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Information Technology: RNs Contribute to Meaningful Use Criteria

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Introduction

According to an Institute of Medicine report, approximately 1.5 million people per year are harmed by medication errors resulting in 7,000 deaths annually in the United States.

According to Hillestad et al., medication errors and adverse drug events in ambulatory settings have been studied much less than in hospitals. “The available data suggest that roughly eight million outpatient events occur each year, of which one-third to one-half are preventable” (Hillestad et al, 2005).

There is also an expectation that when a patient needs to call a doctors office for a medication, whether it be for a recurring sinus infection or a refill of an anticoagulation medication, he/she would get the right medication, right dose and proper instructions.

It is a common practice for Registered Nurses (RNs) to authorize medication refills using a written protocol. The protocol outlines the criteria that must be met in order to honor a refill request. The criteria is designated by a physician, pharmacy and RN team and is intended to ensure the safety of the medication regimen. Nurses who have to refer to a lengthy paper protocol, might rely on their memory to fill a prescription, rather than review the protocol with each and every medication request. With the use of technology, it is possible to reduce the number of medication errors by incorporating the protocol within the electronic record rather than relying on memory to recall over a 1000 medications in a written protocol.

The practice of nursing in today’s healthcare has been affected by the growing need for implementation of information technology (IT) in all venues and the area of medication refills is no exception. The Institute of Medicine report, *To Err is Human* (1999), points to the need for

healthcare venues to implement computerized systems for physician order entry, medication administration, and electronic health records.

The Institute for Medication Safety defines a medication error as "any error occurring in the medication use process" (Bates et al, 1995). Medication errors can occur at different stages of the medication use process. It is critical to understand the causes of medication errors and their contributing factors so that necessary changes can be made to prevent them in the future. The potential for nursing informatics to enhance nursing practice, study clinical problem-solving and ultimately improve the quality of care has vast possibilities.

This article centers on the use of information technology, specifically SmartPhrases/macros, to reduce medication errors related to refill requests which is just *one* of the aspects of medication administration. The organization referred to in this article receives 1.2 million refill requests per year, and involved a team of RNs, physicians and a pharmacist to try to reduce medication errors and streamline the process of refill requests.

There are multiple steps involved when a patient requests a refill on their medication. Patients will call their pharmacy when they need a refill of their prescription medication. The pharmacy then contacts the ordering physician office with the prescription request. Next, an RN approves or denies the request based on a set of criteria determined by a committee of physicians and pharmacists. Last, the request is documented in the form of a protocol.

Registered Nurses play a significant role in the health care of individuals. Medication refills is one area where technology can be used to assist RNs by ensuring data is available and organized in one section of the patient's medical record. The goal of this project was to reduce medication errors by improving adherence to the written policy with the use of informatics, specifically, the use of SmartPhrase technology in the electronic health record.

RNs have the opportunity to find ways to use technology within the electronic medical record to contribute to improved patient care that would in turn support the US government's "Meaningful Use" program. "Meaningful Use" means providers need to show they're using certified electronic health record technology in ways that can be measured significantly in quality and in quantity. The American Recovery and Reinvestment Act of 2009 authorizes the Centers for Medicare & Medicaid Services to provide reimbursement incentives for eligible professionals and hospitals who are *successful* in becoming "meaningful users" of certified electronic health record (EHR) technology. Meeting the goal of "Meaningful Use" will become imperative for the future of healthcare organizations and their ability to survive. Achieving the goal means each member of the healthcare team must be proactive in meeting the criteria for meaningful use and reducing errors. Nursing educators have the opportunity to promote technology and creative thinking with their students.

History of Informatics

The health care professional's focus is either to prevent illness, maintain health/wellness or to treat patient's medical problems. But, in today's health care environment a duality exists around the health care professional because in addition to their moral and ethical need to help patients there is a business/financial element that they deal with daily. While they must care for patients effectively, the health care professional must also treat the patients efficiently. Recent government laws may allow the health care professionals and their business entities to blend this sometimes conflicting focus by providing financial incentives if specific system changes are implemented.

In 2004 then President Bush created a plan to promote the medical community to convert to electronic health records by 2014 to improve the quality and efficiency of the nation's health care. To begin the process he signed an executive order to create a new position called the Office of the National Coordinator for Health Information Technology (Athenahealth, 2009). In 2009 one of the provisions of The American Recovery and Reinvestment Act (ARRA) was the Health Information Technology for Economic and Clinical Health (HITECH). The HITECH provision expands the scope of the HIPAA Privacy and Security Rules and increases the penalties for HIPAA violations. In addition and possibly more important it provides Medicare and Medicaid financial incentives for hospitals and physicians to implement electronic health records and also provides grants for the development of a health information exchange (HIE). The financial incentives are based on "meaningful use" of certified EHR technology to achieve health and efficiency goals. "Meaningful use" as defined by the Centers for Medicare & Medicaid Services CMS means providers need to show they're using certified EHR technology in ways that can be measured significantly in quality and in quantity. The reduction of medication errors and fatalities would be an outstanding "meaningful use" of nursing informatics.

Ambulatory care electronic medical records (EMRs) typically include lists of problems, medications, allergies, tests, and other personal information. Advantages of using EMR's include: reduction in the cost of dictation and "chart pulls", improved efficiency (assisting in identifying the least expensive drug within a class of drugs), accessible 24 hours for 7 days a week, flag drug interactions and much more.

A 1998 study found that the implementation of a computerized physician order entry (CPOE) system in a large teaching hospital reduced medication error rates by 55% (Bates et al, 1998). While this is one aspect of the medication process, errors can also occur when a patient

calls the clinic requesting a refill on a medication. Examples of the types of errors that can occur are:

1. The medication the client is taking requires laboratory follow up which could be missed without a warning or reminder in place. With the use of informatics, a smartphrase can be written to pull laboratory data results (providing it exists) and the RN or physician can make a decision more efficiently and in some cases more accurately.
2. A refill of a medication might be requested when the client is due for a visit. With the use of informatics, a smartphrase can be built to pull visit data to an area of the chart which provides the information instantly for the RN or physician thus making it less likely to approve a medication when follow up care is needed.

Literature Review

Nurses are considered frontline providers who play an important role in medication administration. Fry & Dacey (2007), conducted a study that revealed that 33% of the 45 respondents involved in medication error incidents felt that they were incompetent, guilty and afraid of manager reactions. Twenty-four percent indicated they were scared, worried, and upset about reporting and feared the possible consequences of their act. Seventy-four percent indicated medication error incidents affected their practice and 18% acknowledged that the error reinforced their responsibility as a nurse.

Medline, CINAHL and EBSCOhost were searched for articles on medication errors using a combination of the terms medication errors, ambulatory setting and prescription refills. Articles between 1998 and 2009 revealed numerous studies related to errors made by RNs during the

administration of medication. However, few studies relate to the specific task of approval of refills in an ambulatory setting using informatics. This leads me to believe that this article has even greater importance because nurses in the ambulatory setting are responsible for approving medications which can alter a life or worse, could be fatal.

Burt & Hing (2005), state the Centers for Medicare and Medicaid Services expects to issue standards for electronic prescribing. In addition, the Federal government intends to fund research and demonstration projects for electronic health records systems. These efforts should help promote the use of supplemental systems within the electronic medical record system and will provide two more reasons to study the uncharted territory of prescription refills. In addition, nurses have the prime opportunity to demonstrate how *nursing* can impact medication errors and advance efficiency by using technology.

Electronic medical record systems have become more prevalent in hospitals, clinics and pharmacies in an attempt to consolidate patient information and provide safer care. According to a market research report (SK&A, 2010) generated from a telephone survey of almost 180,000 United States medical sites over half of hospital owned offices have electronic medical records. One study identified 22 medication error sources in a hospital setting (Burt & Hing, 2005).

Medication errors are a significant issue that can put the patient in harm's way, and can add to the cost of healthcare. Medication errors in the hospital setting are related to several variables, such as education, pressure for time, interruptions and legibility (Bates, Boyle, Vander, Schneider, & Leape, 1995). These variables also apply to the ambulatory care setting.

The problem of medication errors is extremely important for nursing. Every step in patient care for an RN involves a potential for error and to some degree, poses a risk to patient safety.

This is especially true with medication errors. A proper understanding of the contributing factors that increase medication errors is a step to better understand how to prevent them. The uniform exchange of patient information in health care demands a wide use of standards (Goossen, 2006). From nursing's perspective, there are several types of standards (such as input/output flowsheets and pain scales) and technology (electronic blood pressure devices) available that are necessary for information to be integrated within the electronic health record. The use of information models, such as clinical templates, to structure clinical information leads to the conclusion that this is a feasible and economic approach to the development and application of standards (Fry & Dacey, 2007). This information best supports this study.

Several articles supported the need for electronic medical record data which would resolve incomplete prescriptions and eliminate the illegible prescriptions.

Computerized feedback improved inappropriate prescribing of target drugs in the elderly and pharmacist intervention improved medication adherence (Fry & Dacey, 2007). While these are important factors related to medication administration, they do not reflect the work of RNs in the medication refill process, however the relevance of this article is that the more complex the medication regimen, the more likely there will be errors.

Nursing informatics (Information technology) might play an important role in the reconciliation of medications during an office visit. Informatics could aid the discharge nurse in adding medication education sheets in the post-visit summary for patients to take home. These are also opportunities that are factors in the meaningful use program. The interest of the researcher in the survey outlined in this article was to gain feedback from RN's using the smartphrase technology.

The literature review produced many articles on medication errors that support the use of information technology in a variety of ways. For example, nurses are taught to review the “five rights” when dispensing medication to the patient. Speaking from experience, the same steps must be taken to ensure the patient calling for a refill is a safe process. Additionally, the nurse must determine if the patient has had the necessary follow-up labs, a recent visit to the physician to ensure the medication is effective and verify when the last time the medication was refilled. When providing a medication refill the RN must answer all of these questions and review the patient history. The intention of studying one organization after the implementation of smartphrase technology, was to determine if the RNs perceived that the SmartPhrases/macros reduced medication errors and improve efficiency. SmartPhrases are timesaving tools for documenting information in the electronic record. With SmartPhrases, the nurse types a dot (period) and then a few characters and those will expand into a word, phrase or paragraph. For example: A patient requests a prescription refill on Lisinopril. If the policy states the patient has to have had a visit during the past six months for blood pressure (BP) and a BP < 130/80, a potassium within normal range, then you can refill the medication for 6 months. By using SmartPhrases, the nurse could type all the information within the policy as a smartphrase once and in the future type .lisinopril. The next time the nurse types .lisinopril in the electronic health record as the smartphrase it would expand all the information for you without having to type it again. In addition, the most recent BP and last visit date would automatically populate the field rather than having to search another area of the chart.

Gaps in the Literature

Although the literature pertaining to errors in health care has grown steadily over the last decade and some notable studies are particularly strong, there is very little research related to nursing informatics in the ambulatory setting. Nothing was found related to the use of smartphrases for refill requests, albeit RNs handling refill requests is a common practice in the ambulatory setting.

The Study

The purpose of the study was to determine if the use of SmartPhrases within the electronic medical record could reduce medication refill errors and improve the efficiency of RNs. This was a qualitative, cross-sectional study of a purposive sample of 92 RNs who work in 57 ambulatory clinics representing one large healthcare organization. The study was developed to gain the understanding of the RN's perception of improvement and efficiencies after the implementation of SmartPhrase technology. IRB approval was not necessary as patient identification was not needed nor shared.

Grounded theory approach was used to analyze the free-text responses. Survey monkey was used to distribute a 10-item questionnaire related to use of SmartPhrases. No identifying demographics of respondents was requested. It is important to note that each RN surveyed had at least one year of experience using a paper protocol prior to the implementation of the smartphrase technology. This was intentional in order to gain the perception of the before and after from our RNs. Four of the ten questions asked are listed in table 1. The questions not listed were free text comments provided by the RNs with suggestions for the upcoming protocol review. The use of survey monkey allows for anonymity for RNs to respond. Luc et al (2008) reports nurses acknowledged mistakes but did not disclose the incidents to patients and relatives and feared repercussions from management if reported. The intent of the study was

to gain an understanding of the RNs perception of how SmartPhrases/macros compared to the use of written protocols and their thoughts about improvements to the refill process and perceived efficiency.

Table 1: Respondent answers

<p>Do you feel the smartphrases have increased your productivity and efficiency?</p>	<table> <tr> <td>Yes</td> <td>92.8%</td> <td>90/97</td> <td>Respondents</td> </tr> <tr> <td>No</td> <td>2.1%</td> <td>2/97</td> <td></td> </tr> <tr> <td>Haven't used them</td> <td>3.1%</td> <td>3/97</td> <td></td> </tr> <tr> <td>Too early to tell</td> <td>3.1</td> <td>3/97</td> <td></td> </tr> </table>			Yes	92.8%	90/97	Respondents	No	2.1%	2/97		Haven't used them	3.1%	3/97		Too early to tell	3.1	3/97					
Yes	92.8%	90/97	Respondents																				
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Haven't used them	3.1%	3/97																					
Too early to tell	3.1	3/97																					
<p>How much time do you feel you have saved per day to do other duties when authorizing refills using the smartphrases?</p>	<table> <thead> <tr> <th>Amount of time saved</th> <th></th> <th></th> <th>Respondents</th> </tr> </thead> <tbody> <tr> <td>10%</td> <td></td> <td></td> <td>23.7% 23</td> </tr> <tr> <td>25%</td> <td></td> <td></td> <td>35.1% 34</td> </tr> <tr> <td>50%</td> <td></td> <td></td> <td>14.4% 14</td> </tr> <tr> <td>75%</td> <td></td> <td></td> <td>3.1% 3</td> </tr> </tbody> </table>			Amount of time saved			Respondents	10%			23.7% 23	25%			35.1% 34	50%			14.4% 14	75%			3.1% 3
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Unable to tell if I am saving time.						23.7%	23		
<p>Do you feel the smartphrases have increased your adherence to the policy?</p>	Respondents								
	Yes							87.6%	85
	No							6.2%	6
	Don't know							6.2%	6
<p>On a scale of 1 (worst) to 5 (being the best), how happy are you with the refill smartphrases?</p>	Not Happy (1)	(2)	Neutral (3)	(4)	Elated(5)				
	0	3	11.3%	55.7%	29.9%				

Summary Recommendation

To reduce medication errors, commitment at all levels of healthcare for patient safety is needed. This will require strong leadership from our government, collaboration from our Nursing and Medical Boards and, our nation’s educators.

Table 1 demonstrates 98.2% of the nurses surveyed perceive an improvement in productivity and efficiency with the use of SmartPhrase technology. More importantly, 87.6% of the nurses responded adherence to the policy on medication refills due to the efficiency and availability of the SmartPhrases. These results demonstrate technology can be used to increase patient safety if nurses report adherence to the policy when efficiency is realized.

As nurse educators we need to begin to change our practice by integrating the use of informatics in our curriculum and to stimulate learners to think of ways to improve the quality of care through the use of informatics. To do this, educators need to keep up with technology and educate students at every opportunity. Attention must be placed on reducing errors and finding ways to utilize technology to reduce medication error without sacrificing efficiency.

Educators will need to determine and act on the barriers which prevent nurse educators from being able to respond effectively to the rapidly changing technology. It is important to understand that an analysis of medication errors can help healthcare professionals identify why medication errors occur and how to develop processes that will minimize the errors. Equally important is to talk to the RNs and students who do the work to gather their input and perceptions.

Nurses practice in many settings, including hospitals, long-term care facilities, ambulatory care centers, and surgery centers. Most of these settings use the electronic medical record and some type of nursing informatics.

A way to identify potential use of nursing informatics is to create discussion with the learners about ways to improve patient care by using the electronic record. Questions that could be asked are:

1. What information would be ideal to have had at your fingertips during the time you cared for your client without having to locate it within different areas of the EMR?
2. Did you identify any nursing functions during the charting process that you would have to consistently repeat your documentation? Could a SmartPhrase replace these steps?

The National League for Nursing (Board of Governors Report, 2008, page 4) recommends the following for nursing faculty:

- Participate in faculty development programs to achieve competency in informatics.
- Designate an informatics champion in every school of nursing to: (a) help faculty distinguish between using instructional technologies to teach vs. using informatics to guide, document, analyze, and inform nursing practice, and (b) translate state-of-the-art practices in technology and informatics that need to be integrated into the curriculum.
- Incorporate informatics into the curriculum.
- Incorporate ANA-recognized standard nursing language and terminology into content.
- Identify clinical informatics exemplars, those drawn from clinical agencies and the community or from other nursing education programs, to serve as examples for the integration of informatics into the curriculum.
- Achieve competency through participation in faculty development programs.
- Partner with clinicians and informatics people at clinical agencies to help faculty and students develop competence in informatics.
- Collaborate with clinical agencies to ensure that students have hands-on experience with informatics tools.
- Collaborate with clinical agencies to demonstrate transformations in clinical practice produced by informatics.

- Establish criteria to evaluate informatics goals for faculty.

New graduates who develop knowledge, skills and attitudes in informatics will be able to participate in the design, selection, and evaluation of information technologies used in the support of patient care and better navigate within the electronic health record” (Cronewett et al, 2007).

It’s a day in the future, hopefully the near future. Someone drives to a pharmacy to pick up their new prescription and the chance of dying from a medication error is less than the chance of dying in a car accident on the way to the pharmacy. Today that wouldn’t be the case because more people die yearly from medication errors than they do in motor vehicle accidents (IOM, 1999). As nurse educators we have the unique opportunity and a fundamental role to provide our learners with the informatics technology that will allow them to be active participants in the meaningful use of that technology.

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