



Advanced Practice Nurses' Meaningful use of electronic health records

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ABSTRACT

Aim: The aim of this study was to better understand electronic health records (EHRs) use among advanced practice nurses (APNs).

Background: EHRs are becoming an integral part of the U.S. health care system. Federal law was enacted with provisions that offer incentive payments to eligible professionals and hospitals who use EHRs. Little is known about APNs' EHR use.

Methods: A quantitative, non-experimental research design was used. Descriptive and multiple logistic regression analyses were performed.

Results: Two thirds of the APNs were EHR-user. Statistically significant differences between EHR-users and non-users were found in age categories, practice setting, practice size, and in tasks related to imagery report review and care coordination. EHR use was associated with higher odds of practicing in hospital, and employment longevity, but with decreased odds in the number of patients seen per day.

Conclusions: With one third of the APNs being EHR non-users, more efforts are needed to help guide the adoption and diffusion of EHRs in practice.

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1. Background

In an effort to accelerate the adoption of Health Information Technology (HIT) and the use of electronic health records (EHRs), the Health Information Technology for Economic and Clinical Health Act (HITECH) was enacted in February 2009 as part of the American Recovery and Reinvestment Act, with specific provisions that offer incentive payments to eligible professionals and hospitals, as well as to critical access hospitals. However, these health care providers must participate in the Medicare and Medicaid programs and must adopt and successfully demonstrate meaningful use of certified EHR technology. The overarching concept of meaningful use rests on five pillars of health outcomes policy priorities, namely: (1) improving quality, safety, efficiency, and reducing health disparities; (2) engaging patients and families in their health; (3) improving care coordination; (4) improving population and public health; (5) ensuring adequate privacy and security protection for personal health information (Centers for Disease Control and Prevention, 2011).

Recent estimates provided by the Centers for Medicare and Medicaid Services (CMS) indicated that as much as \$27 billion over 10 years may be spent to support the adoption of EHRs (U.S. Department of Health and Human Services, 2010). Medicare eligible professionals (doctors of medicine or osteopathy, dentists, optometrists, podiatrists, and chiropractors) may receive as much as \$44,000 over a 5-year period. Medicaid eligible professionals (physicians, certified nurse-midwives, dentists, nurse practitioners, and physicians assistants) may receive as much as \$63,750 over 6 years (Centers for Medicare and Medicaid Services, 2010).

States such as Arkansas, Louisiana, Mississippi, and Tennessee have received respectively 1.4, 1.6, 1.2 and 2.1% from Medicare; 1.1; 4.2, 2.3 and 2.8% in incentive payments from Medicaid. In comparison, Texas has received up to 11.6% and got the lion's share of Medicaid endowment (Centers for Medicare & Medicaid Services, 2012a).

EHRs are becoming an integral component of the U.S. health care system. A massive amount of public dollars is being used with the hope of improving the delivery and coordination of health care services in the U.S. At this juncture, it has become imperative to determine whether or not national investments in EHRs are serving their intended purpose: to speed-up EHRs acquisition, implementation, and meaningful use.

Since advanced practice nurses (APNs) play a pivotal role in the delivery of health care services, it is essential to understand if and how

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they participate in the meaningful use of EHRs. Yet, research investigating the use of EHRs by APNs remains scarce. Furthermore, there is a lack of methodologically rigorous data on the adoption of EHRs in both physician offices and hospitals (DesRoches, Painter, & Jha, 2012). This research constitutes an effort to better understand the use of EHRs by APNs, and relies upon Rogers' theory of Diffusion of Innovations (Rogers, 2003) as a theoretical framework to apprehend APNs' use or non-use of EHRs as an innovation in the health care system.

2. Literature review

2.1. Theoretical framework

EHR introduction into the health care system can be viewed as an innovation; as such it constitutes a revolutionary change in health care management and in the practice of medicine. Its adoption and diffusion are part of a complex process. According to Rogers (2003) getting a new technology adopted, even when it has obvious advantages, is difficult. He defines innovation as an idea or practice that is perceived as new by an individual. In his model, Rogers proposes a five step change process whereby individuals consider acceptance of innovations: knowledge, persuasion, decision, implementation and confirmation. During this process, an individual passes from first knowledge of an innovation, to the formation of an attitude toward the innovation, to a decision to adopt or reject it, to implement and use of the new idea, and to confirm this decision. This process is essentially an information-seeking and information-processing activity in which an individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation: "How does this innovation work?" "Why does it work?" "What are consequences?" and "What will its advantages and disadvantages be in my situation?" (Rogers, 2003).

2.2. Advantages of EHRs

Rogers (2003) considers the "relative advantage" of an innovation as the degree to which it is perceived as better than the idea it supersedes. There are numerous structural and process benefits associated with adopting EHRs. From a technology standpoint, EHRs improve care by enabling functions that paper health records cannot deliver (Centers for Medicare & Medicaid Services, 2010b). More specifically, benefits provided by EHR use include the following.

2.2.1. E-Prescribing

E-prescribing systems enable bi-directional health information exchange between the pharmacy and the health care provider's office. CMS is strongly incentivizing providers to use e-prescribing with medication decision support (MDS). CMS is specifically mandating two types of MDS, drug–drug and drug–allergy checking (Kannry, 2011). According to Hufstader, Furukawa, and Hogin (2012), government incentive programs appear to have increased e-prescribing use among health care providers as the percentage of total physicians e-prescribing in the U.S. has increased from 2 to 50% between 2008 and 2012. However, this increase does not necessarily translate into improvements in patient safety. For Kannry, the promise of e-prescribing in reducing the time gap between point of care and point of service, reduction in medication errors, and improved quality of care has not been fulfilled. Although the majority of providers believe e-prescribing provides for improved patient care, there is limited evidence that e-prescribing with medication decision-making improves patient safety.

2.2.2. Safety

EHRs improve safety by reducing adverse drug events, focusing on several components of computerized physician order entry (CPOE)

such as alerts, reminders, warning and potential drug interactions (Hillestad et al., 2005). Research suggests that nurses working in hospitals with basic EHRs consistently report fewer poor patient safety incidents and other adverse events than nurses working in hospitals without an EHR (Kutney-Lee & Kelly, 2011).

2.2.3. Decision support

EHRs can identify built-in alerts, and reminders, thereby providing decision support capability to assist providers (Ohno-Machado, 2011). Another important benefit of EHRs stems from access to evidence-based medicine. Most EHRs have embedded references to current literature that facilitates evidence-based decisions, thereby helping health professionals in providing higher quality care (Thompson & Warren, 2008).

2.2.4. Productivity and costs

Studies have suggested that the exchange of health information contained in EHRs and other related EHR activities (e.g. reduced paperwork) will have a substantial impact on the health care system's costs (Blumenthal et al., 2006). Hillestad et al. (2005) have estimated that over 15 years, the cumulative potential net efficiency and safety savings from hospital systems could be nearly \$371 billion; and the potential cumulative savings from physician practice EHR systems could be \$142 billion. With regards to EHRs, studies have primarily focused on costs, whereas the effectiveness of EHRs in patient outcomes has been clearly overlooked (Holroyd-Leduc, Lorenzetti, Straus, Sykes, & Quan, 2011). In a literature review, Colosia et al. (2010) identified multiple aspects of value of EHR use to providers in assessing and improving quality cancer care and highlighted issues in cost-effectiveness of EHRs. Cost savings were incurred across multi-disciplinary teams because fewer tests were duplicated. In parallel, EHR use among hospitals, and moderately sized oncology practices indicated that providers rapidly obtained information on guideline adherence and determined whether patients received follow-up in physician offices, thereby leading to more efficient processes of care and improving overall quality of care.

2.2.5. Patient-centeredness

One of the meaningful use objectives is to provide patients with an electronic copy of their health information. Patients can have a better access to their medical records as health information becomes available when and where it is needed. For Feeley and Shine (2011), EHRs provide new opportunities to engage patients in their care. Patients become enabled to view their own records, be more informed about their care plan and diagnostic results, and they can also grant permission for family members and caregivers to view as well. With such sharing of information, patients become more empowered and involved in decision-making regarding their health. They can request correction of an incorrect medical note and formulate more focused and relevant questions in advance of a visit on the basis of prior notes and test results, thereby improving physician–patient communication (Feeley & Shine, 2011). And, if systems integrate, EHRs can bring a patient's health services received from different providers in one place, so care is better coordinated (Centers for Medicare & Medicaid Services, 2010b). Another key element of patient-centeredness related to EHRs is the transition of care. For example, after a clinical visit or hospital stay, instructions for the patient can be transitioned to another health care provider (Centers for Medicare & Medicaid Services, 2010b).

APNs play a critical role in facilitating meaningful use of EHRs as they typically document patient demographics, vital signs, medication, allergy lists, and maintain lists of medical issues and plans; use CPOE, and even report on clinical quality measures to CMS or state agencies (Barton, 2011). Although EHRs have unrivaled value compared to paper health records, the technology is only good if providers accept it and are willing to use it. For Rogers (2003), "it does not matter so much whether an innovation has a great deal of

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