Homecare Risk Management: Nursing Issues Related to Technology

Juliana J. Brixey and James P. Turley

University of Texas Health Science Center at Houston
School of Biomedical Informatics
7000 Fannin, Suite 600, Houston, TX, USA 77030
{Juliana.J.Brixey,James.P.Turley}@uth.tmc.edu

Abstract. Traditional risk management may not address the needs of technology being introduced into homecare situations for nurses. We propose to augment traditional risk management with insights from Prevention through Design and The 8 Rights giving a more technology focus to risk management.

1   Introduction and Background

The goal of this paper is to propose an expanded view of risk management to address the technology which is rapidly coming to the homecare setting. Technology has the ability to create unintended side effects. We believe that with proper risk management that these side effects can be minimized. The future role of risk management in homecare is twofold. The first is to monitor and protect the client given the limits of current technology. The second will monitor and assess the potential for increased risk to the client as a result of the technology. The first role of healthcare is to "do no harm". Findings from a recently published study indicate the introduction of EHRs and DSS can lead to numerous unintended consequences[1]. A core aspect of risk management in homecare would be to pre-emptively assess the implications of the current and future technologies to minimize the unintended consequences of the technology. This would be true whether it was a direct result of the technology or a consequential result in clinical care. As a result of the proliferation of HIT, EHRs, and PHRs in homecare a new paradigm of risk management is emerging from the intersection of socio-medical problems and socio-technical approaches.

The problem space for risk management in homecare is well summarized by the AHRQ Report:

> "Home health care clinicians seek to provide high quality, safe care in ways that honor patient autonomy and accommodate the individual characteristics of each patient's home and family. Falls, declining functional abilities, pressure ulcers and non-healing wounds, and adverse events related to medication administration all have the potential to result in unplanned hospital admissions. Such hospitalizations undermine the achievement of important home health care goals:

keeping patients at home and promoting optimal well-being. Nevertheless, the unique characteristics of home health care may make it difficult to use—or necessary to alter—interventions that have been shown to be effective in other settings. Therefore, research on effective practices, conducted in home health care settings, is necessary to support excellence and evidence-based care."[2]

The AHRQ report indicates that that homecare addresses a wide range of acute and chronic health care needs. Homecare can expose social-medical problems different from those associated with hospital care with resultant risk management issues. For example, the homecare treatment of acute and chronic health conditions can involve the use of Health Information Technology (HIT) once reserved for hospitals. The patient/client and significant others are increasingly using HIT such as glucose monitors, infusion pumps, ventilators, sleep apnea machines and other medical devices. In homecare, HIT is being used in both direct client care and in adjunct components to that care. In terms of direct client care, EHRs are being used to both record the elements of direct client care and with increased DSS to directly control the quantity and quality of direct client care. DSS will become more directive in domains where the evidence is sufficient to direct "evidence based best practices". Moreover, patients/clients are recording their own health information in personal health records (PHRs). Using PHRs, patients control access to the health information. This is in sharp contrast to clinician controlled access to heath in the patient has limited access to their own health information. The addition of patient specific outcomes and interventions in PHRs will become future resource to be mined to create new areas of evidence based care.

Homecare companies may be small. As noted in 2000, 16% of healthcare agencies have 5 or fewer employees. These smaller organizations may lack the sophistication to complete comprehensive risk management.[3]

Homecare is becoming more integrated into the continuum of health care services. To accomplish this we will need to view a more pervasive model of HIT used in homecare and that will communicate with other health care delivery areas.[4] The HIT integration will demand not only standards for communication and data structures but will also require standardization of outcomes and homecare interventions.

Moreover, emerging HIT is being introduced into homecare to facilitate aging in place. The near future requires HIT to address directly the specific needs of the socio-medical problems related to homecare. Examples of social-medical problems include monitoring that medications and treatments are completed; they are usually a combination of people interacting and tasks that need to be completed. HIT may allow that monitoring from a distance, introducing new social dynamics. As the AHRQ2 report indicates, mobility is one of the chief concerns in homecare. The "smart home" will allow practitioners to monitor mobility within the home using sensors. These sensors, whether monitored by external humans, family members or artificial intelligence, to determine whether the target patient/client is ambulatory within the home to indicate whether there is a risk for falls or reduced immobility which leads to pneumonia, pressure ulcers, and deep vein thrombus. These same sensors could be used to

monitor 'safe vs. unsafe' activity within the home indicative of bodily functions such as continence and performance activities related to cooking and other activities of daily living (ADLs). These sensors will become part of the pervasive computing network noted above.

2   Identified Homecare Risks

The National Institute for Occupational Safety and Health developed the National Occupational Research Agenda (NORA). NORA[5] identified a number of risks in the healthcare arena that have particular import for homecare. These include:

1. Work related musculoskeletal disorders
2. Slip, Trip and Fall Incidents
3. Violence
4. Hazardous Drugs
5. Chemical Hazards
6. Sharps injuries and Bloodborn Pathogens
7. Other infectious diseases.

Taylor and Donnelly6 cite a different set of risks to homecare workers. They noted that workers were "visiting at all hours and in all seasons, homecare workers faced many and varied hazards ranging across access issues, hygiene and infection, manual handling, aggression and harassment, domestic and farm animals, fleas and safety of home equipment. Something accepted unquestioningly as a 'normal' hazard of life by the client (perhaps over decades) may be unacceptable to the homecare worker or (possibly) the employing organization". The issue of perspective and relative value of 'risk' will vary between the professionals and the patients with geographic and value perspectives as well. Similar to the NORA list they identified:

1. Physical risks moving patients and equipment
2. Violence from other family members and the environment

Other identified risks included:

1. Environmental Risks
   (a) Internal to the home situation (e.g. lack of running water)
   (b) External to the home (e.g. animals, travel during winter etc.)
2. Patient/Family lifestyle choices
3. In-home safety issues (e.g. electrical wiring, sanitation, heat etc.)
4. Conflicts on how to decide care protocols.

While there are a variety of 'lists of risk', issues of injury to workers, from the setting, the environment and the tasks to be accomplished are always present. The environmental risks are ever present. While the environmental risks may vary between urban and rural settings and by geographic locations e.g. whether the category is a major one. Likewise the potential for violence is an ongoing concern for homecare

providers. Taylor and Donnelly summarized this as "Homecare is not a panacea for the high costs of institutional care. There are significant hazards facing homecare workers in the homes of clients including health hazards, injuries in moving and handling, verbal abuse and aggression. Such hazards were a major concern for the managers of homecare workers.".6

3   Risk Management by Prevention

The introduction of technologies into home care will demand new areas for risk management in the homecare setting. The prevention of unintended consequences from the technology is an overarching goal. The settings for homecare are less standardized than other healthcare settings as the setting is usually the patient/client's home. Homecare providers have less control over the environment, increasing the difficulty in risk management.   Prevention through design resulted from a NIOSH initiative launched in 2007.[7] The Prevention through Design Model involves three major components to achieve the goal:

1. Strategic Input
    (a) Research
    (b) Education
    (c) Practice
    (d) Policy
2. Strategic Planning
    (a) Incorporating occupational safety and health considerations
3. Implementation
    (a) Designing systems with the goal of reducing injuries and risk.

Prevention through design incorporates the usual steps in risk management:

1. Information Sharing
2. Risk Identification
3. Risk Assessment
4. Risk Management

And it more formally includes the research, education and practice policies to infuse the Risk Management Model with information external to each situation. The additional information gives a move complex view of the elements which can abate risk.

4   Risk Management by Design

We will present a comprehensive framework based on socio-technical approaches to the use of technology in health care and a multi-dimensional understanding of the impact of technology in health care to frame a better understanding of risk assessment in healthcare technologies. Sittig and Sing1 identified eight 'rights':

1. Right Hardware or Software
2. Right Content
3. Right Interface
4. Right Personnel
5. Right Workflow and Communication
6. Right Organizational Characteristics
7. Right State and Federal Policies and Regulations
8. Right Monitoring

We propose creating a grid using the identified categories of Prevention through Design and The 8 Rights identified by Sittig and Sing will create a model to better inform the steps in the risk management process. Figure 1 gives an example of how Prevention through Design and The 8 Rights can be combined. The resulting information grid is then used to 'inform' the risk management process.

	Hard-ware Soft-ware	Con-tent	Inter-face	Per-sonnel	Work-flow Comm.	Organiza-tional Character.	Pol-icy	Moni-toring
Input								
Research								
Education								
Practice								
Policy								
Planning								
Safety								
Implemen-tation								
Design								

Fig. 1. Integration of Prevention through Design and The 8 Rights

The combination of Prevention through Design and the 8 Rights give a richer framework for risk analysis.

5   Conclusions

Conventional risk management may not address the requirements of technology being introduced into homecare environments for nurses. We caution that the interaction between technology and the variables inherent in homecare settings warrant continued and cautious scrutiny.

References

1. Sittig, D., Singh, H.: Eight Rights of Safe Electronic Health Record Use. JAMA 302(10), 1111–1112 (2009)
2. Ellenbecker, C.H., Samia, L., Cushman, M.J., Alster, K.: Patient Safety and Quality in Home Health Care. Patient Safety and Quality: An Evidence-based Handbook for Nurses (2008), http://www.ahrq.gov/qual/nurseshdbk/
3. BLS.: 2000 Standard Occupational Codes (2000), http://www.bls.gov/oes/2002/oes_stru.htm
4. Armrich, A., Mayora, O., Bardram, J., Troster, G.: Pervasive Healthcare: Paving the Way for a Pervasice, User-centered and Preventive Healthcare Model. Methods of Information in Medicine 49(1), 67–73 (2010)
5. NIOSH.: State of the Sector: Healthcare and Social Assistance – Identification of Research Opportunities for the Next Decade of NORA (2009), http://www.cdc.gov/niosh/docs/2009-139/pdfs/2009-139.pdf
6. Taylor, B.J., Donnelly, M.: Risks to Home Care Workers: Professional Perspectives. Health, Risk & Society 8(3), 239–256 (2007), http://dx.doi.org/10.1080/13698570600871695
7. Lamba, A., Heckel, P.: Practice designing out hazards in the real world. Prof. Saf. 58(1), 34–40 (2013), http://www.asse.org/professionalsafety/search/index3.php