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Electronic Personal Health Record Use among Registered Nurses

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Abstract

Background—Nurses promote self-care and active participation of individuals in managing their healthcare, yet little is known about their own use of electronic personal health records (ePHRs).

Purpose—To examine factors associated with ePHR use by nurses for their own health management.

Method—A total of 664 registered nurses working in 12 hospitals in the Maryland and Washington D.C. area participated in an online survey from December 2013 to January 2014. Multiple logistic regression models identified factors associated with ePHR use.

Results—More than a third (41%, 95% CI=0.37-0.44) of the respondents were ePHR users. There was no variation between ePHR users and nonusers by demographic or job related information. ePHR users were, however, more likely to be active health care consumers (i.e., have a chronic medical condition and taking prescribed medications, OR=1.64, 95% CI=1.06-2.53) and have health care providers that used electronic health records (EHRs) for care (OR=3.62, 95% CI=2.45-5.36).

Conclusions—Nurses were proactive in managing their chronic medical conditions and prescribed medication use with ePHRs. ePHR use by nurses can be facilitated by increasing use of EHRs.

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Keywords

personal health record; nurse; health care provider; electronic health record; chronic condition and medication use

Introduction

Digital health records are an important element in reducing medical error and increasing quality of care by bringing efficiency and accessibility to the health care system (Markle Foundation, 2005). Electronic personal health records (ePHRs) are consumer-centric tools that individuals can use to communicate with their health care providers to manage their own health and health care (Healthcare Information Management and Systems Society [HIMSS], 2007). An ePHR is described as “an electronic application through which individuals can access, manage and share their health information and that of others for whom they are authorized, in a private, secure and confidential environment” (Tang, Ash, Bates, Overhage, & Sands, 2006, p. 2). ePHRs can be non-tethered or tethered. Non-tethered ePHRs include stand-alone formats (e.g., PC, USB drive) and web-based formats (e.g., Microsoft HealthVault) (American Health Information Management Association [AHIMA], 2010). The ideal ePHR is one that can be integrated and augmented (tethered) with data from health care provider electronic health records (EHRs), pharmacies, health monitoring devices, and laboratory and radiology clinics to provide a more complete view of relevant health information for both consumers and their health care providers (Johnston et al., 2007).

Studies suggest that a tethered ePHR can increase patient-centered care, improve patient ability to manage their health and health care, enhance the use of appropriate preventive services, and promote ePHR use (Ant Ozok, Wu, Garrido, Pronovost, & Gurses, 2014; Do, Barnhill, Heermann-Do, Salzman, & Gimbel, 2011; Wagner et al., 2012). Users have the ability to access their own medical information as needed to manage chronic conditions and monitor behavioral changes (Dorr et al., 2007; Patel et al., 2012; Tang et al., 2003; Tenforde, Jain, & Hickner, 2011; Tobacman et al., 2004) but ePHRs also allow caregivers to oversee health management for other family members, such as a child or elderly parent (Tang et al., 2006). The usefulness of tethered ePHR has also been reported for accessing lab results and patient education materials, requesting medication refills and appointments, and engaging in preventive screening and health promotion behaviors (e.g., vaccinations) (Krist et al., 2011; Nazi, 2010; Wright et al., 2012).

Although the potential for ePHRs to improve healthcare is significant, there are barriers to widespread adoption of ePHRs. Although almost 50% of Americans responded favorably toward the idea of ePHR, they are relatively unfamiliar and inexperienced with ePHRs (Markle Foundation, 2008). A national survey estimated that the rate of ePHR use among Americans was only 10% (California HealthCare Foundation [CHCF], 2010a). Data accuracy, data privacy and security concerns, the “digital divide” (i.e., a difference in the racial and socioeconomic status in information and communication technologies), and literacy have been found to be prevalent concerns affecting ePHR adoption (Archer, Fevrier-

Thomas, Lokker, McKibbin, & Straus, 2011; Kahn, Aulakh, & Bosworth, 2009; Kim, Mayani, Modi, Kim, & Soh, 2005; Tang et al., 2006). Activating and engaging consumers is an essential component to health care reform in the U.S. (Hibbard & Cunningham, 2008) and this process can be facilitated by nurses (Kim et al., 2007). Nurses have always promoted self-care and active participation of individuals in managing their healthcare. There is a professional obligation to become familiar with the technology and promote personal health care information management supported by the Office of the National Coordinator (ONC) for Health Information Technology and the American Nurses Association (ANA, 2014). Nurses can learn about ePHRs by using them personally. Assessing nurses' use of ePHRs as consumers themselves is very important. There is no existing research that examines health care professionals' use of ePHRs for their own personal health management. The purpose of this study was to examine factors associated with ePHR use by nurses for their own health management.

Methods

Study Design and Sample

A descriptive cross-sectional study design was used. We conducted an anonymous self-administered online survey of registered nurses about ePHRs use for their own health management from December 2013 to January 2014 in 12 hospitals located in the Maryland and Washington DC area. Retired, currently unemployed (including students) nurses were excluded. Registered nurses (RN) were informed about the survey through their hospital LISTSERVs. The invitation email and follow-up reminders were sent out by the research director in each hospital. In total, 664 nurses completed the 37-item survey that took approximately 15 minutes to complete. Two participants received tablets (Height: 7.87 inches, Width: 5.3 inches, Depth: 0.29 inch) from a raffle offered as an incentive to participate. Institutional Review Board approval was provided by the University of Maryland, Baltimore and each facility.

Measures

The survey began with a definition of an ePHR, described as follows "Unlike an EHR used by health providers, an ePHR is used by you to enter and view your own data, update your health information, and manage your health care. An ePHR requires you to assign yourself a user name and password to access it (HIMSS, 2007; National Alliance for Health Information Technology [NAHIT], 2008)." The description did not distinguish between types of ePHRs (tethered or non-tethered). An example of an ePHR image was also shown after the description. The main outcome of interest was defined as ePHR use or not based on the response to the question: "Have you ever used an ePHR to view, update, or manage your health information?"

In order to preserve anonymity only a few demographic characteristics (age, gender, ethnicity/race, education, marital status) and job related variables were collected (working full time or not, years working as a RN, current practice position and specialty area). The items for the job information were adapted from the Nurses Worklife and Health Study (Trinkoff, Geiger-Brown, Brady, Lipscomb, & Muntaner, 2006) and the website of the

Hospital of the University of Pennsylvania [HUP] (HUP, 2013). Health was assessed with a self-rated overall health status question and two yes/no questions that inquired about any chronic conditions and prescribed medication usage. Responses from the chronic medical condition and prescription medication use questions were combined to capture the concept of being an active health care consumer that might reflect more constant vigilance and healthcare provider interaction (coded as 0= neither condition, 1= either one, and 2= both). Additional items for health care experience inquired about health care decision making preferences for themselves as well as their dependents (eg., children or elderly parents).

The survey also contained many questions adapted from consumer surveys on ePHR use about potential promoters or barriers to use (CHCF, 2010b; Patel et al., 2011). These items were tailored to appropriately reflect the nursing context as well as ePHR use. Experience with technology was assessed via single items that inquired about work place EHR experience, computer and internet usage, and their degree of frustration when learning new applications. The concept of eHealth literacy (use of emerging information and communication technology, especially the Internet, to improve or enable health and health care) was assessed using four items selected from an 8-item scale developed by Norman and Skinner (2006) and rated on a 5-point Likert scale (Cronbach's $\alpha = 0.88$). The four items were chosen because they were appropriate to evaluate the nurses health literacy, and had good reliability (Cronbach's $\alpha = 0.91$) with a 4-point Likert scale (strongly disagree to strongly agree) ranging from 0 to 16. The four items were as follows: 1) I know where to find helpful health resources on the Internet, 2) I know how to use the health information I find on the Internet to help me, 3) I have the skills I need to evaluate the health resources I find on the Internet, and 4) I feel confident in using information from the Internet to make health decisions.

To capture the concept of awareness of new technology, respondents were asked if they were aware of the meaningful use policy issued by the US government, and if their health care providers used EHR as part of their own healthcare. Another set of questions inquired about attitudes and concerns with the privacy and security of electronic health information. Attitudes about privacy of electronic health information assessed general privacy and security of online health information, and responses were coded as concerned vs. not concerned. Meanwhile, the privacy permission was assessed with tailored questions (e.g., ePHR users were asked whom they granted permission to view their ePHR, and ePHR nonusers were asked who they would grant permission to view their ePHRs). Separate yes/no questions inquired about sharing information with designated family or friends, primary care providers, other providers (e.g., specialists or emergency departments), pharmacists, health insurance company or their employer.

Analysis

Descriptive statistics examined the distribution and frequency of variables. Differences in group means between ePHR users and nonusers were tested with t-tests for continuous variables and χ^2 tests (Yate's correction for continuity, or Fisher's exact test) where appropriate for categorical variables, with 2-sided tests. Odds ratios examined the magnitude of the associations between RN characteristics and ePHR use. Variables found to be

significantly associated with ePHR use ($p \leq 0.20$) in bivariate association were included in the multiple logistic regression model using a forced entry method. To examine factors associated with ePHR use, four models were generated. Model 1 concentrated on health (chronic medical condition and/or taking prescribed medication). Model 2 contained the variables related to technology experiences (EHR use for patients as part of job, Internet use, eHealth literacy, awareness of meaningful use, and providers use of EHR). Model 3 contained general concern for privacy and security of health information online. Model 4 included all variables from Model 1 through Model 3. All models were adjusted for demographics (e.g., age, marital status) and job information (e.g., current position, specialty area). No multicollinearity across the covariates was found, omnibus tests were all significant ($p < 0.05$) and Hosmer-Lemeshow tests were not violated ($p > 0.05$). SPSS 21 was used for all data analyses.

Results

More than a third (41%, 95% CI=0.37-0.44) of respondents were ePHR users. There was no variation between ePHR users and nonusers by demographics and job related information (**Table 1**). The majority of respondents were white (73%) and female (96%) and half were ages 45 and over. The majority of respondents had a Bachelor's degree or higher (84%) and were currently married or living with a partner (65%). Ninety-two percent of respondents were employed full-time, with 17 years worked on average (SD=12.7). The majority of respondents were staff RNs (75%) with specialties in noncritical care (73%).

Health and Healthcare Experience

The vast majority of RNs (96%) reported they were in excellent, very good, or good health, but one-third of respondents (34%) either had chronic conditions or used prescribed medications and one-third of nurses (33%) had both (**Table 1**). There was significant variation between ePHR users and nonusers regarding chronic conditions and taking prescribed medications ($p < 0.05$). A larger percent of ePHRs users had a chronic medical condition and/or taking prescribed medications (71%) as compared to non-users (65%). More than two-thirds (69%) of respondents reported that they collaboratively made decisions about their health care with their primary care providers. Less than half (43%) reported that they were primary caregivers for children or elderly parents and less than one-third (29%) made medical decisions for their children or elderly parents. However, there was no difference in healthcare experiences between ePHR users and nonusers.

Technology Experience and Awareness of New Technology

As seen in **Table 2**, 76% of respondents reported using EHRs for patients as part of their job, for an average of 4 years (SD=3.8), and using personal computers for any purpose an average of 15 years (SD=7.4), which did not differ significantly between ePHR users and nonusers. A larger portion of ePHR users used the internet frequently (several times a day) compared to ePHR nonusers ($p < 0.05$). One-third (36%) of respondents reported that they had frustration in learning new applications. Although eHealth literacy did not show significant variation between ePHR users and nonusers, ePHRs users showed slightly higher eHealth literacy scores compared to nonusers ($p = 0.15$). A significantly larger portion of

ePHR users were more aware of health technologies: 57% of users as compared to 47% of nonusers had heard about meaningful use ($p<0.05$), and nearly 80% of users compared to approximately 50% of nonusers indicated their primary care providers currently used an EHR for care ($p<0.01$).

Attitudes about Privacy of Electronic Health Information

Overall, more ePHR non users (72%) were concerned about general privacy and security of health information online compared to users (64%, $p=0.06$) (**Table 2**). However, privacy permission to specific entities was less stringent among nonusers compared to users. The vast majority of ePHR nonusers (91%) reported that they would grant permission to view their ePHRs to specific entities, but only 62% of ePHR users actually granted permission to view their ePHRs to specific entities (**Figure 1**). Among those who granted or would grant permission ($n=527$), fewer ePHR users granted permission to designated family members or friends (24% vs. 59%), their primary care providers (87% vs. 97%), other health care providers who care for them (34% vs. 79%), or pharmacists (19% vs. 53%) compared to nonusers ($p<0.01$). Meanwhile, a greater portion of ePHR users granted permission to a health insurance company (30% vs. 21%) or their employer (8% vs. 3%) compared to nonusers ($p<0.05$).

Factors Associated with ePHR Use

Models for testing factors associated with ePHR use were adjusted for potential confounders as summarized in **Table 3**. As seen in Model 1, being an active health care consumer (both existing chronic medical condition and taking prescribed medications) almost doubled the odds of being an ePHR user ($OR=1.74$, 95% $CI=1.15-2.64$). For technology experience (Model 2), those whose health care providers used EHR for care were almost four times more likely to use ePHRs ($OR=3.77$, 95% $CI=2.55-5.56$). Although not significant, ePHR users were less concerned about general privacy and security of health information online (Model 3: $OR=0.73$, 95% $CI=0.51-1.04$). In the full model (Model 4) that incorporated all factors, the associations between ePHR users and active health care ($OR=1.64$, 95% $CI=1.06-2.53$) and health care providers that used EHR for their care ($OR=3.62$, 95% $CI=2.45-5.36$) were attenuated only slightly.

Discussion

The ANA (2014) called for action to get patients engaged in their own care as part of health care reform, and endorsed nurses participation in helping patients to do this. However, as a baseline, leadership must be aware of nurses' own use of, and attitudes about ePHRs. Our study is the first to characterize nurses use of ePHRs for their own health management. We found that 41% of the hospital RNs who responded used an ePHR to view, update, or manage their own health care which is four times higher than the estimated 7%-10% of ePHR use among a national sample of Americans (CHCF, 2010a; Markle Foundation, 2011). Our finding that more than half of the nurse ePHR users were under age 45 and the majority of nurses had at least a Bachelor's education is comparable to the characteristics found in the national consumer survey (CHCF, 2010a).

Our survey indicated that being an active health consumer (both chronic medical condition and taking prescribed medication) was significantly associated with the use of ePHR compared to nonusers. The national consumer survey found that those who are older, with less education or income, and chronically ill have the most to gain from using ePHR (CHCF, 2010a). It has been shown that ePHRs are valuable for chronic disease management (e.g., diabetes, heart failure, and multiple sclerosis) (Fonda, Kedziora, Vigersky, & Bursell, 2010; Miller et al., 2011; Ross, Moore, Earnest, Wittevrongel, & Lin, 2004). Chronic disease management based on ambulatory healthcare technology and care coordinators reduced emergency room visits, hospital admissions and length of hospitalizations (Meyers, Kobb, & Ryan, 2002). A survey in ten counties in Kentucky indicated that 53% of households managing a chronic illness were willing to pay to use a community wide ePHR that had been implemented (Thornewill & Baluch, 2007). Also 56% of respondents that had chronic conditions among consumers went online to find specific information about their medical conditions or prescription medications (CHCF, 2008). ePHR can be a useful tool for chronic disease self-management as an example of active engagement in managing health among patients and nurses.

Health care providers adoption and meaningful use of EHRs allow patients to access the health information via patient portal (i.e., ePHR) (U.S. Department of Health & Human Services [DHHS], 2012). In our sample, more than half of ePHR users had heard about meaningful use. More than three-quarters of ePHR users had providers that used EHR and it was significantly associated with ePHR use compared to nonusers. The national survey also reported that when providers used EHR, Americans were more likely than others to be interested in the use of ePHRs (CHCF, 2010a). Doctors and hospitals are the most common ePHR suppliers for those who use ePHR (Markle Foundation, 2011), thus providers who use EHR may be more likely to offer ePHR to their patients. Physicians who used EHRs were more likely to be aware of ePHRs than physicians who planned to use or had no intention of using EHRs (Fuji, Galt, & Serocca, 2008). Our findings support that as more health care providers adopt EHRs, this might encourage more interest in ePHR use (Jamoom et al., 2011). We did not ask RNs about what type of ePHR they used (e.g., tethered vs. non-tethered), which could provide valuable information because an integrated ePHR with providers EHR is often preferred as indicated in a review of the literature (Kim & Nahm, 2012).

Our survey indicated that 69% of participants were generally concerned about privacy and security of health information online, but fewer ePHRs users were concerned about general privacy of electronic health information online (64% vs. 71%) compared to ePHR nonusers. A national consumer survey found that 63% of ePHR users were concerned generally about the privacy of their medical records, but they were less worried about the privacy of information in their ePHRs, similar to our findings (CHCF, 2010a). We found that fewer ePHR users granted permission to designated family members or friends, their primary care providers, other health care providers who care for them, or pharmacist compared to nonusers. A larger portion of ePHR users granted permission to a health insurance company or their employer than ePHR nonusers. However, the vast majority of both ePHR users and nonusers would grant permission to their primary care providers to access ePHRs, similar to findings from Patel et al. (2011). This might be explained by the fact that ePHR users

actually control who they grant permission to view their ePHR specifically, while ePHR nonusers do not have this experience or may be unaware of this feature. Therefore nonuser responses are hypothetical not actual.

Data privacy and security protection is another critical issue for ePHRs (Kahn et al., 2009). Nurses should be familiar with the Health Insurance Portability and Accountability Act (HIPAA) and the privacy regulations (Fetter, 2009). ePHR can yield numerous health benefits for nurses, but only if privacy and security barriers are overcome. Atkinson et al. (2007) found that users mistrusted credibility and privacy of the ePHRs used, because of the lack of clear and concise information in the privacy policy and consent form. A survey found that many participants would like limits on the distribution of their personal health information for purposes other than clinical care, and suggested incorporating sophisticated access control (i.e., multi-step authentication) into the ePHR (Whiddett, Hunter, Engelbrecht, & Handy, 2006). Privacy of ePHRs and comfort with using them depends on adequate security. There should be stringent security services required by the HIPAA security standard (DHHS, 2006) to give consumers control over access to their records. ePHR that has stringent internet security policy and security services on privacy of information may facilitate the use of ePHR by nurses. As a result of using ePHR, RNs can better manage their health and hopefully have better health outcomes.

Limitations

Generalizability of this study's results may be limited because our sample consisted of a convenience sample of healthy (i.e., the vast majority self-rated as good, very good, or excellent health) employed RNs working in hospitals in the Maryland and Washington DC area. It is probable that RNs who are on the computer more and interested in the topic of ePHRs might be more likely to have participated in this survey, therefore the estimates of the proportion of ePHR users should be cautiously viewed. However, many of the characteristics in our nursing sample (average age close to 45, and predominantly female, white, staff position and noncritical care specialty) are reflective of the distribution of characteristics of the national workforce 2013 survey of RNs (Health Resources and Services Administration [HRSA], 2013). We did not assess what type of ePHR (tether or non-tethered) participants used, and this could explain whether ePHR use is influenced by the features of the ePHR. Many of the factors studied were single item questions, so reliability and validity of the measures is a concern. However the questions were adapted from a survey of consumers to allow comparisons of the results. The logistic regression models did not incorporate the potential of clustering effects attributed to employees working at the same hospital.

Policy Implications

The ANA's (2014) endorsement for nurses becoming the firsthand experience in using ePHRs should be supported by hospital leadership. The organizational stake holders (e.g., chief nursing officers) can facilitate nurses' health-promoting role model for patients in health care. Studies found that the success of system implementation was based on the innovative culture at the professional level in organizations (Ash, Stavri, Dykstra, &

Fournier, 2003; Gagnon et al., 2010; Terry et al., 2008). Nurses could leverage an ePHR portal to accomplish tasks such as providing health education resources, and can participate in design of ePHRs. For instance, education for patients with interpretation of clinical information can be offered by nurses with their hands-on experience using ePHRs. Family members can be included in this educational process so that they can act as a support system to the patient in case the patient is unable to maintain his or her ePHR alone. Due to their experiences with ePHR potentially both as a patient and a clinician, nurses can provide invaluable insights and input for improving the design of ePHRs.

Kupchunas (2007) stated that the process of teaching patients how to maintain their own health records is an opportunity for nurses to capitalize on educational time spent with patients. For instance, nurses can help patients manage chronic illness and medication with ePHRs. Connolly, Gulanick, Keough, and Holm (1997) found that 70% of critical care nurses would recommend their lifestyle to their patients because they had a positive experience and attitude about their healthy lifestyles (e.g., maintain a healthy weight, eat well). But, Strobl and Latter (1998) reveal that when nurses perceive themselves negatively as role models, they are reluctant to teach and counsel patients about health-promoting behaviors, and engage in implementation of hospital healthy environments (e.g., smoking policy). Regardless of personal condition, nurses can help patients use ePHRs to adopt health behaviors like exercising regularly, eating a healthy diet, not smoking, managing depression, and adhering to prescribed medications (Northern Illinois Physicians for Connectivity [NIPFC] & Northern Illinois University Regional Development Institute [NIU RDI], 2009). Led by experienced nurses, ePHRs could help patients improve their quality of life and reduce health care costs (NIPFC & NIU RDI, 2009).

Conclusion and Further Research

We found that hospital nurses were active health care consumers in managing their own chronic medical conditions and prescribed medication use with ePHRs. Nurses who had providers who were using an EHR for their care (perhaps increasing their access to an ePHR) were significantly associated with ePHR use. Although the security and privacy permissions are problems to overcome in using ePHR, promoting the wide adoption and use of providers EHRs may leverage the more meaningful use of data in ePHRs by nurses.

Study findings can be improved by validating the survey instrument for adopting ePHR to various nursing practice and factors that related to job. Additional assessment of different types of ePHRs may provide answers to (1) whether the ePHR users' adoption and continuing use of ePHR are affected by the comprehensive ePHR functionality (i.e., whether ePHR offers secure-messaging, prescribed medication refills, etc.), and (2) whether tethered ePHR with providers' EHR provide more stringent legal protections compared to non-tethered.

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Highlights

- This is the first study to characterize nurses' use of electronic personal health records (ePHRs) for their own health management.
- ePHR users were more likely to be active in managing chronic conditions and prescribed medications use compared to non-users.
- ePHR users were more likely to have health care providers that used electronic health records for care than non-users.
- Nurses can leverage an ePHR portal to accomplish tasks such as providing health education resources, and can participate in the design of ePHRs with their own experience.

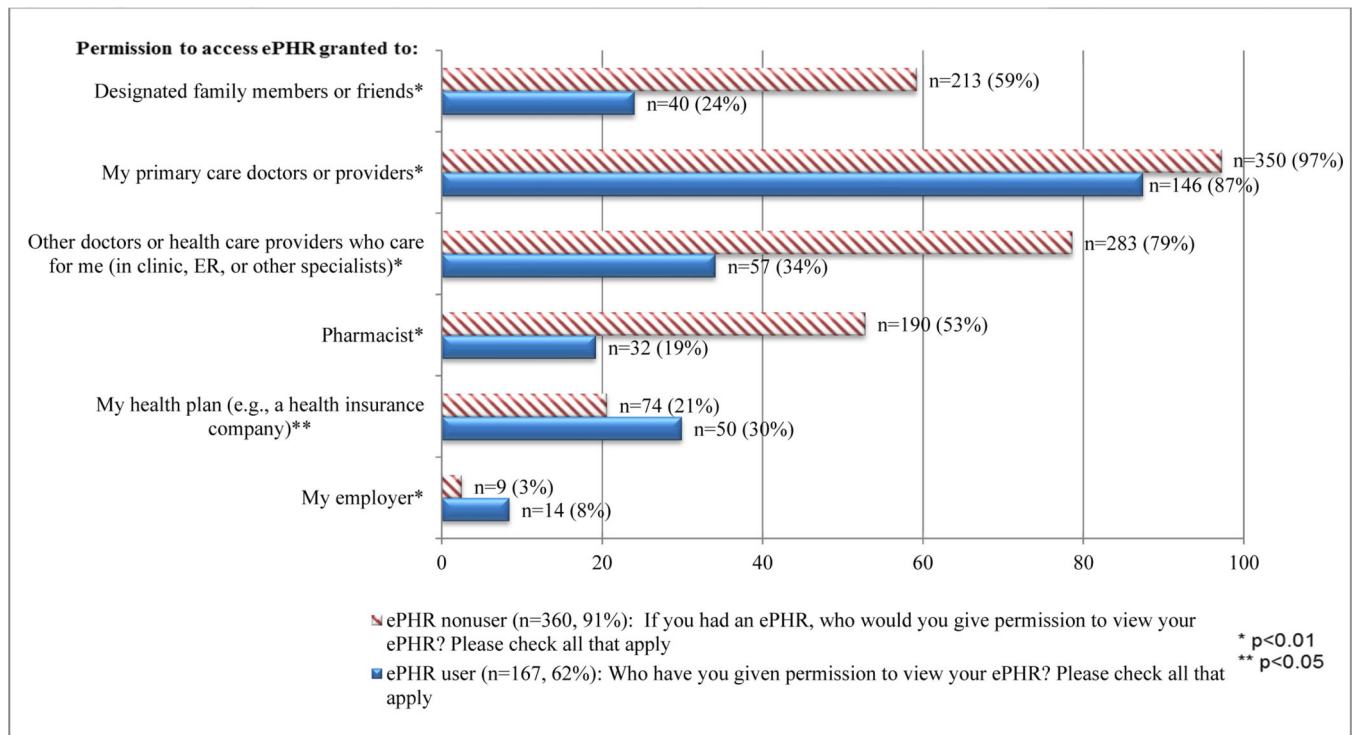


Figure 1.
Proportion Granting Permission to Specific Entities to View ePHR among Users and Nonusers (n=527, 79%)

Table 1

Characteristics of Nurses by Personal Use of ePHR: ePHR hospital survey

Characteristic	Total (n=664) n (%) ^a	n (%) ^a		χ^2	p
		ePHR Nonuser (n=395)	ePHR User (n=269)		
Demographics					
Age (years), Mean (SD)	43.5 (12.8)	43.5 (12.9)	43.4 (12.7)	t= 0.17	0.87
21-34	208 (31.4)	121 (30.7)	87 (32.5)	5.66	0.13
35-44	121 (18.3)	68 (17.3)	53 (19.8)		
45-54	157 (23.7)	106 (26.9)	51 (19.0)		
55+	176 (26.6)	99 (25.1)	77 (28.7)		
Female	632 (95.5)	258 (96.3)	374 (94.9)	0.39 ^b	0.53
White	482 (73.1)	285 (73.1)	197 (73.2)	<0.01 ^b	1.00
Education					
Diploma/Associate's degree	103 (15.6)	67 (17.0)	36 (13.4)	1.69	0.43
Bachelor's degree	400 (60.4)	232 (59.0)	168 (62.5)		
Master's/Doctoral	159 (24.0)	94 (23.9)	65 (24.2)		
Marital status					
Never married	154 (23.3)	100 (25.4)	54 (20.1)	3.38	0.19
Divorced/separated/widowed	80 (12.1)	50 (12.7)	30 (11.2)		
Currently married/living with partner	427 (64.6)	243 (61.8)	184 (68.7)		
Job information					
Full-time employed, yes ^d	608 (91.6)	366 (92.7)	242 (90.0)	1.18 ^b	0.28
Years of working as RN, Mean (SD)	17.1 (12.7)	17.0 (12.7)	17.2 (12.7)	t= -0.22	0.83
Current position					
Staff/General duty/Private duty	497 (74.8)	303 (76.7)	194 (72.1)	3.42	0.18
Nurse practitioners/Other ^e	69 (10.4)	42 (10.6)	27 (10.0)		
Nurse manager/supervisor/administrator	98 (14.8)	50 (12.7)	48 (17.8)		
Specialty area					
Noncritical care	485 (73.0)	298 (75.4)	187 (69.5)	5.43 ^c	0.07
Critical care	169 (25.5)	94 (23.8)	75 (27.9)		
Nursing Informatics	10 (1.5)	3 (0.8)	7 (2.6)		
Health					
No chronic medical condition or taking prescribed medication	216 (32.6)	138 (35.0)	78 (29.0)	8.38	0.02
Either chronic medical condition or taking prescribed medication	228 (34.4)	143 (36.3)	85 (31.6)		
Both chronic medical condition and taking prescribed medication	219 (33.0)	113 (28.7)	106 (39.4)		
Healthcare experience					
Collaborative medical decision making: PCP and I decide together	459 (69.2)	275 (69.8)	184 (68.4)	0.09 ^b	0.77

Characteristic	Total (n=664) n (%) ^a	n (%) ^a		χ^2	p
		ePHR Nonuser (n=395)	ePHR User (n=269)		
Primary caregiver for child/elderly	284 (42.8)	161 (40.8)	123 (45.7)	1.42 ^b	0.23
Make medical decision for child/elderly	194 (29.2)	107 (27.1)	87 (32.3)	1.89 ^b	0.17

ePHR=electronic personal health record. PCP=primary care provider.

^aPercentage may not sum to 100 because of rounding; numbers may not sum to totals due to missing responses

^bYate's Correction for continuity

^cFisher's exact test: 1 cell < 5 count

^dFull-time employed: vs. No (Part-time, PRN, Other)

^eNurse practitioners/Other (informatics specialists, educators, researcher, others).

Table 2

Technology Use and Attitudes of Nurses by Personal ePHR use: ePHR hospital survey

Characteristic	Total (n=664) n (%) ^a	n (%) ^a		χ^2	p
		ePHR Nonuser (n=395)	ePHR User (n=269)		
Technology experience					
EHRs used for patients as part of job	503 (75.8)	292 (73.9)	211 (78.4)	1.54 ^b	0.22
EHRs use for patients (years), Mean (SD)	4.01 (3.8)	4.3 (3.9)	3.8 (3.6)	t= 1.29	0.20
PC use (years), Mean (SD)	15.4 (7.4)	15.3 (7.2)	15.5 (7.7)	t= −0.41	0.68
Internet use: Several times a day ^c	561 (84.5)	324 (82.0)	237 (88.1)	4.06 ^b	0.04
Frustrated as learning new applications	240 (36.1)	146 (37.0)	94 (34.9)	0.20 ^b	0.65
eHealth literacy (Higher score is better) ^d	13.0 (2.8)	12.9 (3.0)	13.2 (2.6)	t= -1.43	0.15
Awareness of new technology					
Heard about meaningful use	337 (50.8)	185 (46.8)	152 (56.5)	5.61 ^b	0.02
My health care providers use EHR	426 (64.2)	211 (53.4)	215 (79.9)	47.75	<0.01
Attitudes about privacy of health information					
Concerned about privacy and security of health information online ^e	456 (68.7)	283 (71.6)	173 (64.3)	3.68 ^b	0.06

ePHR=electronic personal health record. EHR=electronic health record. PC= Personal computer.

^aPercentage may not sum to 100 because of rounding; numbers may not sum to totals due to missing responses;^bYate's Correction for continuity^cFrequency of Internet use: <=Once a day (about once a day/Several times per week/Several times per month/Rarely or not at all) vs. several times a day^deHealth literacy (scale : 4 items, Response items: 0=Not sure, 1= Strongly disagree, 2=Disagree, 3=Agree, 4=Strongly agree, Range 0-16, Cronbach's alpha=0.91^eConcerned (Very concerned/Somewhat concerned) vs. Not concerned (Not at all concerned/Not very concerned/Not sure).

Table 3
Adjusted^a Odds Ratios of Factors Associated with ePHRs Use: ePHR hospital survey (n=660)

	Model 1		Model 2		Model 3		Model 4	
	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Health								
No chronic medical condition or taking prescribed medication	1.0						1.0	
Either chronic medical condition or taking prescribed medication	1.06 (0.71-1.57)	0.79					1.04 (0.68-1.58)	0.86
Both chronic medical condition and taking prescribed medication	1.74 (1.15-2.64)	0.01					1.64 (1.06-2.53)	0.03
Technology experience								
EHR use for patients as part of job (Yes vs. No)			0.97 (0.65-1.46)	0.90			0.98 (0.65-1.47)	0.91
Internet use (Several times a day vs. <= Once a day)			1.34 (0.80-2.22)	0.26			1.33 (0.80-2.22)	0.28
eHealth literacy (Higher score is better) ^b			1.01 (0.94-1.07)	0.86			1.01 (0.94-1.07)	0.85
Heard about meaningful use (Yes vs. No)			1.13 (0.79-1.62)	0.51			1.16 (0.80-1.66)	0.44
My health care providers use EHR (Yes vs. No)			3.77 (2.55-5.56)	<0.01			3.62 (2.45-5.36)	<0.01
Attitudes about privacy of health information								
General concern for privacy and security of health information online (Concerned vs. Not concerned) ^c					0.73 (0.51-1.04)	0.08	0.87 (0.60-1.26)	0.46

ePHR=electronic personal health record. EHR=electronic health record.

^a Adjusted for age, marital status, current position, and specialty area.

^b eHealth literacy (scale: 4 items, Response: 0=not sure, 1= strongly disagree, 2=disagree, 3=agree, 4=strongly agree, range 0-16, Cronbach's alpha=0.91)

^c Concerned (Very concerned/Somewhat concerned) vs. Not concerned (Not at all concerned/Not very concerned/Not sure).