Use of Electronic Health Records by Nurse Practitioners and Nurse Midwives

Prepared for:
The California Medicaid Research Institute for the California Department of Health Care Services' Office of Health Information Technology

Prepared by:
Joanne Spetz, PhD, FAAN
Dennis Keane, MPH
Janet M. Coffman, MA, MPP, PhD
Lela Chu

Philip R. Lee Institute for Health Policy Studies
& School of Nursing
University of California, San Francisco

2012

CAMRI
CALIFORNIA MEDICAID RESEARCH INSTITUTE

About the Authors

Joanne Spetz, PhD, FAAN, is a Professor at the Philip R. Lee Institute for Health Policy Studies, and the Departments of Family and Community Medicine, Social & Behavioral Sciences, and Community Health Systems at the University of California, San Francisco. She also is a faculty researcher at the Center for the Health Professions.

Dennis Keane, MPH, is a Survey Manager at the Philip R. Lee Institute for Health Policy Studies at the University of California, San Francisco.

Janet M. Coffman, MA, MPP, PhD is Associate 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.

Lela Chu is a Research Analyst at the Philip R. Lee Institute for Health Policy Studies at the University of California, San Francisco.

Acknowledgements

This research was supported by the Office of Health Information Technology of the California Department of Health Care Services and the California Health Care Foundation. We are grateful for the guidance from Dr. Larry Dickey and Raul Ramirez over the course of the project, and for support by our partners at the California Medicaid Research Institute. We also wish to thank Jessica Lin and Patrick Madigan for their research assistance.

Contents

Tables

Figures

Executive Summary

The use of electronic health records (EHRs) shows promise to improve the coordination of care, provider efficiency, and care quality. However, the purchase and implementation of EHR systems requires a significant investment of time and money, and often demands redesign of care practices and workflow. To encourage the use of EHRs, the federal government created an incentive program for providers who demonstrate meaningful use of EHR technology. 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 in order to improve health care delivery. HITECH incentive payments will total up to $27 billion over 10 years, with $2 to $3 billion going to California hospitals and providers.[1] In order to implement this program, the California Department of Health Care Services (DHCS) needs to establish baseline use of EHRs, and identify California physicians, nurse practitioners, nurse midwives, and other eligible providers who might receive incentive payments. In 2011, faculty at the University of California, San Francisco, working on behalf of the California Medicaid Research Institute, developed and conducted two surveys to measure baseline use of EHRs. A survey of physicians was conducted in summer 2011, and a survey of nurse practitioners (NPs) and nurse midwives (CNMs) was conducted in fall 2011.

A questionnaire was sent on October 21, 2011, to 5,000 NPs and CNMs with active California certificates. The questionnaire asked NPs and CNMs about their work in advanced practice nursing, whether they had an EHR at their main practice location, and assessed the attainment of 12 objectives CMS established for meaningful use of EHRs.

Findings for All Respondents

Employment in advanced practice roles

- NPs and CNMs are also licensed as registered nurses (RNs) and can choose to work in an RN role rather than an advanced practice NP or CNM role. They are not eligible for Medicaid incentive payments if they are not working in an advanced practice role.
- 24.6 percent of California's NPs and CNMs do not work in advanced practice.

Prevalence

- 78.3 percent of all NPs and CNMs report having an EHR at their main practice location.
- Only 26.1 percent have an EHR at their main practice location that can achieve all 12 of the meaningful use objectives measured in this survey.
- EHR systems vary in terms of availability of functions meeting the CMS meaningful use objectives. Rates at which specific functions were available when EHRs were present

range from a low of 59 percent for providing patients with access to their own electronic records to a high of 94.9 percent for generating lists of medication allergies.
- NPs and CNMs are more likely to use functions that give them information they can access during patient encounters than functions associated with assessing quality of care or exchanging information electronically with patients or other providers.

System functionality

- Only 19.3 percent of NPs and CNMs think all of their EHR systems function well.
- NPs and CNMs who indicated that their EHRs can meet the 12 meaningful use objectives were more likely to report that their systems functioned well, compared to those who use EHRs that cannot meet all of those objectives. This may reflect user comfort with more-developed EHRs as opposed to fundamental problems in less-complete EHRs.

Factors associated with EHR use at main practice location

- Practice type is a strong predictor of EHR availability. NPs and CNMs who practice in large organizations, including Kaiser Permanente, are much more likely to have an EHR at their main practice location than those in solo or small practices, or community health centers and public clinics.
- Kaiser Permanente providers are more likely to have an EHR that can meet the 12 meaningful use objectives measured than non-Kaiser providers.
- Urban NPs and CNMs are more likely to have EHRs than those in rural settings.

NPs' and CNMs' plans regarding EHR incentive payments

- 58.5 percent of NPs and CNMs do not know if their practice setting will apply for incentive payments.
- 27.1 percent of NPs and CNMs say they or their practice plans to apply for either Medicaid or Medicare incentive payments for meaningful use of EHRs.

NPs' and CNMs' comments about EHRs and health information technology

- NPs and CNMs noted that EHR implementation has increased accuracy of charting and efficiency, and many think there have been improvements in the quality of patient care.
- Dissatisfaction with EHRs is largely focused on the time required to use them effectively, and with the lack of continuity of EHR data across care settings.
- Some NPs and CNMs commented that the transition process to using an EHR is challenging. They want to be included in decisions about which system to purchase, and well-designed training programs are needed.

Findings for Respondents Who Appear Eligible for Medicaid EHR Incentive Payments

Number of eligible nurse practitioners and nurse midwives

- Findings from this survey suggest that 2,506 NPs and CNMs with active California certificates (21.8%) could be eligible for Medicaid 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 NPs and CNMs

- NPs and CNMs who practice in community health centers and public health clinics are much more likely to be eligible for incentive payments (65.8%) than are those who practice in other settings such as private practices and Kaiser Permanente.
- Compared with NPs and CNMs who appear to be ineligible based on their practice location and their patients' enrollment in Medi-Cal, NPs and CNMs who could be eligible for Medicaid incentive payments are somewhat less likely to report having any sort of EHR (68.7% vs. 81%) or an EHR that can meet the 12 meaningful use objectives measured (13.8% vs. 29.5%).

Summary

- Nearly one-quarter of California NPs and CNMs do not work in advanced practice roles.
- EHRs are widely available in California NPs' and CNMs' practices, for all types of practice locations, but many of these EHRs are not currently configured to meet CMS objectives for meaningful use.
- The Medicaid incentive payments are well-targeted to increase meaningful use of EHRs. The majority of respondents who appear eligible for the incentive payments do not currently have EHRs that can meet all 12 of the meaningful use objectives measured in the survey. Twenty-two percent of respondents do not have any sort of EHR. However, many respondents are not familiar with the rules governing eligibility for Medicaid incentive payment.
- A substantial percentage of respondents do not know whether their organizations will apply for meaningful use incentive payments. Some of those who appear to be eligible for Medicaid 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 do not appear to be eligible.

Recommendations

- Ongoing efforts are needed to educate NPs and CNMs about the eligibility criteria for Medicaid incentive payments and to encourage those who are eligible to apply.
- A high priority should be placed on outreach to providers in community/public clinics and small group practices because these providers are the least likely to have EHRs or to have EHRs that meet meaningful use objectives.
- Expanding meaningful use among eligible providers will require outreach to providers whose EHRs now lack the capacity to meet all of the CMS meaningful use objectives.

Introduction

Electronic health records (EHRs) provide a mechanism to electronically record and retrieve information about the health of and health care services received by individual patients over time. EHRs can facilitate improvement in coordination of care, patient safety, quality management, outcomes reporting, and provider efficiency. Despite these benefits, EHR adoption has been slow in ambulatory care settings, due to the high costs of implementation and maintenance, concerns about interoperability of systems, a lack of standardization, and concerns about the privacy of EHRs.[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 $63,750 from Medicaid per clinician.[3]

Each state is tasked by the Centers for Medicare and Medicaid Services (CMS) to identify health care providers who are eligible to receive Medicaid EHR incentive payments, including physicians, nurse practitioners, and nurse midwives. In 2011, faculty at the University of California, San Francisco, working on behalf of the California Medicaid Research Institute, developed and conducted two surveys to measure baseline use of EHRs. A survey of physicians was conducted in summer 2011,[4] and a survey of nurse practitioners (NPs) and nurse midwives (CNMs) was conducted in fall 2011. These surveys were designed to learn the current availability and use of EHRs, as well as to estimate the numbers of providers who would be eligible for Medicaid incentive payments. This report provides the findings for NPs and CNMs, and offers the most detailed information available to date on California NPs' and CNMs' experiences with EHRs.

The NP/CNM survey was fielded shortly after hospitals were permitted to register for the Medicaid incentive program on October 3, 2011, and immediately prior to registration opening for clinics and groups on November 15, 2011. While a few respondents indicated that their organization had already registered, these data can be considered baseline data on EHR availability and use prior to implementation of the incentive payments.

Background

Recent research shows measurable benefits from the adoption of health information technology such as EHRs.[5] Health information technology (HIT) can improve quality by enhancing coordination of care, reducing medical errors and omissions of care, increasing prevention and early diagnosis of disease, and facilitating chronic disease management.[6,7,8,9,10,11] EHRs increase the efficiency of care delivery by eliminating duplicative tests and procedures, as well as through evidence-based decision support and real-time access to medical histories.[12,13,14,15] Integration of

systems and sharing of health record data can facilitate proactive, coordinated care approaches such as the patient-centered medical home model.

The potential for HIT and EHRs to improve the quality and accessibility of health care services has led to national efforts to ensure that health care providers use these systems.[16] However, HIT adoption remains limited, with only about 34 percent of ambulatory care providers estimated as using basic HIT functionalities.[17] Implementation of EHRs involves significant investment in equipment, software, personnel training, and changes in workflow.[18] To accelerate the adoption and use of EHRs, the federal government now provides incentive payments to hospitals and providers through the Medicare and Medicaid programs. This program, established through the HITECH Act as part of the American Recovery and Reinvestment Act of 2009, links the incentive payments to the achievement of "meaningful use" of EHR technology as defined by federal regulations.[19,20]

Meaningful Use

There are 25 EHR meaningful use objectives for health care providers, and 24 for hospitals. These objectives are grouped into three categories: core objectives, menu objectives, and electronic reporting on the quality of care. In the first year of the Medicaid incentive payment program, providers need to demonstrate that they have adopted, implemented, or upgraded certified EHR technology in order to qualify for payment. 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 5 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.[21]

The core objectives are comprised of 15 basic functions, including collection of basic medical information, including vital signs, demographics, medications, allergies, up-to-date lists of current and past medical diagnoses, and smoking status. Other core objectives focus on functions that help clinicians make better clinical decisions and avoid preventable errors.

The ten menu objectives include more advanced EHR 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.

The third component of meaningful EHR 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 level, tobacco status, and adult weight status, as well as three additional clinical quality measures of the clinician's choice.

Eligibility Requirements

Provider eligibility for incentive payments differs between the Medicare and Medicaid programs. Potentially eligible providers for Medicaid payments include physicians, residents and fellows with medical licenses, dentists, nurse midwives, nurse practitioners, and physician assistants. Eligible providers must spend less than 90 percent of their patient care hours in inpatient or emergency department settings, because hospitals also can apply for incentive payments and the

program seeks to avoid duplication of payments. Providers may accept either the Medicaid or Medicare incentives, but not both in the same year. They may switch once between programs.[22] Nurse practitioners and nurse midwives are not eligible for Medicare incentive payments. In general, the Medicaid incentives are larger and have less stringent requirements than the Medicare incentives, so it is expected that providers who qualify for both will take the Medicaid incentives.

To be eligible for the Medicaid incentives, health care providers must have at least one encounter with a Medicaid patient per representative 90-day period and have a minimum of 30 percent of their patients enrolled in Medicaid. For pediatricians, the minimum Medicaid patient volume is 20 percent, but this lower rate does not apply to pediatric nurse practitioners. Providers who practice mainly in a Federally Qualified Health Center or a Rural Health Clinic and who have a minimum of 30 percent of their patient volume comprised of needy individuals (those receiving Medicaid or Children's Health Insurance Program benefits, or who are uninsured), and at least one Medicaid encounter during the year that contains the 90-day representative period, also qualify. Providers who qualify for payments may receive them individually or reassign the payment to the clinic or practice in which they work.

Results

Surveys were developed in collaboration with the Department of Health Care Services to learn the extent of current EHR use among NPs and CNMs, and to align with a previous survey of California physicians.[23] The Board of Registered Nursing's records indicated that 15,143 NPs and CNMs had active certificates and California addresses. The surveys were distributed by mail to 5,000 NPs and CNMs who were systematically sampled to ensure adequate numbers of each type of respondent (NP, CNM, and dual-certified) in each region of California to permit analyses by type of certificate and, for NPs, by region. A total of 2,624 surveys were returned, and 138 of those sampled were determined to be ineligible due to them being unreachable, their certificates having expired after the sample was selected, or them explicitly refusing to complete the survey. The response rate of those eligible for the survey was 54 percent (Table 1). All statistics presented in this report are weighted to represent the full population of NPs and CNMs with California addresses.

Table 1. Sample Numbers and Response Rate

	Total	NPs	CNMs & Dual-Certified
Number of NPs and CNMs in license file residing in California	15,143	14,120	1,023
Number of NPs and CNMs sampled for the survey	5,000	4,325	675
Sampling rate	33.0%	30.6%	36.9%
Number unreachable, ineligible, and refused to complete survey	138	110	28
Number eligible for survey	4,862	4,215	647
Number of NPs and CNMs who completed the survey	2,624	2,247	377
Percentage of total population represented by respondents	17.3%	15.9%	36.9%
Percentage of eligible respondents who completed the survey	54.0%	53.3%	58.3%

Characteristics of Respondents

After survey data were checked for completeness and entered into a database for analysis, the demographic and employment characteristics of respondents were examined. Seventeen respondents indicated that they resided outside California when they completed the survey, and these respondents were not included in the analysis. The remaining California-resident NP and CNM population is thus estimated as being 15,064.

Many NPs and CNMs do not work in advanced practice positions. The most common fields of work for those not in advanced practice roles were public health nursing, academic instruction, and general registered nursing. Overall, 24.6 percent of California's NPs and CNMs do not work in advanced practice. CNMs are somewhat more likely to work in advanced practice, with 77.2 percent having an advanced practice role, compared with 76.4 percent of NPs and 74.1 percent of those with dual certificates (Table 2).

The shares of NPs and CNMs who are potentially eligible for Medicaid incentive payments were estimated from respondents' reports of their practice locations and patient populations. The questionnaire, which was based on previous surveys of the NP and CNM population, asked respondents whether 26 percent or more of their patients were enrolled in Medi-Cal. These respondents were coded as eligible for Medicaid incentive payments, which does not perfectly align with CMS's requirement that 30 percent or more of their patients be enrolled in Medi-Cal. Based on this approximation, a minority of NPs and CNMs employed in advanced practice roles are potentially eligible for Medicaid incentive payments based on their practice location and patient population.

A lower share of NPs is potentially eligible for Medicaid incentive payments as compared with CNMs and those who are dual-certified ($p=0.052$). More than one-fourth of NPs are potentially eligible (21.8%) as compared with 28.2 percent of CNMs and 26.7 percent of dual-certified APRNs. This is likely because a large share of CNMs provide care in the area of women's health in public clinics and settings such as Planned Parenthood.

Table 2. Residence and Employment of NPs and CNMs

	Total	NPs	CNMs	Dual-Certified
APRNs residing in California	15,064	14,056	526	482
Total (%) employed in advanced practice	11,503 76.4%	10,735 76.4%	406 77.2%	362 75.1%
Total potentially eligible for Medicaid incentive payments	2,506 (21.8%)	2,295 (21.4%)	114 (28.2%)	97 (26.7%)

*Note: 2,001 respondents were included in these calculations. Differences across APRN types are marginally significant (p=0.052).

Findings for All Respondents

Availability and Use

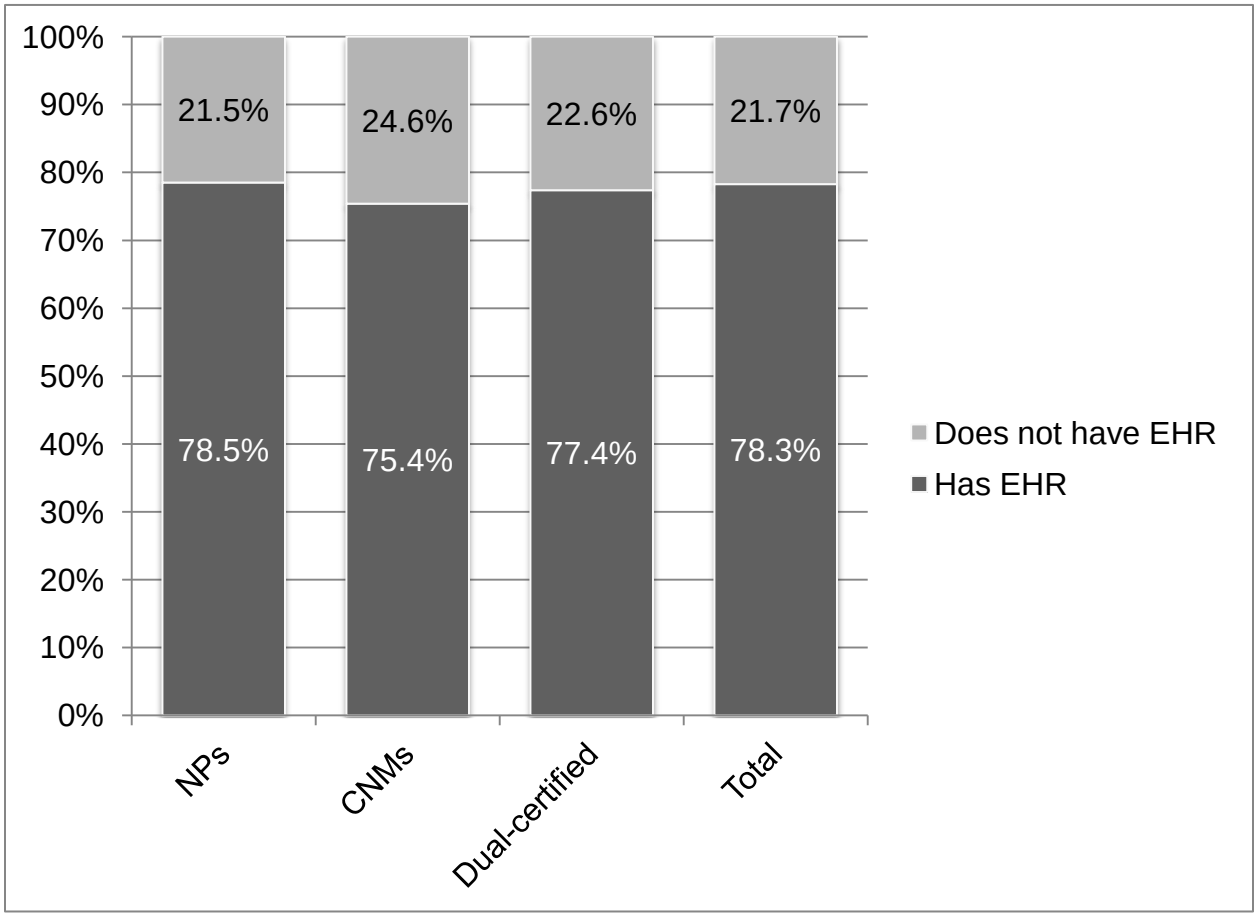
The majority of NPs and CNMs (78.3%) across all practice settings report having some form of EHR at their main practice location (Figure 1). EHRs can offer a variety of functions that enable health care providers to record and share information, and to support health care decisions. CMS has defined specific functions that are necessary to achieve meaningful use of EHRs. The survey asked about the availability of functions needed to achieve 8 of the 15 core meaningful use objectives and 4 of the 10 menu objectives established by CMS. The objectives measured are listed in Table 3. The survey also asked about the availability of 4 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 core objectives not included in the survey were (1) checking drug-drug and drug-allergy interactions, (2) recording and charting vital signs, (3) recording smoking status, (4) implementing one clinical decision support rule, (5) providing patients with an electronic copy of their health records, (6) providing clinical summaries for patients at each office visit, and (7) protecting EHR data through appropriate security systems. The menu objectives not included were (1) implementing drug formulary checks, (2) sending patient reminders based on patient preference for preventive and follow-up care, (3) identifying patient-specific education resources, (4) medication reconciliation, (5) providing summary care records for transitions of care and referrals, and (6) submitting syndromic surveillance data to public health agencies. The survey did not ask if the EHR had been certified by the Office of the National Coordinator because at the time of the survey the certification program was new and thus very few EHR systems had been certified.

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 report 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

Figure 1. NPs, CNMs, and Dual-Certified Advanced Practice Nurses with Any EHR at Their Practice*

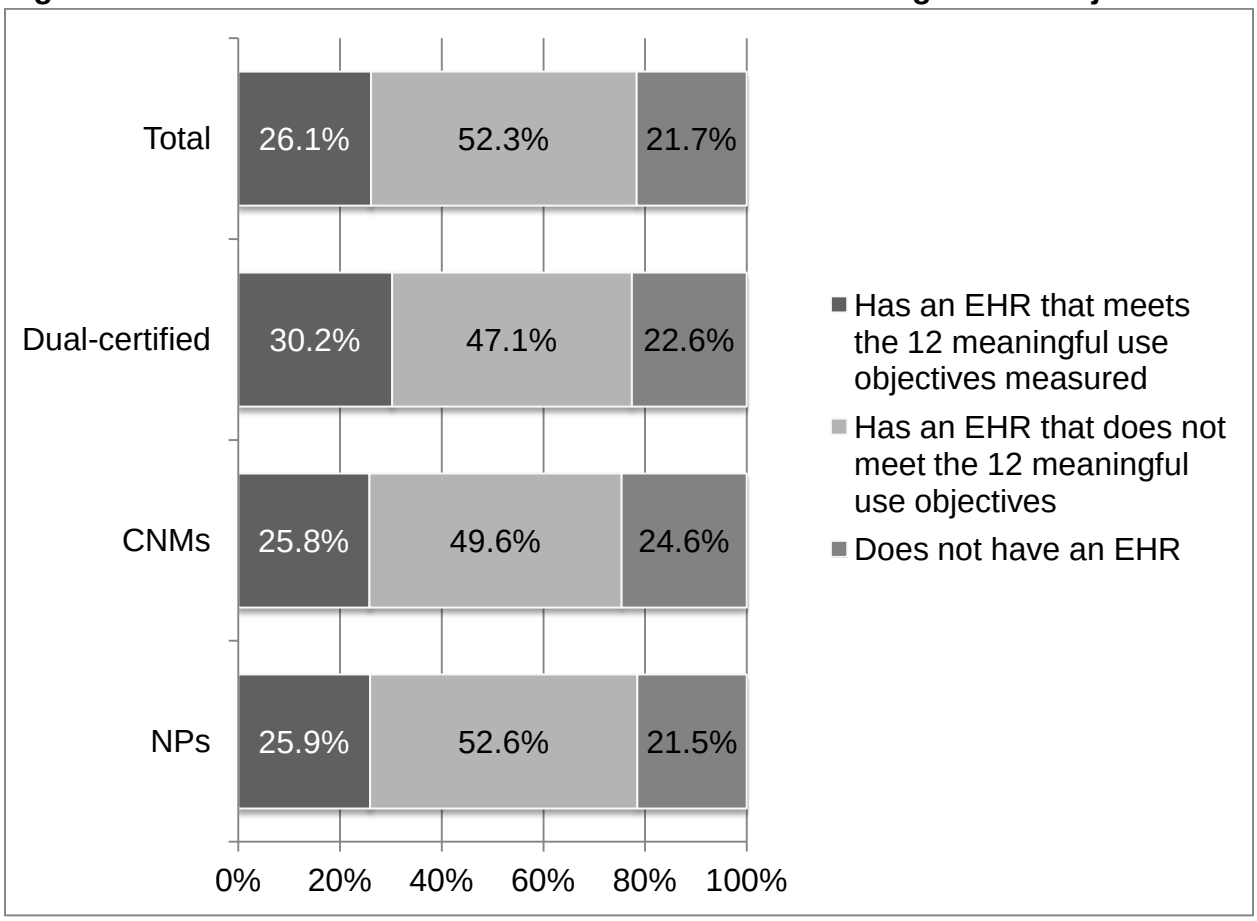


***Note: 1,988 observations use d in calculations. Percentages do not sum to 100% due to rounding. Differences across type of APRN are not statistically significant (p=0.647).**

The survey question regarding lab test results is phrased more broadly than the meaningful use standard set forth by CMS. The question asked 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.[24] Thus, this survey may overestimate the percentage of respondents who meet the CMS meaningful use objective with regard to laboratory test results.

A minority of NPs and CNMs have EHRs that offer all 12 meaningful use objectives measured in the survey (Figure 2). Only 26.1 percent meet all 12 objectives, as compared with 30 percent of physicians surveyed earlier the same year. Over half (52.3%) of NPs and CNMs have fewer than 12 and 21.7 percent have no EHR. Advanced practice nurses who hold both NP and CNM certificates are somewhat more likely to have EHRs that meet the 12 meaningful use objectives (30.2%), although this different is not statistically significant (p=0.630).

Figure 2. NPs and CNMs with EHRs that Meet the 12 Meaningful Use Objectives



*Notes: 1,988 observations used in calculations. Percentages do not sum to 100% due to rounding. Differences across APRN types are not statistically significant (p=0.630).

Table 4 presents NPs' and CNMs' reports of the extent to which they use EHR functions that fulfill core and menu meaningful use objectives; the top panel (no shading) lists core functions while the lower panel (shaded) lists menu functions. In general, NPs and CNMs are highly likely to report that they often use EHR functions that are used in patient encounters, including taking clinical notes (84.2%), generating lists of patients' medications (83.3%) and medication allergies (84.5%), and viewing or receiving laboratory test results (79.9%). They less frequently used features that allow them to collect patient demographic data (50.1%) and order or transmit prescriptions electronically (62.8%). Fourteen percent report that their EHR does not allow them to order or transmit prescriptions electronically. A large share do not use functions that allow then to generate routine reports of quality indicators even when the feature is available (29.8%), and 16 percent do not have this function available. Twenty-two percent cannot transmit information electronically to or from other providers when patients are referred, and 23 percent do not use this function even when it is available. Other menu meaningful use objectives are typically not available or not used by NPs and CNMs. For example, only 46.6 percent of respondents have EHRs that provide patients with access to their own health records and only 15.7 percent use this function all or most of the time.

Similar patterns of EHR availability and use are found among NPs who are not dual-certified (Table 5). CNMs are less likely to frequently use most EHR functions, although that they more frequently indicate they order or transmit prescriptions most or all of the time (69.3%) (Table 6).

The survey also assessed the availability of other EHR functions that may be helpful for providing patient care (Tables 7-9). 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.

As may be true with physician use of EHR functions, these data do not necessarily mean that EHR functions for monitoring quality of care or exchanging information are not being used. In large practices, it is possible that other personnel, such as registered nurses and medical assistants, are using EHRs to assess the health of patients with specific conditions or to monitor the practice's compliance with quality indicator monitoring and reporting. Other personnel also may be exchanging information with other providers, although the feasibility of doing so depends largely on the interoperability of EHRs across health care providers.

Table 4. Availability of Functions to Fulfill Core and Menu Meaningful Use Objectives Among NPs and CNMs who Have an EHR

	Yes, the feature is available				No, this feature is not available	Don't know
	Yes, use all or most of the time	Yes, use some time	Do not use	Not applicable		
Collect patient demographics	50.1%	25.1%	12.7%	1.5%	5.3%	5.4%
Take clinical notes	84.2%	6.6%	2.0%	0.5%	5.4%	1.3%
Generate patient problem list	75.6%	11.2%	3.6%	0.5%	7.6%	1.5%
Generate list of patient medications	83.3%	7.2%	1.8%	0.4%	6.3%	1.0%
Generate list of medication allergies	84.5%	6.5%	2.1%	0.6%	5.1%	1.3%
Order/transmit prescriptions electronically	62.8%	9.1%	8.9%	2.1%	14.2%	2.9%
Generate routine reports of quality indicators	20.3%	13.3%	29.8%	3.7%	16.0%	17.1%
Transmit info electronically to/from providers to whom a patient is referred	22.9%	17.0%	23.0%	3.4%	22.0%	11.8%
View or receive lab test results	79.9%	8.5%	3.6%	1.0%	5.8%	1.2%
Generate lists of patients by conditions	23.5%	13.3%	28.6%	3.7%	17.3%	13.7%
Transmit data to immunization registries	13.5%	4.5%	31.9%	5.7%	23.4%	21.1%
Patients able to access their own electronic health record	15.7%	11.0%	16.9%	3.0%	41.0%	12.5%

*Notes: 1,552 observations used in calculations. Percentages do not sum to 100% due to rounding.

Table 5. Availability of Functions to Fulfill Core and Menu Meaningful Use Objectives Among NPs who Are Not Dual-Certified and Have an EHR

	Yes, the feature is available				No, this feature is not available	Don't know
	Yes, use all or most of the time	Yes, use some time	Do not use	Not applicable		
Collect patient demographics	50.6%	24.6%	12.7%	1.6%	5.3%	5.3%
Take clinical notes	84.6%	6.4%	2.0%	0.4%	5.3%	1.3%
Generate patient problem list	75.6%	11.3%	3.6%	0.5%	7.6%	1.5%
Generate list of patient medications	83.7%	7.1%	1.7%	0.4%	6.2%	0.9%
Generate list of medication allergies	84.7%	6.4%	2.1%	0.6%	5.0%	1.3%
Order/transmit prescriptions electronically	62.2%	9.1%	9.2%	2.2%	14.5%	2.9%
Generate routine report of quality indicators	20.5%	13.7%	29.3%	3.8%	16.1%	16.5%
Transmit info electronically to/from providers to whom a patient is referred	22.9%	16.8%	22.9%	3.5%	22.5%	11.5%
View or receive lab test results	79.6%	8.4%	3.7%	1.0%	6.1%	1.2%
Generate lists of patients by conditions	23.8%	13.6%	28.4%	3.7%	17.2%	13.3%
Transmit data to immunization registries	13.6%	4.4%	31.6%	5.9%	23.9%	20.7%
Patients able to access their own electronic health record	14.7%	11.0%	17.3%	3.1%	41.5%	12.4%

*Notes: 1,371 observations used in calculations. Percentages do not sum to 100% due to rounding.

Table 6. Availability of Functions to Fulfill Core and Menu Meaningful Use Objectives Among CNMs who Are Not Dual-Certified and Have an EHR

	Yes, the feature is available				No, this feature is not available	Don't know
	Yes, use all or most of the time	Yes, use some time	Do not use	Not applicable		
Collect patient demographics	46.3%	23.5%	12.6%	1.5%	8.8%	7.4%
Take clinical notes	74.8%	7.0%	2.9%	1.5%	11.3%	2.6%
Generate patient problem list	71.1%	7.8%	3.9%	1.5%	12.3%	3.3%
Generate list of patient medications	72.3%	9.5%	2.0%	1.5%	12.6%	2.1%
Generate list of medication allergies	75.7%	6.8%	2.9%	1.5%	11.2%	1.9%
Order/transmit prescriptions electronically	69.3%	8.3%	6.1%	1.5%	13.0%	1.9%
Generate routine report of quality indicators	16.9%	3.5%	34.3%	2.8%	17.1%	25.4%
Transmit info electronically to/from providers to whom a patient is referred	24.2%	13.5%	25.5%	3.2%	17.1%	16.6%
View or receive lab test results	84.7%	10.1%	0.0%	1.5%	2.9%	0.9%
Generate lists of patients by conditions	16.7%	6.6%	30.2%	4.3%	23.5%	18.7%
Transmit data to immunization registries	11.9%	2.0%	37.9%	3.7%	18.9%	25.7%
Patients able to access their own electronic health record	31.3%	7.9%	9.7%	2.9%	38.0%	10.3%

*Notes: 121 observations used in calculations. Percentages do not sum to 100% due to rounding.

Table 7. Availability of Other EHR Functions Among NPs and CNMs Who Have an EHR

	Yes, the feature is available				No, this feature is not available	Don't know
	Yes, use all or most of the time	Yes, use some time	Do not use	Not applicable		
Order laboratory tests	61.9%	8.4%	9.5%	1.6%	15.6%	3.1%
Order radiology tests	52.2%	9.7%	11.8%	3.4%	19.4%	3.5%
View written records of radiology tests	68.5%	12.0%	6.2%	2.7%	8.4%	2.2%
View images of radiology tests	43.0%	15.9%	15.3%	3.9%	17.4%	4.4%

*Notes: 1,552 observations used in calculations. Percentages do not sum to 100% due to rounding.

Table 8. Availability of Other EHR Functions Among NPs Who Are Not Dual-Certified and Have an EHR

	Yes, the feature is available				No, this feature is not available	Don't know
	Yes, use all or most of the time	Yes, use some time	Do not use	Not applicable		
Order laboratory tests	61.2%	8.7%	9.5%	1.7%	15.9%	3.0%
Order radiology tests	51.5%	9.6%	12.1%	3.5%	19.8%	3.5%
View written records of radiology tests	68.4%	11.8%	6.4%	2.8%	8.5%	2.3%
View images of radiology tests	43.5%	15.4%	15.3%	3.9%	17.4%	4.4%

*Notes: 1,371 observations used in calculations. Percentages do not sum to 100% due to rounding.

Table 9. Availability of Other EHR Functions Among CNMs Who Are Not Dual-Certified and Have an EHR

	Yes, the feature is available				No, this feature is not available	Don't know
	Yes, use all or most of the time	Yes, use some time	Do not use	Not applicable		
Order laboratory tests	67.2%	1.8%	8.6%	1.9%	17.6%	2.9%
Order radiology tests	60.7%	6.7%	8.0%	3.3%	19.1%	2.2%
View written records of radiology tests	73.8%	14.1%	3.5%	3.3%	4.7%	0.7%
View images of radiology tests	36.9%	16.0%	15.9%	6.6%	19.4%	5.1%

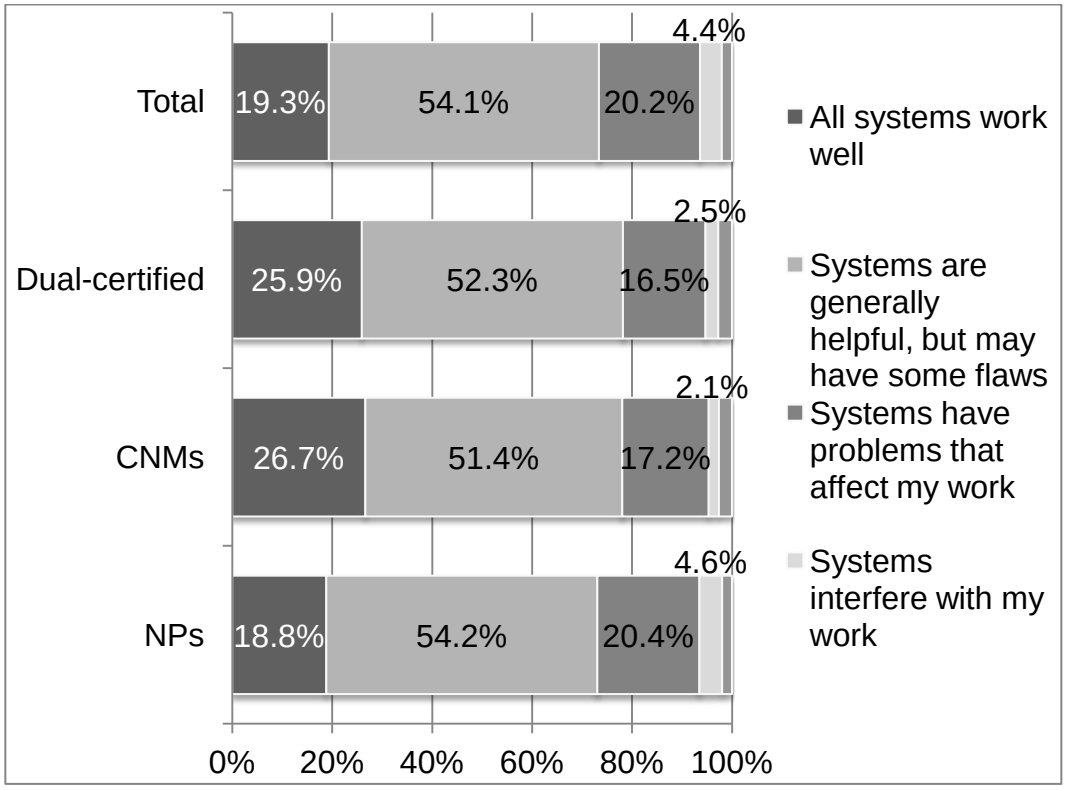
*Notes: 121 observations used in calculations. Percentages do not sum to 100% due to rounding.

Satisfaction with and perceived functionality of EHR systems

NPs and CNMs were asked about their experience with their EHR; specifically, they were asked whether their EHR worked well, or interfered with their work. As seen in Figure 3, only 19.3 percent reported that all EHR systems worked well. NPs were less likely to report that all systems worked well (18.8%) than CNMs (26.7%), but this difference was not statistically significant. Small shares indicated that their EHR systems interfered with their work (4.4% overall), but 20.2 percent indicated that their system had problems that affected their work. NPs were more likely to report problems than were CNMs (20.4% vs. 17.2%), but this difference was not statistically significant ($p=0.205$).

NPs and CNMs who use EHR systems that meet the 12 meaningful use objectives identified in the survey were significantly more likely to be satisfied than those whose systems did not meet the 12 objectives ($p<0.001$) (Table 10). Of those whose systems meet the 12 objectives, 30.7 percent reported that all their HIT systems worked well, in contrast to 13.9 percent of those whose systems did not meet all 12 objectives. Those whose systems did not meet the 12 objectives were more likely to indicate their systems had problems that affect their work (23.8% vs. 13.5%) or interfere with their work (5.5% vs. 2.3%). These differences in perceived functionality may reflect both user comfort with more-developed EHRs as well as fundamental problems in less-complete EHRs

Figure 3. NP and CNM Satisfaction with EHRs



*Notes: 1,557 observations used in calculations. Percentages do not sum to 100% due to rounding. Differences across types of APRNs are not statistically significant (p=0.205).

Table 10. NP and CNM Satisfaction with EHRs, by Ability to Meet All 12 Meaningful Use Criteria

Experience with EHR	NPs and CNMs with EHRs that *do not meet* the 12 meaningful use objectives	NPs and CNMs with EHRs that *meet* the 12 meaningful use objectives
All systems work well	13.9%	30.7%
Systems are generally helpful, but may have some flaws	55.5%	53.4%
Systems have problems that affect my work	23.8%	13.5%
Systems interfere with my work	5.5%	2.3%

*Notes: 1,551 observations used in calculations. Percentages do not sum to 100% due to rounding. Differences by meeting meaningful use objectives were statistically significant (p<0.001).

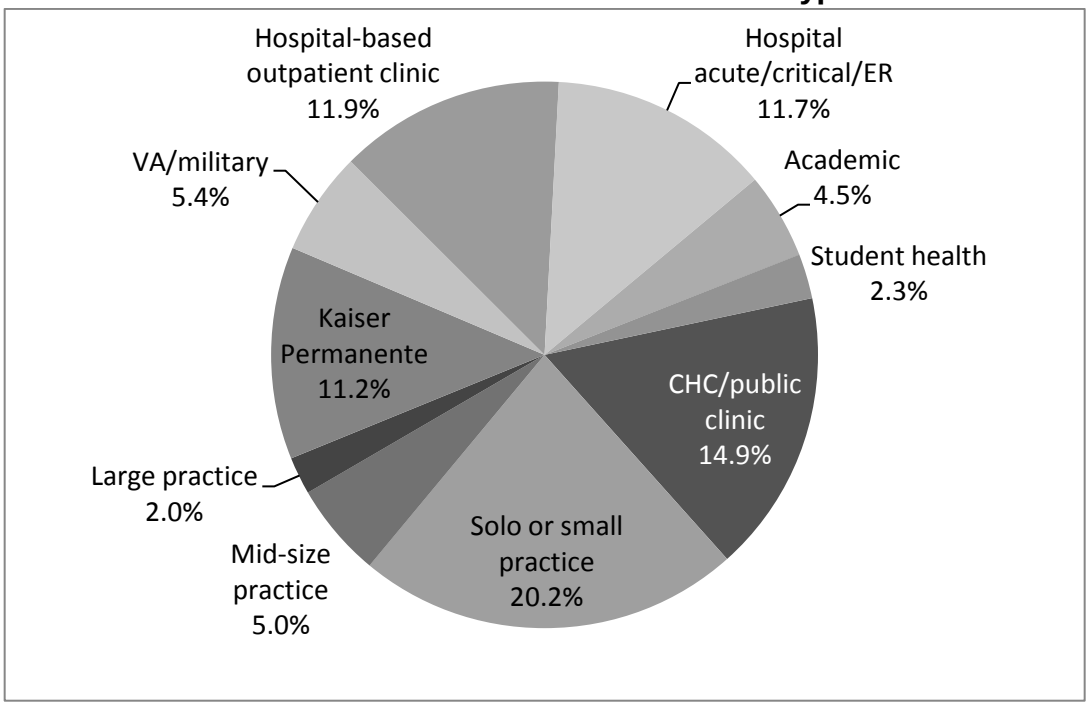
Factors Associated with EHR Use

The survey responses were analyzed to understand the association between NPs' and CNMs' practice settings, roles, and EHR use.

Practice Type

Advanced practice nurses work in a variety of settings. Figure 4 presents the distribution of NPs and CNMs across settings. The largest share of NPs and CNMs – 20.2 percent – works in practices with fewer than 10 providers. Nearly 15 percent work in community health centers or other public clinics. Hospital-based outpatient clinics and hospital-based acute, critical care, and emergency room units each employ about 12 percent of NPs and CNMs. Kaiser Permanente is the reported principal practice location of 11.2 percent.

Figure 4. Distribution of NPs and CNMs Across Practice Types

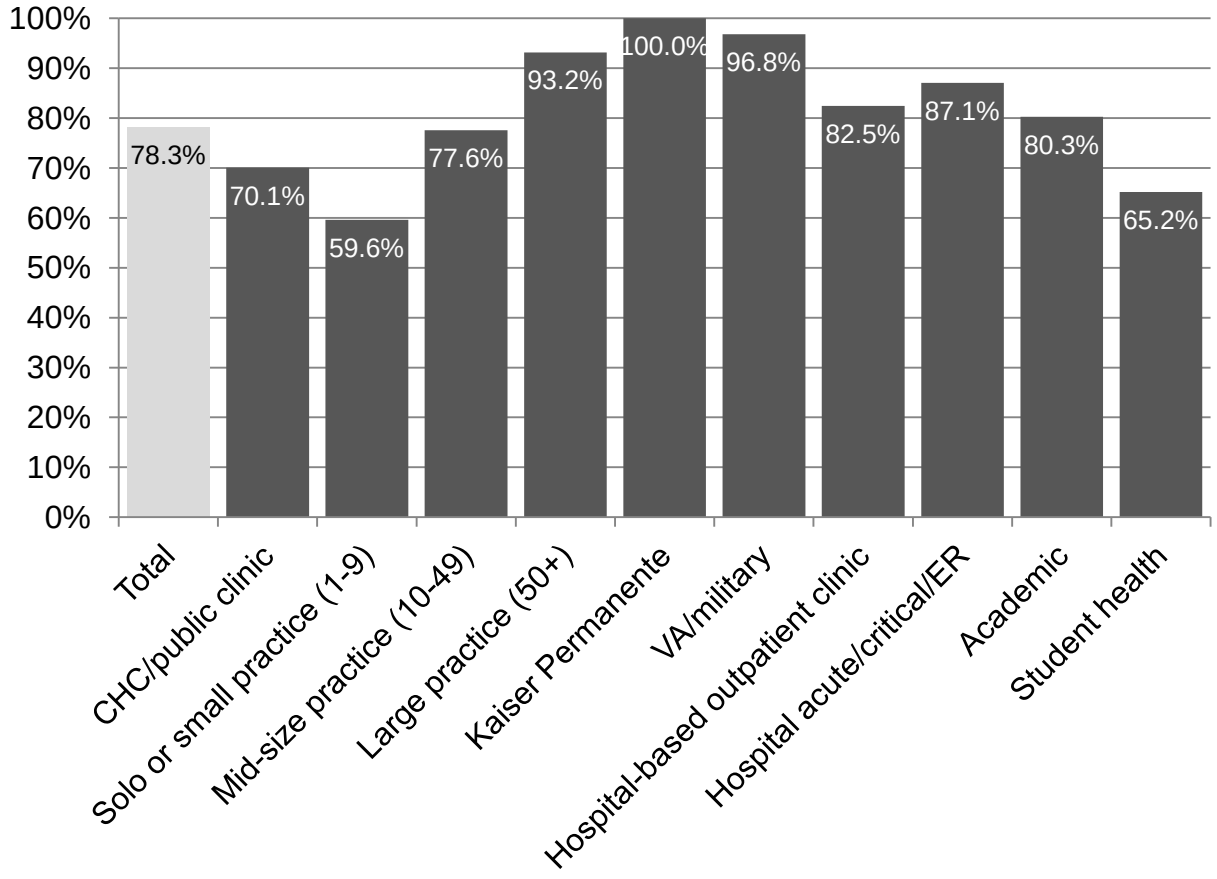


*Notes: 1,995 observations used in the calculations.

The type of organization in which a NP or CNM practices is a strong predictor of whether he or she has an EHR of any sort at the main practice location. As Figure 5 illustrates, NPs and CNMs who work in the Kaiser Permanente system have the highest rate of EHR availability (100%). Those who are employed by the Department of Veterans Affairs (VA) or the military also report very high rates of EHR availability (96.8%), as do those in large group practices (93.2%). 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 NPs and

CNMs in solo or small practices (59.6%), student health centers (65.2%), and community/public health clinics (70.1%).

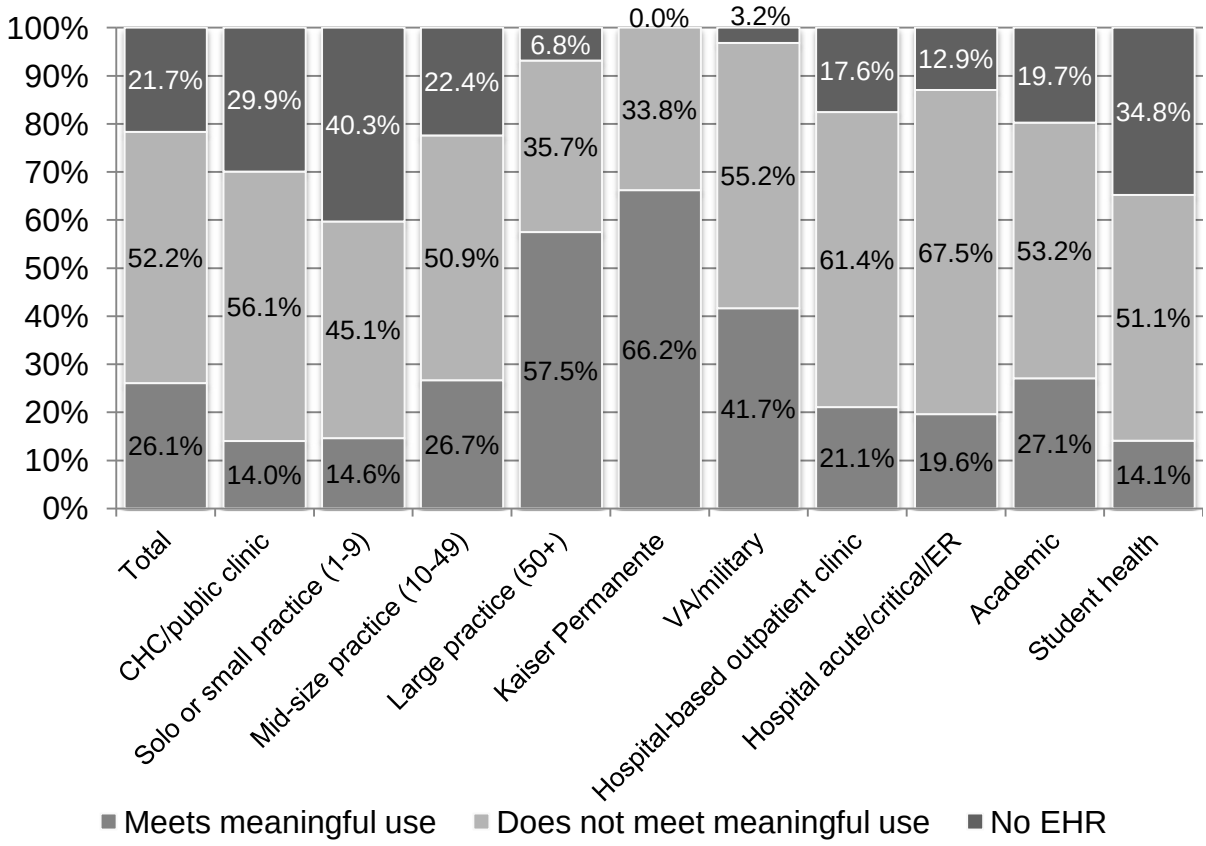
Figure 5. EHR Availability by Practice Type, All NPs and CNMs



*Notes: 1,985 observations used in the calculations.

NPs and CNMs who work in Kaiser Permanente and large group practices are more likely to have an EHR that meets the 12 meaningful use objectives measured than those working in other settings (Figure 6). Nearly two-thirds of Kaiser Permanente NPs and CNMs report having EHRs that can meet the 12 meaningful use criteria. In contrast, 14 percent of NPs and CNMs in community health centers and public clinics, 14.1 percent in student health centers, and 14.6 percent in solo or small group practices report having EHRs that meet the 12 meaningful use criteria. These differences across settings are statistically significant ($p<0.001$).

Figure 6. EHRs Meeting Meaningful Use Objectives by Practice Type, All NPs and CNMs



*Notes: 1,985 observations used in the calculations. Differences across settings are statistically significant (p<0.001).

Urban vs. Rural Practice

EHR availability does not differ substantially between NPs and CNMs who practice in urban areas versus rural areas (Table 11). Of the NPs and CNMs in the sample, 88.2 percent practice in an urban setting and 11.8 practice in a rural setting. (The criteria used to determine whether providers' practices in an urban or a rural area are described in Appendix A.) Urban NPs and CNMs are slightly more likely to have an EHR at their main practice site than those who practice in rural settings (78.6% vs. 73.9%), but this difference is not statistically significant (p=0.062).

Table 11. EHR Availability and Meaningful Use Objectives, Urban vs. Rural NPs and CNMs

Geographic area	Has an EHR that meets meaningful use objectives	Has an EHR that does not meet meaningful use objectives	Does not have an EHR
Urban	26.0%	52.6%	21.4%
Rural	22.6%	51.3%	26.1%

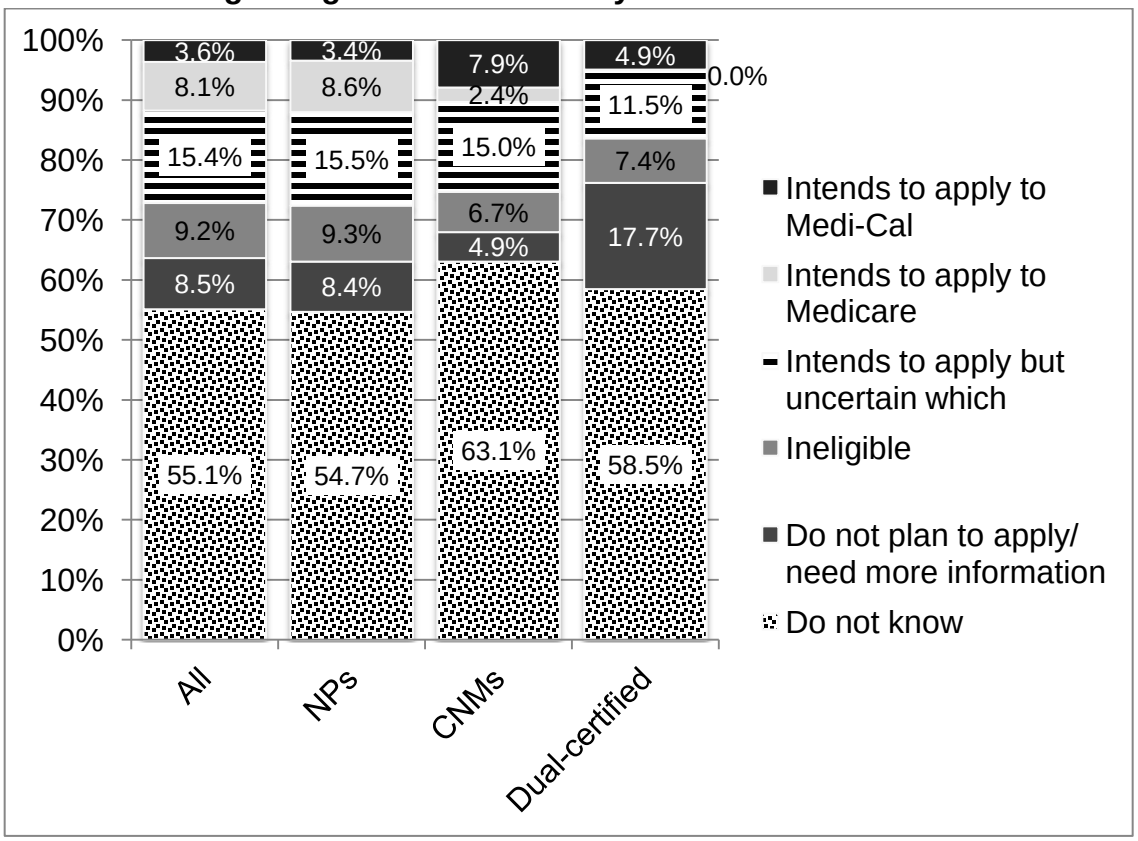
*Notes: 1,891 observations used in calculations. Differences by urban/rural location are not statistically significant (p=0.062).

Intentions Regarding EHR Incentive Payments

NPs and CNMs were asked to indicate their plans to apply for Medicaid or Medicare incentive payments for EHR use (Figure 7). Note that NPs and CNMs are not individually eligible to apply for Medicare incentive payments, but their practice group or organization may apply. The majority of respondents (55.1%) indicated that they did not know if their practice group intended to apply, and many wrote in the comment section of the survey that they were not in a position to have input into the decision or know what the decision would be. More than one-fourth (27.1%) intend to apply to either the Medicaid or Medicare incentive payment programs. Fifteen percent intend to apply but are not certain whether their group will apply for Medicare or Medicaid incentive payments. Eight percent intend to apply for Medicare incentive payments, and 3.6 percent plan to apply for Medicaid incentive payments.

The responses to the survey suggest that many NPs and CNMs were not familiar with the eligibility rules for Medicaid and Medicare EHR incentive payments at the time they completed the survey (Table 12). About 3 percent of NPs and CNMs who could be eligible for Medicaid incentive payments based on their payer mix, practice setting, and practice type do not believe they are eligible, and 8.2 percent do not plan to apply or need more information. Conversely, 1.9 percent of respondents who do not appear to be eligible for Medicaid incentive payments plan to apply for them. These findings suggest that ongoing efforts are needed to educate NPs and CNMs about the eligibility criteria for incentive payments and to encourage potentially eligible NPs and CNMs to apply.

Figure 7. Plans Regarding EHR Incentive Payments



*Notes: 1.588 observations used in calculations. Differences across APRN types are statistically significant (p=0.006).

Table 12. Plans Regarding EHR Incentive Payments, by Eligibility

Plans regarding EHR incentive payments	Medicaid incentive payment eligibility	
	Eligible	Not eligible
Intends to apply but uncertain which	28.8%	12.1%
Intends to apply to Medicare	2.6%	9.5%
Intends to apply to Medicaid	10.5%	1.9%
Do not plan to apply/ need more information	8.2%	8.6%
Ineligible	3.1%	10.7%
Do not know	46.8%	57.1%

*Notes: 1,588 observations used in calculations. Differences by incentive payment eligibility are statistically significant (p<0.001).

Findings for Respondents Who Appear Eligible for Medicaid EHR Incentive Payments

Number and Percent Eligible.

One goal of this project was to estimate the number of NPs and CNMs with active California licenses who may be eligible for Medicaid EHR incentive payments. As discussed in the Introduction, eligibility for Medicaid incentive payments is determined by the health care provider setting and the percentage of the provider's patients enrolled in Medi-Cal. To estimate the number and percentage of California NPs and CNMs who could be eligible for Medicaid EHR incentive payments, respondents who spend less than 90 percent of their patient care hours in hospital settings were identified. They were considered potentially eligible for Medicaid incentive payments if a minimum of 25 percent of their patients are enrolled in Medi-Cal. NPs and CNMs also were considered eligible if they practiced mainly in a Federally Qualified Health Center or a Rural Health Clinic and served a minimum of 25 percent of patients who are uninsured, enrolled in Healthy Families, and/or enrolled in Medi-Cal.

According to this survey, 2,506 NPs and CNMs could be eligible for Medicaid EHR incentive payments based on payer mix, practice setting, and practice type. These NPs and CNMs constitute approximately 21.8 percent of the 11,497 NPs and CNMs who were employed in advanced practice in California.

Characteristics

NPs and CNMs who could be eligible for Medicaid 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 NPs and CNMs across practice types varies. As illustrated in Table 13, NPs and CNMs who appear eligible for Medicaid EHR incentive payments are much more likely to practice in community/public clinics (65.8% being eligible) as compared with the next highest share of fewer than 25 percent in student health centers. None practice in Kaiser Permanente's medical group, which has few Medi-Cal enrollees. The high percentage of NPs and CNMs eligible for Medicaid incentive payments who work in community health centers and public clinics is likely due to the mission of these clinics. These clinics serve low-income individuals including those who are uninsured or enrolled in Medi-Cal, Healthy Families, or other public programs.

NPs and CNMs who could be eligible for Medicaid EHR incentive payments are also more likely to practice in rural areas than those who do not appear to be eligible (32.9% versus 20.2%, $p<0.001$). 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 providers in those rural areas to provide care to greater numbers of Medi-Cal enrollees than their providers in urban areas.

Table 13. Number and Percentage of NPs and CNMs Eligible for Medicaid Incentive Payments, by Type of Practice

Practice type	Number eligible for Medicaid Incentive Payments	Percent eligible for Medicaid incentive payments
Community health ctr/ public clinic	1,131	65.8%
Solo or small practice	420	18.1%
Mid-sized practice	77	13.4%
Large group practice	33	14.4%
Kaiser Permanente	32	2.5%
Hospital-based outpatient clinic	0	0.0%
Student health center	66	24.3%

*Notes: 1,995 observations used in calculations. Percentages do not sum to 100% for respondents eligible for Medicaid incentive payments due to rounding. Differences across setting types are statistically significant ($p<0.001$).

EHR Availability

Table 14 compares EHR availability of NPs and CNMs who could be eligible for Medicaid EHR incentive payments based on payer mix, practice setting, and practice type to that of NPs and CNMs who do not appear to be eligible. Differences between the two groups are notable and statistically significant ($p<0.001$). NPs and CNMs who could be eligible for Medicaid incentive payments are less likely to have an EHR at their main practice sites than those who do not appear to be eligible (68.7% vs. 81.0%). They are also somewhat less likely to have EHRs that meet all 12 of the meaningful use objectives measured (13.8% vs. 29.5%).

Table 14. EHR Availability Among NPs and CNMs Who Appear Eligible vs. Not Eligible for Medicaid EHR Incentive Payments

EHR availability at main practice location	Respondents eligible for Medicaid EHR incentive payments	Respondents not eligible for Medicaid EHR incentive payments
Any EHR	68.7%	81.0%
EHR that can meet 12 meaningful use objectives±	13.8%	29.5%

*Notes: 1,988 responses used in calculations. Differences by eligibility status are statistically significant ($p<0.001$).

Rates of EHR availability among NPs and CNMs who could be eligible for Medicaid EHR incentive payments vary across practice settings. As Table 15 illustrates, NPs and CNMs who could be eligible for Medicaid incentive payments and work for large group practices are more likely to have some sort of EHR at their main practice location than those in other settings. Of the NPs and CNMs who are eligible for Medicaid EHR incentive payments, 12.5 percent of those in community health centers and public clinics have an EHR that can meet the 12 meaningful use criteria, while 52.4 percent of those in other large group practices do.

Table 15. EHR Availability by Practice Type, Among Providers Eligible for Medicaid Incentive Payments*

Practice type	Any EHR at main practice location	EHR at main practice location that can meet meaningful use criteria
Community health center/ public clinic	68.7%	12.5%
Solo or small practice	49.6%	8.0%
Mid-sized practice	59.4%	11.3%
Large group practice	100%	52.4%

*Notes: 468 responses used in calculations. Sample sizes too small to report for other practice settings.

Thematic Analysis of Nurses' Comments

Narrative responses were invited in the comments section at the end of the 2011 Advanced Practice Registered Nurses & Health Information Technology Survey. It should be kept in mind that the comments made by respondents may not reflect the opinions of the whole sample of surveyed APRN nurses, let alone the whole of California's advanced nursing workforce. Nonetheless, the fact that the expressed issues, opinions and concerns were shared by a considerable number of the sampled nurses suggests that these are important concerns and issues about the health information systems.

This analysis utilizes a set of themes identified from the range of comments provided by the respondents: (1) respondents' experiences with health information technology systems, (2) the challenges of learning to use these systems, (3) opinions on the types of systems currently in use, and (4) suggestions on how the health information technology systems might be improved upon.

Theme 1: Respondents' Experiences with HIT Systems

A common theme among the narrative comments was the impact of implementing new HIT and EHR systems, and nurses' different reactions to the change.

Positive Experiences with EHRs

Many of the respondents responded positively to the implementation of EHRs in their workplace. Positive responses were linked with increased accuracy of charting, ease of use, efficiency and an improvement in the quality of patient care. Note that some respondents refer to EHRs as "electronic medical records" or EMRs.

> *I've come to appreciate the accuracy and ease of use. Remembering issues with reading handwriting, missing charts - I see that EMR are great for patient safety.*
>
> *I am able to legibly document my visit with patient. And more importantly am able to read the previous MD/NP/PA notes! Kudos to EMR!*
>
> *Have been using electronic medical records exclusively for 3 years and although I am not a "computer person" feel that the quality of patient care has increased significantly with follow up appointments. There is no lag time between being seen for example in the ER* [emergency room] *and having the ER document available during follow up Primary Care or specialist visit.*

Mixed Experiences with EHRs

Not all of the respondents had completely positive opinions of the EHR systems though they acknowledged the benefits of EHR systems. Some respondents noted an increase in stress associated with the having to learn how to use the EHRs, as well as an increase in the amount of time necessary to use the EHR.

> *EMR has been absolutely the best thing we could do for our patients. It allows for me to manage pts much better than paper charts. However the pt accessibility to me via email has been overwhelming as pts send multiple emails per day.*
>
> *It was stressful learning a new application when first started electronic medical records/charting but now so beneficial to our patients care. Kaiser did a great job in supporting our training.*
>
> *While it has been challenging learning our computer medical record system it has made taking care of my patients so much easier and better!*
>
> *The number of items requiring documentation every encounter is HUGE, and some are quite peripheral to the focus of the encounter; this plus HIPPA, takes more time than paper charts. There are positives - can read handwriting, but still long way to go to be reasonable & help us see the # of pts we need to see!*

Negative Experiences with EHRs

Just as many expressed their support for their EHR, many respondents also expressed their dissatisfaction with the EHR, which they felt inhibited their ability to provide quality care, led to

problems with continuity between departments and institutions, and required more time to use than traditional paper systems.

> *Very time consuming and many steps to order anything: labs, xrays, medications. Before electronic records I always had a lunch. Now with electronic records, I work thru lunch and an hour before work hours.*
>
> *I developed carpal tunnel syndrome with 4 mo's of using the electronic medical record. The primary advantage is billing. Our system decreases communication and slows me down. It's difficult for PCP's and the admitting teams to understand what happened in the ER visit due to the format. The medical staff looks at the computer instead of working as a team to formulate treatment plans.*
>
> *Current EMR system impairs productivity, adds to medication errors especially with corporate pharmacies, wastes paper, reduces accuracy of subjective/objective data due to preworded point and click boxes, and does not coordinate with other practices' EMR systems.*
>
> *EHR 's were supposed to make us go "paperless" - it's not true and EHR's are slower and more cumbersome than paper!! I dislike our system immensely!!*

Among those respondents who were displeased with EHRs, many noted that the system distanced them from their patients, and prevented them from providing patients with their full attention.

> *I feel I lose the "pts* [patients] *voice", sometimes don't list in a check box. It can be a barrier between me and my pt.*
>
> *I retired 3 years ago due to the way in which computerized medical records interfered with the patient contact.*
>
> *Most of my work time is spent on charting rather than patients, although I am a floor nurse. I often feel my patents' care is compromised by the amount of computer charting.*

Theme 2: Challenges of Learning to Use HIT System

Many of the respondents commented on the challenges of switching from paper charting to an electronic system. Suggestions from the survey respondents regarding this transition period included the need for training and HIT support to help nurses adjust to the new systems.

Need for Training

The narrative responses from the Survey strongly expressed the need to provide nurses with strong HIT training in order to effectively use the EHR. Many respondents noted experiencing stress and dissatisfaction because of lack of training.

> *As an older provider I do have some concerns about changing to EHR but the county is setting up training programs and will decrease our pt #s on the schedule during the transition to EHR.*

This is a difficult transition but will work eventually. Unfortunately, it seems insufficient though often invested at the outset of the process - for example: Not enough time dedicated to checking out EMR systems to find a quality product suitable to OB [obstetrics] *- our system very buggy when they tried to customize it. Insufficient training time! - Leads to frustration, increase time wasted.*

We need more training on how to utilize the EMR to its max potential that is why it takes longer to chart and search dx, etc. However we also need more funding for this training which is difficult to come by in a non-profit clinic.

Theme 3: Systems Currently in Use

There were many comments from the respondents on the systems they were currently using. Comments covered a wide range of issues including the lack of input on selecting HIT systems, problematic system features, continuity issues across systems, stability complaints, and benefits of the systems.

Lack of Input on Selecting Systems

Many respondents indicated displeasure at having been excluded from the decision-making process for selecting HIT systems. As a result, comments on this topic were focused on how systems failed to meet their needs.

Management chose system, not physician - owners. Management bought laptops that are not compatible so system at workstation only, which is cumbersome.

I am in favor of EHR however the program that our organization chose was selected because of its "meaningful use" built into the system. It is very disorganized, dysfunctional & contributes additional stress to the job. NOT user friendly, it is cumbersome to use & was certainly not designed by clinicians.

Should be designed with the complete involvement of the users, RN, NP, MD. Should always include the help of the practitioner and their ability to communicate specific and unique assessments of the chart to improve communication with other practitioners.

System Features

Contributing to the frustration of nurses were problematic system features that prevented nurses from efficiently and effectively using the EHR.

Medical information systems when not well-designed interfere with effective nursing practice.

Notes too long - and not true (pre made templates). Lots of copy and paste. Often documentation never really mapped.

Although the theory is good, meanful (sic, meaningful) use is horrible. I spend more time charting pure crap so that we can fulfill meaningful use than I care to admit ie - 80 y/o that has never smoked, to "encourage them to continue to not

smoke" vs. spending that same time educating that 70 y/o about the risks of falls & accidents & how to prevent that!

Continuity Problems

Respondents noted continuity problems associated with either having multiple systems in place within one organization, and/or different systems between organizations.

Greatly simplifies patient record transfers from area to area; but not yet able to instantly obtain records not generated in So. CA; still rely on faxes…

Electronic system for charting. Many systems do not interface or talk to each other. Problematic when each hospital is doing something different. Most programs have limitations & problems. Gross restrictions for students and teaching.

Multiple electronic charting systems used w/in depts. of hospital - need major work to coordinate these systems to talk to one another easily.

Stability

Many noted the crucial need for strong IT support in order to combat the stability issues that greatly interfered with the nurses' ability to effectively use the EHR.

We don't typically keep a paper record, so when the system crashed we are compromised. We need to print out office visits and health care summaries and file in paper chart.

Takes too long. Too many bugs still to work out, hard to read vs. paper. When network is down - problem!!

Our computers "freeze" and it incapacitates our ability to safely treat our patients - without a chart sometimes we are unaware of allergies or past medical history that is vital to our treatment.

Despite advances in technology, there is fragmentation due to incompatible, non-interphased, costly system upgrades & systems that don't speak to each other & then you have down times & crashes - all these make it difficult to provide fluid, seamless care.

We need robust EMR & IT to provide adequate care for pts!

Ongoing tech support 24 hr, 7d/week very necessary for EMR to work safely. After 2-3 years since initiating it, I love it. I love our EMR system - needed: nationwide ability to coordinate EMRs.

Benefits of the Systems

Despite the dissatisfaction that some felt towards their EHR, some respondents also voiced their support for EHRs, pointing specifically to the increased accuracy, integration and patient care coordination that resulted.

Prior to retiring one year ago, I worked at the VA Med Center. It used a fully computerized medical records and order system. It was a wonderful system and updated annually. I found it to be very efficient.

Electronic medical records has so dramatically changed the quality of health care that I believe all medical practices should have it. The VA has led the way and doing a superb job!

I work for Kaiser Permanente. The EMR has had a huge and overall positive effect on health care provision and coordination.

Thematic Summary

While the perspectives voiced in the comments section are not likely to represent all Advanced Practice Registered Nurses using Health Informational Technology in California, the recurrence of key issues indicates their relevance to a sizable number of advanced practice nurses using EHRs. The issues voiced in these comments indicate that the implementation process of HIT systems can be complicated, as there were both positive and negative responses to using them. Implementing EHRs may be a challenge, as many reported difficulties with learning how to navigate these systems, especially when nurses didn't have any influence in the decision-making process of EHR implementation, or when the system had problematic features. Though frustrated by certain systems, nurses also noted the benefits of having systems that worked – an increase in accuracy and quality of patient care.

These narrative comments offer some insight into the issues which respondents find pertinent to their ability to provide high-quality care to patients and their decision to continue practicing in a fluid profession. Comments from the 2011 Advanced Practice Registered Nurses Health Information Technology Survey indicate that nurses are working in a changing industry that is now working to embrace advanced technology and improve efficiency.

Discussion

While EHRs are widely available in the practices in which California NPs and CNMs work, many of these EHRs do not meet CMS objectives for meaningful use. Many California NPs and CNMs' practices are not currently configured with all the functions needed to meet CMS objectives for meaningful use. Although 78.3 percent of NPs and CNMs have some sort of EHR, only 26.1 percent have EHRs that can meet all 12 of the meaningful use objectives measured in the study. 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. CNMs and NPs are more likely to report that their EHRs function well if the EHR has functionality that meets all 12 of the meaningful use objectives considered in this survey. This may reflect user comfort with more-developed EHRs as opposed to fundamental problems in less-complete EHRs

Rates of EHR availability vary widely depending on the characteristics of NPs and CNMs practice settings. NPs and CNMs who are in solo or small group practices, school health settings, and community/public clinics are much less likely to have EHRs at their main practice locations than those in Kaiser Permanente, VA, and the military. 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 NP and CNM practice settings also affect their eligibility for Medicaid EHR incentive payments. Providers who could be eligible for Medicaid EHR incentive payments are more likely to practice in community/public clinics.

The survey results suggest that the Medicaid EHR incentive payments are well-targeted to increase meaningful use of EHRs. An estimated 2,216 CNMs and NPs appear eligible for the incentive payments, representing 19.3 percent of the employed NP and CNM workforce in California. This number may increase as Medi-Cal enrollment increases with the expansion of Medicaid in 2014 under the Patient Protection and Affordable Care Act.[25,26,27] However, relatively few NPs and CNMs who appear eligible for Medicaid incentive payments based on their payer mix, practice setting, and practice type currently have an EHR that meets all 12 meaningful use objectives identified in this survey. One-third does not have any sort of EHR. Medicaid incentive payments may be particularly important for this group of providers, because community health centers, public clinics, and other practices that serve large shares of Medi-Cal patients typically receive comparatively low reimbursement rates for patient care services than do practices with fewer Medi-Cal patients. These lower reimbursements limit the ability of these settings to invest in expensive EHR systems and other technologies. Incentive payments may enable these settings to make these investments.

The majority of NPs and CNMs are not aware of whether their practice setting intends to apply for Medicaid or Medicare incentive payments, with many indicating that the application decision would be made by others in their practice and would not involve their input. There was some confusion among NPs and CNMs as to whether they were likely to be eligible for the incentive payments and whether they intend to apply for them.

Limitations

Although this survey provides useful information about the availability and use of EHRs among NPs and CNMs in California, it has several important limitations. First, the response rate was 54 percent, and non-respondents may be systematically different from respondents. All analyses were weighted to account for differences in response rates across regions, which should address some of the potential for bias. However, it is still possible that the respondents did not represent the full population of NPs and CNMs. The self-reporting nature of the survey data does not allow for verification of answers. In addition, some responses were incomplete.

Second, the estimates of the number and percentage of NPs and CNMs eligible for Medicaid EHR incentive payments are based on individual responses to the survey. This approach may underestimate the number of NPs and CNMs eligible for Medicaid payments. In clinics and group practices, all providers 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 providers in the clinic or group apply for incentive payments using the clinic/group level data.[28] Some NPs and CNMs 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. On the other hand, due to the response options on the survey instrument, the estimates may overstate the number and percentage of eligible NPs and CNMs. Respondents who reported that 26 percent or more of their patients were enrolled in Medi-Cal were coded as eligible for Medicaid incentive payments, whereas CMS limits eligibility for Medicaid incentives to NPs and CNMs with 30 percent or more of their patients enrolled in Medi-Cal.

Policy Implications

While the incentive program could have a major impact on EHR adoption and use in California, NPs and CNMs face several hurdles in adopting EHRs and seeking meaningful use incentive payments. About 19 percent of NPs and CNMs appears to be eligible for federal incentives for the adoption and use of EHRs through Medicaid on the basis of their payer mix and practice setting, but most of these do not know whether their practice will apply for incentive payments. Many report that their EHRs do not offer enough functionality to qualify for meaningful use. The Department of Health Care Services (DHCS) and the Health Information Technology Regional Extension Centers should consider strengthening education and outreach efforts to inform eligible providers about the program and explore the possibility of providing technical assistance to them, such as how to attain and report on meaningful use.
Second, the findings suggest priorities for outreach to potentially eligible NPs and CNMs, which parallel recommendations regarding outreach to physicians. DHCS should place a high priority on outreach to all providers who practice in community/public clinics, solo practice, and small partnerships because these providers are least likely to have EHRs.

Third, the results suggest that DHCS outreach efforts should include both providers who do not have an EHR and those who have EHRs that do not meet the CMS meaningful use criteria. The survey found that about two-thirds 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. NPs and CNMs, and the practices in which they work, will need guidance on the importance of using a certified EHR that has the capacity to meet all meaningful use objectives. Existing EHRs may need significant modification to meet meaningful use objectives.

Appendix A. Methodology

Questionnaire Development

The survey instrument combined questions from surveys previously conducted of NPs and CNMs by the California Board of Registered Nursing, as well as the prior survey of California licensed physicians on EHR use. Preliminary versions of the survey instrument were edited to keep the survey reasonably short and then pilot tested. Nine nurse practitioners and two nurse midwives were invited to review the survey instrument and provide feedback to the research team. Changes were made to the question structure and language based on pilot test feedback.

The questionnaire asked about the advanced practice nurse's practice type (e.g., small group practice, community health center/public clinic), payer mix, percentage of time spent in different practice settings (e.g., ambulatory care, inpatient care), plans to apply for Medicaid or Medicare electronic health record (EHR) incentive payments, availability of an EHR at the main practice location, the specific functions of the EHR available at the main practice location, and whether the respondent thinks the EHR works well. A copy of the survey questionnaire appears in Appendix B.

The final survey instrument was offered to respondents as both an online web-based survey and a paper questionnaire. Previous RN and APRN surveys showed online participation to range from 10 to 20 percent and a robust response rate to be more likely with a dual-format survey instrument.

Sample

The survey sample was selected from the California Board of Registered Nursing Public Masterfile, which was received by UCSF on September 30, 2011. The file provided names, mailing addresses, and license status for all nurses licensed by the Board of Registered Nursing. Nurses residing in California who had active certificates as NPs and/or CNMs were selected as eligible for the survey.

Eligible nurses were sorted by the type of certificates they held (NP, CNM, or dual-certificate), and the region of their residence. The regions were based on those developed by the California Economic Strategy Panel in 2006, with two modifications.[29] The first modification was a division of the Los Angeles region into two sub regions, based on U.S. Census Bureau Metropolitan Statistical Areas (MSAs). Riverside and San Bernardino counties, which comprise a single MSA, were defined as the Inland Empire region. The Oxnard-Thousand Oaks-Ventura MSA (Ventura County) and the Los Angeles-Long Beach-Santa Ana MSA (Los Angeles and Orange Counties) were merged to create the Los Angeles region. The second modification was the merging of the Central Valley and Central Sierra regions, due to the small numbers of NPs and CNMs residing in Central Sierra counties. The counties within each region are listed in Table A1.

Table A1. Regions of California Used for Sampling

Region	Counties
N. Sacramento Valley	Butte, Colusa, Glenn, Shasta, Tehama
Northern Mountains	Del Norte, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Plumas, Sierra, Siskiyou, Trinity
Sacramento	El Dorado, Placer, Sacramento, Sutter, Yolo, Yuba
SF Bay Area	Alameda, Contra Costa, Marin, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma
Central Valley & Sierra	Alpine, Amador, Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Mono, San Joaquin, Stanislaus, Tulare, Tuolumne
Central Coast	Monterey, San Luis Obispo, Santa Barbara
Los Angeles	Los Angeles, Orange, Ventura
Inland Empire	Riverside, San Bernardino
Southern Border	Imperial, San Diego

In order to allow for analyses for each type of advanced practice nurse, and for each region, we intentionally selected more nurses from some certificate categories and regions than others. The strata for this sampling approach were based on three certificate types (NP, CNM, and dual-certificate) and 9 regions. Some strata were extremely small – with fewer than 40 people – and for these strata the sampling rate was 100 percent. Table A2 details the population and survey sample for each certificate-region group.

Survey Process

After the sample of NPs and CNMs to be surveyed was selected, their addresses were checked against the National Change Of Address (NCOA) database, and envelopes including the survey instrument, cover letter, and return envelope were mailed on October 21, 2011. The cover letter included a link to the online survey along with login/password information.

A reminder postcard was mailed to all people who were sent the initial mailing on November 1, and the full questionnaire was re-mailed to non-respondents on November 18. Two additional reminder postcards were mailed on December 9 and 26, and data collection closed on January 18, 2012. When data collection closed, a total of 110 surveys had been returned without delivery (generally due to an incorrect address), 24 people were determined to be ineligible for the survey (due to their license expiring), and 4 explicitly refused to complete the survey. A total of 4,862 NPs and CNMs were thus eligible for the survey. Responses were received from 2,644, resulting in a response rate of 54.4 percent of those eligible (Table A3). The response rate was higher for those with CNM certificates (58.6%) than for those with only an NP certificate (53.2%).

Table A2. Total Population, Survey Sample, and Sampling Rate

Region	Total Population			Survey Sample			Sampling Rate		
	NPs	CNMs	Dual	NPs	CNMs	Dual	NPs	CNMs	Dual
Northern Mountains	304	21	14	300	21	14	98.7%	100%	100%
N. Sacramento Valley	245	12	6	245	12	6	100%	100%	100%
Sacramento	848	30	33	400	30	33	47.2%	100%	100%
SF Bay Area	3,958	173	153	760	80	70	19.2%	46.2%	45.8%
Central Coast	337	18	11	320	18	11	95.0%	100%	100%
Central Valley & Sierra	1,334	28	36	500	28	36	37.5%	100%	100%
Los Angeles	4,580	141	129	870	65	55	19.0%	46.1%	42.6%
Inland Empire	1,076	35	36	450	35	36	41.8%	100%	100%
Southern Border	1,438	72	75	480	60	65	33.4%	83.3%	86.7%
Statewide	14,120	530	493	4,325	349	326	30.6%	65.8%	66.1%

Table A3. Response of NPs and CNMs

	All	NPs	CNMs &Dual
SAMPLED FOR SURVEY	5,000	4,325	675
Returned to sender (wrong address)	110	89	21
Ineligible for survey	24	20	4
Refused to complete survey	4	1	3
ELIGIBLE SAMPLE	4,862	4,215	647
Completed paper survey	2,141	1,831	310
Completed online survey	483	416	67
TOTAL RESPONSES	2,624	2,247	377
Response rate of total sample	52.5%	52.0%	55.9%
RESPONSE RATE OF ELIGIBLE SAMPLE	54.0%	53.3%	58.3%

This survey was fielded shortly after hospitals were permitted to register for the Medicaid incentive program on October 3, 2011, and immediately prior to registration opening for clinics and groups on November 15, 2011. While a few respondents indicated that their organization had already registered, these data can be considered baseline data on EHR availability and use prior to implementation of the incentive payments.

Data Analysis

After data collection was complete, response rates were examined and weights were computed so that the responses represent the population of nurse practitioners and nurse midwives in California.

The analysis was limited to respondents whose residential address is in California because only NPs and CNMs who practice in California will be eligible for Medicaid EHR incentive payments. In addition, the analysis was limited to respondents who indicated that they work in an advanced practice position. To be eligible for Medicaid EHR incentive payments, a provider must have at least one encounter with a Medi-Cal patient during the representative 90-day period. For this report, the criterion of the NP or CNM providing any direct care was used 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 region. Weighting the survey responses in this manner generates estimates that better reflect the total population of nurse practitioners and nurse midwives with active California licenses.

Identification of NPs and CNMs Who Have EHRs

Estimates of the percentage of NPs and CNMs 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 any type of computerized medical records system (also known as an electronic health record or an electronic medical record)?" Respondents who answered "yes" to this question were considered to have an EHR. Those 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.

The survey included questions that measured 8 of the 15 core meaningful use objectives, based on the items collected in the previous survey of physicians. These items were prioritized based on their inclusion in the National Ambulatory Medical Care Survey.

- 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 provider's patients are referred

The survey also asked about 4 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 question on the survey regarding viewing or receiving 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 (Blumenthal and Tavenner, 2010). Thus, our survey may overestimate the percentage of respondents who meet CMS's meaningful use objective with regard to laboratory test results.

The core objectives not included in the survey were (1) checking drug-drug and drug-allergy interactions, (2) recording and charting vital signs, (3) recording smoking status, (4) implementing one clinical decision support rule, (5) providing patients with an electronic copy of their health records, (6) providing clinical summaries for patients at each office visit, and (7) protecting EHR data through appropriate security systems. The menu objectives not included were (1) implementing drug formulary checks, (2) sending patient reminders based on patient preference for preventive and follow-up care, (3) identifying patient-specific education resources, (4) medication reconciliation, (5) providing summary care records for transitions of care and referrals, and (6) submitting syndromic surveillance data to public health agencies. The survey did not ask if the EHR had been certified by the Office of the National Coordinator because at the time of the survey the certification program was new and thus very few EHR systems had been certified.

Identification of Characteristics Associated with Having an EHR

Analyses of the impact of practice setting on likelihood that NPs and CNMs 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 or small group practice (1-9 providers, NPs, CNMs, and/or PAs), mid-sized group practice (10-49 providers), large group practice (50+ providers), Kaiser Permanente, a community or public clinic, a Department of Veterans Affairs (VA) or military facility, hospital-based ambulatory care clinic, hospital acute or emergency unit, hospital ancillary unit (including labor and delivery), academic setting, or other practice type. Those who selected other were asked to specify the type of setting; 47 indicated they worked in a school health center and were analyzed as a separate group.
For analyses that compared urban and rural providers, a provider's practice location was classified as urban or rural based on the ZIP code for the practice location or, if the practice ZIP code was missing, the ZIP code for the provider's mailing address. A crosswalk 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 persons per square mile. MSSAs are classified as rural if they have 250 or fewer persons per square mile and no incorporated area with greater than 50,000 persons, and as frontier if the population density is less than or equal to 11 persons per square mile. For the purposes of this report, ZIP codes in rural and frontier MSSAs were combined and categorized as rural.

Estimation of the Percentage of NPs and CNMs Who May Be Eligible for Medicaid EHR Incentive Payments

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 providers who met the Medicaid EHR incentive program's requirement that a provider spend at least 90 percent of his or her patient care hours in non-hospital settings. NPs and CNMs were deemed to meet this requirement if they reported that less than 90 percent of their patient care hours were in inpatient, anciallary, and/or emergency department settings.

Once providers who could be eligible for the Medicaid EHR incentive program based on practice setting were identified, the next step in the analysis was to determine which NPs and CNMs could be eligible on the basis of payer mix. They were considered eligible if they reported that at least 26 percent of their patients were enrolled in Medi-Cal. The use of a threshold of 26 percent could overstate the number of NPs and CNMs who may be eligible for Medicaid EHR incentive payments because the actual eligibility threshold is 30 percent. The response options for the question on the percentage of patients enrolled in Medi-Cal did not include 30 percent, necessitating use of 26 percent as the closest approximation.

The third step was to identify the third group of NPs and CNMs who could be eligible for the Medicaid EHR incentive program: NPs and CNMs who practice in a Federally Qualified Health Center (FQHC) or Rural Health Clinic (RHC) for whom 30 percent of patients are enrolled in Medi-Cal, enrolled in 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 Medicaid EHR incentive payments that allow all providers 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.[30]

California Department of Health Care Services

Advanced Practice Registered Nurses & Health Information Technology Survey

Conducted for the DHCS by

Institute for Health Policy Studies
University of California, San Francisco

Here's how to fill out the Survey:

- Use pen or pencil to complete the survey.
- Please try to answer each question.
- Most questions can be answered by checking a box or writing a number or a few words on a line.
- Never check more than one box, except when it says **Check all that apply.**
- Sometimes we ask you to skip one or more questions. An arrow will tell you what question to answer next, like this:

☐1 YES
☐2 NO ⟶ **SKIP TO Question 23**

- If none of the boxes is just right for you, please check the one that fits you the best. Feel free to add a note of explanation. If you are uncomfortable answering a particular question, feel free to skip it and continue with the survey.
- If you need help with the survey, call toll-free (877) 276-8277.
- **REMEMBER**: An online version of this survey is available. Follow the instructions in the cover letter that came with this questionnaire to access the online survey.

After you complete the survey, please mail it back to us in the enclosed envelope. No stamps are needed. Thank you for your prompt response.

California Advanced Practice Registered Nurses & Health Information Technology Survey

1. What is your education in your advanced practice field(s) and other nursing or nursing-related fields? A nursing-related field is an area in which your education has contributed to your nursing career.

	RN/CNS	NP	CNM
Diploma	_____(Year)	_____(Year)	_____(Year)
Associate degree (ADN)	_____(Year)	_____(Year)	_____(Year)
Baccalaureate degree	_____(Year)	_____(Year)	_____(Year)
Master's degree	_____(Year)	_____(Year)	_____(Year)
Doctoral (DNP, DNSc, ND, PhD) degree	_____(Year)	_____(Year)	_____(Year)
Post-Master's Certificate	_____(Year)	_____(Year)	_____(Year)
Other (specify):_____	_____(Year)	_____(Year)	_____(Year)

2. Are you **currently working for pay <u>in a nursing (APRN or RN) position</u>**?

☐1 **Yes**

☐2 **No**, I am not working in a nursing position.

If you are <u>NOT</u> working in a paid nursing position, you do not need to complete the rest of the survey. Please skip to the last page, Question #13. →

3. In how many positions (<u>APRN or RN</u>) do you currently work for pay?

RN positions ☐1 One ☐2 Two ☐3 Three or more

APRN positions ☐1 One ☐2 Two ☐3 Three or more

If you <u>DO NOT have an APRN position</u>, please skip to last page, Question #13. →

Please complete the following questions for your <u>primary APRN position</u> according to where you spend most of your working time.

4. a Total hours normally worked per **week** _____hours/week

b What percent of this time involves direct patient care? _____ % time in direct patient care

c Primary position location (zip/county) (zip)_____/_____(county)

d Does this position require a California APRN certificate? ☐ No ☐ Yes, **NP** ☐ Yes, **CNM** ☐ Not certain

e Does this position require a California RN license? ☐1 Yes ☐2 No

5. Which **one** of the following **best** describes the **job title** of your **primary APRN position**?

☐ 1	Nurse Practitioner	☐ 5	Nursing education or education of other health professionals
☐ 2	Certified Nurse Midwife	☐ 6	Patient care coordinator, patient educator, case manager, discharge planner
☐ 3	Management	☐ 7	Public health, community, or occupational health nurse
☐ 4	Charge Nurse or Team Leader		
☐ 8	Other (Specify: _____		

6. Which **one** of the following **best** describes the **organization** you work for in your **primary APRN position**?

☐ 1	Community health center / public clinic	☐ 6	VA or military
☐ 2	Solo or small private primary care or multispecialty practice **(2-9 NPs/CNMs/MDs/DOs)**	☐ 7	Hospital-based outpatient clinic
☐ 3	Private primary care or multispecialty practice **(10-49 NPs/CNMs/MDs/DOs)**	☐ 8	Hospital, acute, critical, or emergency care
☐ 4	Private primary care or multispecialty practice **(50+ NPs/CNMs/MDs/DOs)**	☐ 9	Hospital, labor and delivery or other ancillary department
☐ 5	Kaiser Permanente	☐ 10	Academic
☐ 11	Other (specify)_____		

7. **Of the time you devote to patient care** in your primary APRN position, what percentage of time do you provide care in each of the following settings?

	0%	1-19%	20-39%	40-59%	60-79%	80-89%	90-100%
a. Ambulatory/ outpatient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
b. Inpatient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
c. Emergency department	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
d. Diagnostic services (e.g., radiology, pathology)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
d. Other patient care	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

(specify) _____

8. In your **primary APRN practice**, please estimate what percent of your patients:

	0%	1-25%	26-50%	51-75%	76-99%	100%
a. Are covered by Medicare?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
b. Are covered by Medicaid?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
c. Are covered by Healthy Families?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
d. Are covered by private insurance?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
e. Other government program (e.g., VA, IHS)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
f. Uninsured, cash paying?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
g. Received uncompensated care?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6

USE OF COMPUTERS IN YOUR PRIMARY APRN LOCATION

9. Does your primary APRN practice location have **any type** of computerized medical records system (also known as an electronic health record or an electronic medical record)?

Yes ☐ 1 No ☐ 2 Do Not Know ☐ 3 **Skip to the next page, #13**

10. Please answer the following questions about your main APRN practice location's computerized medical records system

Availability of the feature in your EMR → If a feature is available, please indicate to what extent you. personally, use it.	***No, the feature is not available***	***YES, the feature is available***				***Do Not Know***
		(I) 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)	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. Clinical notes (e.g., office visit notes, nursing notes)	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. Patient problem list/summary	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. List of medications patient takes	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
e. List of medication allergies	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
f. Ordering and transmitting prescriptions electronically	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
g. Ordering laboratory tests	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
h. Viewing or receiving laboratory test results	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
i. Ordering radiology tests	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
j. Viewing printed records of radiology test results	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
k. Viewing images from radiology tests	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
l. Generating lists of patients by specific condition	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
m. Generating routine reports of quality indicators	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
n. Transmitting information electronically to entities outside your practice to which you frequently refer patients OR from which patients are referred to you	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
o. Transmitting data to immunization registries	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
p. Patients able to access their own electronic record	☐ 6	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11. What is your experience with the electronic medical records system in your main APRN practice location? **(Check one.)**

All systems work well	Systems are generally helpful, but may have some flaws	Systems have problems that affect my work	Systems interfere with my work	No systems in my workplace
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

12. In 2011, Medicare and Medicaid will begin offering financial incentives for physicians, NP, CNMs, and other providers 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 provider will only be allowed to apply for either the Medicare OR Medicaid incentive program.)

☐1	My practice intends to apply for incentive payments but uncertain whether Medicare or Medi-Cal
☐2	My practice intends to apply for the Medicare incentive
☐3	My practice intends to apply for the Medi-Cal incentive
☐4	My practice does not at this time plan to apply for either incentive or need more information to make a decision
☐5	My practice is not eligible for either the Medicare or the Medi-Cal incentive
☐6	I don't know or I am not involved in these decisions

DEMOGRAPHICS

13. Your gender: ☐1 Female ☐2 Male 14. Your age: _____

15. What is your ethnic/racial background (select the **ONE** with which you most strongly identify)?

☐1 African American/Black/African ☐2 Caucasian/White/European/ Middle Eastern ☐3 American Indian/Native American/Alaskan Native ☐4 Other or Mixed

Asian				Latino/Hispanic		Native Hawaiian/Pacific Islander			
☐5	Cambodian	☐10	Korean	☐15	Central American	☐20	Fijian	☐25	Tongan
☐6	Chinese	☐11	Laotian/Hmong	☐16	South American	☐21	Filipino	☐26	Other
☐7	Indian	☐12	Pakistan	☐17	Cuban	☐22	Guamanian		
☐8	Indonesian	☐13	Thai	☐18	Mexican	☐23	Hawaiian		
☐9	Japanese	☐14	Vietnamese	☐19	Other Hispanic	☐24	Samoan		

16. In what languages, other than English, do you have medical fluency? **(Check all that apply.)**

☐a	**None**						
☐b	American Sign Language	☐j	Hebrew	☐r	Mandarin	☐z	Russian
☐c	Arabic	☐k	Hindi	☐s	Mien	☐1	Samoan
☐d	Armenian	☐l	Hmong	☐t	Other Chinese	☐2	Spanish
☐e	Cambodian	☐m	Ilacano	☐u	Other Non-English	☐3	Tagalog
☐f	Cantonese	☐n	Italian	☐v	Other Sign language	☐4	Thai
☐g	Farsi	☐o	Japanese	☐w	Polish	☐5	Turkish
☐h	French	☐p	Korean	☐x	Portuguese	☐6	Vietnamese
☐i	German	☐q	Lao	☐y	Punjabi	☐7	Decline to State

17. Home Zip Code: _____ , City: _____, State: _____ or

If you reside outside of the country, other country (**Please specify:** _____)

Thank you for your participation.

If you have anything else to tell us about information technology impacting your advanced practice work, please write your comments below.

_____

_____

Endnotes

[1] Dickey L., California Department of Health Care Services, personal communication, February 29, 2012.

[2] Gold MR, McLaughlin CG, Devers KJ, Berenson RA, Bovbjerg R. Obtaining providers' 'buy-in' and establishing effective means of information exchange will be critical to HITECH's success. *Health Aff (Millwood)*. Mar 2012;31(3):514-525.

[3] Blumenthal D, Tavenner M. The "meaningful use" regulation for electronic health records. *N Engl J Med*. Aug 5 2010;363(6):501-504.

[4] Coffman, JM., Grumbach, K, Fix, M, Traister, L, Bindman, A. (2012). On the Road to Meaningful Use of EHRs: A Survey of California Physicians. Oakland, CA: California HealthCare Foundation.

[5] Buntin MB, Burke MF, Hoaglin MC, Blumenthal D. The benefits of health information technology: A review of the recent literature shows predominantly positive results. *Health Aff (Millwood)*. Mar 2011;30(3):464-471.

[6] Bobb A, Gleason K, Husch M, Feinglass J, Yarnold PR, Noskin GA. The epidemiology of prescribing errors: The potential impact of computerized prescriber order entry. *Arch Intern Med*. Apr 12 2004;164(7):785-792.

[7] Kim Y, Chen AH, Keith E, Yee, HF, Jr., Kushel MB. Not perfect, but better: Primary care providers' experiences with electronic referrals in a safety net health system. *J Gen Intern Med*. May 2009;24(5):614-619.

[8] Linder JA, Rigotti NA, Schneider LI, Kelley JH, Brawarsky P, Haas JS. An electronic health record-based intervention to improve tobacco treatment in primary care: A cluster-randomized controlled trial. *Arch Intern Med*. Apr 27 2009;169(8):781-787.

[9] Chaudhry, B., Wang, J., Wu, S., Maglione, M., Mojica, W., Roth, E., . . . Shekelle, P. G. (2006). Systematic review: Impact of health information technology on quality, efficiency, and costs of medical care. Annals of Internal Medicine, 144, 742-752.

[10] Parente, S. T., & McCullough, J. S. (2009). Health information technology and patient safety: Evidence from panel data. Health Affairs, 28, 357-360.

[11] Roberts, L. L., Ward, M. M., Brokel, J. M., Wakefield, D. S., Crandall, D. K., & Conlon, P. (2010). Impact of health information technology on detection of potential adverse drug events at the ordering stage. American Journal of Health-System Pharmacy, 67, 1838-1846.

[12] Hansagi, H., Olsson, M., Hussain, A., & Ohlen, G. (2008). Is information sharing between emergency department and primary care useful to the care of frequent emergency department users? European Journal of Emergency Medicine, 15, 34-39.

[13] Bates, D. W., Leape, L. L., Cullen, D. J., Laird, N., Petersen, L. A., Teich, J. M., . . . Seger, D. L. (1998). Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. Journal of the American Medical Association, 280, 1311-1316.

[14] Dexheimer, J. W., Talbot, T. R., Sanders, D. L., Rosenbloom, S. T., & Aronsky, D. (2008). Prompting clinicians about preventive care measures: A systematic review of randomized controlled trials. Journal of the American Medical Informatics Association, 15, 311-320.

[15] Sequist, T. D., Gandhi, T. K., Karson, A. S., Fiskio, J. M., Bugbee, D., Sperling, M., . . . Bates, D. W. (2005). A randomized trial of electronic clinical reminders to improve quality of care for diabetes and coronary artery disease. Journal of the American Medical Informatics Association, 12, 431-437.

[16] Office of the National Coordinator for HIT. (2011). The Federal health IT strategic plan: 2011-2015. Retrieved from http://healthit.hhs.gov/portal/server.pt/community/federal_health_it_strategic_plan_-_overview/1211

[17] Hsiao, C. J., Hing, E. S., Socey, T. C., & Cai, B. (2011). Electronic health record systems and intent to apply for meaningful use incentives among office-based physician practices: United States, 2001-2011. Hyattsville, MD: Division of Health Care Statistics, Centers for Disease Control and Prevention. Retrieved from http://www.cdc.gov/nchs/data/databriefs/DB79.pdf.

[18] Poon, E. G., Jha, A. K., Christino, M., Honour, M. M., Fernandopulle, R., Middleton, B., . . .Kaushal, R. (2006). Assessing the level of healthcare information technology adoption in the United States: A snapshot. BMC Medical Informatics and Decision Making, 6, 1.

[19] Blumenthal, D., & Tavenner, M. (2010). The "meaningful use" regulation for electronic health records. New England Journal of Medicine, 363, 501-504.

[20] Bruen, B. K., Ku, L., Burke, M. F., & Butin, M. B. (2011). More than four in five office-based physicians could qualify for federal electronic health record incentives. Health Affairs, 30, 472-480.

[21] Centers for Medicare and Medicaid Services. "EHR Incentive Programs." 2012 May 1. https://www.cms.gov/EHRIncentivePrograms/35_Basics.asp#TopOfPage

[22] Center for Medicare and Medicaid Services. "The Medicare HER Incentive Program. 2012 May 1. "https://www.cms.gov/EHRIncentivePrograms/15_Eligibility.asp#BOOKMARK1

[23] Coffman, JM., Grumbach, K, Fix, M, Traister, L, Bindman, A. (2012). On the Road to Meaningful Use of EHRs: A Survey of California Physicians. Oakland, CA: California HealthCare Foundation.

24 Blumenthal, D., Tavenner, M. "The 'Meaningful Use' Regulation for Electronic Health Records." *N Engl J Med* 2010; 365: 501-504.

[25] Holahan, J., Headen, I. Medicaid Coverage and Spending in Health Reform: National and State-by-State Results for Adults at or Below 133% FPL. *Kaiser Commission on Medicaid and the Uninsured*. 2010 May.

[26] Jacobs K, Lucia L, Graham-Squire D. *Eligibility for Medi-Cal and the Health Insurance Exchange in California Under the Affordable Care Act*. Berkeley, CA: University of California, Berkeley Center for Labor Research and Education. 2010 August.

[27] Long P, Gruber J. Projecting the Impact of the Affordable Care Act on California. *Health Aff (Millwood)*. 2011;30(1):63-70.

[28] Department of Health Care Services. "Understanding Groups and Clinics." http://www.dhcs.ca.gov/provgovpart/Documents/OHIT/Understanding_Groups_and_Clinics.pdf.

[29] California Economic Strategy Panel, California Economic Strategy Panel Regions, October 2006, http://www.cvc.edu/wp-content/uploads/2009/01/california_economic_strategy_panel_regions.pdf.

[30] Department of Health Care Services. "Understanding Groups and Clinics." http://www.dhcs.ca.gov/provgovpart/Documents/OHIT/Understanding_Groups_and_Clinics.pdf.