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Information Systems and Healthcare XXXVII: When Your Employer Provides Your Personal Health Record—Exploring Employee Perceptions of an Employer-Sponsored PHR System

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Abstract:

A growing number of employers provide electronic personal health records (PHRs) as a service to employees as part of a health benefit program. However, a variety of unique issues related to attitudes and adoption arise when a PHR is hosted by the employer, and little research has addressed this relationship. This article reports the findings from an exploratory study of factors that influence employee perceptions, concerns, and expectations related to an employer—sponsored PHR service, with data from 132 employees of a large U.S. corporation. Attitudes toward PHR systems and employee perceptions and concerns identified in prior research are evaluated. Despite studies suggesting significant demand for PHR products across the general public, especially those that are offered at no cost to the user, responses indicated unique barriers to use, as well as opportunities, for employer-sponsored PHRs. The future role of employers as sponsors of PHRs is discussed in light of obstacles and strategies to improve system use, and the need to help employees realize the potential value of employer-sponsored PHRs.

Keywords: personal health records, e-health, employer-sponsored systems, health informatics

I. INTRODUCTION

Personal Health Records (PHRs) that are available online have gained widespread attention since their introduction in the 2000s. In some cases, employers decide to sponsor PHRs for their employees, but little is known about the key issues affecting employee perceptions of personal health records sponsored by employers, as well as how such perceptions might influence effective use of PHRs. This research explores three main questions: What are employee perceptions of employer-sponsored PHRs (ESPHRs), which perceptions are important, and what are the implications of these perceptions for sponsorship and effective use of ESPHRs?

The potential value of electronic Personal Health Records (PHRs) has been established in an increasing body of literature in Information Systems and healthcare. For example, PHRs have been identified as an important tool to help reduce medical errors [AHRQ, 2007], improve patient safety [Win, 2005], facilitate continuity of care [Iakovidis, 1998], improve patient–physician communication [Denton, 2001; Unruh and Pratt, 2006], improve information handoffs and hospital efficiency [VanEaton et al., 2005], and aid in the overall healthcare management of individuals [Iakovidis, 1998]. Major software firms and Internet search service providers such as Microsoft and Google, as well as many smaller competitors, now offer PHR products [Swartz, 2008].

Employers have created a new category of PHR by introducing ESPHRs, offering an ESPHR as a service directly to their employees. ESPHRs have been examined from a commercial perspective, including plans to offer health record options to employees of large firms across the U.S. [e.g.,Baker, 2006; Dolan, 2010; Gonzalez, 2008; Health Data Management, 2008; Hunt, 2008; J.P. Morgan Research, 2006; McGee, 2008], as well as discussion of broader policy themes [California Healthcare Foundation, 2010; California Healthcare Foundation, 2007] and privacy implications [Health Privacy Project, 2007]. However, an extensive search of research literature found no research that examined employee perceptions of ESPHRs (see Appendix A). Since factors affecting the acceptance and use of ESPHR systems may differ from those affecting the use of independent PHRs, this study focuses on understanding the distinct issues affecting ESPHRs by exploring perceptions of an ESPHR implementation in a large U.S. firm.

Healthcare entities may differ from typical private firms in their motivations and objectives for sponsoring PHRs. While PHRs are offered by such entities as health insurance companies and healthcare providers, who wish to minimize healthcare costs and document medications and health events [Gellman, 2008; Kaelber et al., 2008], ESPHRs may be offered by employers to address health-related employee productivity losses and health insurance costs [AHIMA Personal Health Record Practice Council, 2006].

PHRs that are connected to various kinds of sponsors can be described as either "untethered" or "tethered" to a healthcare provider, health insurance company or other payer, employer, or related entity [Smolij and Dunn, 2006]. Some studies suggest that PHRs that are simultaneously controlled by the individual and tethered to a sponsor may be most appropriate for consumers [Brennan and Strombom, 1998; Simons et al., 2005; Tang et al., 2006], paralleling the relationship seen in a customer's use of personal accounting software that is connected with a consumer's bank [Ball and Gold, 2007; Moore, 2008; Ramsaroop and Ball, 2000]. Still, little is known about the types of organizational sponsors that consumers will prefer for PHR sponsorship, especially when the sponsor is an employer.
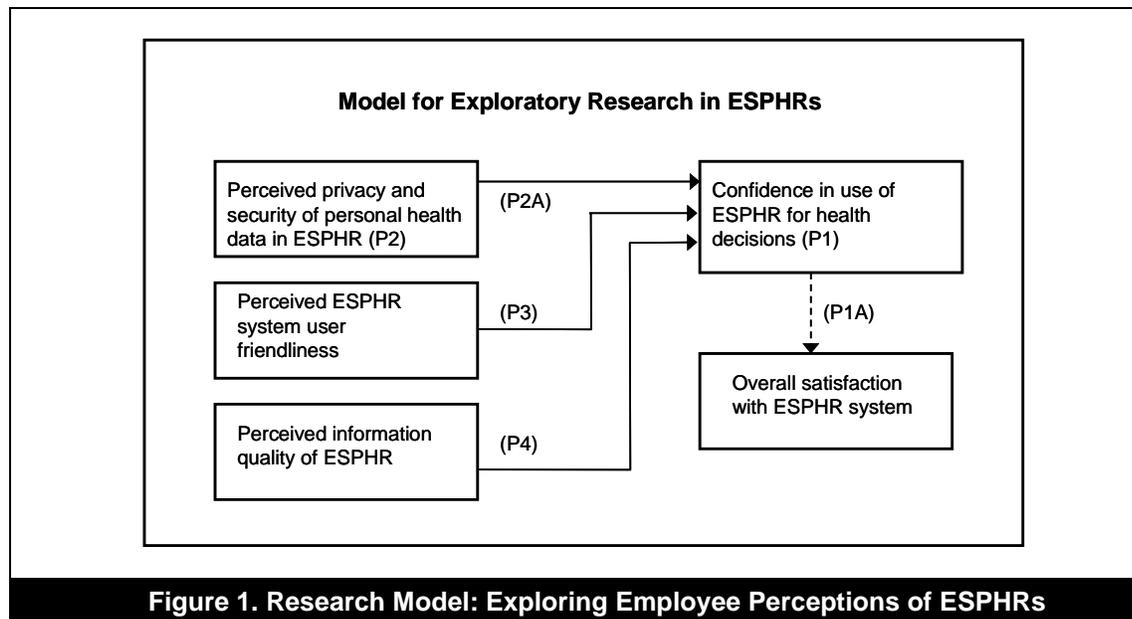
Employer involvement in the healthcare of employees is not new; wellness programs and the subsidy of employee health insurance premiums are examples of employer participation. On the other hand, employer programs to provide ESPHRs are relatively recent phenomena [Dawson, 2007; Galvin and Delbanco, 2006]. It remains uncertain to what extent employees value these services and the role that employers should or should not play in terms of offering them.

This study reports the results of a survey that was conducted among the employees of a large firm that provides free access to an ESPHR system for all employees. Relationships are explored between user perceptions of ESPHRS in four areas:

- Ability of the ESPHR system to facilitate health decisions—A system's ability to affect health decisions is an important indicator of its potential for effective use.

- Privacy and security of personal health record data in the ESPHR—Perceived privacy and security of PHRs are a top concern among users and should be understood in the unique context of an employer-sponsored system.

- User friendliness of the ESPHR system—User friendliness has a long history of fundamental effects on system adoption and use.

- Quality of the information that the ESPHR system produces—Perceptions of the quality of the information provided by an ESPHR system may affect its use by employee users.

The research model shown in Figure 1 shows these relationships, along with satisfaction as a secondary outcome, as they are explored in this study. The discussion that follows Figure 1 reviews the rationale and literature basis for the four propositions and the research model. This is followed by the setting and methods, quantitative and qualitative results, and implications of the study.

Model for Exploratory Research in ESPHRs

Perceived privacy and security of personal health data in ESPHR (P2) —(P2A)→ Confidence in use of ESPHR for health decisions (P1)

Perceived ESPHR system user friendliness —(P3)→

Perceived information quality of ESPHR —(P4)→

Confidence in use of ESPHR for health decisions (P1) --(P1A)--> Overall satisfaction with ESPHR system

Figure 1. Research Model: Exploring Employee Perceptions of ESPHRs

II. EMPLOYEE PERCEPTIONS OF ESPHRS

ESPHRs and the Employee-Employer Relationship

The perceptions and attitudes toward ESPHRs discussed in this study arise in a context of complex relationships of trust between employees and the employer-sponsor of the system. Links between trust in employers and employee workplace satisfaction are well established [Aryee et al., 2002; Dirks and Ferrin, 2001; Rich, 1997] and are generally seen as based on expected employer benevolence [Coyle-Shapiro and Kessler, 2002; Whitener et al., 1998]. However, trust concerns can be amplified by the introduction of healthcare into the employee-employer relationship [Hoglund, 2004; Markle Foundation, 2005; Pratt et al., 2006]. Employees may be skeptical of the motivations of an employer that is providing resources that don't necessarily support their day-to-day activities [Galvin and Delbanco, 2006], such as an ESPHR. These background and work relationship factors may influence attitudes toward ESPHRs in ways that are distinct from those identified toward untethered PHRs.

Attitudes Toward ESPHRs in Prior Research

The variables chosen to evaluate ESPHRs for this study, usefulness in decision-making, information privacy and security, ease of use, quality of information, and satisfaction with the system, were based on several areas of prior research. First, Lafky [2007] identified specific differences in importance attributed by users of standard PHRs to technology factors, privacy factors, information security factors, and technology ease-of-use, with a specific focus on well users, the unwell, and the disabled. Persons classified as chronically ill and disabled account for approximately 32 percent of the U.S. population [U.S. Census Bureau, 2005; U.S. National Center for Health Statistics, 2006], with the remaining 68 percent falling in the well category. These factors had not been examined in an employment context, and their effects on attitudes toward ESPHRs remain unknown. In addition, a large study conducted and reported by an ESPHR vendor that focused on attitudes toward ESPHRs among 11,023 employees in eight Fortune 500 firms [URAC, 2006; WebMD Health, 2004] found significant differences in perceptions of the value of ESPHRs in relation to system information and health decisions, including its ability to assist with health management (20–28

percent) and health tracking (18–22 percent). In addition, frequent use of personal health management tools for health planning ranged from 20–51 percent between firms, employees reporting a strong effect of the ESPHR on personal health ranged from 15–29 percent between firms, and those who reported being satisfied with the ESPHR ranged between firms from 37–60 percent. The highest-rated ESPHR functions were those pertaining to health planning and decisions, with 79 percent of employees using the system to take action to manage health. These factors are relevant for an exploratory study of ESPHRs and were expected to be easily understood by employee users.

Decision Making and Decision Confidence

Research on how computer-based health information influences decision making suggests the importance of gaining an understanding of how perceptions of ESPHR health information might affect user health decisions. First, the overall link between health information and decisions is inconsistent [Ball, 2001]. For example, studies of clinical environments, with their inherent demands for technical and clinical information and rapid decisions, have found that the decision-support capabilities of information systems have been met with low acceptance [Kawamoto and Lobach, 2007]. Use of e-health information by the nonmedical public may be even less likely to affect health decisions in a consistent or predictable manner [Eysenbach and Jadad, 2001].

A second and broad area of influence on decision making stems from varying biases toward e-health information. In spite of the fact that e-health information has been widely available since the introduction of web browsers, some studies have shown an age-related bias against using e-health information for decisions, with younger users tending to attribute greater credibility to online health information [Gray et al., 2005]. Other studies suggest that older persons and those with chronic health conditions may be motivated to use e-health systems by virtue of pressing health needs imposed by their conditions [Wilson and Lankton, 2009]. In addition, biases affecting interpretation of e-health information for decisions can result from cognitive anchoring to specific items of remembered health information [Lau and Coiera, 2009]. Biases can also be affected by the opinions of peers [Lau and Coiera, 2008].

ESPHRs as a Basis for Consumer Health Decisions

Health policy research emphasizes the importance of consumer responsibility for health decisions, with PHRs assisting the consumer decision process [e.g., Halamka et al., 2008]. PHR-assisted decision-making by consumers is expected to provide many benefits, such as reducing healthcare costs by limiting routine information-sharing burdens on healthcare providers [Gerard et al., 2009]. Ideally, PHRs can function as a tool for shared decision-making [Kaelber et al., 2008], with consumers using PHRs to collaborate with health providers on decisions [Gerard et al., 2009]. Consumers are aware of the value of sharing health information with providers [Weitzman et al., 2009], and healthcare consumers show a willingness to use PHRs for active health management [Kahn et al., 2010]

Efforts to shift the locus of decision-making from healthcare provider to patient can be assisted by decision aids incorporated into PHRs, which can enable consumer health decisions. While over the long term PHRs are expected to provide a wide range of decision-making capabilities to consumers, PHR providers have been slow to develop advanced PHR features for such decision-making [Dixon et al., 2009]. For example, a 2007 study found that no PHR hosting organizations shared clinical notes recorded by practitioners that might facilitate patient participation in decisions [Reti et al., 2010].

In addition, many examples of consumer health decisions found in published research focus on short-term or immediate decision-making, whereas the long-term value of PHR-enabled consumer decisions on health strategies is unclear and requires further exploration. Satisfaction with a PHR or ESPHR system, taken alone, may not necessarily indicate that the system will guide health decisions and behaviors over the long term. In this study, the effectiveness of the ESPHR is reflected in users' intent to use an ESPHR for future health decisions. This explicit intent is seen as a key indicator of the potential effectiveness of the ESPHR for consumer health decisions and the health behaviors that result.

Although age, health status, and social environments can affect how health information affect health decisions, it is not clear how these effects apply to employed users of ESPHRs. While preconceptions about e-health information can influence its effect on subsequent health decisions [Lau and Coiera, 2009], preconceptions that affect the use of ESPHRs on decision making have not yet been identified. Overall, the potential influence of ESPHRs on employee health decisions is difficult to estimate. To explore the effects of ESPHRs on health decisions, P1 and P1A address confidence in the use of ESPHRs by employees for health decision making, along with its effect on satisfaction.

P1)   Users of ESPHRs will have high confidence in the use of the ESPHR system for making health decisions.

P1A) Confidence in the use of ESPHRs for decision making is positively associated with satisfaction with ESPHRs.

Privacy and Security

Views on information privacy and security may be important to employee confidence in ESPHRs, and several factors may influence such perceptions. As a general trend, privacy of Internet access and privacy of online health discussions have been shown to be determinants of online health information seeking [Anderson, 2004], and this is especially the case among the most active Internet users, particularly younger users [Skinner et al., 2003]. Although the Health Insurance Portability and Accountability Act (HIPAA) of 1996 gives individuals specific rights to information system privacy with respect to their medical records, the HIPAA privacy rule of 2000 applies to health plan systems, healthcare providers, but not employers [Hodge and Gostin, 2004]. At the time of this study, specific plans for extending HIPAA rules to PHR systems remained unclear [Department of Health and Human Services, 2009; Vesely, 2008].

In addition, widely publicized threats to e-health privacy may build negative perceptions of ESPHR privacy and security. Coverage of incidents of breakdown in the security of medical records appear regularly [e.g., Nowottny, 2008], including unauthorized access to medical records by medical providers [e.g., Rind et al., 1997], as well as outright loss or theft of health information held by insurers [e.g., State of Connecticut, 2009]. Firms that sponsor highly accessible online PHR systems may be viewed as unsafe with respect to information security, and perceived data security vulnerabilities may build user skepticism toward ESPHRs. The employment context adds the potential threat to health information security and privacy from managers or other employees. P2 explores the influence of perceived personal information privacy and security in the ESPHR context and its effects on decision making.

P2) Users of ESPHR will accord high importance to the perceived privacy and security of ESPHR data.

P2A) The perceived importance of ESPHR privacy and security is positively associated with confidence in the use of ESPHRs for decision making.

User Friendliness

Technophobia remains a barrier to consumer health information seeking, in spite of the widespread use of the Internet for other purposes, such as web surfing and use in ordinary work contexts [Fonseca et al., 2007]. Avoidance of computer-based medical record systems appears to be widespread and is not restricted to health consumers as end-users. Even medical providers may only be motivated to use medical record systems in cases of emergencies, and limited computer skills remain relatively common [Simon, 2007; Westbrook et al., 2004].

Although PHRs have fewer barriers to use than full medical record systems with complex clinical information [Tang et al., 2006], usage may differ for ESPHRs. For example, an ESPHR vendor study of employees identified considerable variation in frequency of use of an ESPHR [URAC, 2006; WebMD Health, 2004], and the extent to which ease of use affected this variation is unexplored. More generally, variations in perceptions of PHR technologies are seen in relation to health status, and generational differences may also apply [e.g., Hogan, 2009]. Expectations for user friendliness among ESPHR users may not reflect those of PHR users in the general population. In particular, potential associations between perceived user friendliness of ESPHRs and confident use of ESPHRs for health decisions may have useful implications for future research and practice. The relationship between ease of use and decision confidence is addressed in P3.

P3) The perceived user friendliness of ESPHRs is positively associated with confidence in the ESPHR for decision making.

Health Information Value

The perceived quality and value of information provided by a system can be a key factor in user acceptance and satisfaction. Information quality can be assessed in terms of attributes that include accuracy, consistency, and relevance [Jiang et al., 2002], as well as informativeness, quantitative adequacy, and interpretability [Wand and Wang, 1996]. In health record systems [Institute of Medicine, 2001], as well as health portals used by consumers [Nelson et al., 2004], perceived accuracy and credibility of health record system information are important to acceptance and satisfaction.

Despite the importance of information accuracy and completeness to the perceived quality of healthcare information systems, accuracy and completeness metrics are generally not found in the PHRs on which ESPHRs are based [Niland et al., 2006]. In addition, maintaining accurate, high quality information in an ESPHR is made more complex by the need for updating health information at appropriate intervals by the end user. A problem with standalone PHRs is the risk that patients will neglect the time-consuming task of personal health record maintenance [Tang et al., 2006]. While the best case for ESPHRs would be updated systems that include accurate user histories, some health data are inherently subjective [Tang et al., 2006], which can lead to uncertainties about record accuracy.

Ease of interpretation of PHR health information is an important influence on perceptions of PHR systems, and interpretability develops in a context of increasingly available health information from online and media sources. These trends suggest a need for evolving definitions for perceived sufficiency and accuracy of e-health information [Henwood, Wyatt, Hart, and Smith, 2003], as well as the need for assessment of perceptions of information quality in PHRs. The need for assessment is especially clear for ESPHRs, given the added complexities that may arise in the context of employer sponsorship. This study explores the association between perceived information quality of ESPHRs and confidence in the use of ESPHRs for decision making because of its implications for future research and practice. The relationship between information quality and decision confidence is addressed in P4.

> P4) The perceived information quality of ESPHRs is positively associated with confidence in the ESPHR for decision making.

III. STUDY CONTEXT

This study was conducted within a large, Fortune 500 firm in the U.S. The company had recently implemented an ESPHR system based on a model from a major third-party vendor and made it available, but not mandatory, for all of its employees at no cost to the employee. The ESPHR system offered standard features that allowed the employee to populate the ESPHR with information about past and present health conditions, medications, and health status for the employee and his/her family members. The system provided a set of online reports, updates, and reminders as requested by the employee. Other features included information searches of databases on medication, diseases, illnesses, wellness practices, and addiction programs. Employees were informed that they were evaluating an initial version of the ESPHR, and that future improvements to the ESPHR may incorporate their feedback. The human resources department of the company explained the intent of the employer was to be a "good corporate citizen" by providing new or additional benefits to employees.

Data

Data were collected in a single-stage, web-based survey using a secure, anonymous, online survey tool. Three hundred sixty-eight employees from a single corporate business unit at the firm were invited to participate in an anonymous, online survey that included questions on attitudes toward the ESPHR in the areas addressed by P1-4, as well as open-ended questions to capture expectations, concerns, and use in emergencies (Appendix B). Questions regarding user expectations were adapted from Szajna, et al. [1993], and questions regarding user satisfaction were adapted from Doll et al. [1988]. All questions were reviewed for face validity. Four summated scale variables were created from a total of nine questionnaire items to represent the attitudes defined in P1-4. Internal consistency was evaluated, with each scale meeting the suggested Cronbach's α criterion of 0.70 [Nunnally and Bernstein, 1994], as shown in Table 1.

Table 1: Variables			
Indicator items	**Variable**	**α**	**N**
5,6,7 (P1,1A)	Decision Confidence (confidence in health decisions using system)	0.794	132
8,9 (P2,2A)	Privacy and Security (perceived privacy and security of system)	0.695	132
3,4 (P3)	User Friendliness (perceived ease of use)	0.993	132
1,2 (P4)	System Information Value (perceived quality of system reports)	0.918	132
10 (P1A)	Future Satisfaction with System	n/a	132

Participants were offered the option to disclose their contact information at the end of the survey if they desired to participate in focus group discussions to be held at a later time.

IV. RESULTS

Participants

Of the 368 invitees, 132 valid and complete responses were received, giving a response rate of 35 percent. Respondents were 59 percent male and 41 percent female; 36 percent were managers and 64 percent were non-managers. The demographic profile of the sample is shown in Table 2.

Table 2: Demographics of Respondents				
Employee	Male	Female	Total	Percent
Manager	28	20	48	36.36
Non-Manager	50	34	84	63.64
Total	78	54	132	100
Percent	59.09	40.91	100	

Results for P1-4

Analysis procedures selected with the Andrews method [Andrews et al., 1981, p. 3–30; Andrews et al., 1998] were the Chi-square goodness-of-fit test with hypothesized proportions of 0.50 for P1 and P2, and ANOVA for P1a, P2a, P3, and P4. In addition to use of scaled data items in their original form where needed, factor items were dichotomized to low and high case levels, with removal of cases in the central, neutral position at scale position 4. The resulting number of combined case level responses for the dichotomized prediction factor items ranged from 96 to 127. Results of the test procedures supported P1a, P2, and P2a. P3 and P4 were not supported, and while P1 was not supported at a 0.05 alpha level, it may be considered a borderline case. These results are shown in Table 3.

Table 3: Summarized Results			
Proposition	Test	Results	Interpretation
P1) Users of ESPHRs will have high confidence in the use of the ESPHR system for making health decisions.	Chi-sq GoF	χ^2 (1, N = 127) = 3.47, P = 0.062	Not Supported
P1A) Confidence in the use of ESPHRs for decision making is positively associated with satisfaction with ESPHRs.	ANOVA	M DecConf = 2.49, 5.27; F(1,126) = 262.01, P <0.001; (Tukey's method CI = 2.43-3.11, FE rate = 0.05)	Supported
P2) Users of ESPHR will accord high importance to the perceived privacy and security of ESPHR data.	Chi-sq GoF	χ^2 (1, N = 110) = 83.78, P <0.001	Supported
P2A) The perceived importance of ESPHR privacy and security is positively associated with confidence in the use of ESPHRs for decision making.	ANOVA	M DecConf = 1.47, 4.41; F(1,109) = 41.07, P <0.001; (Tukey's method CI = 2.05-3.90, FE rate = 0.05)	Supported
P3) The perceived user friendliness of ESPHRs is positively associated with confidence in the ESPHR for decision making.	ANOVA	M DecConf = 3.97, 4.16; F(1,95) = 0.36, P = 0.55	Not Supported
P4) The perceived information quality of ESPHRs is positively associated with confidence in the ESPHR for decision making.	ANOVA	M DecConf = 3.65, 4.07; F(1,115) = 2.10, P = 0.15	Not Supported

V. DISCUSSION

As employers grapple with the decision to extend PHRs to employees as part of an added corporate benefit, many complex considerations arise. While ESPHR systems may be intended to assist employees in managing and keeping track of their health information, employers face potential obstacles in employee usage of the system due to user concerns and unmet expectations concerning the privacy and use of their information. A principal finding of this study was that employees consider the privacy and security of their personal health data in the ESPHR to be very important and a topic of considerable concern. Issues of ESPHR information security were also a dominant theme in the open-ended responses. A recurring message in the open-ended responses was that a significant proportion of employees want to maintain a comfortable distance between their health information and their employer. Many comments specifically identified the employer as a source of threat to personal information security in the ESPHR. Open-ended questions (Appendix B) explored three broad areas intended to capture major issues not covered in the survey items. Questions addressed concerns (34 responses), expectations (43 responses), and use of the ESPHR in emergencies (82 responses), and provided a variety of insights into perceptions of ESPHRs and motivations to use or avoid them. Questions about concerns and expectations provided a means for respondents to expand and

complement responses in the scaled survey items. Questions about emergencies addressed a topic that may be one of the most important motivators for recording electronic health information [ONC, 2006]

Concerns

When asked about their concerns with the ESPHR system, 22 percent of the respondents described concerns about the employer and other employees who might gain access to their personal health information. These responses included, for example:

I'm afraid of the risk to allowing 3rd party to access my information….. Not sure I trust having my employer and others with access to my health information….. Thanks, but no thanks…. Too many eyes on my records…. Wonder why my employer all of a sudden wants to help me keep track of my health information.

Many of these employee participant responses discussed the need to guard personal information from the employer and other employees.

Approximately 34 percent of the respondents were also concerned with the privacy and security of their information, but in a more general sense. Comments included:

Is my health information behind the firewall?… Who else inside or outside the company can see my personal information?… I'm not sure how private or secure my information will be and for how long.

Approximately 8 percent of the respondents expressed concerns about the challenges associated with consistently updating their records to ensure the accuracy and completeness of their health information, with comments such as:

How do I know that the data from the system is correct? … Who updates the data? What credentials do they have?

Approximately 36 percent of the respondents expressed no concerns with ESPHR privacy.

Expectations

Although slightly over half of respondents reported no expectations about the ESPHR, the remaining responses described expectations that personal information would be kept private and secure, accurate and up to date, and that there would be a high level of usability, or user friendliness, of the PHR. Responses included:

My health information needs to be private and out of the (sight) of others….. A secure environment for my information is expected….. In a big company like this, I want my health information in a secure and private location….. Privacy and security are my #1 expectation.

Approximately 14 percent of the respondents expected the ESPHR to have accurate and up to date information. For example:

A lag in updating medical definitions would not be a good thing…. Medicine (i.e. sulfa, benzocaine) usage information will need to be accurate and dependable.

Medical Emergencies

In response to questions about using the ESPHR in a time of medical emergency, almost half of the respondents reported that they were not sure. However, 27 percent of respondents indicated that they would use the ESPHR in the time of emergency, mainly for the purpose of providing accurate information to emergency responders. Comments included:

I want to have accurate information available in case of an emergency….. Information is available if I can't speak for myself….. In a car accident, I would use my GPS system, so having a PHR connected would be useful also….. I would use a PHR to gather information on the type of poison and suggestions to counteract the poison….. I used it to look up how to stop bleeding….. Hurricane Katrina, families could have used a PHR to get prescriptions filled….. It is not helpful to hold back important information from people that are trying to help you.

Others appeared reluctant to use an ESPHR in the time of a medical emergency because, for example:

It is faster to speak with someone….. The system may not be available. I (may) need to speak with someone….. I can't rely on a computer system or the Internet….. What if the Internet is down or connectivity is bad? I'm up a creek! ... I don't want the emergency personnel fumbling around trying to figure out how to use the system or figuring out my password.

Several themes emerged from the open-ended responses. First, among many respondents, there was a lack of trust in the employer and other employees who might gain access to personal health information. Second, results showed a lack of confidence that the PHR could prove useful in the event of a healthcare visit, particularly in the case of an emergency. Many found an insufficient or unsatisfactory level of communication by the employer about the information sharing rules of employee–employer engagement with the PHR. Finally many employees expressed a lack of understanding about the role of the employer versus the role of the PHR vendor in the PHR relationship—which was which?

These responses indicate that the ESPHR may be a valuable place to have health information stored for use in the time of an emergency, provided that user concerns are addressed. For employers, this may be an unexpected, but highly promising, application for the ESPHR in the workplace. Future improvements to the ESPHR should include additional features to address the issues raised by employees in this study.

Another finding of this study is that use of the ESPHR for health decisions is an important concept worthy of further research. The results show a strong association between the ability to use the ESPHR for health decisions and expected future satisfaction, as well as a possible importance for ESPHR-based decision making considered in isolation. It is important to note that these responses were given in evaluation of what was understood to be an initial version of the ESPHR, and that employee feedback would be considered in expected future revisions of the ESPHR. The perceived credibility of subsequent versions of the ESPHR may affect its influence on health decision making.

Two proposed relationships were unsupported. Neither ease of use of the ESPHR nor the perceived quality of data and information contained in the system were associated with a confident ability to make health decisions. It may simply be that the relatively highly educated and presumably tech-savvy employee population in this study is less susceptible to concerns in these areas, or it may be that the quality of the prototype ESPHR was sufficient to satisfy the participants. However, the employees in this study may not be representative of employees in other types of firms or in other geographic areas. More research is needed to build an understanding of perceptions among diverse groups.

Open-ended responses indicate that employees have a variety of expectations and concerns about the applications of information stored in the ESPHR system. In particular, some users were skeptical that the system would be useful in the case of emergencies. The lack of a relationship between ESPHR information and expected decisions may be an additional sign of this perception. Employee comments also suggested that significant employee demand for the ESPHR system did not exist prior to or during implementation. Rather, the employer appeared to have assumed that employees would adopt and appreciate using the ESPHR system without being consulted.

The focus of many prior PHR studies has been on several factors, including the effects on PHR use of a wide range of behavioral influences outside of employment contexts, as well as system design considerations and improving overall effectiveness [e.g., Forti et al., 2009; Gellman, 2008; Hassol et al., 2004; Kaelber et al., 2008]. Research in technology acceptance demonstrates the importance of an employer–employee partnership when introducing and implementing new information technology. The same may be true when implementing ESPHRs, even if the technology is being offered at no cost to the employee, with the most ethical of employer intentions. In the case of the ESPHR in this study, employees were not consulted to get an understanding of the requirements for an ESPHR or the need or desire for an ESPHR in the workplace. Including employees in future ESPHR design projects can yield many benefits. When end-user needs are well understood, organizations often see increased acceptance and diffusion of technology, greater levels of satisfaction, and systems that are better aligned with organizational needs [Katz and Kahn, 1978; Robson, 1997; Zinatelli et al., 1996]. These issues may gain added importance as more major software vendors introduce health records that can be linked to organizational sponsors, including ESPHRs [Swartz, 2008].

VI. FUTURE RESEARCH

This exploratory study of ESPHRs in a large, high-technology firm produced potentially useful findings not fully addressed in prior research literature. The primary insights of this study suggest that at least two factors may affect employee acceptance of ESPHRs in the unique and complex context of the employer-employee environment. The following model incorporates the findings of this study and is proposed as a basis for further evaluation of the use of ESPHRs.
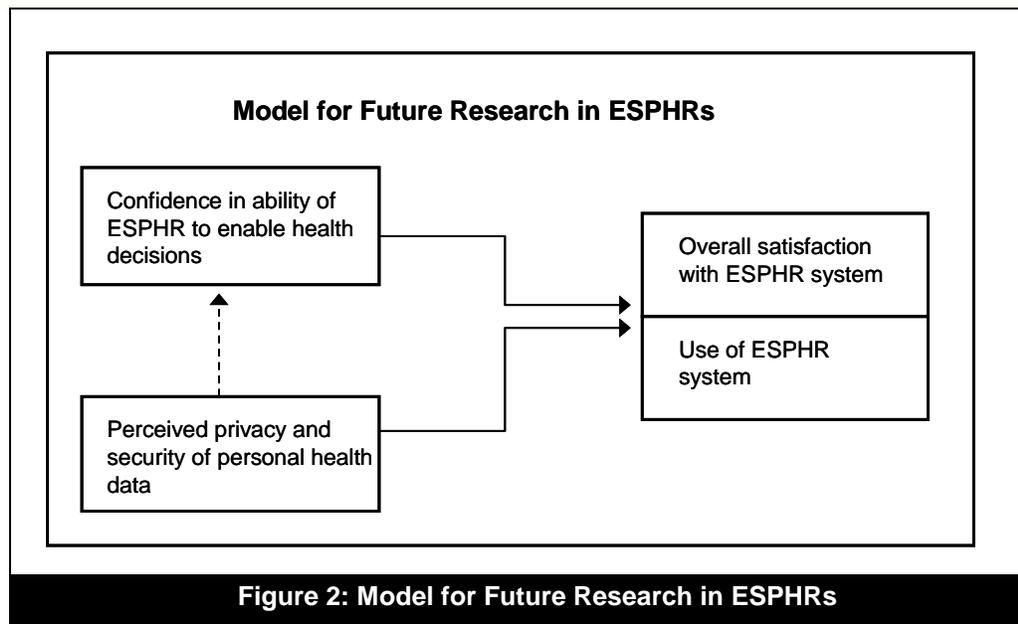
Figure 2: Model for Future Research in ESPHRs

To strengthen the usefulness of this line of research, future studies should also consider how the attitudinal and intention factors in this study evolve over time as a result of changing healthcare context and evolving ESPHR technology. In addition, future research should examine how these relationships differ across firms in different types and sizes of industries, and across a variety of employee demographic groups. Acceptance and diffusion of an ESPHR should be examined across end-users in environments where employees were first engaged in the design and control plan for the system, as well. In such a scenario, the diffusion of the ESPHR technology across the organization may be better realized, more appreciated, and could lead to usage paralleling that of other workplace technologies [Galvin and Delbanco, 2006]. In today's corporate workplace, the employer is expected to partner with the employee to build a trusting environment [Drucker, 2002]. Employers who acknowledge the need for this type of partnership may realize greater returns as their employees embrace and use the ESPHR to manage their health and wellness.

The ESPHR will continue to evolve, with influences including health privacy regulations, improvements in ESPHR accessibility through handheld devices, and new product offerings from ESPHR providers. These changes should be considered in any future studies on ESPHR implementation and use.

VII. LIMITATIONS

This study has limitations that affect the generalizability of the results. The sampled target firm is a large, high-technology company in which approximately 70 percent of employees have at least a bachelor's degree. Most earn a relatively high income and are computer literate. This profile may not be representative of employees in firms in other industries or other geographic areas. In addition, since participation was optional, a level of self-selection took place in the decision to respond to the survey. Additional data from a number of firms in different industries will be needed to fully address the limitations of the single firm data source used in this study.

VIII. CONCLUSION

This exploratory study added to the existing literature by investigating some of the factors affecting the acceptance, use, and employee attitudes toward ESPHRs provided by an employer. Future research should seek to confirm the importance of ESPHR information privacy and use of the ESPHR for decisions, along with other issues. On the practical side, findings from this study can help guide employers and system designers in the efforts to implement ESPHR systems and to understand which areas may affect employee attitudes about such systems. Appropriate employee education, along with explanation of system capabilities and security features may assist employees in making the decision to participate fully in the use of an ESPHR.

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Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the article on the Web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.
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APPENDIX A: SEARCH PARAMETERS FOR PRIOR RESEARCH IN ESPHRS

The following sources were searched (8/2009) for academic research literature addressing employer-sponsored PHRs using the search terms "Personal Health Record" and "Employer," along with their typical variants: ABI Inform Global Database, Academic Search Premier (covers more than 3,600 academic journals), ACM Digital Library (all journals, magazines and published transactions of the Association of Computing Machinery). In addition, several journals that regularly publish in related areas were specifically searched: American Journal of Public Health, Health Affairs, International Journal of Healthcare Technology & Management, Information Management Journal, Family Practice Management, The Healthcare Manager, and Occupational Health.

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APPENDIX B: SURVEY QUESTIONS

Table 4: Survey Questions		
Question Number	**Question Text**	**Response item**
Q1 ProvRpts ExcNeed	Does the system provide reports that seem to be just about exactly what you need?	7-point Likert-type, balanced, Extremely Dissatisfied-Extremely Satisfied
Q2 ProvSuffInfo	Does the system provide sufficient information?	7-point Likert-type, balanced, Extremely Dissatisfied-Extremely Satisfied
Q3 SysUsrFrndly	Is the system user friendly?	7-point Likert-type, balanced, Extremely Dissatisfied-Extremely Satisfied
Q4 SysEasyUse	Is the system easy to use?	7-point Likert-type, balanced, Extremely Dissatisfied-Extremely Satisfied
Q5 LklyHlpGdDec	How likely is it that the Personal Health Record system will enable you to make a good decision?	7-point Likert-type, balanced, Extremely Unlikely-Extremely Likely
Q6 LklyMkDecQkly	How likely is it that, by using this system, you will be able to make decisions quickly?	7-point Likert-type, balanced, Extremely Unlikely-Extremely Likely
Q7 LklyConf DecUseSys	How likely is it that you will be very confident in the decisions you make using this system?	7-point Likert-type, balanced, Extremely Unlikely-Extremely Likely
Q8 CncrnPrivInfo	When inputting personal information, I was concerned with the privacy of my information.	7-point Likert-type, balanced, Strongly Disagree-Strongly Agree
Q9 CncrnScrtyDat	When inputting personal information, I was concerned with the security of the data.	7-point Likert-type, balanced, Strongly Disagree-Strongly Agree
Q10 Future Satisfaction	How likely is it that you will be very satisfied with the system?	7-point Likert-type, balanced, Extremely Unlikely-Extremely Likely
Q11 Concerns Open Ended	What are your concerns with the system (if any)?	Open-ended
Q12 Expectations Open Ended	What were your expectations prior to using the system?	Open-ended
Q13 Emergency Open Ended	Would you use the (system) in a time of medical emergency? Why or why not?	Open-ended

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