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ELECTRONIC MEDICAL RECORDS IN LONG TERM CARE

ABSTRACT

Long Term Care (LTC) facilities possess unique characteristics in terms of implementation and utilization of Electronic Medical Records [EMRs]. The focus of LTC is on a population requiring care encompassing all aspects associated with quality of life rather than simply acute treatment. Because this focus is of a larger scale than traditional medical facilities, the priorities in the implementation and utilization of EMRs are higher in accessing patient history information. The purpose of this study was to determine the EMR utilization in the chronic care settings. In conclusion, the literature review performed does not support the fact that EMRs are currently being effectively and widely used in the LTC facilities.

INTRODUCTION

State-of-the-art filing cabinet systems that occupy several square feet of medical record office space in healthcare facilities across the country are one-by-one being emptied in the name of innovation. While still lagging behind the major industries that embraced the newest technological advances in the 1990's, the healthcare industry specifically has taken great strides with the implementation of an electronic system for the storage of a patient's medical data (Hillestad et al. 2005). Influential leaders have agreed that this is the next logical progression in the maintenance and handling of an

individual's health record from a cumbersome paper-based system (Jha et al. 2009). With the founding of Health Level Seven (HL7) in 1987, standards for dealing with health information electronically began to be developed without even knowing what the work-in-progress product would look like (HL7 2007).

Although an Electronic Medical Record (EMR) has various forms depending on its usage and integration, its most basic description consists of any patient data that has been stored electronically. The EMR is sometimes inappropriately referred to as an Electronic Health Record (EHR) as this last one refers to interoperable EMRs in more than one organization (Wagner 2009). In addition, the Healthcare Information and Management Systems Society (HIMSS) define the Electronic Health Record (EHR) as an electronic record of patient health information produced by one or more encounters in any healthcare setting. This information includes patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports (HIMSS, 2009). The National Alliance for Health Information Technology (NAHIT) defines the Electronic Medical Record (EMR) as the electronic record of health-related information on an individual that is created, gathered, managed, and consulted by licensed clinicians and staff from a single organization who is involved in the individual's health and care (Fonkych 2007).

With separate and unique issues to address as compared to the acute and ambulatory settings, EMR implementation and utilization in long term care has been hindered by costs, regulatory requirements and software that is not all-interoperable (Roop 2006).

However, in facilities where it has been applied as a part of an integrated electronic system, a non-exhaustive list of uses includes patient registration, assessments, rehabilitation, census, and care plans while meeting the Medicare requirements for documentation with Minimum Data Set (MDS). Standardization of incident reporting, improved accuracy and completeness of reports combined with overall enhancements in quality have also been realized (Briggs 2006).

Historically, long term care facilities recognized the need for descriptive and extensive historical patient data while having little provider communication coupled with minimal treatment information (Roop 2006; Lee 2009). To address these issues, long term care aided in the pioneering of EMRs after being identified as a possible solution to address identified industry concerns and to ultimately improve quality. With the addition of federal regulations in 1998, electronic records were further validated when the submission of MDS data from certified Medicare and Medicaid facilities became mandatory in order to participate in these programs (Rochon et al. 2005; Roop 2006;).

Although the majority of long term care facilities are still using a combination of paper and electronic records with the ratio of use being facility-dependent, current strategies and investments are being implemented towards EMRs altogether. In the meantime, this type of facility and others are at a minimum deciding between the following three options, to reduce the use of paper while pursuing patient safety and quality improvement. To fully implement an EMR is necessary is: (1) maximize existing hardware and software, (2) update technology as it becomes available, and (3) invest in an integrated system from the onset. Regardless of which path is chosen, individual

facility budgetary constraints will be a deciding factor in the choice outcome as well as a potential government-issued timeline for completion (Walker 2009).

Despite this dilemma and depending on which source is cited, nursing homes country-wide are paving the way in the adoption of EMRs compared to other healthcare entities. With further application, integration and eventual standardization of this type of technology, projections are that caregivers will have extra hands-on time with patients while also providing an additional means for high-quality care leading to positive outcomes. Furthermore, improved decision-making, patient care trend analysis, evaluating evidence-based treatment as well as increased patient safety among others are just a few of the benefits that remain to be reaped as well using EMR (Hillestad et al. 2005).

The purpose of this research study was to determine the effectiveness of EMR utilization in the long term care settings.

METHODOLOGY

A literature review was accomplished by systematic search of the Academic Search Premier, Google Scholar, LexisNexis, Academic Business, and Source Premier databases. For the purpose of the research paper's query, all information regarding electronic medical records use in long term care was considered valuable. The search was limited to only sources available in the English language.

The databases were queried using the key terms, "electronic medical record", or "electronic health record" AND "long term care settings", OR "nursing homes" and considered applicable under the following definitions: Long term care facility defined as a facility that provides rehabilitative, restorative, and/or ongoing skilled nursing care to

patients or residents in need of assistance with activities of daily living. Long-term care facilities include nursing homes, rehabilitation facilities, inpatient behavioral health facilities, and long-term chronic care hospitals (MedicineNet 2009). Electronic medical record was defined as an electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within a healthcare organization (Wagner 2009).

The literary research review focused on three topics within EMR use in long term care: benefits, limitations, and effectiveness. Benefits to the implementation of EMR use in long term care facilities were compared between sources for commonalities, while benefits of significance were also included regardless of concurrence with other sources. The literature search was validated by other member of the research team [AC].

RESULTS

Long term care facilities possess unique characteristics in terms of implementation and utilization of EMRs. The focus of long term care is on a population requiring care encompassing all aspects associated with quality of life rather than simply acute treatment (Pacicco 2008). Because this focus is of a larger scale than traditional medical facilities, the priorities in the implementation and utilization of EMRs are high in: (1) access to extensive patient history information (2) descriptive patient information (3) communication among providers (4) facilitation of integrated care and (5) cost benefits (Oatway 2004; Tomzak 2006; Covolo 2007; DeVore et al. 2007; Pacicco 2008;

Rand Corporation 2009). It is these priorities that identify the benefits, limitations and effectiveness of EMR use in long term care facilities (Table 1).

Table 1 about here

The reviewed literature offered a multitude of benefits for the implementation and use of EMRs in long term care settings. Several commonalities developed among the evaluated information to include: reduction in adverse drug events, streamlining of regulatory compliance, ensuring the most accurate data is available to clinicians, improved coordination in patient care, and increased efficiency (Tomzak 2006; Rand Corporation 2009).

The population served by the long term care setting includes a number of factors putting them at increased risk for experiencing adverse drug events (Rochon et al. 2005). This population often has more than one chronic medical condition, multiple daily and otherwise scheduled medications, and use of medications associated with drug interactions and high occurrence of side effects (Pacicco 2008). It is these factors that result in a higher number of adverse drug events in long term care facilities than in acute care settings.

On average, a typical patient of a nursing home is regularly administered six different medications daily, with over 20% taking 10 or more per day (Cassel 2003). This study performed at 18 chronic care facilities in Massachusetts focused on every resident staying at those facilities over a 12-month period. During the 28,839 nursing home resident-months of observation in 18 participating nursing homes, 546 adverse drug events were recognized. Of all adverse drug events, one was deadly, 31 were life threatening, 206 were serious, and 308 were significant (Cassel 2003). It was determined

that half of these events could have been prevented (Cassel 2003). The end result was a benefit to both the facility and patient in improved patient safety. Evidence expressed in the literature also demonstrated a direct correlation between costs and adverse drug events (Oatway 2004; Rochon et al. 2005; Pacicco 2008).

High rates of preventable adverse drug events were identified in several studies which concluded that errors in monitoring and prescribing specific to the long term care population were the causes of adverse drug events .The reduction in adverse drug events after implementing a Computerized Physician Order Entry (CPOE) system into their institution reported by the Baycrest Centre for Geriatric Care is consistent with the results in similar published literature (Rochon et al. 2005).

Regulatory and reimbursement requirements of long term care facilities are different than those of acute care facilities. According to Pacicco (2008), 50% of residents in long term care facilities stay at least one year and 21% stay for five years or longer. The requirements that must be met in order to qualify to participate as a skilled nursing facility in the Medicare program and as a nursing facility in the Medicaid program, are complex and must be continually evaluated. Regular assessment and maintenance of compliance with Centers for Medicare and Medicaid Services (CMS) can be implemented through the EMR (Pacicco 2008). Linderner, et al, 2007, reported that 99.6% of active nursing homes in the United States, 2004, already used an electronic information system to report to CMS supporting the claim that EMRs augment regulatory and reimbursement requirements (Linderner et al. 2007).

In the long term care setting physicians and other providers are not always immediately available at the bedside. Communication through multiple parties can lead to poor and inaccurate information (Oatway 2004; Schnelle 2005). Having the ability to access electronic medical records from anywhere allows providers to make assessments and care decisions remotely; ultimately providing the best outcomes based on the most current and complete patient history and treatment information (Tomzak 2006; Pacicco 2008). Oatway (2004), expanded on this topic by addressing the benefit in the ability to share medical information with other providers, for example outside medical consultations, via the EMR.

Improved coordination in patient care is a benefit expressed extensively throughout the literature (Hakes 2008). This is a broad topic encompassing a wide range of examples: tools to summarize trends in patient care, evidenced-based disease protocols, improved documentation, improved records management, and the ability for multiple people to utilize the same information at the same time (Linderner 2007; Hakes 2008). The San Francisco VA Medical Center, 2004, developed this benefit in their study of an EMR intervention used specifically to increase the rate of completion of advanced directive assessments by providers in their nursing home. Reported outcomes showed an increase from four percent completion prior to the implementation of EMRs for advanced directive discussion notes, to an amazing 63% completion in a three month time period (Linderner 2007). The remarkable effectiveness of the intervention is attributed to many actions by the San Francisco VA Medical Center discussed in further detail in the effectiveness section of this paper (Linderner 2007).

Implementation of EMRs as a means of increasing efficiency has spurned significant debate in regards to long-term care. Although the majority of articles reviewed expressed increased efficiencies with usage, the outcomes in efficiency were not consistent between facilities. In many circumstances, reporting included increased efficiency in billing, storing, and access to medical records with no change or decreased efficiency in provider activities, while other research supported the contrary (Oatway 2004; Garg et al. 2005 Pacicco 2008; Hakes 2008).

Implementation of EMRs in long term care settings is not achieved without challenge. Even with the best of circumstances and product, EMR implementation and use in long term care settings has its limitations. Those limitations identified in the literature review are adoption costs, incongruity in cost savings, interoperability, and change to the facility culture (Oatway 2004; Rochon et al. 2005; Tomzak 2006; DeVore et al. 2007; Pacicco 2008).

Adoption costs are significant and many facilities lack the capital needed to complete adoption of an EMR (Pacicco 2008). These adoption costs include investment into software, hardware, training and maintenance updates (Pacicco 2008). Every literature article evaluated addressed adoption costs as the main limitation in implementing EMRs in long term care facilities. Similar costs correlated with implementation in long term care facilities, adjusting for size (Rand Corporation 2009). Consideration was given to long term care facilities that have some form of electronic clinical data in place prior to implementing the full EMR and their subsequent reduced adoption costs, as the electronic base, for example computers, training is their use, is already in place (Oatway 2004). This limitation may be undermined by findings reported

due to the large number of long term care facilities that already have partial electronic clinical data in place.

The 2009 Resnick study reported greatest use of electronic information systems in the largest facilities and the lowest use of electronic information systems in the smaller, stand-alone facilities.

Adoption costs correlate well in the limitation of incongruity of cost savings. While the adoption costs are high, the projected savings with EMRs is not of benefit to the facility making the investment (Oatway 2004; DeVore et al. 2007; Covolo 2007). Researchers supported that insurance companies and patients should receive the greater part of the cost benefit (Oatway 2004; Covolo 2007). Though there are many benefits to the implementation of EMRs, the cost alone was reported as the primary or only deterrent for long term care facilities in the United States who currently do not use EMR in their facilities (Covolo 2007).

Interoperability refers to the ability to exchange patient information between various aspects of patient care (DeVore et al. 2007). For example, interchange between the physicians' orders and the pharmacy software or interchange between physical therapy and the case manager roles. The lack of interoperability has been identified as the largest limitation factor. Most current programs are vendor-unique and don't interface with other programs (Oatway 2004). Programs designed for acute care settings have encountered limitations when used in long term care settings because of larger records and longer lengths of stay. The inevitability of these issues is multiplied when it is considered that, outside of the generic guidelines set forth by the Health Insurance Portability and Accountability Act (HIPAA), there is virtually no certifying agency to

standardize the system for universal use (Oatway 2004). Compounding this issue is a portion of the current presidential administration's proposed solution to our nation's healthcare dilemma. A central component of that proposal is the development and implementation of a standardized EMR. Standards required to make interoperability possible have not been developed yet which could lead to widespread variations in implementation and utilization of EMRs in all settings including long term care, ultimately resulting in inability to have interoperability (Oatway 2004; DeVore et al. 2007).

Change in facility culture was discussed inclusively in all evaluated research (Pacicco 2008). The term change in facility culture encompasses a wide range of changes occurring with the implementation of an EMR (DeVore et al. 2007; Pacicco 2008). Professional acceptance has been problematic to many facilities in implementing EMRs (Oatway 2004). Physicians report difficulties in use and initially increased time in use, both arguments confirmed by research (Rochon et al. 2005; Garg et al. 2005). Many patient care providers are not familiar with computer use and report feelings of frustration and being threatened (DeVore et al. 2007). Research corroborates extensive training prior to implementation, consulting patient care staff in the development process and user-friendly programs as the key components in addressing professional acceptance (Oatway 2004).

Implementation details shared by the Baycrest Centre for Geriatric Care, 2005, showed a specific outcome and significant limitation. In their implementation of a CPOE system, results demonstrated a significant increase in the time spent by the physician. When compared with similar research on the subject of CPOE, this study identifies a

common argument against the use of CPOE demonstrating that it does not initially increase efficiency, creating some resistance to implementation (Rochon et al. 2005). This insight was shared in an attempt to help other institutions employ (time neutral) methods of implementing an EMR system of any kind.

Effectiveness of EMRs in the long term care setting is minimally represented in the literature. Results from the study by The San Francisco VA Medical Center in 2004 of EMR intervention in nursing home advance directive orders and documentation present a positive effectiveness for their intervention (Linderner 2007). As stated prior, completion of advanced directive discussion notes increased from a four percent completion to 63% completion in a short period of three months (Linderner 2007). This study concluded that the effectiveness of the intervention was a result of including the participating clinicians in the design, implementation with a group of clinicians who were supportive of the initiative, keeping the implementation site confined to one singular nursing home ensuring a small implementation force and use of quality and scientific augmentation techniques (Linderner 2007).

Aside from the above stated study by Linderner, et al, 2007, (Linderner 2007) very little information on the effectiveness of EMR use in long term care settings is represented in the published literature.

Comparative Analysis of Literature Assessing the Use of EMRs in Long Term Care Settings
TABLE 1: Comparative Analysis of Literature Assessing the Use of EMRs in Long Term Care Settings

Published Source	Benefits	Limitations	Effectiveness
Oatway D. (2004)	Electronic records will be more secure and available than paper. Sharing records among providers is easier. Electronic medical records aid in acquiring data for medical research. Health records can be access anywhere by authorized providers. Claims are easier to file. Backup documentation is more readily accessible. Transition to full electronic medical records is easier if the facility is already storing some clinical data in an electronic format. Reductions in medical errors. Increased efficiency, reduced claim rejections, improved documentation, and more informed and synchronized clinical care.	Unable to implement acute care oriented systems is ineffectual, software programs are limiting technical factor, professional acceptance, public acceptance, the savings claimed will not necessarily go to the facility making the investment, multiple hybrid systems.	No results reported
Rochon P, Field T, Gurwitz J et al. (2005)	Reduction in adverse drug events, improved patient safety and improved coordination in patient care.	Change in culture and implementation did not save time for the providers, but increased their time spent on ordering medications.	No results reported
DeVore D, Price C, Natzke J. (2007)	Improving the quality of patient care, reducing medical errors, increasing operational efficiencies, and reducing costs.	Interoperability challenges and extensive change to the facility culture.	No results reported
Linderner S, Davoren J, Vollmer A, Williams B, Landefeld C. (2007)	Not applicable	Not applicable	The targeted electronic medical record intervention greatly increased completion of the advanced directive discussion notes. Outcome was improved communication and met their implementation goal.
Tomzak M. (2007)	streamlining of regulatory compliance	Lack of strategically defined objectives	No results reported
Pacicco S. (2008)	Improved quality and safety, streamlining of regulatory compliance, ensuring the most accurate data is available to clinicians, improved coordination in patient care, and increased efficiency	EMR designed specifically for LTC setting, significant change to culture, lack of capital to invest in necessary equipment, training, and maintenance.	No results reported

DISCUSSION

As is true of any act of change, the implementation of EMRs in long term care facilities incorporates benefits as well as some limitations. The actual and potential positive aspects that were described in the results relating to EMRs in long term care facilities consist of: reduction in adverse drug events, ensuring the most accurate data is available to clinicians, improved coordination in patient care, increased efficiency and streamlining of regulatory compliance.

In large part, the theme of these benefits revolves around quality of care. With the average nursing home resident typically administered six different prescription medications daily, medication errors have an increased chance of occurring with the current system. Through EMR and CPOE, implementation of an electronic system could be a significant step toward prevention of such errors. By allowing physicians and other healthcare providers to access patient records (i.e. charting, images) remotely, EMRs could provide the patient access to more timely and accurate treatment. A standardized EMR that is fully compatible across different healthcare facilities would no doubt provide for improved coordination, increased efficiency of the healthcare system as a whole, and greater access for regulatory bodies to maintain control and provide input when it comes to streamlining compliance and reimbursement issues.

Limitations of integrating electronic records into long term care that were found in the literature review included: adoption costs, not a clear Return of Investment (ROI), interoperability, and change to the facility culture. Adoption costs of electronic records software for long term care facilities as well as interoperability issues that make up the total cost of implementing an EMR not only includes the first year's software,

implementation, and infrastructure costs, but also includes the costs for ongoing support and licensing, as well as for ongoing basic IT support not integrated with software support. Further compounding the limitations has been a discrepancy between who the cost savings offered by EMR actually benefits.

Regarding standardization/interoperability between facilities, the reviewed literature showed that there simply isn't any at this point. The lack of a governing body in this area enormously limits advancement of EMR use since independent software companies have virtually no guidelines and standards by which to write their individual programs. Finally, the introduction of change to the organizational culture of any facility will always be met with some amount of resistance. There are proven steps that can be taken—and should not be ignored—when implementing change in an organization, especially change that can impact a facility as greatly as the implementation of an EMR.

EMRs are a top priority to President Obama's administration (Blumenthal 2009). With Government backing the healthcare community it is expected a greater implementation of these systems nationwide, and realize the hope network linking all participants in the U.S. health care system (Himmelstein, & Woolhandler, 2005).

Finally, comes the inquiry of the effectiveness of the current utilization of EMRs in long-term care. All evidence from this literature review is negative in regard to effectiveness. The primary rationale for this determination is the fact that utilization of EMRs in nursing homes is all but nonexistent. Where EMRs have been implemented results of effectiveness are limited and shallow as the few long term care institutions who have employed EMRs are still in their implementation periods and therefore have yet to assess the effectiveness of using EMR in their institutions. While one study showed a

high level of participation in the use of one or more specific aspects of an electronic information system, a study performed in 2005 by Brigham and Women's Hospital in Boston (Resnick 2009) found that a negligible one percent of the nation's long-term care facilities had implemented and were using some comprehensive form of EMR (Pacicco 2008). That translates into only about 160 of the nation's 16,100 nursing homes.

The current state of failure of EMR utilization in long-term care facilities cannot be attributed to a lack of technological advancement—especially when considering the hardware component. While the ever-evolving phenomenon that is the technological industry will continue to develop products that will increase capacity, speed, and capabilities, most concur that the equipment currently available is at least adequate to manage the current demands that an EMR would entail. The obstacle from a technological standpoint stems not from a lack of—or shortage of—hardware or software; rather the abundance of available electronic record software serves to hinder its acceptance and implementation (Oatway 2004). The reason for this hindrance is largely due to a lack of standardization. One of the major benefits for the country as whole, when considering the use of EMRs is the ability to quickly and easily share patient information among various providers, allowing greater collaboration and a more extensive knowledge base concerning patient status and history. With the assorted development of multiple software systems by various independent companies, problems with compatibility are unavoidable as well as detrimental to collaboration. When combined, the current lack of standardization and the expected movement toward a standardized system deter facilities from committing to a specific system for fear that their investment may prove to be in vain.

Limitations specific to this paper and the assessment of benefits, limitations and effectiveness of EMR use in LTC include a lack of substantial research completed on the subject and lack of documentation of processes involved in the implementation of EMRs in LTC.

CONCLUSION

Implementation of EMRs in the long term care setting is still in its infancy. Current implementation is limited and varies among institutions. Those facilities that have adopted EMR use are still developing methods to assess effectiveness; therefore, statistical data regarding effectiveness regarding EMRs in the long term care setting is minimal. In summary, the literature review does not support the fact that EMRs are currently being effectively and widely used in the long-term care settings.

REFERENCES

Blumenthal, R. 2009. Stimulating the Adoption of Health Information Technology. N Engl J Med. Apr 16; 360 (15):1477-79.

Briggs B. 2006. EMR Goes on a Lengthy Assignment: A long-term care organization brings together clinical and financial software to reduce the paper form glut and improve efficiency. *Health Data Management*. Accessed July 2, 200, from http://www.accessmylibrary.com/coms2/summary_0286-13095263_ITM

Cassel C. 2003. *Geriatric Medicine*. 4th Ed. New York (NY): Springer Publishing Co.

Covolo D. 2007. Electronic medical records systems: Know the total cost of ownership. *Nursing Home* 56(7); 16-20.

DeVore D, Price C, Natzke J. 2007. Preparing for Electronic Charting – It's an

    Important First Step Toward the Electronic Health Record and It Has to Be

    Done Right. *Nursing Homes* 1; 28-31.

Fonkych, K. (2007). *Accelerating the Adoption of Clinical IT Among the Healthcare*

    Providers in US: Strategies and Policies. Santa Monica, California: RAND

Garg A, Adhikari N, Haynes R et al. 2005. Effects of Computerized Clinical Decision

    Support Systems on Practitioner Performance and Patient Outcomes. *Journal*

    of the American Medical Association. 293; 1223-1238.

Hakes B, Whittington J. 2008. Assessing the Impact of an Electronic Medical Record

    on Nurse Documentation Time. *Computers, Informatics, Nursing*. 26(4); 234-

    241.

Health Information Technology Research Brief. *RAND Corporation*. Accessed July

    11 from http://www.rand.org/pubs/research_briefs/RB9136/index1.html

Healthcare Information and Management Systems Society 2009. Electronic Health

    Records. Accessed November 11 from

    http://www.himss.org/ASP/topics_ehr.asp

Hillestad R, Bigelow J, Bower A, Girosi F, Meili R, Scoville R, Taylor R. 2005. Can

    Electronic Medical Record Systems Transform Health Care? Potential Health

    Benefits, Savings, and Costs? *Health Affairs*. 24(5); 1103-1117.

Himmelstein, D. U., & Woolhandler, S. (2005, Sept/Oct). Hope and Hype: Predicting

    The Impact of Electronic medical Records. *Health Affairs* , pp. 1121-1123.

HL7's Newest Specification Moves US a Step Closer to the Reality of Online

  Medical Records, 2007. *Health Level Seven, Inc*. Accessed July 5,

  http://demo.hl7.org/News/Pages/HL7_PRESS_20071017.pdf 2009.

Jha AK, DesRoches CM, Campbell EG, Donelan K, Rao SR, Ferris TG, Shields A,

  Rosenbaum S, Blumenthal D 2009 . Use of electronic health records in U.S.

  hospitals. N Engl J Med. Apr 16; 360(16):1628-38

Lee EJ, Lee M, Moorhead S. 2009. Developing an electronic nursing record system

  for clinical care and nursing effectiveness research in a Korean home

  healthcare setting. Comput Inform Nurs. Jul-Aug; 27(4):234-44.

Linderner S, Davoren J, Vollmer A, Williams B, Landefeld C. 2007. An Electronic

  Medical Record Intervention Increased Nursing Home Advanced Directive

  Orders and Documentation. *Journal of American Geriatrics Society*. 55(7);

  1001-1006.

Medicine Net 2009. Definition of Long Term Care Facility. Accessed July 2, 2009

  from http://www.MedicineNet.com

Oatway D. 2004. Electronic records in long-term care. *Nursing Homes*. 9; 84-89.

Pacicco S. 2008. The Current State of EMRs in LTC Settings. *Nursing Homes*. 2; 34-
  37.

Resnick H, Manard B, Stone R, Alwan M. 2009. Use of Electronic Information

  Systems in Nursing Homes: United States 2004. *Journal of American*

  Informatics Association. 16(2); 179-186.

Rochon P, Field T, Gurwitz J et al. 2005. Computerized Physician Order Entry with

  Clinical Decision Support in the Long Term Care Setting: Insights from the

Baycrest Centre for Geriatric Care. *Journal of American Geriatrics Society*. 53; 1780-1789.

Roop E. 2006. Connecting Long Term. *For the Record*. 18(5); 16.

Schnelle J, Oserweil D, Simmons S. 2005. Improving the Quality of Nursing Home Care and Medical-Record Accuracy With Direct Observational Technologies. *The Gerontologist*. 45:576-582.

Tomzak M. 2006. Facing the IT Future: You Are Not Alone. *Nursing Homes*. 5; 60-62.

Wagner K, Lee F, 2009. Glaser J. *Health Care Information Systems*. 2nd ed. San Francisco (CA): Jossey-Bass Publishers.

Walker M. 2009. The Three Paths to An EMR: Electronic Medical Records and a National Electronic Health Record are Almost Upon Us. *Advance for Long Term Care Management*. Accessed July 3, 2009.

http://long-term-care.advanceweb.com/Editorial/Content/Editorial.aspx?CC=191942