

Determining Factors of Organizational Readiness for Technology Adoption in Long-Term Care Facilities

Phase 2 Preliminary Report:
Focus Group Survey Results

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Barbara Cherry, DNSc, R.N., M.B.A.
Donna Owen, R.N., PhD
Brad Bachetti, B.A.

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EXECUTIVE SUMMARY

Background. The United States (U.S.) healthcare system is moving towards the widespread use of healthcare information technology (IT) to improve the efficiency, effectiveness and safety of healthcare. The literature overwhelmingly supports the idea that IT and electronic health records (EHR) hold tremendous value for the healthcare system. The long-term care (LTC) industry lags far behind other healthcare settings in EHR adoption yet there is strong support that EHRs hold the potential to significantly improve the quality of care for nursing home residents. While there is extensive research about the impact of EHRs in acute care and physician practice settings, there is limited research related to EHRs in LTC. Therefore, the purpose of this study was to identify factors that hinder and factors that facilitate implementation of EHRs in LTC facilities.

Methods. The study utilized a qualitative research design with a focus group methodology.

Focus groups were conducted via conference calls with LTC directors of nursing, facility administrators, and corporate executives/owners for both EHR user and non-user facilities. A semi-structured interview guide was used to direct the conference call discussion. Results. The primary barriers identified by participants were costs, training, implementation processes, and compatibility with existing systems. The primary facilitators were evidence that EHRs will improve efficiency and effectiveness of care, government assistance with implementation costs, comprehensive implementation plans, and strong support from the state for EHRs in general and EHR certification processes in particular. Conclusion: This study has provided insight into the issues that hinder and facilitate EHR adoption in LTC facilities and offers a framework for action for health policy makers, LTC industry leaders, and researchers.

BACKGROUND

The United States (U.S.) healthcare system is moving towards the widespread use of information technology (IT) to improve the efficiency, effectiveness and safety of care provided in healthcare facilities across the nation. In support of IT at the national level, the United States (U.S.) Department of Health and Human Services (HHS) has established the Office of the National Coordinator for Health Information Technology for the purpose of encouraging and facilitating the widespread use of modern IT. This national effort is in response to the growing recognition that a stronger IT infrastructure is integral to improving the safety, quality and efficiency of healthcare (Bates & Gawande, 2003; Institute of Medicine [IOM], 2003). The electronic health record (EHR) is an essential component of this IT infrastructure.

Studies in acute care and physician practice settings provide evidence that EHRs contribute to reduced adverse drug events (Hillestad et al., 2005); improved quality of documentation (HIMSS, 2003; Smith, Smith, Krugman, & Oman, 2005; Smith, 2003); reduced hospital lengths-of-stay (Hillestad et al., 2005); improved efficiency in time to complete nurses' documentation (Pizziferri et al., 2005; Poissant, Pereira, Tamblyn, & Kawasumi, 2005); increased capture of allowed billable expenses (HIMSS, 2003; Keshavjee, Troyan, Holbrook, & VanderMolen, 2001; Schmitt & Wofford, 2002; Soper, 2002; Wang et al., 2003); decreased chart pulls and lower transcription costs (Keshavjee et al. 2001; Miller & Sim, 2004; Smith, 2003; Wang et al., 2003; Schmitt & Wofford, 2002; Soper, 2002); more efficient use of nurses' administrative time (Deese & Stein, 2004; Hillestad et al., 2005); instant availability of charts (HIMSS, 2003; Smith, 2003; Laing, 2002; Keshavjee et al., 2001); improved communication among clinicians (Turpin, 2005); and elimination of physical storage space (Laing, 2002; Soper, 2002). A group from the Center for Information Technology Leadership at Harvard University developed a financial model which projected that a completely standardized, nationwide electronic health care information exchange and interoperability system could yield the U.S. healthcare system a net value of \$77.8 billion annually after a 10 year period (Walker et al., 2005).

The healthcare settings most active in EHR adoption initiatives are hospitals and physician practices. It is currently estimated that between 20% and 30% of U.S. hospitals and 12% of physician practices have adopted EHRs with adoption rates growing annually for both

settings (Fonkych & Taylor, 2005). There were no estimates available for EHR adoption rates in long-term care (LTC) settings. It appears that the movement towards EHR adoption in LTC lags far behind acute and primary care settings.

Despite the minimal use of EHRs in LTC, there is strong support that such systems hold the potential to significantly improve the quality of care for nursing home residents (Dyck, 2002; IOM, 2001; 2003; 2004; Report to Congress, 2003). The professional organizations that support LTC providers agreed that developing and implementing EHRs is a top priority for the LTC industry (American Association of Homes and Services for the Aged, 2005; American Health Care Association, 2005; American Medical Directors Association, 2005).

Further, the American Health Information Management Association (AHIMA) (2005) suggests that LTC organizations, vendors, and government agencies increase their interest and awareness of healthcare IT issues and become involved in the national agenda to advance IT and EHRs. However, there is very limited research specifically related to EHRs in LTC to guide the industry in advancing this IT agenda. An area of research yet to be reported is related to factors that can impact EHR adoption in LTC facilities. Therefore, determining the barriers and facilitators to EHR implementation in LTC facilities is the first step to advancing their use in LTC.

PURPOSE AND METHODOLOGY

The purpose of this study was to identify factors that hinder and factors that facilitate implementation of EHRs in LTC facilities. The results of the study will provide policy makers and LTC leaders with information to develop strategies to support and promote the diffusion of EHRs in LTC with the ultimate goal of improving resident care.

Definitions

The definitions necessary to clarify the study are “electronic health record,” “long-term care,” “barriers,” and “facilitators.” The conceptual definitions and operational definitions for these terms follow.

Electronic health record (EHR). The use of the term EHR for this study deserves explanation prior to presenting its conceptual and operational definitions. A wide variety of terms are used in the medical and health informatics literature to refer to various types of

electronic health information management systems. Some of the more common terms are electronic health records (EHR), electronic medical records (EMR), electronic patient record (EPR), and computerized patient record (CPR). Depending on the usage, these terms can connote a simple system to record patient encounters or an entire healthcare information management system with a full range of dynamic functions like decision support, order entry and interoperability with other systems. Experts in health informatics “have variously defined electronic health record systems . . . however, some of the terms used refer only to the patient record itself, whereas others include the entire system that supports the delivery of high-quality, integrated patient care across multiple providers” (Bower, 2005, p. 9).

In an attempt to identify the most often used terminology in the marketplace, the authors reviewed 44 websites of commercially available electronic health information management systems and found that 73% used EMR (electronic medical record) to describe their products and 20% used EHR (electronic health record). Cerner Corporation, one of the largest providers of electronic health information management systems in the U.S., uses the term EPR (electronic patient record) to refer to its products. General Electric, another one of the largest providers of health information systems in the U.S., uses the term EMR. Achieve Healthcare Technologies, specializing in information management systems for the LTC industry, uses the term EHR.

The IOM (2003) uses the term EHR (electronic health record) to describe the ideal health information management system necessary to achieve improved safety, quality and efficiencies. Because of the inconsistent use of the terms elsewhere in the literature and the comprehensive definition provided by the IOM, EHR will be used for the purposes of this study.

The EHR is conceptually and operationally defined for this study as the non-redundant, longitudinal electronic health information maintained by providers (e.g., hospitals, nursing homes, ambulatory settings) pertaining to the health of an individual and/or to the health care provided to that individual; the EHR provides functions for results management (e.g., diagnostic test results), order entry and management, decision support, administrative processes, quality improvement, and population health management (IOM, 2003). Additionally, the EHR serves as a replacement for the paper medical record as the primary source of information and documentation for health care, meeting all clinical, legal and administrative requirements (Nicolli, 2005).

Long-term care (LTC). LTC is conceptually defined as an “array of health care, personal care, and social service generally provided over a sustained period of time to persons with chronic conditions and with functional limitations....long-term care is generally distinguished from acute and primary care because of its greater emphasis on personal care and social services” (IOM, 2001, p. 27). LTC for the purposes of this study is operationally defined as care provided in a licensed nursing facility that offers 24-hour nursing supervision and a range of a comprehensive medical, personal, and social services developed and coordinated to meet the physical, social, and emotional needs of chronically ill or disabled individuals. Individuals who are admitted to a LTC facility generally reside in the facility for several months to several years and are referred to as “residents” of the facility; the LTC facility becomes their permanent home and they most often live out their remaining life span in the facility.

Barrier. Barrier is conceptually defined as something material that blocks or impedes progress or achievement (Merriam-Webster, 2005). For the purpose of this study, barrier is operationally defined as something that impedes the ability of organizations to implement or adopt EHRs.

Facilitator. Facilitator is conceptually defined as something that makes progress or achievement easier or helps bring about results (Merriam-Webster, 2005). For the purpose of this study, facilitator is operationally defined as something that helps to bring about successful implementation or adoption of EHRs.

Assumptions

1. Implementation of EHRs in LTC facilities will improve clinical, financial and/or human resource outcomes for the facilities.
2. Professionals who work in LTC facilities including nurses, physicians, healthcare administrators, and LTC corporate executives will have some general knowledge about EHRs.
3. Information reported in the literature about EHRs in healthcare in general will be applicable to LTC settings.

Study Design

The study utilized a qualitative descriptive design with a focus-group methodology. Focus groups serve as a valid qualitative research methodology by (a) helping to identify a range of ideas, feelings or perceptions that people have about a topic; and (b) allowing ideas to emerge from the group rather than be driven by the investigator (Burns & Grove, 2005; Krueger & Casey, 2000). Because the literature review has given us extensive information about barriers and facilitators to EHR adoption in hospital and physician practice settings, the focus groups served to elicit new information about such barriers and facilitators in LTC settings as well as to compare and contrast information from the literature. Institutional Review Board (IRB) approval was obtained from Texas Tech University Health Sciences Center prior to initiation of the study.

Instruments

Two instruments were used to conduct this study. The first instrument is a demographic data collection worksheet on which focus group participants recorded demographic data (included in Appendix A). The second instrument is a semi-structured interview guide designed specifically for use in conducting the focus groups (included in Appendix B)

Participants

The population for the study consisted of directors of nursing (DON), administrators, and corporate executives/owners who were employed by companies that own and operate LTC facilities. An IRB-approved flyer describing the research study was used to recruit participants. The flyer, directed to the attention of DONs, administrators, and corporate executives/owners was faxed and mailed to 600 facilities using facility names and addresses from the Texas Department of Aging and Disability Services Directory of Licensed Nursing Facilities. The facility directory consisted of approximately 1200 facilities; every other facility in the directory was selected for a total of approximately 600 facilities.

Facilities that use EHRs were specifically targeted for participant recruitment. EHR user facilities were identified by searching the websites of vendors who offer EHR products specific for LTC. Three user facilities were identified in Texas and recruitment flyers were mailed and faxed to these facilities.

The initial mailing and fax resulted in only two individuals responding; thus, approval for a follow-up letter was obtained from the IRB. The follow-up letter, accompanied by the original flyer, was resent to approximate 600 facilities via mail and fax. Eleven individuals responded to the second contact for a total of 13 participants. All 13 individuals met the inclusion criteria of having a minimum of 1 year experience in LTC and being in the position of DON, administrator, or corporate executive/owner. Two of the participants were from facilities that use EHRs while 11 were from facilities that do not use EHRs. All participants were employed by facilities in Texas.

Individuals who contacted the investigator and agreed to participate were mailed a packet that contained a letter providing details about the conference call, the statement of research (in lieu of informed consent as approved by the IRB), the list of focus group questions, and the demographic data sheet with a stamped, addressed envelop to facilitate return. Table 1 provides summary information about participants. Participants were scheduled for focus-group conference calls based on times that were convenient for the participant. Focus groups consisted of two to three participants per group.

Table 1: Summary Information about Focus Group Participants

Participant Position	EHR Users	EHR Non-users
Director of Nursing	0	3
Administrator	2	3
Corporate Executive/Owner	0	5
Total Participants	2	11
	Average (n = 7)	Range
Time in current position – combined groups (data from 7 returned demographic data sheets)	5.8 years	1 – 16 years
Time in long-term care – combined groups (data from 7 returned demographic data sheets)	11.7 years	3.5 – 27 years
Average number of beds per facility – combined groups	157	70 – 341

Data Collection and Analysis

Focus groups were conducted via telephone conference call and facilitated by the principal investigator using the semi-structured interview guide. Focus groups via telephone offer the advantage of allowing participants across distant locations to participate without the time commitment or expense of travel to a central location (Krueger and Casey, 2000). The interview guide was structured in such a way that ideas would emerge from the group and were not driven by the investigator's knowledge of barriers and facilitators.

Focus groups were categorized by (a) users: participants from LTC facilities that currently use EHRs and have used them for a minimum of six months, or (b) non-users: participants from LTC facilities that do not use EHRs. All conference call dialog was hand-recorded on paper and tape-recorded in duplicate. Tape recordings were transcribed verbatim within 14 days and transcriptions were compared against tape recordings and hand-recordings to verify accuracy and completeness of data.

Focus group data was analyzed using the following qualitative method: identify and organize themes and patterns; identify the frequency of occurrence of themes and patterns; identify any connections; compare themes and patterns to data gathered from the literature review; and finally, interpret the data to answer the research question (University of Texas at Austin, 2005). Themes, patterns and frequencies were identified separately for the nonuser and user groups and then comparisons were made between the two groups. Themes or patterns that corroborate or contradict information gleaned from the literature were noted.

STUDY RESULTS

Common themes for both non-user and user groups emerged directly related to the key research questions: (a) aspects of resident care affected by EHR use; (b) barriers or challenges to implementation; (c) factors to promote implementation; (d) information necessary for EHRs to be of benefit; (e) tasks the EHR should perform to be of benefit; (f) top three challenges to EHR implementation; and (g) top three facilitators to EHR implementation. Patterns within each major theme were categorized by the investigator with a summary table provided in Appendix C.

Aspects of Resident Care Affected by EHR Use

Participants in the non-user group largely agreed that more efficient documentation would be realized; also the quality of documentation would improve resulting in evidence of higher levels of care followed by higher reimbursement levels. Other aspects of resident care identified by non-user participants included easier access to charts and medical information, improved quality-of-care outcomes because staff would spend less time in documentation tasks and more time in resident care, and improved staff retention because of a sense of pride and empowerment associated with using computers in the work setting.

Similar to the non-user group, participants in the user group also identified more efficient documentation, easier access to charts and medical information, and improved quality of documentation with associated higher levels of reimbursement. A new theme identified by the user group was that supervisors were able to more easily monitor documentation of resident care activities and thus more quickly identify and address quality of care issues, regulatory compliance issues, or staff education needs.

Findings in the literature related to hospital and physician practice settings are consistent with those themes affecting resident care identified by both non-user and user participants. Studies support that the use of EHR systems result in improved efficiency in time to complete nurses' documentation (Pizziferri et al., 2005; Poissant, Pereira, Tamblyn, & Kawasumi, 2005); improved quality and completeness of documentation (HIMSS, 2003; Smith, Smith, Krugman, & Oman, 2005; Smith, 2003); increased capture of allowed billable expenses (HIMSS, 2003; Keshavjee, Troyan, Holbrook, & VanderMolen, 2001; Schmitt & Wofford, 2002; Soper, 2002; Wang et al., 2003); and instant availability of charts (HIMSS, 2003; Smith, 2003; Laing, 2002; Keshavjee et al., 2001). The use of EHRs has also been strongly associated with increased patient safety and reduction of adverse drug events (IOM, 2003; Hillestad et al., 2005) yet participants in neither the user nor the non-user groups identified these as potential areas affected by EHR use.

Barriers or Challenges to EHR Implementation

The number one barrier to EHR implementation identified by both the non-user and user groups was cost. This finding is consistent with numerous studies and reports that identify implementation costs as the number one barrier to EHR adoption (Anderson, 2004; Ash et al.,

2003; Bates & Gawande, 2003; Ford, Menachemi, & Phillips, 2005; Hillestad et al., 2005; HIMSS, 2004; Medical Records Institute, 2005; Miller & Sim, 2004; Valdes et al., 2004).

A second barrier identified by both non-user and user groups was adequately training staff to use the EHR system. One user participant discussed the problem of “mislearning” in which staff, even after training, developed methods of entering data that were not in line with correct system protocols. Non-users were also concerned about training part-time or temporary staff to use complex EHR systems. Closely related to training, both groups identified challenges which the investigator categorized as human factors and included issues such as unfamiliarity with computers, fear of computers, and resistance to change.

Another major challenge suggested by the non-user group was the process of implementation, which included choosing the right system, finding systems that were non-complex and user-friendly, and converting from paper to electronic data. Likewise, the user group identified the conversion of the paper chart to electronic data as a challenge. Both groups discussed challenges with the state survey process including general acceptance of EHRs with new standards such as electronic signatures and preparation of surveyors to conduct facility inspections using computers instead of paper. Both groups also identified compatibility of EHR systems with other systems within the facility as a challenge. Examples of electronic systems currently present in facilities included corporate accounting systems and systems used by contracted providers such as therapy services. Finally, a small group of non-users discussed challenges related to back-up systems to ensure the integrity of the data, HIPPA compliance, and confidentiality and privacy of records.

With the exception of cost as the number one barrier identified in this study, studies from hospital and physician practice settings provide a slightly different perspective on other major barriers and challenges to EHR implementation. Following costs, clinician acceptance of EHRs along with perceived disruption of clinical workflow and increased time for physicians to complete documentation were identified as major barriers (Ash & Bates, 2005; Chambliss, Rasco, Clark, & Gardner, 2001; Ford et al., 2005; Hillestad et al., 2005; Waegemann, 2002; Wang et al., 2003; Sprague, 2004; Miller & Sim, 2004; Poissant et al., 2005). A second major barrier was lack of documentation standards and insufficient methods for data coding, collection, storage and retrieval (Bates & Gawande, 2003; Dougherty, 2005; Hillestad et al., 2005; Middleton, Hammond, Brennan, & Cooper, 2005; Brookstone, 2004; Abbott, 2003).

Interoperability among systems with the ability to extract multi-site relevant data and share information among clinicians across organizations is also widely recognized as a major challenge to gain the full benefit of technology in healthcare (Brookstone, 2004; Dougherty, 2005; IOM, 2003; Waagemann, 2002; Walker et al., 2005). While participants in both groups discuss interoperability of different systems used within a facility, only one participant mentioned the issue of interoperability across healthcare organizations.

Other barriers identified in the literature that are consistent with findings from this study include training concerns (Brookstone, 2004); complex systems that are difficult to navigate either because of hardware or software problems (Smith et al., 2005; Chambliss et al., 2001; Poissant et al., 2005); maintaining HIPAA compliance with confidentiality, privacy and safety of records (Bates & Gawande, 2003; Hillestad et al., 2005; HIMSS, 2004; Soper, 2002; Valdes et al., 2004; Waagemann, 2002); and difficult implementation processes (Ash et al., 2003). One report suggests that the lack of EHR experts specializing in LTC is a barrier for advancing EHRs in LTC (Dougherty, 2005).

Factors to Promote EHR Implementation

Participants in both user and non-user groups suggested that strong implementation planning was a primary facilitator for EHR implementation. For the non-user group, implementation planning included system selection, staged implementation processes, learning from facilities that have implemented EHR systems, and gaining staff buy-in early in the process. Non-users also suggested that the state should establish basic system requirements for EHRs to aid facilities in system selection. Users suggested that vendor support for implementation planning and staff training along with staff buy-in early in the process are essential.

The importance of comprehensive planning prior to implementation was also frequently cited in the literature. Planning steps included setting realistic goals and expectations (Ash et al., 2003; Smith, 2003); involving users early in the planning process (McLane, 2005; Schmitt & Wofford; Smith, 2003; 2002; Souther, 2001); determining how current workflows will be redefined with EHRs (Ammenwerth, Mansmann, Iller, & Eichstadter, 2003; Ash et al., 2003; Deese & Stein, 2004; Poissant et al., 2005); and entering historical data into the system (Smith, 2003).

Another important facilitator suggested by both non-user and user groups was government assistance to cover implementation costs. A variety of payment mechanisms were suggested including temporary rate increases, grants or one-time payments for infrastructure and hardware costs, or reimbursement incentives. Experts also agree that some form of government incentives will be required to move EHR adoption forward (Giroi, Meili, & Schville, 2005; Middleton et al. 2005; Taylor et al., 2005).

Another important facilitator for non-user groups was strong vendor support to provide easy-to-use, high quality EHR products, initial and follow-up training, and 24-hour availability for technical problems. The literature also supports the notion that initial training with live help “at the elbow” during implementation is critically important (Ash et al., 2003) as is on-going support through such strategies as "super users" who serve as resources for other users (Laing, 2002).

The user group participants also suggested that raising awareness among providers about the benefits of EHRs including quality of care and financial outcomes would serve as an important facilitator. This issue of awareness among providers ties directly to studies and case reports that have identified strong leadership and support from clinical leaders as the major facilitator to EHR adoption (Ash et al., 2003; Poissant, 2005; Podichetty & Penn, 2004; Smith, 2003).

Information Necessary for EHRs

All participants in both non-user and user groups agreed that the entire current paper system needs to become electronic to provide the necessary information for quality care and operational efficiencies. Specific sections of the current paper system mentioned were nurses’ notes, medication administration record, treatment administration record, acute condition change reports, care plans, physicians’ orders, do-not-resuscitate records, risk assessments, social work and dietary assessments, CNA flow sheets, resident photo, and lab and radiology reports. Non-users also suggested that the EHR should provide easy access to non-current resident information as well as access to the residents’ hospital records.

These study findings about information that should be contained in the LTC EHR correspond with one of the eight core functionalities for EHRs as recommended by the IOM (2003): health information to make sound clinical decisions including past medical history,

laboratory tests, allergies, current medications, and consent forms. The other seven core functionalities recommended by the IOM address functions or tasks the EHR can perform rather than just information included in the record. These tasks are addressed in the following section.

Tasks the EHR Should Perform

The EHR task most frequently identified as important by both non-user and user groups was the ability to provide automatic alerts for various elements of resident care. The non-user group proposed alerts for out-of-range elements of residents' vital signs and lab results; alerts for critical elements of medication administration and incomplete documentation; alerts for new physician orders; and due-date alerts for routine labs, scheduled appointments, and immunizations. Participants in both groups suggested that alerts be customizable to meet facility needs.

Both groups also suggested the following tasks: data entered into the system should automatically be pulled to the Minimum Data Set (MDS); the medication administration record should be automatically updated and always current; and an easy-to-use query system that provides individualized reports based on facility need. The non-user group proposed several additional tasks including:

- Daily task list for CNA assignments;
- Automatic updates to care plans;
- Bowel and bladder program tracking;
- Bedside or point-of-care documentation;
- Supply management and charge capture;
- Methods for supervisors to monitor staff documentation;
- Interdepartmental exchange of information/electronic communication between nursing staff;
- Automatic updates to payer source information; and
- Interface with hospital and physician office systems.

The tasks suggested by this study are essentially consistent with five of the eight core functionalities for EHRs as recommended by the IOM (2003): 1) electronic communication between healthcare team members with connectivity to the patient record across multiple care settings; 2) electronic reports of laboratory results and radiology procedures with automated display of previous results; 3) reminders about preventive practices such as immunizations, drug

alerts for dosing and interactions, and clinical decision making; 4) administrative functions such as scheduling systems, billing and claims management, insurance eligibility, and inventory management; and 5) public and private sector reporting (i.e. MDS reporting requirement) and internal quality improvement initiatives.

The remaining two of the eight core functionalities for EHRs not suggested or discussed by participants were: 1) computerized provider order entry (CPOE) with or without decision support to eliminate lost orders and illegible handwriting, generate related orders automatically, monitor for duplicate or contradictory orders, and reduce time to fill orders; and 2) patient support through computer-based patient education and home monitoring where applicable. CPOE is defined as the “process by which a clinician with order writing authority sits at a computer to directly enter patient care orders” (Ash et al., 2003, p. 229). The omission of CPOE as an essential function for EHRs in LTC is an important consideration since this process has been associated with improved patient safety (Ash et al., 2003; IOM, 2003) and medical error prevention (Bates & Gawande, 2003).

Top Three Challenges to EHR Implementation

To summarize and clarify the focus group discussions, each participant was asked to identify what they viewed to be the top three challenges or barriers to EHR implementation in LTC facilities. The top three challenges for non-user participants were 1) costs; 2) staff training; and 3) implementation to include finding the right system. The top three challenges for user participants were 1) costs; 2) staff training; and 3) compatibility with existing systems. As previously discussed, costs have been identified in numerous studies and expert reports as the number one challenge to EHR adoption. Other top barriers and challenges identified in the literature are clinician acceptance, interoperability among systems, and difficult implementation processes.

Top Three Facilitators to EHR Implementation

To summarize and clarify the focus group discussions, each participant was also asked to identify what they viewed to be the top three facilitators to EHR implementation in LTC facilities. The top three facilitators for the non-user participants were 1) evidence that EHRs will improve operational efficiencies and improve care; 2) support from the state in the form of

setting EHR requirements to assist with system selection and providing general support for EHR adoption from the state regulatory agency; and 3) government financial assistance for implementation costs. Strong vendor support was also in the top three facilitators for non-users. The top three facilitators for the user participants were 1) government assistance with implementation costs; 2) well-defined implementation plans; and 3) support from the state regulatory agency in the form of general support for EHR adoption and preparation of state surveyor teams to accept and use EHR systems. The top facilitators identified in the literature review were strong leadership, comprehensive implementation plans, effective training and on-going support, and governmental assistance to cover implementation costs.

DISCUSSION

The literature overwhelmingly supports the idea that health information technology and EHRs hold tremendous value for the healthcare system. The IOM (2003) asserts that successful EHR systems will improve patient safety, support delivery of effective patient care, facilitate management of chronic conditions, and improve operational efficiencies. Hospitals and physician practice settings are beginning to embrace EHRs (Fonkych & Taylor, 2005). However, adoption of EHRs in long-term care facilities are not documented and are probably much slower. This study provides insight into the issues that hinder and facilitate EHR adoption in LTC facilities and offers a framework for action by policy makers, LTC industry leaders, and health services researchers.

Health Policy Initiatives

Policy initiatives will be required to address the number one barrier to EHR implementation – cost. State and federal governments are the primary financial source of payment for LTC facilities through the Medicare and Medicaid system; thus, policy makers have direct responsibility for enacting policies to accelerate EHR adoption and maximize the financial and productivity benefits resulting from EHR use (Taylor et al., 2005). Policy options to promote EHR adoption that would apply to LTC include (a) reducing the costs for EHR system adoption with financial or non-financial incentives; (b) providing direct subsidies for EHR acquisitions; and (c) providing direct subsidies for network development to promote adoption of

systems with common networking standards and infrastructures that enable information sharing and provider linking (Taylor et al., 2005).

A second policy initiative to promote EHR adoption is related to LTC managers' need to feel confident in their EHR system purchase. Participants in this study suggested that state policy makers develop a set of standard EHR system requirements specific to LTC; vendors would then have to demonstrate that their product met such requirements. The American College of Medical Informatics has established a comprehensive set of policy initiatives to stimulate EHR adoption, which includes a recommendation to establish an EHR certification processes to attest to a system's functionality (Middleton et al., 2005).

Finally, as LTC EHR adoption rates grow, state agency leaders responsible for LTC regulatory oversight will need to develop comprehensive plans to prepare state surveyors to adapt the survey process to an electronic format. State surveyors will also have to learn to manage various types of EHR systems, since different facilities will have different systems. Just as facilities have discovered greater supervisory capabilities utilizing the electronic record, perhaps EHR systems can lead state surveyors to discover innovative survey methods to increase both the efficiency and effectiveness of the survey process.

LTC Industry Initiates

Strong leadership has been suggested as the primary facilitator to EHR implementation (Ash et al., 2003; Poissant, 2005; Podichetty & Penn, 2004; Smith, 2003). Leaders in the LTC industry's professional organizations have already begun to take an active role to promote EHR implementation by raising awareness of its benefits among member organizations and encouraging them to incorporate IT adoption into their strategic plans (Derr, 2004). LTC leaders can also play an important role in collaborating with state policy makers to promote policy initiatives to assist with implementation costs as well as to develop EHR product specifications that are congruent with specific LTC needs such as MDS reporting requirements and regulatory survey processes.

Additionally, LTC leaders can work with vendors to develop robust systems that meet interoperability standards to enable information sharing among healthcare settings as well as to provide user-friendly products that are acceptable to the LTC workforce. Comprehensive implementation planning can be advanced by industry leaders willing to share lessons learned

and other implementation resources with their colleagues who are embarking on the EHR journey.

One interesting finding in this study was the absence of discussion about patient safety in general or CPOE systems in particular. Both of these issues top the list of concerns for acute care settings since the release of the IOM's landmark study, *To Err is Human* (1999) and the recognition that EHRs with CPOE can significantly improve patient safety related to adverse drug events (Hillestad et al., 2005; Ash et al., 2003; IOM, 2003). A recent study about the perceptions of a patient safety culture in nursing homes concluded that interventions to change the safety culture in nursing homes are warranted (Hughes & Lapane, 2006). As LTC leaders face the future with greater opportunities to use technology to improve operational efficiencies and quality of care outcomes, they should also begin focusing on the concepts of a safety culture and using IT to promote improvements in safety for their residents.

Research Initiatives

One of the top facilitators for EHR implementation identified in this study was evidence that EHRs will improve operational efficiencies and improve care. With the exception of one unpublished evaluation study (Cherry & Owen, 2004), this investigator found no empirical studies to document the effect of EHRs on LTC facility operational efficiencies, financial outcomes, or resident care outcomes. LTC facilities present a unique opportunity for research to validate the value of EHRs as seen in the acute care setting. Research questions might include: How does the paraprofessional workforce (i.e., CNAs) react to and utilize computerized documentation? What is the relationship between EHRs and staff retention?; quality indicators?; medication safety?; financial outcomes?; staff overtime?; level of care documentation for Medicaid reimbursement?; inventory/supply management? Another important research area would relate to effectively using electronic data for advanced patient safety and quality improvement initiatives in facilities.

Limitations

Several factors limit the ability to generalize the study results to a larger population. First, random sampling was not used to obtain participants. Second, the type of person who agreed to participate in a focus group most likely had some particular interest in EHRs and thus may be

different from those who did not choose to participate. Next, the small number of participants limits the generalizability of the study. Finally, focus groups conducted via telephone conference call lose the advantage of face-to-face interaction among participants. Despite these limitations, the study provided good information related to LTC which was strongly supported by reports and studies related to hospital and physician practice settings.

CONCLUSION

As LTC leaders struggle with rapidly rising costs, low reimbursement rates, nursing shortages, high staff turnover, widespread inefficiencies, and a growing elderly population requiring increasingly complex care, EHRs hold promise for improvements in many of these areas. However, EHR implementation in LTC is slow. This study has provided insight into the issues that hinder and facilitate EHR adoption in LTC facilities and offers a framework for action by policy makers, LTC industry leaders, and health services researchers.

Important action areas include governmental assistance with EHR implementation costs, EHR certification processes to attest to a system's functionality, adaptations to allow the regulatory survey process to function in an electronic environment, resources for strong implementation planning, a stronger safety culture focus, and research to investigate the impact of EHRs on LTC facility operational efficiencies, financial outcomes, and resident care outcomes. Hopefully, LTC will realize the same multiple advantages from EHRs that have been documented in acute care and physician practice settings.

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Appendix A

Demographic Data Collection Worksheet

1. What is your ethnicity?
 Caucasian
 African American
 Hispanic/Latino(a)
 Asian
 Native Hawaiian/Asian Pacific Islander
 American Indian/Alaskan Native
 Other (Please specify.) _____
2. What is your gender?
 Male
 Female
3. What is your position in your long-term care facility? (Check the appropriate response.)
 Administrator
 Director of Nursing
 Charge Nurse
 Medical Director
 Corporate Executive
 Other (Please specify.) _____
4. How long have you been worked in your current position? Months _____ Years _____
5. What is your highest level of education? (Check the appropriate response.)
 Associates
 Bachelors
 Masters
 Doctoral
 Other (Please specify.) _____
6. What are your credentials? _____
7. How long have you worked in long-term care? Months _____ Years _____
8. Do you have experience with electronic health records?
 Yes
 No

Please describe. _____

9. LTC Facility information:

What is the total number of beds in your facility? _____

Is your facility currently owned by a:

- Profit entity
 Nonprofit entity

What is the location (city and state) or your organization? _____

What services does your facility currently offer? (Circle all those that apply.)

- Skilled Nursing
 Residential Nursing Care
 Certified Dementia Care
 Other (Please specify.) _____

What is the average annual occupancy of your facility? _____

Appendix B

Semi-Structured Interview Guide for Focus Groups

The focus group begins with introductions of all individuals present on the conference call followed by a short description of the study. Participants will also be reminded that the call should last approximately 60 minutes and that it is being hand and tape recorded but no individual identifying data will be used in the study write-up. The focus group will then move into questions as follows:

1. Opening question (to get participants talking and to help them feel comfortable)
 - Tell us about your experience in long-term care.
2. Transition questions (to move into the key questions)
 - Tell us about your experience with electronic health records.
 - What aspects of resident care might be [or are] affected by the use of electronic health records?
3. Key questions (to elicit information about barriers and facilitators to EHRs)
 - What are [were] the barriers or challenges to implementing electronic health records in your facility?
 - What factors would help [helped] promote implementation of electronic health records in your facility?
 - What other factors would contribute [contributed] to successful implementation of electronic health records in your facility?
 - What kinds of information should the electronic health record include to be of benefit?

- What tasks should the electronic health record perform to be of benefit to the facility?
4. Probe or follow-up questions (to elicit more information during the discussion)
- Tell me more about that.....
 - Would you explain further.....
 - Has anyone else had a different experience...?
5. Ending questions (to summarize information and bring closure to the discussion)
- After considering today's discussion, please summarize the top three challenges for implementing electronic health records in long-term care facilities.
 - After considering today's the discussion, please summarize the top three factors that would be most helpful to implementing electronic health records in long-term care facilities.

Appendix C

Summary of Focus Group Common Themes and Patterns

<i>Aspects of Resident Care Affected by EHR Use</i>	
EHR Non-Users: 11 Participants (# of times mentioned)	EHR Users: 2 Participants (# of times mentioned)
<ul style="list-style-type: none"> ▪ More efficient documentation (14) <ul style="list-style-type: none"> - Faster input will increase staff time with residents - Reduced time to file, copy papers, handle “mechanics of it all” - Decreased redundancy as compared to paper systems ▪ Improved quality of documentation leading to higher reimbursement levels (9) <ul style="list-style-type: none"> - Increased reimbursement with increased profit to care for residents - Reduced errors and omissions in documentation - Improved legibility of documentation - Improved medication administration accuracy and documentation ▪ Easier access to charts and medical information (5) <ul style="list-style-type: none"> - Easier access to charts - Access to residents’ past medical history - Easier access for physicians to sign orders ▪ Improved resident outcomes related to improved quality and efficiency in documentation (4) <ul style="list-style-type: none"> - Allow for more time to be spend in resident care - Improved outcomes for pain, toileting, behaviors, and falls - Inputs into the system integrate into the care plan ▪ Improved staff retention (2) <ul style="list-style-type: none"> - Involve and empower CNAs and nursing staff 	<ul style="list-style-type: none"> ▪ More efficient documentation (2) <ul style="list-style-type: none"> - Caregivers experience time savings in documentation - Increased caregiver time with resident ▪ Improved quality of documentation leading to higher reimbursement levels (1) <ul style="list-style-type: none"> - Better documentation of activities of daily living and care provided result in higher level of reimbursement ▪ Easier access to charts and medical information (2) <ul style="list-style-type: none"> - Provides accurate information to all care providers - Universal access to chart by all care providers ▪ Higher level of monitoring resident care by supervisor (2) <ul style="list-style-type: none"> - More “eyes” looking at resident care in real time - Easier tracking for regulatory compliance issues - Earlier identification of staff education needs

Barriers or Challenges to Implementation

EHR Non-Users: 11 Participants (# of times mentioned)

EHR Users: 2 Participants (# of times mentioned)

- | | |
|--|---|
| <ul style="list-style-type: none">▪ Cost for hardware and infrastructure (10)
▪ Staff training (6)<ul style="list-style-type: none">- Cost of training- Quality of training programs
▪ Human factors (5)<ul style="list-style-type: none">- Staff resistance to change- Unfamiliarity with computers/fear of computers- Lower education level of CNAs
▪ Complexity of EHR systems (5)<ul style="list-style-type: none">- Use by temporary and on-call staff- Use by multiple entities other than staff (i.e., consultants)- Non user-friendly systems
▪ Implementation (5)<ul style="list-style-type: none">- Choosing the right system- Running two systems (paper and electronic) during conversion
▪ State surveyor issues (3)<ul style="list-style-type: none">- Access to computerized record for surveyors- State requirement for original signatures
▪ Compatibility of different systems within facilities (2)<ul style="list-style-type: none">- Dietary assessment system vs dietary department system- Systems used by companies providing contracted services within the facility (i.e., therapy services) | <ul style="list-style-type: none">▪ Cost of hardware and on-going licensing fees (2)
▪ Staff training (2)<ul style="list-style-type: none">- Identify areas of mislearning and provide on-going training/retraining
▪ Human factors (2)<ul style="list-style-type: none">- Users not familiar with computers
▪ Converting current paper chart to electronic data (1)
▪ Customization of software (when applicable) to meet facility needs (1)
▪ Compatibility of different systems within the facility (1) |
|--|---|

Barriers or Challenges to Implementation (continued)

EHR Non-Users: 11 Participants (# of times mentioned)

EHR Users: 2 Participants (# of times mentioned)

- Integrity of the system (2)
 - Documentation plan if the system “goes down”
 - Back-up system in the event of power failures

- Maintaining confidentiality and privacy (2)

- Physical space and wiring (2)
 - Old facilities with limited space for equipment

- Maintenance Issues (2)
 - Maintenance costs
 - Securing equipment (i.e., staff “walking off” w/equipment)

Factors to Promote Implementation

EHR Non-Users: 11 Participants (# of times mentioned)

EHR Users: 2 Participants (# of times mentioned)

- | | |
|--|--|
| <ul style="list-style-type: none">▪ Strong implementation planning (10)<ul style="list-style-type: none">- Recommendations from TX DADS related to system characteristics to aid in system selection- Well-written implementation plan/staged implementation processes- Learn from facilities that have implemented EHRs- Gain staff buy-in early in the process (i.e., early education for staff on computer use); involve nursing director
▪ Strong vendor support (10)<ul style="list-style-type: none">- High quality, easy-to-use EHR product- Initial and follow-up training programs- 24-hour availability for technical problems | <ul style="list-style-type: none">▪ Strong implementation planning (2)<ul style="list-style-type: none">- Gain staff buy-in early in the process- “Grass roots” efforts to increase comfort level with computers (i.e., allow staff to play solitaire on the computer during breaks, kick-off parties to build excitement)- Vendor support with training and implementation plans
▪ Assistance from government entities to cover costs (2)<ul style="list-style-type: none">- Reimbursement incentives or other mechanisms to assist facilities with technology related costs
▪ Raise awareness among providers about benefits (2)<ul style="list-style-type: none">- Quality of care outcomes; financial outcomes |
|--|--|

Factors to Promote Implementation (continued)

EHR Non-Users: 11 Participants (# of times mentioned)

- Assistance from government entities to cover costs (6)
 - Temporary rate increase or one-time payment for infrastructure development and hardware purchases
 - Grants to help cover implementation costs
 - Additional reimbursement or rate increase

- Cooperation with state survey process (2)
 - Increase efficiency of the survey process with cooperation from CMS and state regulatory agencies
 - Change in state survey requirements to support EHRs

EHR Users: 2 Participants (# of times mentioned)

- Lower product costs as number of facilities using EHRs increase (2)
 - Greater number of competing products will help to lower overall costs

Information Necessary for EHRs to be of Benefit

EHR Non-Users: 11 Participants (# of times mentioned)

- Entire current paper system becomes electronic and maintained as paperless (11)
 - Nurses' notes, medication administration record, treatment administration record, acute condition change reports
 - Physicians' orders; do-not-resuscitate records
 - Risk assessments; all assessments and dietary records
 - Photo of the resident
 - CNA Flow sheets

- Data from ancillary services is accessible (2)
 - Easy follow-up for labs/radiology; interface w/off-site labs

- Non-current resident information is available (1)

- Hospital records are readily accessible (1)

EHR Users: 2 Participants (# of times mentioned)

- Entire current paper system becomes electronic (2)
 - Electronic chart parallels paper chart system
 - Ability to scan in lab and radiology reports from outside vendors

Tasks the EHR Should Perform to be of Benefit

EHR Non-Users: 11 Participants (# of times mentioned)	EHR Users: 2 Participants (# of times mentioned)
<ul style="list-style-type: none"> ▪ Provide automatic alerts (10) <ul style="list-style-type: none"> - Out-of-range data elements (i.e., lab, vital signs) - Change in condition; new orders - Due date alerts: routine labs, appointments scheduled, immunizations, MDS schedule - Incomplete documentation - Critical elements of medication administration ▪ Facilitate staff care tasks and documentation (9) <ul style="list-style-type: none"> - Task list for resident assignments - Automatic updates to care plans/real-time care plans - Point of care/bed side documentation - Easily accessible photos of each resident - Bowel and bladder program tracking - Electronic signatures ▪ Support ancillary tasks (7) <ul style="list-style-type: none"> - Manages interdepartmental exchanges of information (i.e., dietary order change automatically goes to dietary dept.) - Integrates w/other systems used in the facility - Prints records for transfers - Data is automatically pulled to the MDS - Reduce redundancy of current paper system - Manage payer source information efficiently ▪ Improve medication administration and documentation (5) <ul style="list-style-type: none"> - Eliminate holes in documentation - Electronic medication administration record that is immediately updated/always correct. 	<ul style="list-style-type: none"> ▪ Provide automatic alerts (2) <ul style="list-style-type: none"> - Customizable to meet facility needs ▪ Provide a robust query system (2) <ul style="list-style-type: none"> - Customizable reports to meet facility needs ▪ Improve medication administration (2) <ul style="list-style-type: none"> - Automatically updated electronic medication administration record that is always current ▪ All documentation ties to the MDS to support a higher level of reimbursement (1)

Tasks the EHR Should Perform to be of Benefit (continued)

EHR Non-Users: 11 Participants (# of times mentioned)

EHR Users: 2 Participants (# of times mentioned)

- Allow for staff monitoring by supervisor (5)
 - Allow supervisor to monitor staff charting/activities
 - Notify supervisor about work not documented

- Allow for supply management and charge capture (3)
 - Populate the accounts receivable systems with charges for treatment and supply usage

- Facilitate communication (3)
 - Interoffice communication
 - Communication among nursing staff

- Provide a robust query system (2)
 - Customizable reports to meet facility need

- Interface with hospital & physician office systems (1)

- Provide back-up for power failures (1)

Top Three Challenges or Barriers

EHR Non-Users: 11 participants (# of times mentioned)	EHR Users: 2 Participants (# of times mentioned)
<ul style="list-style-type: none"> ▪ Costs (13) ▪ Staff training (9) ▪ Implementation: finding the right system (2) ▪ Management of data for policy changes (1) ▪ Acceptance by CMS and TX DADS (1) ▪ Space and wiring issues (1) ▪ Power failures/back-up systems (1) ▪ Maintaining HIPAA standards (1) ▪ Interoperability between systems (1) 	<ul style="list-style-type: none"> ▪ Costs (2) ▪ Staff training (2) <ul style="list-style-type: none"> - Comfort levels with computers - Basic skill sets of users ▪ Compatibility with existing systems (1)

Top Three Facilitators

EHR Non-Users: 11 participants (# of times mentioned)	EHR Users: 2 Participants (# of times mentioned)
<ul style="list-style-type: none"> ▪ Evidence that systems will improve operational efficiencies and lead to improved care (7) ▪ Support from state LTC regulatory agency (7) <ul style="list-style-type: none"> - EHR system requirements established by the state - EHR systems are accepted by state LTC regulatory agency ▪ Financial assistance for implementation costs (6) ▪ Strong vendor support (6) <ul style="list-style-type: none"> - Excellent initial training and ongoing support - User-friendly, non-complex systems 	<ul style="list-style-type: none"> ▪ Well-defined implementation plan (2) <ul style="list-style-type: none"> - Early involvement of all staff levels in the facility - Plan to accurately/efficiently convert paper to electronic - Strong training programs with support from vendor ▪ Financial assistance for implementation costs (2) ▪ Support from state LTC regulatory agency (2) <ul style="list-style-type: none"> - General support for EHR adoption - Prepare survey teams to accept and use EHR systems ▪ Evidence that systems will improve efficiency and care (1)

