%	26%
Mid-sized group (10 to 49 MDs)	79%	25%
Large group (50+ MDs; including Kaiser Permanente)	92%	28%
Community/public clinic	48%	24%
Other†	82%	57%

*Differences across practice types in availability of any EHR and of an EHR that can meet the 12 meaningful use criteria measured are statistically significant at $p < 0.0001$.

†Percentages for Kaiser Permanente physicians are combined with percentages for physicians in other large group practices due to the small number of respondents practicing in those settings who could be eligible for Medi-Cal EHR incentive payments and who have an EHR that can meet the 12 meaningful use objectives. Percentages for VA and military physicians are not reported separately in this table due to the small number of respondents practicing in those settings who could be eligible for Medi-Cal EHR incentive payments and who have an EHR that can meet the 12 meaningful use objectives.

Of physicians who are eligible for Medi-Cal EHR incentive payments, 16% of those in solo practice have an EHR that can meet the 12 meaningful use criteria, while 57% of physicians in other settings do.

Characteristics of Eligible Physicians Not Planning to Apply

Physicians who are eligible for Medi-Cal EHR incentive payments who do not believe they are eligible, do not plan to apply, or need more information were compared to eligible physicians who plan to apply in order to understand any systematic differences between the two groups. According to the survey, physicians who practice in community/public clinics and large group practices are overrepresented among physicians who are eligible for Medi-Cal incentive payments but do not believe they are eligible, do not plan to apply, or need more information. Physicians in these types of practices may be less aware of the Medi-Cal and Medicare EHR incentive programs than physicians in solo practices and small partnerships because they may rely on clinic or practice administrators to keep track of incentive programs. Rural physicians are also less likely to plan to apply for Medi-Cal incentive payments than urban physicians.

V. Discussion

While EHRs are widely available in California physicians' practices, this survey suggests that many are not currently configured with all the functions needed to meet CMS objectives for meaningful use. Although 71% of physicians report that they have some sort of EHR, only 30% report that they have EHRs that can meet all 12 of the meaningful use objectives measured in the study. Physicians' EHRs are more likely to have functions that facilitate encounters with individual patients than functions that allow for monitoring of population health or exchanging information with patients or other providers.

Rates of EHR availability vary widely with the characteristics of physicians' practices. Practice type is the strongest predictor of EHR availability. Physicians who are in solo practice, small partnerships, and community/public clinics are much less likely to have EHRs at their main practice locations than physicians in Kaiser Permanente, VA, and the military. Office-based physicians are less likely to have EHRs than hospital-based physicians, and rural physicians are less likely to have them than urban physicians. These findings may reflect disparities in access to resources for investment in EHRs and other technologies. Hospitals and large group practices have greater ability to purchase EHRs and other technologies that require large upfront expenditures. Differences in availability in urban and rural areas of California may be associated with differences in the prevalence of large practices, which tend to be located in urban areas.

The characteristics of physicians' practices also affect their eligibility for Medi-Cal EHR incentive payments. Most notably, the survey found that physicians who are eligible for Medi-Cal EHR incentive payments on the basis of payer mix and practice setting are much more likely to practice in community/public clinics than the general group of respondents (33% versus 6%). This finding may reflect the mission of community/public clinics to provide care to Medi-Cal enrollees and other low-income individuals. Physicians who are eligible for Medi-Cal incentive payments are also more likely to practice in rural areas and to be primary care physicians.

The survey results suggest that the Medi-Cal EHR incentive program may increase the meaningful use of EHRs among physicians. An estimated 21,598 physicians are eligible for the incentive payments based on their survey responses. This number may grow as Medi-Cal enrollment increases in 2014 under the Patient Protection and Affordable Care Act.[27–29] The majority of physicians who are eligible for Medi-Cal incentive payments based on payer mix, practice setting, and practice type (70%) do not currently have EHRs that can meet all 12 of the meaningful use objectives measured in the survey. Twenty-four percent do not have any sort of EHR. Medi-Cal incentive payments may be especially helpful for expanding meaningful use of EHRs among these physicians. Medi-Cal reimburses physicians at lower rates than most other payers, which limits the ability of practices that care for large numbers of Medi-Cal enrollees to set aside resources for EHRs or other technologies. In addition, some practices with high percentages of Medi-Cal enrollees also have high percentages of patients who are uninsured.

Thirty-seven percent of physicians surveyed intend to apply for either the Medi-Cal or the

Medicare EHR incentive program. However, many physicians are not familiar with the rules governing eligibility for the programs. More than half of physicians who are eligible for Medi-Cal incentive payments based on payer mix, practice setting, and practice type believe that they are not eligible, do not plan to apply, or need further information. Conversely, 8% of physicians who are not eligible for Medi-Cal incentive payments plan to apply for them. This confusion may abate as DHCS and other entities continue to disseminate information about the program. In addition, some physicians in community/public clinics and group practices may not be fully aware of practice administrators' efforts to apply for Medi-Cal incentive payments on their behalf.

Finally, the findings from this survey demonstrate the value of partnering with the Medical Board of California to collect information on availability and use of EHRs by physicians. This survey's 68% response rate is relatively high for a physician survey. Few resources were devoted to encouraging physicians to respond; the survey was mailed only once, and physicians only received an email reminder if they submitted their licensure materials but did not complete the survey. No financial incentives were provided to encourage physicians to participate. Other studies have invested considerably greater resources to achieve a similar response rate.

Limitations

Although this survey provides useful information about the availability and use of EHRs among physicians in California, it has several important limitations. The self-reporting nature of the survey data does not allow for verification of answers. In addition, some responses were incomplete. Fourteen percent of respondents were omitted from estimates of the number and percentage of physicians eligible for Medi-Cal EHR incentive payments because they did not answer questions about payers and practice settings or gave implausible answers (e.g., the amount of time spent in the five practice settings on which data were collected summed to 500%).

The survey was also administered to a sample of physicians who may not be fully representative of all licensed physicians in California. Although the findings presented in the report are weighted to reflect the age, gender, and location of all physicians with California licenses, respondents may have differed from other physicians in other important ways that are not so easily measured. In addition, only MDs were surveyed. Patterns of EHR use and availability may vary between MDs and other health professionals eligible for Medi-Cal incentive payments.

Finally, the estimates of the number and percentage of physicians eligible for Medi-Cal EHR incentive payments are based on individual physicians' responses to the survey. This approach may underestimate the number of physicians eligible for Medi-Cal payments. In clinics and group practices, all physicians in the clinic or group are eligible if the clinic or group's overall patient population meets the eligibility threshold for Medi-Cal patients (or Medi-Cal, Healthy Families, and uninsured patients combined for Federally Qualified Health Centers and Rural Health Clinics) and if all physicians in the clinic or group apply for incentive

payments using the clinic/group-level data.[30] Some physicians practicing in clinics or groups who do not individually meet one of the eligibility thresholds would nonetheless be eligible because the whole clinic or group meets one of the thresholds.

Implications

These findings have several implications for the Medi-Cal EHR incentive program. While the incentive program could have a major impact on EHR adoption and use in California, several hurdles must first be overcome. One in six physicians with active California licenses are eligible for federal incentives for the adoption and use of EHRs through Medi-Cal on the basis of their payer mix and practice setting, but only half of these physicians intend to apply for incentive payments. DHCS should consider strengthening education and outreach efforts to inform eligible physicians about the program and explore the possibility of providing technical assistance to eligible providers, such as training in how to use EHRs to attain and report on meaningful use.

Second, the findings suggest priorities for outreach to potentially eligible physicians. DHCS should place a high priority on outreach to physicians who practice in community/public clinics, solo practice, and small partnerships because these physicians are least likely to have EHRs. DHCS efforts to prequalify clinics that are eligible based on data submitted to the California Office of Statewide Health Planning and Development (OSHPD) are especially important, as these organizations focus on providing care to Medi-Cal enrollees and other uninsured individuals.[31] Reaching physicians in solo practice and small partnerships will be more challenging because there is no central source of information about them.

Third, the results suggest that DHCS outreach efforts should address both physicians who do not have an EHR and those who have EHRs that do not meet the CMS meaningful use criteria. The survey found that more than half of respondents with an EHR have a system that does not possess all of the functions necessary to achieve the 12 meaningful use objectives measured. Both groups of physicians will need guidance on the importance of using a certified EHR, which has the capacity to meet all meaningful use objectives. In some cases, physicians may need to reconfigure certified EHRs to enable them to fulfill all meaningful use objectives.

Finally, DHCS should consider collaborating with the Medical Board on a follow-up survey to determine whether rates of EHR availability and meaningful use increase after implementation of Medi-Cal incentive payments. As the experience with this survey demonstrates, conducting a survey in partnership with the Medical Board will likely result in a high response rate at relatively low cost. To fully assess the program's impact, sufficient time should be allowed for physicians to register for the program and begin obtaining payments before a follow-up survey is administered.

Appendix A. Survey Instrument

Dear Physician,

The Medical Board of California (MBC), in conjunction with a team of experienced researchers from the University of California, San Francisco (UCSF), is seeking information regarding physician practices in California. You have been randomly selected to answer a few questions regarding the characteristics of your practice and your use of electronic health records. Your responses to these questions are critical in forming public policy. The information you provide is voluntary and confidential and will not affect the timing or any other aspect of your license renewal. It will be analyzed by the research team at UCSF. Findings will be presented only in aggregate. No personal or identifying information will be shared with payers or other parties, and specified protocol will be followed to safeguard the information you provide.

We would greatly appreciate your answering the following questionnaire and including your responses, along with your other license renewal information, in the envelope provided. Alternatively, if you are completing your renewal on line, you may submit your responses through the Web site. The study questions have been reviewed and approved by the MBC and UCSF's Committee on Human Research.

Debbie Nelson, Assoc. Analyst
Medical Board of California
(916) 263-2480

Janet Coffman, PhD, Assistant Prof
University of California, San Francisco
(415) 476-2435

Please answer each question by completely shading the appropriate circle like this ●

1. PRACTICE SETTING *What is your principal practice location? (check only one)*

Medical office: Solo practice	O	Kaiser Permanente	O
Medical office: Small medical partnership (2 to 9 physicians)	O	Community health center/public clinic	O
Medical office: Group practice (10 to 49 physicians)	O	VA or military	O
Medical office: Large group practice (50+ physicians)	O	Other (specify _____)	O

2. PRACTICE TYPE *Of the time you devote to patient care (100%), what percentage of time do you provide care in each of the following settings?*

	Ambulatory Care	Inpatient care	Emergency department	Diagnostic services (e.g., radiology, pathology)	Other
0%	O	O	O	O	O
1 to 19%	O	O	O	O	O
20 to 39%	O	O	O	O	O
40 to 59%	O	O	O	O	O
60 to 79%	O	O	O	O	O
80 to 89%	O	O	O	O	O
90 to 100%	O	O	O	O	O

3. PAYERS *Of your total number of patients (100%), what percentage are:*

	Private, commercial, other insurance	Medicare	Medi-Cal	Healthy Families	Other (e.g., VA, CHAMPUS)	Uninsured
0%	O	O	O	O	O	O
1 to 9%	O	O	O	O	O	O
10 to 19%	O	O	O	O	O	O
20 to 29%	O	O	O	O	O	O
30 to 39%	O	O	O	O	O	O
40 to 49%	O	O	O	O	O	O
50 to 59%	O	O	O	O	O	O
60 to 69%	O	O	O	O	O	O
70 to 79%	O	O	O	O	O	O
80 to 89%	O	O	O	O	O	O
90 to 99%	O	O	O	O	O	O
100%	O	O	O	O	O	O

4. IPA PARTICIPATION *Do you belong to an Independent Practice Association (i.e., a network of physicians who form an association to contract with health plans)?* Yes O No O Do Not Know O

5. INCENTIVES FOR HEALTH INFORMATION TECHNOLOGY (IT) USE *In 2011, Medicare and Medi-Cal will begin offering financial incentives for physicians to adopt, implement, or upgrade computerized medical records systems (also known as electronic health records or electronic medical records) and use them meaningfully in practice. Do you or your principal practice organization plan to apply for these incentive payments? Please check only ONE answer from the list. (A physician will only be allowed to apply for either the Medicare OR Medi-Cal incentive program.)*

I intend to apply for incentive payments but uncertain whether Medicare or Medi-Cal	O
I intend to apply for the Medicare incentive	O
I intend to apply for the Medi-Cal incentive	O
I do not at this time plan to apply for either incentive or need more information to make a decision	O
I am not eligible for either the Medicare or the Medi-Cal incentive	O

6. USE OF COMPUTERS IN YOUR MAIN PRACTICE LOCATION *Does your main practice location have a computerized medical records system (also known as an electronic health record or an electronic medical record)*?

Yes O ***See below*** No O Do Not Know O

If you answered "Yes" above, please answer the following questions about your main practice location's computerized medical records system. **If a feature is available, please indicate to what extent you use it.**	***YES, the feature is available***				***NO, the feature is not available***	***DO NOT KNOW***
	Do not use	*Use some of the time*	*Use most or all of the time*	*Not applicable to my practice or specialty*		
a. Patient demographics (e.g., race/ethnicity)	O	O	O	O	O	O
b. Clinical notes (e.g., office visit notes)	O	O	O	O	O	O
c. Patient problem list/summary	O	O	O	O	O	O
d. List of medications patient takes	O	O	O	O	O	O
e. List of medication allergies	O	O	O	O	O	O
f. Ordering and transmitting prescriptions electronically	O	O	O	O	O	O
g. Ordering laboratory tests	O	O	O	O	O	O
h. Viewing or receiving laboratory test results	O	O	O	O	O	O
i. Ordering radiology tests	O	O	O	O	O	O
j. Viewing printed records of radiology test results	O	O	O	O	O	O
k. Viewing images from radiology tests	O	O	O	O	O	O
l. Generating lists of patients by specific condition	O	O	O	O	O	O
m. Generating routine reports of quality indicators	O	O	O	O	O	O
n. Transmitting information electronically to entities outside your practice to which you frequently refer patients OR from which patients are referred to you	O	O	O	O	O	O
o. Transmitting data to immunization registries	O	O	O	O	O	O
p. Patients able to access their own electronic record	O	O	O	O	O	O

7. SATISFACTION *If you answered "Yes" to Question 6, how satisfied are you with the computerized medical records system at your main practice location.*

Very satisfied O Somewhat satisfied O Somewhat dissatisfied O Very dissatisfied O

Appendix B. Methodology

Data Collection

This report presents data from a 2011 survey of a sample of physicians renewing their medical licenses through the Medical Board of California, the state agency responsible for licensing physicians with MD degrees. To maintain an active license in California, a physician must apply to be relicensed every two years. During this reapplication process, the physician completes a mandatory survey that includes questions on race/ethnicity, training status, medical specialty, board certification, work hours, and practice location.

For this study, the University of California, San Francisco (UCSF), developed a one-page, double-sided supplemental questionnaire that was included in the materials sent to physicians whose license renewals were due between June 1 and July 31, 2011. This is the second supplemental survey on which UCSF has partnered with the Medical Board.[32] The supplemental questionnaire was accompanied by a letter indicating that its completion was voluntary. Physicians were given 90 days to complete the mandatory and supplemental survey either by returning the materials by mail or by entering their answers online through the Medical Board website. Physicians received a reminder if they renewed their license but did not complete either the mandatory or the supplemental survey. No financial incentives for participation were provided. Because the timing of the relicensing process is based on the applicant's birth month, the sample approximated a random sample.

Responses to this survey can be considered baseline data on electronic health record (EHR) availability and use prior to implementation of Medi-Cal EHR incentive payments because all responses were submitted several months before DHCS began registering providers for the Medi-Cal incentive program on January 3, 2012. Registration for hospitals opened on October 3, 2011, and registration for clinics and groups opened on November 15, 2011.

The questionnaire asked about the physician's practice type (e.g., solo practice, group practice), payer mix, percentage of time spent in different practice settings (e.g., ambulatory care, inpatient care), plans to apply for Medi-Cal or Medicare EHR incentive payments, availability of an EHR at the physician's main practice location, the specific functions of the EHR available at the main practice location, and level of satisfaction with the EHR. A copy of the survey questionnaire appears in Appendix A.

The Medical Board provided UCSF with responses to the supplemental survey, responses to the mandatory survey, and information from the board's core licensing database. For the analysis, UCSF combined data from these three sources to describe the respondents and identify respondent characteristics associated with having an EHR.

Data Analysis

The analysis was limited to respondents with a California practice address or preferred mailing address (if no practice address was reported) because only physicians who practice in California will be eligible for Medi-Cal EHR incentive payments. (Physicians who are licensed in California but practice in other states may be eligible for Medicaid incentive payments in those states.) In addition, the analysis was limited to respondents who provide at least one hour of patient care per week. To be eligible for Medi-Cal EHR incentive payments, a physician must have at least one encounter with a Medi-Cal patient during the representative 90-day period. For this report, the criterion of at least one hour of patient care per week was used to identify potentially eligible physicians because the survey did not collect data on the frequency of encounters with Medi-Cal patients.

To address potential bias associated with the characteristics of respondents, responses were weighted in inverse proportion to the response rates within specific groups for age (< 46 years, 46 to 65 years, > 65 years), gender,

and geographic location (in California, not in California). Weighting the survey responses in this manner generates estimates that better reflect the total population of physicians with active California licenses. Throughout the report, point estimates are reported without confidence intervals. P-values are reported for statistically significant comparisons of subgroups of respondents.

Identification of Physicians Who Have EHRs

Estimates of the percentage of physicians who had any form of EHR available at their main practice location were based on responses to the following question: "Does your main practice location have a computerized medical records system (also known as an electronic health record or an electronic medical record)?" Physicians who answered "yes" to this question were considered to have an EHR. Physicians who did not answer this question or who answered "no" or "don't know" and then went on to affirmatively answer questions about availability and use of specific EHR functions were also considered to have an EHR. Among physicians classified as having an EHR, 87% had answered "yes" to the question about EHR availability at their main practice location and 13% answered "yes" to one or more questions about availability and use of specific EHR functions.

The survey included questions that measured eight of the 15 core meaningful use objectives established by CMS:

- Collect patient demographics (e.g., age, race/ethnicity)
- Take clinical notes
- Generate patient problem lists
- Generate list of patient medications
- Generate list of medication allergies
- Order/transmit prescriptions electronically
- Generate routine reports of quality indicators
- Transfer information electronically to/from providers to whom a physician's patients are referred

The survey also asked about four of the 10 menu objectives established by CMS:

- View or receive lab test results
- Generate lists of patients by condition (e.g., all patients with diabetes)
- Transmit data to immunization registries
- Patients access their own electronic health records

The survey also included questions about the availability of electronic ordering of laboratory tests and electronic ordering and viewing of imaging tests. These features are not specifically enumerated among the CMS core or menu meaningful use objectives.

The survey question regarding viewing or receiving lab test results is phrased more broadly than the CMS meaningful use standard. The question asks respondents whether their EHRs have features that permit "viewing or receiving laboratory test results." The CMS objective calls for incorporation of clinical laboratory test results into EHRs as structured data.[33] Thus, this survey may overestimate the percentage of respondents who meet the CMS meaningful use objective with regard to laboratory test results.

Identification of Characteristics Associated with Having an EHR

Analyses of the impact of practice type and practice setting on likelihood that physicians will have EHRs were based on responses to survey questions. The question regarding practice type asked respondents to indicate whether their primary practice location was a solo practice, a small partnership (2 to 9 physicians), mid-sized group practice (10 to 49 physicians), large group practice (50+ physicians), Kaiser Permanente, a community or public clinic, a Department of Veterans Affairs (VA) or military facility, or other practice type. Practice setting was determined by analyzing responses to a question that asked respondents to indicate the percentage of their patient care hours that they spend in an ambulatory care setting, an emergency department, an inpatient setting, a diagnostic setting (e.g., radiology, pathology), and other settings.

For analyses that compared urban and rural physicians, a physician's practice location was classified as urban or rural based on the ZIP code for the physician's practice location or, if the practice ZIP code was missing, the ZIP code for the physician's preferred mailing address. A cross reference of ZIP codes with the Office of Statewide Health Planning and Development's (OSHPD) Medical Services Study Areas (MSSAs), which are based on census tracts, was used to classify ZIP codes as rural or urban. OSHPD categorizes MSSAs as urban if they have a population density of more than 250 people per square mile. MSSAs are classified as rural if they have 250 or fewer people per square mile and no incorporated area with greater than 50,000 people, and as frontier if the population density is less than or equal to 11 people per square mile. For the purposes of this report, ZIP codes in rural and frontier MSSAs were combined and categorized as rural.

Analyses that compared primary care and specialist physicians relied on physicians' responses to a question on the mandatory survey that asked them to indicate their primary and secondary specialties. Primary care physicians were defined as physicians who indicated that their primary specialty is family practice, general practice, geriatrics, internal medicine, or pediatrics. All other physicians who reported their primary specialty were classified as specialists.

Comparison with Data from the National Ambulatory Medical Care Survey

Findings from the Medical Board survey were compared to findings for California from a supplement to the National Ambulatory Medical Care Survey (NAMCS) regarding EHR use. The NAMCS EHR supplement is administered by mail to a stratified sample of non-federally employed, office-based physicians, excluding residents and fellows, in specialties other than anesthesiology, pathology, and radiology.[34] For this comparison, data from the Medical Board survey were analyzed on the subset of respondents who were likely to meet inclusion criteria for the NAMCS survey.

There are two important limitations of the effort to compare similar samples of physicians. First, the NAMCS survey included both allopathic physicians (MDs) and osteopathic physicians (DOs), whereas the Medical Board survey only included allopathic physicians. The second concerns identification of "office-based" physicians. NAMCS uses self-reported data from the American Medical Association Masterfile to identify "office-based" physicians for inclusion in its sample. The Medical Board survey, in contrast, surveyed all California physicians whose licenses were due for renewal in June or July 2011 and asked them to report the percentage of patient care hours they spent in five settings (ambulatory care, emergency department, inpatient, diagnostic services, other). Consistent with the regulations for determining eligibility for Medicaid EHR incentive payments, physicians in the Medical Board survey were classified as "office-based" if they reported that they spent less than 90% of their patient care hours in emergency department or inpatient settings.

Estimation of the Percentage of Physicians Who May Be Eligible for Medi-Cal EHR Incentive Payments

Estimates of the percentage of California physicians who may be eligible for Medi-Cal EHR incentive payments were based on responses from 4,613 respondents who met the following criteria:

- Provided at least one hour of patient care per week
- Reported valid data for both practice setting and payer mix
- Reported information about age, gender, and mailing address

As indicated previously, the requirement to provide at least one hour of patient care per week was intended to limit the analysis to physicians who were likely to meet the Medi-Cal EHR incentive program's requirement that a physician provide at least one patient encounter for a Medi-Cal enrollee within a 90-day period. Data on practice setting were considered valid if the sum of responses across the five practice settings on which data

were collected (office, inpatient, emergency department, diagnostic services, other) was not missing and fell within the range of plausible responses. Data on payer mix were considered valid if the sum of responses across the six payer types (private, Medicare, Medi-Cal, Healthy Families, other, uninsured) was not missing and fell within the range of plausible responses.

The first step in the analysis was to identify physicians who met the Medi-Cal EHR incentive program's requirement that a physician spend at least 90% of patient care hours in nonhospital settings. Physicians were deemed to meet this requirement if they reported that less than 90% of their patient care hours were in inpatient and/or emergency department settings.

Once physicians who could be eligible for the Medi-Cal EHR incentive program based on practice setting were identified, the next step in the analysis was to determine which physicians could be eligible on the basis of payer mix. Pediatricians were analyzed separately from non-pediatricians because the minimum percentage of Medi-Cal patients needed to qualify for incentive payments varies between the two groups of physicians. Non-pediatricians were considered eligible if they reported that at least 30% of their patients were enrolled in Medi-Cal. Pediatricians were considered eligible if at least 20% of their patients were enrolled in Medi-Cal.

The third step was to identify the third group of physicians who could be eligible for the Medi-Cal EHR incentive program: physicians who practice in a Federally Qualified Health Center (FQHC) or Rural Health Clinic (RHC) for whom 30% of patients are enrolled in Medi-Cal, Healthy Families, or uninsured. For purposes of this analysis, all respondents who indicated that their main practice site is a community/public clinic were deemed to be practicing in an FQHC or RHC. The actual number practicing in FQHCs and RHCs may be lower because some community/public clinics are not FQHCs or RHCs. However, this reduction is offset to some extent by a provision of the regulations governing Medi-Cal EHR incentive payments that allow all physicians in a FQHC or RHC to qualify for incentive payments if the clinic as a whole is eligible on the basis of aggregate data on payer mix.[35]

Endnotes

1. Larry Dickey, MD, California Department of Health Care Services, personal communication, February 29, 2012.
2. M. R. Gold, C.G. McLaughlin, K.J. Devers, R.A. Berenson, and R. Bovbjerg, "Obtaining Providers' 'Buy-In' and Establishing Effective Means of Information Exchange Will Be Critical to HITECH's Success." *Health Aff (Millwood),* 31, no. 3 (March 2012): 514–525.
3. D. Blumenthal and M. Tavenner, "The 'Meaningful Use' Regulation for Electronic Health Records," *N Engl J Med,* 363, no. 6 (August 5, 2010): 501–504.
4. M. B. Buntin, M.F. Burke, M.C. Hoaglin, and D. Blumenthal, "The Benefits of Health Information Technology: A Review of the Recent Literature Shows Predominantly Positive Results," *Health Aff (Millwood),* 30, no. 3 (March 2011): 464–471.
5. A. Bobb, K. Gleason, M. Husch, J. Feinglass, P. R. Yarnold, and G. A. Noskin, "The Epidemiology of Prescribing Errors: The Potential Impact of Computerized Prescriber Order Entry," *Arch Intern Med,* 164, no. 7 (April 12, 2004): 785–792.
6. Y. Kim, A. H. Chen, E. Keith, H. F. Yee, Jr., and M. B. Kushel, "Not Perfect, but Better: Primary Care Providers' Experiences with Electronic Referrals in a Safety Net Health System," *J Gen Intern Med,* 24, no. 5 (May 2009): 614–619.
7. J. A. Linder, N.A. Rigotti, L.I. Schneider, J.H. Kelley, P. Brawarsky, and J.S. Haas, "An Electronic Health Record-Based Intervention to Improve Tobacco Treatment in Primary Care: A Cluster-Randomized Controlled Trial," *Arch Intern Med,* 169, no. 8 (April 27, 2009): 781–787.
8. S. M. Elnahal, K.E. Joynt, S.J. Bristol, and A.K. Jha, "Electronic Health Record Functions Differ Between Best and Worst Hospitals," *Am J Manag Care,* 17, no. 4 (April 2011): e121–e147.
9. The official website for the Medicare and Medicaid Electronic Health Records (EHR) Incentive Programs, Basics, www.cms.gov.
10. The official website for the Medicare and Medicaid Electronic Health Records (EHR) Incentive Programs, Eligibility, www.cms.gov.
11. Health Professional Shortage Areas (HPSAs) are designated by HRSA as having shortages of primary medical care, dental, or mental health providers and may be geographic (a county or service area), demographic (low income population), or institutional (comprehensive health center, federally qualified health center, or other public facility), bhpr.hrsa.gov/shortage.
12. See note 3.
13. See note 3.
14. The difference in likelihood of having an EHR that meets the eight core meaningful use objectives measured and an EHR that meets the four menu meaningful use objectives measured is statistically significant at $p < 0.05$.
15. Differences across practice types in rates at which physicians report having an EHR that can meet the 12 meaningful use criteria measured are statistically significant at $p < 0.0001$.
16. Differences across age groups in the percentage of physicians in specific types of practices are statistically significant at $p < 0.0001$.
17. C. J. Hsiao, E. Hing, T.C. Socey, B. Cai. Electronic Medical Record Systems and Intent to Apply for Meaningful Use Incentives Among Office-Based Physician Practices: United States, 2001–2011. *National Center for Health Statistics Data Brief,* no. 79. November 2011, www.cdc.gov/nchs.
18. Ibid.

19. Conclusion based upon comparison of data from the California survey to unpublished data from the 2011 NAMCS provided by Chun-Ju Hsiao, PhD, National Center for Health Statistics, March 9, 2011.
20. See note 16.
21. See note 16.
22. Findings from the previous supplemental survey are summarized in A. B. Bindman, P. W. Chu, and K. Grumbach, *Physician Participation in Medi-Cal, 2008* (Oakland, CA: California HealthCare Foundation, 2010).
23. Ibid.
24. Differences in the percentages of pediatricians and non-pediatricians who could be eligible for Medi-Cal EHR incentive payments are statistically significant at $p < 0.0001$.
25. The difference in the percentage of physicians practicing in rural areas is statistically significant at $p < 0.0001$.
26. The difference in the percentage of specialists is statistically significant at $p < 0.0001$.
27. Several estimates of the number of Californians who would be newly eligible for Medi-Cal under the Affordable Care Act have been generated. These estimates range from 1.7 million to 3.0 million on a base of 7.5 million current enrollees. J. Holahan and I. Headen, *Medicaid Coverage and Spending in Health Reform: National and State-by-State Results for Adults at or Below 133% FPL* (Washington, DC: Kaiser Commission on Medicaid and the Uninsured, May 2010), www.kff.org.
28. K. Jacobs, L. Lucia, and D. Graham-Squire, *Eligibility for Medi-Cal and the Health Insurance Exchange in California Under the Affordable Care Act* (Berkeley, CA: UC Berkeley Center for Labor Research and Education, August 2010), laborcenter.berkeley.edu.
29. P. Long and J. Gruber, "Projecting the Impact of the Affordable Care Act on California." *Health Aff (Millwood),* 30, no. 1 (2011): 63–70.
30. DHCS defines a "clinic" as a clinic licensed by the California Department of Public Health. A "group" is defined as an entity that has a single tax identification number and which has oversight of the quality of clinical care furnished by participating providers. Medi-Cal Electronic Health Record Incentive Program, "Understanding Groups and Clinics," www.dhcs.ca.gov.
31. Medi-Cal Electronic Health Record Incentive Program, "Understanding Groups and Clinics," www.dhcs.ca.gov
32. See note 21.
33. See note 3.
34. See note 16.
35. Medi-Cal Electronic Health Record Incentive Program, "Understanding Groups and Clinics," www.dhcs.ca.gov

California
HealthCare
Foundation

1438 Webster Street, Suite 400
Oakland, CA 94612
tel: 510.238.1040
fax: 510.238.1388
www.chcf.org