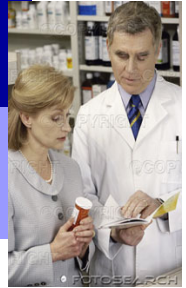


Pharmacists for Patient Safety

*Dyke Anderson Patient Safety Grant
Nebraska State Board of Pharmacy*



State of Patient Safety in Nebraska Pharmacy

December 2008

Preface

In 2006, the State Board of Pharmacy initiated a grant opportunity in honor of Mr. Dyke Anderson, a dedicated professional to pharmacists and their patients. *“Pharmacists for Patient Safety”* was selected as the first Dyke Anderson Patient Safety Grant project and will assist pharmacists in improving patient safety practices. This project is being led by the Creighton Health Services Research Program in the School of Pharmacy and Health Professions at Creighton University.

Pharmacists in Nebraska contributed their knowledge to help identify the patient safety risks that pharmacists are experiencing in practice. This report summarizes and describes the common, new, and informative errors and risks pharmacists have encountered as they have voluntarily shared their stories and experiences about system problems and errors, near misses, and risks in practice

This first report serves to educate us all about the state of safety in pharmacy practices. All survey responses and personal stories are confidential and will remain anonymous. The purpose of this report is to provide an evidence-base to next develop and assist pharmacists in identifying possible practice improvements, strategies, or areas of action for the newly emerging and “solvable” problems to improve patient safety.

This is the first comprehensive “State of Patient Safety in Nebraska Pharmacy” report in Nebraska.

We wish to express our gratitude on behalf of the State Board of Pharmacy and Creighton Health Services Research Program.



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Introduction

The 1999 Institute of Medicine report, “To Err is Human,” focused a social imperative on the reduction in patient harm in health care by improving patient safety.¹ The safety problem involving medication use became such a focus of attention that the Institute of Medicine prepared “Preventing Medication Errors” 2006 to inform health care professionals about the greatest problem areas that need attention.² The report highlights how pharmacists play a key and central role in patient safety, as health professionals who have arguably the most interaction and easiest access to patients. As pharmacy practice has grown increasingly complex, there is a need to determine the prevalent patient safety issues that have a timely concern to pharmacists and to help pharmacists develop approaches to minimize risk and harm.

Timely areas for pharmacists as medication use and system experts include the increased focus and involvement in medication therapy management (MTM). New technologies are being introduced in practice, bar code medication administration, e-prescribing, electronic and personal health records, and decision support systems. These technologies have the potential to improve both patient care and patient safety however; they also have the potential to create new and possibly more errors. The MTM and technology movements are forcing pharmacists to re-assess their use of time needs, and balancing those time needs with the need for continued patient safety efforts. Patient safety concerns are growing as health care delivery systems become more complex and pharmacists work to manage patient care within this context.

Purpose of This Project

The purpose of this project is to understand the different safety issues that Nebraska pharmacists currently face. This report is intended to inform Nebraska pharmacists, patients, health professionals, policy makers, scientists, and other stakeholders about these findings. The results are intended to be used to develop practice improvement recommendations and disseminate widely amongst pharmacists these findings in order to facilitate implementation of the best patient safety practices for pharmacists, their patients, and health professionals in Nebraska.

¹ Institute of Medicine. *To Err is Human: Building a Safer Health System*. Washington, DC: National Academy Press, 1999. Available at: <http://www.nap.edu>. Accessed September 2007.

² *Preventing Medication Errors*. National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; Accessed at <http://www.nap.edu>, December 2008.

How This Project Was Conducted

A cross-sectional survey entitled, *Pharmacists for Patient Safety*, was distributed to pharmacists in Nebraska between June and August of 2008 using a modified Dillman technique.³ The state of Nebraska licensure database was the primary record source to identify pharmacists. The project explored the different patient safety issues pharmacists currently face in practice, and their use of various forms of health information technologies.

Response

The survey was sent to 2,195 pharmacists who maintain a Nebraska pharmacist's license. The data analysis was conducted using responses obtained from pharmacists who were actively practicing at the time the survey was completed. Several retired pharmacists also responded and offered insights. There are 535 respondents (24.4%) who indicated they actively practice pharmacy in the state of Nebraska.

Data Analysis

Data analysis was conducted using both SPSS and SPSS Text Analysis. Both descriptive and inferential analyses are performed as appropriate. Aggregate results are reported, along with stratifications by practice setting. Meaningful qualitative responses to open-ended questions have also been provided.

Results and Recommendations

The remainder of this report provides a summary of the findings, implications and recommendations for action.

³ Dillman, Don A. (2007). *Mail and Internet Surveys The Tailored Design Method Second Edition*. Hoboken, NJ: John Wiley & Sons.

Pharmacist Demographics

Pharmacy Position

The majority of respondents were staff pharmacists (61%) from all health care practice settings, followed by owner/managers of community based pharmacies (20%), and directors of pharmacy in hospitals/health systems (9%). It is noteworthy that 40% of the independent pharmacy respondents were owner/managers. A small proportion of responding pharmacists (7%) described occupying varied roles in practice from staff or owner. These included clinical coordinator, and other management positions in pharmacy, such as supervisors, and relief work pharmacists. An additional 3% either provided multiple responses or no response.

Primary Practice Location

Respondents replied from all types of pharmacy settings. Table 1 below shows the distribution of respondents by pharmacy practice setting for this report.

Table 1. Primary Pharmacy Practice Location

Pharmacy Practice Setting ^a	Number of respondents (n)	Percent of respondents from each Practice Setting (%)
Independent Pharmacy	125	23.4%
Traditional Chain Pharmacy	120	22.4%
Grocery Chain	67	12.5%
Long Term Care	25	4.7%
Hospital	109	20.4%
Home Care	7	1.3%
Clinic	14	2.6%
Other/Multiple ^b	61	11.4%

a. Non-response rate 1.3%

b. Respondents in this category represented pharmacies that specialized in services such as compounding, mail-order, nuclear, home infusion, hospice care, home or long-term care specialty, pharmacy benefits management, clinical research and government affiliated pharmacies within the identified practice settings.

Additional Practice Location

One of four pharmacists (23.6%) reported working in at least two locations.

Years in Practice

These respondents have been licensed pharmacists for an average of 20.9 years, ranging from being in practice less than one year up to 69 years.

Hours Worked per Week

The average pharmacist reports working 37 hours/week at their primary practice location ranging from 2 hours to 87 hours/week. The table below presents the distribution of pharmacists reported work hours into typical work hour categories of employment.

Table 2. Hours Worked per Week

Work Hour Category of Employment	Frequency of respondents by category (n)	Percent of respondents by category (%)
< 20 hours per week	46	9%
20 – 32 hours per week	107	20%
> 32 – 40 hours per week	217	42%
> 40 – 45 hours per week	84	16%
> 45 – 50 hours per week	42	8%
> 50 hours per week	28	5%

Gender, Age and Race/Ethnicity

There were 302 female pharmacists (56.3%) compared to 233 (42.4%) male pharmacist respondents. The mean age of the practicing pharmacist is 46 years, ranging from 25 years to 91 years. The majority of respondents were White/Caucasian (95.4%), followed by Asian/Pacific Islander (1.3%), Hispanic (0.7%), and African American (0.4%), with 2.2% declining to indicate their race or ethnicity.

Pharmacists and Their Patient's Stories – Lessons and Outcomes

Patients' fears about a possible injury or harm and health professionals' fears of being involved in the inevitable error that hurts someone are well founded. Our understanding of the patient safety problem needs to be informed both in magnitude and in the personal meaning of what occurs. It is for these reasons that we have conducted this study by both using traditional survey questions to quantify findings, and also by soliciting short stories and comments by pharmacists who serve patients throughout the state.

Patient Stories about Safety Told to Pharmacists

Nearly one-half of the pharmacists (250 of the 535) shared a story with us that a patient communicated to them about a safety concern the patient had. This is a remarkable response. What is motivating about it is the willingness and readiness of pharmacists to discuss the stories in an effort to share their concerns and experiences with colleagues on behalf of improved patient care.

The patient's stories about safety that are told to pharmacists provide us rich insight into the problems patients experience with medications and health care delivery. The stories have been classified according to the central concern, error or problem expressed in the story. Several hospitalizations resulted from patients having a known allergy to a medication but the prescriber not being aware of it and prescribing a medication the patient was allergic to. A few dispensing errors reached the patient resulting in the patient making an emergency room visit and hospitalization.

The stories about safety that patients told their pharmacists are organized by problem experienced in Appendix A.

Pharmacists' Own Safety Stories

Pharmacists described their own safety stories. There were 362 different descriptions of errors or near misses that they had either observed or were directly involved in the previous six months. These errors and near misses primarily involved incorrect medications, doses, instructions, quantities, formulations, or the wrong patient. Most of the errors did not result in patient harm, but they did cause patients and providers to be inconvenienced, and in many cases, reduced the level of trust the patient previously had with the pharmacist/pharmacy. The vast majority of these problems were attributed to

workload issues causing pharmacists to rush and not properly check the medications that were being dispensed. A few examples of stories about errors that actually caused harm or other negative consequences were also shared.

A detailed description of the pharmacist’s own stories of errors and near misses is provided in Appendix B.

Pharmacist Involvement in Errors or Near Misses

The same area of study was included on the quantitative survey to determine the most recent activity and experiences of pharmacists related to errors and near misses.

One-third of pharmacists reported having been involved in an error in the last six months. About half of all respondents have either observed an error or a “near miss” in the last six months. It is apparent that pharmacists face patient safety issues everyday. These issues stem from a variety of causes, many of which are described here. Table 3 describes the frequency of pharmacists reporting some error or near miss involvement as categorized by practice setting.

Table 3. Errors and Near Misses

Have you been involved in or observed any errors or “near misses” in the last 6 months?						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/ Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Involved in an error	46.2	52.8	31.2	45.2	32.0	30
Involved in a “near miss”	72.5	74.8	56.2	65.0	61.4	49
Observed an error	58.7	75.6	35.7	73.4	56.1	46
Observed a “near miss”	73.3	82.4	68.8	80.5	64.9	52

The non-response rate ranged from 33-39%. We chose to use valid percent, or the percent based on responses only.

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Pharmacists also made it a point to note that errors and near misses are a standard occurrence, even with double checks. Workload was mentioned as a potential cause of errors. A concern about the confidential nature of commission of errors was expressed very well by one pharmacist:

“Every day we catch errors. I can not remember any from the past 6 months that have progressed on to the patient. [This is because] our workload is now manageable. Most of the errors I remember were under horrendous workloads.”

Pharmacists were asked to describe safety stories told to them by their patients, their own safety concerns and experiences, and potential solutions for improvement that they believe are needed. The picture presented provides a framework for the overarching problems Nebraska pharmacists currently face.

Pharmacist Safety Issues and Suggestions for Improvement

Pharmacists shared 649 safety issues they have encountered in their pharmacy practice and suggested proposed solutions to these issues. A wide range of safety issues were described, with the most common being workload, medication reconciliation/polypharmacy issues leading to incomplete records, problems with prescriber legibility, look-alike/sound-alike medications, and dispensing the wrong medication to a patient. The most common safety issues are presented below, along with pharmacists' suggestions for addressing each issue.

A detailed description of the pharmacist's own ideas for how to improve health care delivery and practice in response to some of the safety issues is described in Appendix C.

Pharmacists Practice and Patient Safety Issues

Telephone, Facsimile, E-mail and Computer Transmission of Prescriptions to Pharmacists

It is well accepted that patients will bring hard-copy prescriptions into a pharmacy. This summary informs us about the other ways that prescriptions are received. Pharmacists report accepting prescriptions primarily through fax and over the telephone, however, almost two-thirds of pharmacists are able to accept prescriptions through direct communication from the prescriber to the pharmacy system, and almost one-third accept prescriptions via e-mail.

The fact that two-thirds of respondents are able to accept prescriptions through direct communication to the pharmacy system indicates an increased level of technological sophistication, and may also indicate the proliferation of electronic health records. A reason for low e-mail prescription acceptance may be due to security issues (e.g. not being able to determine if the e-mail legitimately came from the prescriber). Additional findings are shown in Table 4.

Table 4. Method of Prescription Transmission

The pharmacy I work at accepts prescriptions by:						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Fax machine	100	99.5	88.0	73.4	87.8	91
E-mail	31.2	42.2	12.0	8.3	24.4	28
Direct communication from the prescriber to the pharmacy system	53.6	84.5	44.0	49.5	59.8	64
Telephone	100	99.5	84.0	76.1	84.1	91

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Pharmacists in outpatient settings reported accepting more prescriptions through all methods listed compared to inpatient pharmacists. This disparity may be due to inpatient pharmacists primarily receiving prescriptions through written orders in patient charts or having nurses hand deliver prescriptions.

This question generated individual comments from over 300 of the pharmacist respondents. Many of the pharmacists surveyed described limitations to their current systems in the context of accepting prescriptions via different media or technologies. The most frequent comment was “not equipped for it yet,” referring to e-mail and direct exchange from the prescriber to the pharmacy system. Several commented that they could not accept email prescriptions because of

lack of security in their e-mail systems. Some also commented that e-mail is not an accessible service through the pharmacy that they work in. Others indicated that they do not have sufficient sophistication in their existing technologies to support e-mail, or direct communication from the prescriber to the pharmacy system. Some pharmacists indicated that they just do not want to deal with the difficulties of making a change to the prescription system.

Pharmacist Safety Practices and Workload

An alarming finding is that 24% of pharmacists feel that their workload negatively impacts patient safety. Only 44% of pharmacists agreed or strongly agreed that their workload does not compromise patient safety. These responses are displayed in Table 5.

Some pharmacists (16%) feel that they do not have enough time to repeat back orders on the phone. Additionally, though it is a standard of practice for pharmacists to repeat telephone orders back to verify accuracy, only 70% of pharmacists across all practice settings felt that they had the time to perform this action. This is a larger problem in the outpatient setting, where 15% of respondents felt that they did not have time to verify verbal orders compared to 5% of their inpatient counterparts. This may also be due to pharmacists in the inpatient setting taking fewer verbal orders overall (see Table 4). Feelings about workload were nearly identical in the two groups (see Table 6).

Table 5. Time Perceptions of Pharmacists

I have time to routinely repeat telephone orders back to verify the accuracy of the information						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Strongly Agree	19.2	11.2	24.0	32.1	30.5	21
Agree	53.6	46.5	60.0	55.0	37.8	49
Neutral	12.8	17.6	8.0	3.7	12.2	12
Disagree	10.4	19.8	4.0	5.5	13.4	13
Strongly Disagree	3.2	3.7	0	0.9	1.2	3

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Table 6. Workload Perceptions of Pharmacists

My workload is so high that I believe it compromises patient safety						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Strongly Agree	0.8	7.5	8.0	4.6	4.9	5
Agree	20.8	19.8	16.0	22.0	14.6	19
Neutral	31.2	28.9	20.0	29.4	34.1	30
Disagree	29.6	39.6	44.0	36.7	28.0	35
Strongly Disagree	16.0	3.2	8.0	5.5	13.4	9

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Pharmacist Access to Drug Information Sources While Practicing

Though pharmacists access drug information in a variety of ways, most use a computer to do so. A smaller number carry pocket references or access drug information on their PDA. Alarming, 5% of pharmacists report not having immediate access to drug information sources where they practice.

Though state law requires pharmacies to maintain updated drug information resources, 5% of respondents do not have a resource readily available. These respondents may still have access to drug information sources, but in a different form. For instance, despite the proliferation of online references, many pharmacists still utilize hardcopy references in the pharmacy (e.g. Facts and Comparisons). The methods pharmacists use to access resources are in Table 7.

Table 7. Access to Drug Information

During patient care activities, how do you access drug information sources?						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Carry pocket references	31.2	35.8	44.0	57.8	45.1	41
Accessible via computer as a networked resource	88.0	94.1	80.0	93.6	87.8	90
I have drug information references on a hand held device (PDA)	20.8	22.5	40.0	45.9	20.7	27
I do not have immediate access to drug information sources	4.8	6.4	4.0	0	4.9	5

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Pharmacist Access to Language Appropriate Counseling Information

About half of pharmacists are able to provide non-English speaking patients with relevant medication information. Less than one-third of pharmacists do not have the resources to provide this information.

The fact that only half of pharmacists having non-English language resources readily available is also disconcerting, given the large Spanish-speaking population in Nebraska. With a state population estimate of 6% and growing number of Spanish-speaking individuals, it is obvious that poor communication about proper medication use and safety will result in more injuries and harm. Individuals who experience harm and injury from medication errors are often isolated and many do not tell their story to pharmacists or other health professionals. This isolation is a greater challenge to a non-English speaking

person who have difficulty engaging someone who can help. The findings from this survey about access to language-appropriate availability of written information are shown in Table 8.

Table 8. Non-English Language Resources

We have the resources available to provide language-appropriate written information about medications to patients who do not speak English						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Strongly Agree	13.6	22.5	0	16.5	14.6	17
Agree	36.0	27.8	20.0	45.0	35.4	34
Neutral	15.2	17.1	24.0	16.5	19.5	17
Disagree	19.2	18.2	24.0	13.8	17.1	18
Strongly Disagree	14.4	13.4	28.0	6.4	7.3	12

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Pharmacist Error Minimization through Inventory Management Best Practices

About two-thirds of pharmacists report checking new items to see if they look or sound like an existing medication, and to make sure its storage location is away from other products it might be confused with. About half of respondents make sure new items are stored away from packages of the same drug with different routes of administration. Only 87% of pharmacists report shelving new items so that their labels are readable. These findings are shown in Table 9.

Table 9. Inventory Management Best Practices

When a new item is added to the pharmacy's drug inventory, do you check to see if:						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Its name looks or sounds like other products it might be confused with	67.2	61.0	56.0	70.6	64.6	65
Its packaging looks similar to other products it might be confused with	63.2	67.4	56.0	67.0	58.5	64
The storage location is away from products it might be confused with	62.4	56.7	60.0	65.1	67.1	62
Its storage location is away from packages of the same drug with different routes of administration	56.8	46.0	68.0	66.1	56.1	55
It is shelved so the labels face forward and are readable	89.6	93.6	88.0	78.0	79.3	87

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Despite the focus that has been placed on look-alike, sound-alike medications, there is substantial room for improvement in the profession of pharmacy to apply known safety practices. Familiarity with product names, uses, and placement within the pharmacy may lead pharmacists to adopting habits of convenience in drug inventory management. This product familiarity may also lead to pharmacists believing that their practices are safer than they actually are.

There are some pharmacists who do not have control over drug inventory and storage locations. Other employees in pharmacy will need to be educated about optimal safety practices in these settings.

Patient Safety Issues Specific to Outpatient Pharmacy Practice

Time Spent by Pharmacists Resolving Cost, Formulary and Personalizing a Prescription Regimen

Pharmacists report spending on average 29% of their day on either contacting insurance companies/PBMs to conform to a formulary; prescribers to approve to a cheaper medication; or prescribers to approve a medication that will match a patient's lifestyle. See Table 10 for a detailed breakdown.

These responses reflect the time pharmacists directly spend on these activities. They also delegate these responsibilities to pharmacy interns or technicians providing time to concentrate on filling, dispensing, and counseling. We have not accounted for the time spent by technical support in addition to the pharmacists' time to complete these tasks.

Table 10. Outpatient Pharmacists' Daily Activities

Time Spent Each Day by Pharmacist	Independent Pharmacy (mean response)	Chain/Grocery Pharmacy (mean response)
Insurance companies/pharmacy benefit managers to conform to a formulary	14.5	13.8
Prescribers to approve switching to a less expensive medication	9.8	10.8
Prescribers to approve switching to a medication that will match the patient's lifestyle	4.5	5.8

How New Prescriptions are Transmitted to Pharmacists

While errors and near misses are quite commonly associated with poor handwriting by prescribers and telephoned prescriptions that are not pronounced and spelled clearly, these two methods remain most common.

Table 11. Method of New Prescription Transmission

Please estimate the percentage of prescriptions received through the following methods:	Independent Pharmacy (mean response)	Chain/Grocery Pharmacy (mean response)
Fax machine	23.6	24.1
Email	2.3	2.7
Direct communication from the prescriber to the pharmacy system	6.6	7.8
Telephone	40.2	32.6
Traditional handwritten prescription	29.2	33.6

How Prescription Refill Requests are Transmitted to Pharmacists

Patients typically make refill requests over the telephone or in-person. Telephone requests may be through a dedicated medication refill voice messaging system (38%) or through general voice mail (30%). Once again, use of email requests is low (3%).

One pharmacist indicates that phone refill requests go directly to the computer some 40% of the time and the other 60% is face-to-face. Another indicated their entire system receives prescriptions via fax. The frequency of refill requests through these various mechanisms is displayed in Table 12.

Table 12. Method of Refill Requests

Please estimate the percentage of refill requests made by patients to your pharmacy using these routes:	Independent Pharmacy (mean response)	Chain/Grocery Pharmacy (mean response)
In person	40.8	28.7
Email	1.8	4.2
Telephone refill requests to a dedicated medication refill voice messaging system	17.1	47.4
Telephone refill request – general voice mail messages accepted for this purpose	43.0	21.1

Pharmacists, Emerging Health Information Technology, and Safety

Both benefits and problems occur with the variety of health information technologies currently in use. For instance, technologies such as e-prescribing may save pharmacists time by reducing handwriting issues, but may also require just as much time to clarify a prescription if the physician inadvertently selects the wrong medication through a touch screen or pull down menu error. Substantial time and financial investments are made in order to successfully implement these technologies. It is common for health care providers to experience frustration as the transition to “better” technologies is being made, resulting in many “opting out” of use when such choices are voluntary. Even after new technologies are in place, issues such as lack of interoperability between systems and devices are very common. This results in suboptimal realization of the intended value of many technologies. *The “theoretical” benefits of technology implementation into practice may not always be fully realized, or are realized slower than expected*

In this section of the report, the common health technologies presently in use in pharmacy are described. Both findings from evidence-based literature along with the positive and negative consequences associated with the use of each type reported by pharmacists in our state are described.

How Pharmacists Learn to Incorporate New Technologies into Practice

The introduction of new technologies into health care delivery is an increasing and ever growing aspect of the pharmacist's daily work. Many of these new technologies are oriented toward preparation, dispensing, administering and/or managing the myriad of medications used. How pharmacists learn the use of a new technology may influence the potential for errors and mishaps.

How New Technologies Reduce and Increase Errors

While the ultimate goal of health information technology is to improve the quality and safety of patient care, we also see new problems emerge with their introduction and use. Some technologies show a clear value in reducing medical errors, and also introduce new types of errors often result of a change in process or procedures.

There were 540 entries about the types of errors that the use of a technology reduced and the types of errors that were observed with each specific technology. The technologies studies specifically included:

- E-prescribing,
- Computer prescriber order entry (CPOE),
- Automated dispensing machines,
- Prescription vending machines,
- Bar code scanning,
- Radiofrequency identification tags,
- Infusion pumps,
- PYXIS system,
- Baker cells,
- Smart Infusion Pumps,
- Insulin Infusion Pumps,
- Electronic Drug Information Sources,
- Clinical Decision Support Rules in the Computer System,
- Other miscellaneous technologies pharmacists chose to mention.

Appendix D provides a listing of the about the types of errors that the use of a technology reduced and the types of errors that were observed with each specific technology listed.

Health Information Management and Pharmacists Experiences

Pharmacists' Observations about How Their Patients Track Health Information

Overall, 93% of pharmacists have observed their patients documenting personal health information in some way. Most indicate that they observe this in several ways. The most common method is patients listing their medications on a paper record (87%). Many patients also track the common conditions or diseases that they have (52%). Some 9% of the pharmacists know that some of their patients access a Personal Health Record (PHR) website and 1% report that their patients carry a USB drive with their PHR information (Table13).

Table 13. Pharmacist Awareness of Patient PHR Use

Please identify all the ways you have observed your patients documenting personal health information. ^{ab}						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
I have not observed my patients using any method	14.4	6.4	36	3.7	19.5	7
List of medications on a paper record	86.4	93	60	86.2	82.9	87
List of conditions or diseases on a paper record	43.2	56.1	20	57.8	56.1	52
Patient accesses web site to a PHR	8	13.9	12	3.7	8.5	9
Carries a USB drive with a PHR	0	1.1	0	1.8	1.2	1

a. The percentages reported will not add to 100% because pharmacists could select all options they have observed.

b. Other methods of PHR documentation are in the discussion section for this table.

c. Home care, clinic and specialty pharmacies are included in this category of responses.

It is worth noting that between 7% and 20% of the pharmacists who responded to this survey use a PHR *personally*, depending upon their practice setting. More pharmacists in hospital and chain pharmacy reported using a PHR compared other practice settings. In order for PHR adoption to be realized in the patients, it may also require that health professionals gain personal experience in how to use a PHR. This data indicates that PHRs are in early adoption phases within the profession of pharmacy and that some pharmacists are already gaining personal expertise in their use.

A variety of practices by patients were reported by pharmacists. A very common practice is for patients to request a print-out of their medications annually from their pharmacy(ies) as a retrospective method of documenting their medication use. Some pharmacists viewed patients using Med-Alert bracelets as a form of documenting their own personal health information and reported this activity. A few pharmacists also observed patients using technology such as PDAs to keep track of their personal health information.

Patients recognize the importance of exchanging information even when they don't have access to it themselves. For example, patients have asked health organizations such as hospitals to share their health information with other professionals (i.e. an individual exchange of information) without asking for written or electronic documentation for themselves.

Some patients try to rely purely on their memory to recall relevant health information, while others depend on family members. Some patients have no awareness concerning the need to keep track of their health information.

Pharmacists' Experiences with Patients and Their PHRs

It is fairly common for pharmacists to be involved in assisting patients who have PHRs. Many report being able to access information to assist the patient, however, far fewer are able to actually transfer information between the pharmacy and the patient's PHR. Most activity related to PHR use at this time is related to either providing information or viewing information of the patients PHR.

Table 14. Pharmacist Engagement with Patient PHRs

What is your experience with patients who have PHRs? ^a						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/ Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Our pharmacy provides patients with assistance using their PHRs	47.2	46.0	24.0	39.4	29.3	41
I am able to upload the patient PHR info into my pharmacy computer	4.8	5.3	4.0	10.1	13.4	7
I am able to access information to assist the patient	17.6	25.1	32.0	22.0	31.7	24
I am able to transfer information from my pharmacy system to my patients' PHR	4.0	8.0	76.0	11.0	9.8	8

a. Non-response rate 1.3%

c. Home care, clinic and specialty pharmacies are included in this category of responses.

The value of a PHR may be realized in both the ambulatory and institutional setting. One pharmacist notes, “*We enter all home medicines into our computer system manually to reconcile upon discharge.*” This pharmacist is performing the equivalent of a medication history and tracking all medication use for the patient. This is going to be an essential step for future seamless health information exchange. This is likely to become a key role for pharmacists in all health care settings.

Electronic Health Records and Pharmacists

Over half of pharmacists stated that their pharmacy does not plan to adopt an EHR. Only 23% of pharmacists either have an EHR or plan to adopt one in the future. Many of the pharmacists (11%) were unsure if there are plans to adopt an EHR or not within their primary pharmacy location. Hospital pharmacies and clinic and specialty pharmacies have the most involvement with electronic health records. Community/outpatient pharmacies typically contain the pharmacy record, which is often not part of a comprehensive EHR. At this point in time, outpatient pharmacies are slow to consider a transition from a pharmacy-specific record to a comprehensive health record. Those in the hospital setting typically indicate that the information technology department is responsible for this, if they have such a department. Others indicate that management is engaged in this and that they are not involved (Table 15).

Table 15. *Electronic Health Record Status*

What plans does your pharmacy have to adopt an EHR?						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
We have an EHR	0.8	4.1	0	35.3	22.7	11
We plan to adopt an EHR	9.2	11.7	17.4	17.6	12.0	12
We do not plan to adopt an EHR	81.5	62.6	78.3	37.3	61.3	58
I do not know what our plans are for an EHR	8.4	21.6	4.3	9.8	4.0	11

c. Home care, clinic and specialty pharmacies are included in this category of responses.

A very small number of pharmacists (16%) have had prior experience using an electronic health record (EHR). A much larger number of inpatient pharmacists report prior experience with an EHR (36%) compared to their counterparts in the outpatient setting (6%). This discrepancy may be explained by the promotion of EHR adoption within the hospital setting, often supported through federal financial incentive programs to hospitals and clinic systems, and physician offices.

Pharmacists' Attitudes about Exchanging Health Information with Other Providers

Over 80% of pharmacists felt that they should have access to their patients' EHRs created by other providers. However, only 8% indicated that they had access to electronic patient information from other providers at this time.

Almost all inpatient pharmacists were more likely to feel they should have access to patient EHRs created by other providers (97%) compared to outpatient pharmacists (78%). Inpatient pharmacists also reported increased access to electronic patient information from other providers (17%) compared to 3% of outpatient pharmacists. Inpatient pharmacists may expect a greater degree of access because many are already able to obtain some form of patient information. Additionally, inpatient pharmacists are more likely to be in a health system utilizing shared patient records.

There were only eight pharmacists who indicated they were unsure if the pharmacist should have access to the patient electronic health record. The remaining pharmacists were either enthusiastically positive about this, or very clearly negative about this idea. Several commented that the access to the patients EHR should be under the patients control and that it was situational.

Some pharmacists commented that they do have access to the patient's electronic health information; however, it was within the health system (e.g. doctors' offices within the health system network). There is not much activity with electronic record or health information exchange outside of health system networks. These results are displayed in Table 16.

Table 16. Opinions about Electronic Health Information Exchange

Which of the following should pharmacists make available electronically to share with other health care professionals?						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/ Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Health history	65.6	76.5	60.0	73.4	74.4	72
Medication history	91.2	97.9	92.0	96.3	91.5	94
Progress notes	50.4	51.3	60.0	72.5	61.0	57
Lab data	50.4	62.0	64.0	82.6	68.3	64
Allergies	88.8	95.2	92.0	96.3	91.5	93
Immunizations	59.2	63.6	72.0	84.4	78.0	69

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Though pharmacists feel that they should share a wide range of information electronically with other providers, their focus is primarily on providing medication

history and allergy information. This has traditionally been the focus of pharmacy practice, and is information the pharmacist interviews patients about directly.

A greater number of inpatient pharmacists than outpatient pharmacists report favoring the sharing of progress notes (73% vs. 51%), lab data (83% vs. 57%), and immunizations (84% vs. 62%). This information is often much easier to obtain in an inpatient setting at this time. However, with the expansion of advanced community practices, pharmacists in the outpatient setting are increasingly a primary provider of drug monitoring and immunization services. The patients' records about this aspect of care from the pharmacist become essential to other care providers.

Some creative care information was described by pharmacists in response to this question. Some pharmacists commented that they specifically record the patient's actual medication taking behavior, MTM monitoring information, other medications used such as OTCs, vitamins and supplements, refill histories and other expanded information about the patients medication use. Others described that they keep track of drug abusers and drug seeking behavior in the patient's record.

Special Circumstances of Health Information Exchange

Half of the respondents (50%) felt there were circumstances where a patient's medical records should be accessible to others without the patient's expressed consent. Some 240 pharmacists offered specific circumstances for this access. These pharmacists described these situations as:

- Emergency situations
- Drug seeking behavior or drug abuse
- Upon hospital admission
- When a patient is unconscious
- When patient has a known allergy, has diabetes, has hypertension, stroke, heart attack
- When family is unavailable
- Any health care provider with a license and a need to know
- Any health care provider chosen by the patient and a need to know
- Any time the patients health needs override the ability to obtain consent
- Information needed to prevent death or spread of a communicable disease
- Court order
- Criminal proceedings
- If it is a safety issue to the patient or the person asking the question
- If patient expresses intent to hurt self or others
- If patient is a ward of the state or living in a group home
- To maintain patient safety these records should be available
- To other health care providers to determine their course of treatment

Pharmacists' Familiarity with Regional Health Information Organizations (RHIOs)

Over half of all respondents indicated that they were not familiar with what a RHIO is. Even for pharmacists who do know what a RHIO is, participation in one is almost non-existent. This finding is surprising, given that four RHIOs have been established in different parts of the state. This lack of awareness may be due to pharmacists being less engaged in information exchange at the present time. Education and awareness about RHIOs is an important area for development in pharmacy. Details about pharmacists and RHIOs are in Table 17.

Table 17. *Involvement with Regional Health Information Organizations*

What is your current involvement with a RHIO?						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
I am not familiar with what a RHIO is	51.2	57.2	56.0	55.0	50.0	54
There is a RHIO forming in our area	0	2.1	0	2.8	2.4	2
Our pharmacy has been approached to participate in a RHIO	0.8	1.1	0	1.8	1.2	1
Pharmacy exchanges health info data as part of a RHIO	0	1.1	0	1.8	1.2	1

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Type of Clinical Patient Care Information Pharmacists Maintain in Their Pharmacy Records

Pharmacists maintain patient care records when they directly interview and examine patients in their pharmacy practice settings. Though nearly all pharmacists keep track of patient allergies in their pharmacy record, there was no one type of clinical patient information listed that was kept by greater than 48% of pharmacists. Table 8 provides details about this finding.

Several pharmacists indicated that their pharmacy systems were capable of recording and storing all of the health information types listed in Table 18, but did not actually use this capacity. Pharmacists in hospitals often made an effort to indicate that the hospitals primary record system maintained some of these items and others were actually maintained in the pharmacy system.

Table 18. Patient Information in Pharmacy Records

Which of the following information about the patient do you maintain in your pharmacy records?						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Comorbid and/or chronic conditions	29.6	44.9	68.0	62.4	54.9	48
Renal impairment	13.6	21.4	44.0	74.3	40.2	34
Liver impairment	10.4	20.3	32.0	55.0	37.8	28
Pregnancy	32.0	35.3	16.0	54.1	47.6	39
Lactation	9.6	17.6	16.0	45.9	36.6	24
Allergies	88.0	95.7	92.0	91.7	86.6	91
Height	4.8	0.5	24.0	85.3	40.2	26
Weight	4.8	1.1	28.0	85.3	40.2	26
Smoking status	7.2	2.1	12.0	33.0	29.3	14
Alcohol consumption	4.8	0.5	8.0	33.0	26.8	13

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Voluntary Error Reporting by Pharmacists and Reporting Incentives

Overall, 34% of pharmacists in both inpatient and outpatient settings report that management provides incentives to report errors in their pharmacy. More inpatient practice pharmacists (51%) choose to report errors to external voluntary error reporting programs, compared to 24% of outpatient pharmacists. The focus placed on improving patient safety in the inpatient setting (e.g. JCAHO), may be a reason for this disparity. There is a strong correlation between management providing positive incentives for error reporting and the actual reporting of errors to external agencies ($r = .736$; $p < .000$).

Table 19. Positive Incentives for Error Reporting

Management provides positive incentives for individuals to report errors						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Strongly Agree	9.6	4.3	8.0	12.8	15.9	9
Agree	25.6	26.7	16.0	23.9	20.7	25
Neutral	36.0	35.3	28.0	31.2	30.5	33
Disagree	20.8	23.0	32.0	18.3	19.5	21
Strongly Disagree	4.8	8.6	12.0	7.3	6.1	7

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Table 20. Error Reporting by Pharmacists

We report errors to external voluntary reporting programs (e.g. FDA Medwatch, CDC)						
	Responses in Per Cent by Practice Setting					
	Independent Pharmacy	Grocery/Chain Pharmacy	Long Term Care	Hospital	Other ^c	Overall
Strongly Agree	4.0	4.3	8.0	13.8	12.2	8
Agree	14.4	23.0	16.0	42.2	34.1	26
Neutral	36.8	32.6	36.0	25.7	23.2	31
Disagree	36.0	27.3	20.0	12.8	12.2	23
Strongly Disagree	6.4	11.8	16.0	0.9	11.0	8

c. Home care, clinic and specialty pharmacies are included in this category of responses.

Pharmacist Willingness to Share Patient Safety Experiences and Suggestions for Improving Practice through a Common Database

Overall, 42% of pharmacists indicate they are willing to share patient safety experiences and suggestions for improving practice through a common database. Pharmacists who are not willing to enter practice improvements and safety issues into a database cite time as the major barrier to doing so. Some pharmacists also report that their organization already participates in an error-reporting program (e.g. pqc.net). There are some pharmacists that also feel they must receive prior approval from management in their organization in order to participate in such a program.

Conclusions and Recommendations

This report informs pharmacists and others about current safety problems and potential solutions. The findings serve as a baseline to support the future efforts of pharmacists to improve patient safety on behalf of their patients and colleagues.

The pharmacist and patient experiences reveal that there is much improvement that is needed surrounding Nebraska pharmacy practice. It is not surprising that so many pharmacists have told us their stories. What is motivating about it is the willingness and readiness of pharmacists to engage. Their stories are quite varied and demonstrate the many ways and concerns of patients and pharmacists about their medication safety. Pharmacists want to establish a communication network with feedback to assist with improving practice for the benefit of their patient's safety.

Patient safety is an ongoing learning and dissemination model for professionals and their patients. Pharmacist reporting is an essential activity for the purposes of learning and improving the patient safety experience for patients. Establishing a rapid response feedback system with solution dissemination state-wide is an inevitable next step to quality improvement and safety in pharmacy practice. Ongoing educational efforts that emphasize safe practices and safe decisions, especially with regard to adoption of health information technologies is an essential need of the profession.

Recommendations:

1. The state of Nebraska should continue to fund the Dyke Anderson Pharmacists for Patient Safety Project to completion, as proposed. This includes:

- Wide dissemination of the report to stakeholders in the state
- Dissemination of the report through the CHRP website
- Establishment of a reporting mechanism through the CHRP website
- Establishment of a patient safety expert panel to recommend safety improvement actions within the CHRP mechanism in response to pharmacist reports in the state
- Establishment of an accelerated response system to recommend improvements to consider for adoption back to pharmacists in the state.

The need to continue the *Dyke Anderson Pharmacists for Patient Safety Project* to outreach and assist pharmacists and their patients with safety information and solution support is supported by the findings. To our knowledge, the only

organized effort in the state by pharmacists to collectively work together toward an effort to improve patient safety in their practices and within their communities is this project sponsored by the State Board of Pharmacy through the Nebraska Health and Human Services Department.

2. The Nebraska State Board of Pharmacy should recognize, support and encourage pharmacists to participate in the CHRP as a state-based patient safety organization for reporting patient safety problems. The benefits of participations will be to learn on-going safety science knowledge and how to incorporate improvements related to patient safety into practice.

3. The Nebraska State Board of Pharmacy should fund a required reevaluation of the CHRP patient safety reporting and accelerated response program in two years following its implementation to determine the on-going need and the effectiveness of the program for pharmacists and their patients.

Appendix A

Patient Stories about Safety Told to Pharmacists

The number in parentheses reflects the number of pharmacists that mentioned this type of story told to them by a patient.

Wrong Medication, Dose, and Duplication of Therapy

There are times when patients express concern that they are taking or have received the wrong medication. This can result from a change in the medication's appearance (discussed earlier with the switch to a different generic supplier, or the change in color, shape, or size of the medication) or other circumstances. However, some patients do indeed receive the wrong medication, and there are many ways this can happen. A prescription may be filled with a look-alike, sound-alike medication instead of the one actually prescribed, the wrong prescription could be refilled for a patient, or patients with similar sounding names can accidentally be given medication intended for someone else.

- **Wrong Medication/ Sound-alike Patient Name Mix Up (16)**
 - A patient left our pharmacy with someone else's medications because of "sound-alike" names
 - One of our patients received someone else's medicine (antibiotic) and they did take a dose. The patient called back and we fixed the problem and patient was very concerned about others getting the wrong prescription.
- **Wrong Medication Dispensed (16)**
 - Dispensed hydralazine instead of hydroxyzine. They always check their Rx's to make sure they match the description of what the pills look like and it didn't
 - Pt received wrong medicine due to physician writing "continue home medicines." Pt was incorrect on what she was taking. No one checked on the medicines with the pharmacy.
- **Medical Record not Up-to-Date or do not Match Discharge Summary resulting in Wrong/Duplication Prescription Medications Used (14)**
 - Doctor writing the wrong thing because his record is wrong. A dose and drug change on the phone but not corrected in the system.

- Wrong medicines ordered in hospital because they were in the patient's last med list on record.
 - Patient was using diltiazem extended release prior to hospital visit. Discharged from hospital on Cartia® and did not realize they were the same drug. Went to new pharmacy with new Cartia® script from hospital. New pharmacy had no med history or profile to reference.
 - The medication that the patient received did not match the hospital discharge summary. Pt received wrong med due to physician writing "continue home medicines." Pt was incorrect on what she was taking. No one checked on the medicines with the pharmacy.
- **Duplication of Medication Because of Name Confusion**
 - My patient wound up taking the brand and generic version of the drug at the same time.
 - A patient was taking the same drug in two different strengths consuming excessive quantities.
- **Wrong Dose (15)**
 - Physician sent a prescription for Amoxil® 125/5 script which should have been for Amoxil® 500mg. Had to call physician and correct.
 - Patient prescribed one dosage form and told by physician to take one daily, pharmacy filled it with a double strength dose and labeled to take 1/2 tab, but didn't verbally communicate this and patient proceeded to take a full tablet.
- **Polyprescribing/polypharmacy (13)**
 - A patient recently started Ambien® 5mg by Doctor "A" as 1 tablet at bedtime. Five days later Patient visits "B" doctor informs Doctor "B" he still is not sleeping well. Patient tells Doctor "B" he takes Ambien® 10mg one tablet at bedtime (note wrong strength). Doctor issues a new prescription for Ambien® 10mg one tablet at bedtime. (Actually 2 times original dose). A personal health information record for this patient to take to each doctor may have helped avoid this situation. Or a call to the pharmacy to verify strength and drug would also have helped.

- **Medication Refill**
 - Allergic to Celebrex® -- brought in a new prescription for Celebrex®. We caught it as it was noted in our system. Patient had had gastrointestinal bleeds while on it previously. Wanted to make sure that information was available on our "control" profile when he filled it at other stores. It is! But explained he should still remind pharmacist if he is filling anything used like a non-steroidal anti-inflammatory drug.

- **Side Effects Lead to Medication Discontinuance (6)**
 - Patient taking their medicines faithfully but felt they were getting poisoned because they were dizzy all the time
 - Patient experienced chronic severe headaches she thought due to Lipitor® so she discontinued Lipitor® for 1 week but headaches persisted. Advised her to see physician and rule out possible sinus, tumor or neurological problems before restarting Lipitor®.

- **Incomplete or Change in Medication Instructions Lead to Errors (13)**
 - A patient was concerned because no one had told them on discharge from the hospital when to take their new medicines and whether or not to take them with food. They asked to speak to a pharmacist at time of discharge and I addressed their concerns.
 - Father picked up prescription -- Directions said give by mouth -- Father said, infant is NPO therefore medicine to be given by G-tube!
 - Patient felt that we didn't provide adequate instructions on a prescription for prednisone. We could not fit all instructions on the bottle, so we abbreviated the instructions. The patient couldn't understand the instructions. Patient ended up taking the prescription wrong.
 - Patient was told to change Coumadin® dose after INR but was not given a prescription for new dosage -- doctor was contacted by pharmacy to get new dose.
 - Patient prescribed one dosage form and told by the doctor to take one daily, pharmacy filled it with a double strength dose and

labeled to take 1/2 tab, but didn't verbally communicate this and the patient proceeded to take a full tablet.

- Using Advair® and not rinsing mouth after each use -- developed thrush -- wasn't told by any health professional.

- **Patient's Lack of Medication Knowledge (10)**

- I get calls from family members of older adults and they ask me what medications are for. This situation occurs all the time! (Especially when samples are involved, or when they fill the same medications through the Veterans Affairs or mail order, plus fill medications at a retail location.)

- **Medication Substitution in the Hospital (3)**

- Patient concerned about automatic pharmacy substitution for one of her Parkinson's drugs plus automatic administration scheduling per pharmacy protocol of these medicines
- Therapeutic substitutions done in hospital might not be changed back when time for discharge
- I have encountered multiple patients who are concerned about taking the institution's medicines, instead of their own medicines they bring in

- **Privacy Concern; Patient Privacy (3)**

- Patient was concerned that another same chain pharmacy could look up his wife's profile over the computer. He thought this was a violation of privacy

- **E-script Error Led to Patient Getting Wrong Instructions (2)**

- Wrong medication and/ or wrong directions given to patient due to error in e-script sent to pharmacy

- **Allergy (5)**

- A patient told me that his wife was admitted to the hospital without the knowledge of her primary physician. The consulting physician prescribed a medication that she was allergic to, but the medication was discontinued. Another consulting physician prescribed the same medication she was allergic to. In order for her to see her primary physician, she would have to transfer to another hospital for insurance reasons.

- **Lack of Communication Between Patient and Doctor (3)**
 - The doctors are not spending time with patients after Rx's are written as to what they are being written for and why. Usually they have no clue as to what they are being prescribed.

- **Illegible Hand Written Prescription (4)**
 - Recently, a patient expressed concern over a pharmacist's ability to read illegible handwriting on a doctor's prescription.
 - Prescription was poorly written and the pharmacy filling the script filled it with directions to take 5 times the ordered dose of the medication

- **Busy Pharmacy – Heavy Workload Waiting Time for Prescriptions (8)**
 - Some consumers express concern about how much time they have to wait to get their prescriptions filled. With the workload being excessive in pharmacy practice one impact that is noticed is the patient waiting time.

 - One patient was concerned that only one pharmacist works at a time which can increase medication errors when we are busy.
 - Pharmacies so busy, very difficult to speak with pharmacist. All techs/interns preparing/dispensing medicines that it is difficult for 1 pharmacist to oversee everything. Patient concerned it would be very easy to make a mistake in this environment.

 - Most conversations with people are about 'why did it take so long to fill my prescriptions?'

 - Patient was uncomfortable during the delay in receiving analgesics while in pain. Patient wished time frame was faster.

- **Compounding Error by Pharmacist (1)**
 - Compounded oral liquids. An error occurred by making Prevacid® suspension instead of Prilosec® for an infant. Label was correct, but we believed there was the wrong item put into the product. No bar coding technology is used for compounded items

- **Medication Source (Non-USA) and Tainted Medications (7)**
 - Patient's were concerned that the medication they were receiving was not manufactured in the United States.

- Concern about the problem with the tainted heparin -- patient is having knee replacement soon
- **Medication Cost Leads to Non-adherence and Hospitalizations (2)**
 - Patient stopped taking all his medication (warfarin, all diabetic medications, etc.) because he couldn't afford them. He landed himself in the hospital on dialysis for renal failure when I met him.
 - Most common safety concern by far is being forced to change drugs or cut pills in half due to insurance limitation/Medicaid
- **Insurance Coverage Requirement Leads to Error in Medication Use (5)**
 - One patient was angry that his "insurance" provider required him to switch doctors whenever his company changed carriers -- Many errors occurred with the transfer of records
- **Miscellaneous (11)**
 - Miscellaneous safety concerns about proper medication storage, the amount of medication dispensed, and how to properly dispose of medications, including sharps for patients at home, are reported as well.

Generic Medications Names and Appearance Different (color, shape, size) than the Brand Medication cause Confusion and Mistrust with Patients (82)

Pharmacists in all practice settings identified the difference in generic medication appearance as a concern patients have shared with them. With the wide array of drug manufacturers currently producing and supplying generic forms of medications there are many differences in their physical appearances. Patients expressed concern when the size, shape, or color of the medication changed; many worried they received either the wrong medication or wrong strength of the prescribed medication. At times manufacturers change the size, shape, or color of their own medications, which also causes concerns among patients. Some examples are presented below.

Patients expressed concern when the appearance of their medication changed. Like those expressing concern over the change in appearance of generic medications, a change of medication in general causes concern. Many wonder if they have the correct prescription and/or correct strength of the medication.

Some pharmacists shared that they neglected to inform their patients of the change in appearance (due to a different manufacturer, or a change in the appearance in the medication from the same manufacturer), while others reported they told the patient but the patient did not remember. Examples follow:

- Our reoccurring patient concern is: "Is this the right medication?" "It looks different." Hopefully, they ask before taking the medication. Regrettably we may not have informed the patients of the change due to a variety of generic manufacturers, with a different one supplied by our wholesalers.
- A patient took his blood pressure medicines and also his wife's medications. All 3 medications were white, round, and small and the patient didn't realize it. He noticed or realized later when he was feeling nauseated and lightheaded.

Child Related (3)

Many pharmacists reported that their patients shared stories and concerns with them involving children. These stories ranged from children nearly taking the wrong prescription, parents concerned with the dose of medication the child was prescribed, to more serious cases where a child has ended up in the emergency room. The stories shared have strong emotional strings attached, as children are generally incapable of making their own decisions, ensuring the medication instructions are correct, or that the dosage they are told to take is correct for an individual of their age, height, or weight. An example is presented below:

“A young child was able to get the childproof lid off his phenobarbital prescription and was found unresponsive.”

Medication Recall (15)

Patients have expressed concern over medication recalls. Patients hear about medications that have been recalled from various media sources (e.g., television programs, radio advertisements). Many are unable to distinguish the severity of the situation, and bring their concerns to pharmacists. The family members of some patients bring their concerns to pharmacists, worrying that the medication might have serious effects on the individual.

“A lot of pregnant women are concerned about the drugs they take, as well as breastfeeding women. There were lots of concerns regarding the recent digoxin recall. The patients were not clear what to do, even with a detailed letter sent to them by us, explaining what to do. The

manufacturer said they would contact patients and they didn't, or they said they would send non-recalled drug to them, but it would take 2-3 weeks before the patient would get it”

Patient Expressed Concerns Over Their Own Safety (21)

Patients have expressed concern over their own safety. Some patients worry that their prescriptions might not be correct if filled during a busy period at the pharmacy. Others expressed concern that their current condition is not improving and that there must be something else wrong. The concern over patient safety was most common in the hospital pharmacy setting.

- “Patient concerned that he was not getting better on current antibiotic therapy and that the seriousness of his situation was being ignored by the physicians. (Had strep infection in total knee replacement which then showed up as strep pneumonia)”
- Pharmacies so busy, very difficult to speak with pharmacist. All techs/interns preparing/dispensing medicines that it is difficult for 1 pharmacist to oversee everything. Patient concerned it would be very easy to make a mistake in this environment.
- A patient's mom was concerned that the wrong IV medication was hung on her daughter. The 5 Rs were not used by the nurse hanging the medication

Medication Interaction (20)

Medication interactions were a common concern among patients in many of the pharmacy settings. As the medication use experts, patients often consult pharmacists when they have any questions about their medications. Patients express concern when taking multiple medications and taking medications when they have other medical conditions.

- Many patients ask about drug interactions and are concerned with addition of new drugs or over-the-counter (OTC) products
- With patients using multiple physicians and multiple pharmacies, they have concerns about drug interactions.
- A patient inquired about the safety of over-the-counter (OTC) drugs in a child with elevated liver enzymes
- “1. Taking ibuprofen with Celebrex® 2. Taking all my medicines together 3. I am on Coumadin® can I take OTC Tylenol® for headache”
- “Patient concerned about taking antihistamine with heart problems”

Mail Order (11)

Receiving medications through a mail order company has proven to be a point of concern among patients. When medications are delivered to the patient's home, there is no patient counseling provided. In order to ensure that the medication sent is correct; patients have consulted pharmacists when their medication changes size, shape, or color without being notified of a change. It is a common practice in mail order pharmacy to make generic product switches without sending any explanation to the patient about the change in appearance, size, or shape of the medicine.

- A patient received a medication not prescribed for him. When order was phoned in, no date of birth was given. The prescription was filled that was for a patient with a similar name and mailed to him. The patient noticed the mistake and called us before taking.
- A patient received a new supply of medication through mail order. The medication went from an easy-to-swallow small pill to a really large hard-to-swallow pill, with no information about the change in size or shape. The elderly woman patient was scared to death and paid \$20.00 more for medication with insurance, rather than with no insurance.

Appendix B

Pharmacists' Own Stories of Errors and Near Misses

The number in parentheses reflects the number of pharmacists that mentioned this particular concern or experience that they personally had.

Wrong Drug Dose Almost Dispensed – Near Miss (63)

“The pharmacy technician counted Lexapro® 20 mg out for Lexapro® 10 mg. The pharmacist caught on the last check step. The bottles should have larger numbers - or color code. Numbers 10mg or 20mg should be bolder color -- or different ‘shape of bottles’ on shelf for different mg size”.

“Prescription written by physician looked to me to be 4mg. Patient was on before, turns out it was 6mg - an increase. Patient was okay about it. Need to be very watchful - check with patient and doctor. Due to poor writing - or indicate increase in dose on the prescription.”

“Wrong drug strength selected. All prescriptions are checked by another pharmacist so it was caught. Too high of volume of prescriptions that we have to fill...not enough time to check properly.”

Wrong Drug Almost Dispensed – Near Miss (45)

“I filled wrong medicine but caught it before patient received it. The error was caught before patient received it. I learned how important it is to take my time. I was rushing due to numerous patients waiting.”

“Tech wrote in Zestril® instead of Zyrtec® - caught it at end when I read script to product so I didn't release and we corrected. We corrected so patient didn't know. We huddled and corrected it and showed how it happened and also tried to understand why it got by two technicians before I finished checking. Main cause of the problem is the demand rush on product by customers.”

“The wrong drug was pulled from the shelf. Pharmacy technician observed error - NDC number did not match label - also have observed count error. No impact on the patient. Reminder to staff the importance of checking NDC and double count medicines. Reminder to check for correct medicine. Cannot be too careful in filling prescriptions. Similar sounding names and close location on pharmacy shelf were contributors to the problem.”

Wrong Drug Dispensed (42)

“A prescription was written for fluoxetine. The pharmacy technician had the fluoxetine stock bottle and trazodone stock bottle on the counter. The technician scanned the fluoxetine bottle, was interrupted, and then counted and dispensed trazodone. The pharmacist did not catch this error. The patient took trazodone in the morning and nearly fell asleep at work. The pharmacy lost the patient’s trust, disciplined the staff, and realized that they were overworked and understaffed. This, along with the implementation of a new computer system likely led to the error.”

“A nurse called in the prescription to the pharmacist on duty as Cipro® 250 and it was dispensed. Next day a different nurse called and changed it to liquid Cefzil®. I pulled hard copy and said Cipro® was called in, but nurse said everything in chart shows Cefzil® was called in. The person took one dose of Cipro® and then we changed her to Cefzil® liquid. Did not impact the person. A feeling of how scary this could be and how often does this happen that we never catch it. Nurse could not read doctor’s handwriting or pharmacists could not hear nurse because of our poor phone - lots of background noise from overhead announcements and being a pharmacy that is VERY OPEN so lots of noise.”

“Prescription called in for amoxicillin 400/5mL 2 teaspoon twice a day for 10 days. Rx was filled and dispensed Augmentin® 400/5mL 2 tsp twice a day for 10 days, but was only given enough for five days - was only caught because mother called back stating she did not have enough medicine. The mother of patient was very upset. I am sure she lost a lot of faith and trust in us and the pharmacy as a whole - which I don’t blame her. It was hard on me. I was not the pharmacist who initially reviewed and dispensed the medicine, so I had to try and explain what happened to the very upset mother. I believe this happened mainly because of the reviewing pharmacist being distracted and not paying attention.”

Wrong Drug Dose Dispensed (36)

“A prescription got missed for a patient, so we tried to hurry and get it finished for her. My technician typed it out and I verified the information quickly - the prescription was dispensed and she later called back because it was entered and filled for a lower strength than what was prescribed. The patient had called before taking the medicine. She was inconvenienced by a second trip to the pharmacy, but was not harmed because she hadn’t taken the medicine yet. No impact on me other than a big feeling of guilt. When dealing with 200+ prescriptions per day things get missed unfortunately. Main cause was due to being hurried/rushed and tired.”

“Amitriptyline 100mg dispensed instead of 10mg - no harm resulted - patient caught error. Some inconvenience to return wrong drug to that pharmacy. Re-emphasized the need for double checking with the staff. Checking pharmacist didn't open bottle to look at tablets for correct size which is quite different.”

Wrong Patient/Patient Mix-up Led to Receiving Wrong Medication (31)

“A patient Louis received Lois's (same last name) medication. Lois received Louis's med. No harm as nobody took the drugs. Very disturbing to all, however. Although a pharmacist was not responsible for the error, the ‘buck’ stops with us and we are held accountable. Patient still comes here but the level of trust has been compromised. Patient gave last name only. The cashier did not verify first name, thought she knew the customer.”

“Recently a patient found his prescription bottles in the bag along with one bottle that was for a completely different patient. Both were filled correctly by technicians using a Parata® machine, but the pharmacist working very quickly in a cluttered, loud, chaotic area. The patient was upset that ‘he may have taken a blood pressure pill that was not his, causing dizziness while driving and maybe killing someone.’ (His almost exact words). We are always upset when an error occurs. I was upset at how busy it is and how too many people are clamoring for my attention. It was still down to me not concentrating though. Too busy, working too fast, with too many phones ringing and too many customers waiting.”

“Patient with same name. Cashier at drive-thru sold wrong medicine to wrong customer. Fortunately, patient realized error and returned medication. Verify addresses and phone numbers - we have monthly quality control meetings. Cashier did not verify date of birth or address.”

Wrong Instructions Entered Into Pharmacy System Resulting in Medication Bottle Label Error (24)

“Discovered wrong directions during routine end of day review (wrong dose on Amoxil® order). Patient was thankful for discovery. Whenever an error or near miss occurs it always allows us to reflect upon how we all need to remain focused at all times. Very busy at time of order. Period of low staffing. Had to resubmit 3rd party several times; thereby feeling of ‘rushing’ order.”

“It was extremely busy. A s.i.g. (instructions) code got incorrectly typed on the side of the bottle that was dispensed to the patient. It got missed in final verification. The parents of the child caught the mistake and called the pharmacy. I think they ultimately lost trust in the pharmacy. I was extremely upset w/ myself for not catching this. It further pounded in the fact that it is not a good idea to multi-task when busy.”

Wrong Quantity Dispensed (19)

“30 count in a bottle prescribed for 90. Caught when checking prescription. Remind to pay attention to quantity on label. Technician read label too quickly.”

“A patient brought back a bottle of methotrexate stating only got 30 instead of 32 tabs. Checked inventory and it was off so we gave patient 2 tabs and gave our apologies. Inconvenience - had to come back. No harm done. Learned a lesson - pay close attention to number. Employees not paying close enough attention to detail.”

Wrong Drug Formulation Almost Dispensed – Near Miss (17)

“Using a nursing order entry system with pharmacist review, caught incorrect entry of ‘XL’ (long acting) for immediate release product. Made correction before dose administered because of review. The patient was not involved as the medication never reached them. Reminder of need for staff education and stronger warnings on these kinds of products. High volume at time order was entered.”

“Patient had prescription for Tobrex® ophthalmic solution. Tobrex® ointment was selected and I didn't catch it. When I reread the instructions to her I caught it and changed the prescription. Nothing adverse. Makes our alert awareness up and increases diligence. Laps in concentration because of distractions phone, fax, trying to solve problems in pharmacy.”

Drug Administration Error (10)

“Gentamicin was given in place of tobramycin. Patient did not suffer any ill effects. Makes you stop and realize you must be watching all the time. Picked up the wrong aminoglycoside the dose is usually the same and did not carefully read the label.”

“Physician wrote for a one time dose of vitamin K 10mg SQ (subcutaneous to be given one time) x 1 and underneath wrote ‘tomorrow’ - but tomorrow was illegible to both pharmacists and technician and also to nurses - the vitamin K was given on the day written (‘today’). No clinical impact to patient. The physician was mad at pharmacy and nurses and wanted the employees ‘written up’. Illegible writing - should have used electronic order entry - all could have read ‘tomorrow’.”

Wrong Drug Formulation Dispensed (9)

“Prescription for Claritin D® 24 hour; Claritin D® 12 hour dispensed. None other than patient lived 40 miles away and had to drive back to get correct medicine. I

think technician should be held accountable, especially when they know they are not to do something without speaking to a pharmacist first. Techs over-rode bar code scanner by manually punching NDC in. Label covered product identification on box.”

“A computer generated prescription was written for glipizide plain. The patient had recently been on the XL form. I assumed this prescription was written incorrectly and dispensed the XL. The physician wanted the plain. The issue was taken care of in the clinic. The physician was angry. I was embarrassed but learned a valuable lesson. The prescriptions physicians generate are full of errors and incompleteness. They don't pay attention. I got lax and didn't verify.”

Other Safety Issues

Other safety issues described by pharmacists include: inappropriate use of abbreviations, problems with drive-thru pharmacies, problems with nursing, and patient education/knowledge deficiencies, among others.

- “Abbreviations are increasing the risk of mistakes. Computerization is allowing more use and more mistakes from it.”
- “Drive through people believe we are McDonalds® for how fast a prescription should be done.”
- “Administration errors due to nursing not really knowing what they are doing – need better education.”
- “At our pharmacy I rely on interpreters to counsel patients. I know enough Spanish to know when an interpreter misspeaks. I fear incorrect info is given.”
- “Lack of standardized practices in several areas involving high-risk medications (ie recombinant factor VIIa, GPIIb/IIIa inhibitors).”
- “Patients do not know what drug allergies they have. For example ‘some antibiotics gave me hives’ is not helpful when trying to treat pneumonia etc.”
- “With medicines mailed out -- patients have less access to check about a medicine that has changed color or shape because of generic switch.”
- “Patients splitting their pills in order to save money”
- “Format of some preprinted Rx pads. One physician office uses an awful format of circles and arrows on their method of selecting a product and directions.”
- “Patients do not know what medications they are on and what they are used for - resulting in duplicate therapy at home from multiple prescribers or delayed therapy in the hospital while we make numerous calls/inquiries to find out what the patient is taking.”
- “Drug companies that extend their product lines and keep the same name Tylenol®, Tylenol PM®, Tylenol Cough and Cold® etc.”

- “Doctors and patients wanting drugs on \$4.00 lists which may not be the best choice for their disease”
- “Doctors prescribing medicines and not telling patients what medicine is or what it is for.”

Appendix C

Pharmacists Safety Issues and Suggestions for Improvement

The number in parentheses reflects the number of pharmacists that mentioned this type of issue. The suggestions for improvement were included if one or more pharmacist suggested it in response to the identified issue.

Workload (79)

Pharmacists express much concern with their workload. Pharmacists must fill prescriptions, counsel patients, handle insurance problems, and in many situations feel they have an inadequate amount of staffing to complete these various tasks.

- “I wonder if there should be a pharmacist-to-volume ratio of some kind that is monitored by the State (e.g. 1 pharmacist per 100 Rx's per day)”
- “Enact legislation that limits the number of prescriptions per pharmacist shift. Requiring more staffed pharmacists during the day to handle rush times.”
- “Hire more pharmacists and get away from sales/volume being a stores main objective - need to be an Rx/per hour/per pharmacist number that mandates when employer has to hire another pharmacist.”
- “Boards of pharmacy need to institute some guidelines to try to lessen this.”
- “Limit number of scripts a pharmacist can handle including verification/review/drug utilization review/allergies/health conditions/therapeutic interchange/insurance issues and etc.”
- “Just about anything that increases staffing or reduces the volume per pharmacist will definitely reduce errors.”

Medication Reconciliation/Polypharmacy (49)

Medication reconciliation is a key process in ensuring that patients receive the appropriate medication for their condition. However, there are many instances in which medication reconciliation is not performed. This situation is further aggravated by polypharmacy.

- “Community conference on keeping medication (script) records.”
- “Encourage patients to use one pharmacy. Have providers also stress the importance.”

- “Suggestion (not implemented) a ‘credit card’ system that could be swiped for each patient with medicines, medical conditions and updated with each physician pharmacy visit.”
- “Having pharmacists do more medication history.”
- “TEAM of health professionals work TOGETHER to ensure medicines are correct and complete.”
- “We need some form of a universal database accessible to pharmacy, hospital, physician clinic, ER departments, EMS. 3-4 hours of pharmacist time spent/ day on medication reconciliation.”
- “Ask patients if they use several doctors and/or several pharmacies - warn them of interactions.”
- “Teamwork and communication between physician, pharmacy and hospital staff essential.”
- “Educating patients on the importance of choosing one pharmacy or carrying a complete list of medications and knowing their medications.”
- “Encourage patients to use pharmacy - offer incentives, drug reviews, a way to add reported medicines onto profile - even if filled somewhere else.”

Legibility (48)

Pharmacists describe many instances in which prescriptions from the doctor are illegible. This can especially be a problem for medications with names that look-alike. An illegible prescription forces the pharmacist to use time to call the prescriber and verify the medication.

- “Uniform stamps for all physicians, palm pads for all scripts.”
- “Type all prescriptions.”
- “Have computer-generated label attached to hand-written prescription.”
- “Typing or e-mailing prescription orders.”
- “CPOE.”
- “Education of physicians - possibly make them try to decipher each other's handwriting - also diagnosis codes would be very helpful.”
- “Moving toward computer-generated prescriptions.”
- “Possibly have nurse write or print order and signed by doctor.”
- “Always call if unsure on a prescription. Doctors could utilize the fax machine more.”

Look-alike, Sound-alike Medicines (34)

Look-alike, sound-alike medications have often been identified as a problem for pharmacists. Not only may certain medication names look-alike, but their bottles and strengths may also appear very similar.

- “Make these drugs with DIFFERENT COLOR dots or separate them in inventory.”

- “Double and triple check the med with the s.i.g. and even talk to patient about what the physician said.”
- “Always matching NDC numbers.”
- “TALLMAN lettering.”
- “Change colors with change in strength: we put labels on our bottles to double check.”
- “Make lists which make staff aware of similar sounding drugs. Have physician/nurse spell the drug name over the phone.”
- “Capitalization and stocking medicines in different locations.”
- “If unsure, call for clarification. E-prescribing is helping to eliminate this.”
- “Mandatory image of tablet/capsule on prescription bottle, color-coding, etc.”

Wrong Drug Dispensed (28)

A wrong drug may be dispensed for a variety of reasons, including many of the safety issues listed here.

- “Pharmacies should use policies and guideline from the ‘Institute for Safe Medication Practice’ and tout their focus on safety – This would drive a standard of practice – like VIPPS for the web. Pharmacies would use certified safety practice standards.”
- “Check patient’s date of birth and address.”
- “Counsel patients at time of sale. Have them double check what they are receiving to see if it is what they expect.”
- “Matching ‘NDC’ of bottles to ‘NDC’ of hard copy.”

E-prescribing (27)

As a technology that will be used increasingly in the coming years, e-prescribing has the potential to facilitate workflow between the prescriber and pharmacist. However, pharmacists have encountered orders in which the wrong drug, strength, dosage form, etc. has been entered/selected incorrectly.

- “Always review e-scripts with what patient has been taking, especially if they are refill OK’s.”
- “Call to verify – we find more mistakes with this method than any other system.”

Technology (27)

As a health care profession that heavily utilizes technology, pharmacists face many problems with these technologies. The problems range from outdated

software, to workarounds with new software such as bar coding, to the costs associated with implementing new technology.

- “Limit the overrides to VERY IMPORTANT items so that it really ‘catches’ your eye and mind.”
- “Budget money for these new technology tools.”
- “Choose single computer system that will serve all hospital areas.”

Pharmacy Technician Issues (21)

The use of pharmacy technicians helps reduce the workload of the pharmacist. However, some pharmacists express concern that technicians don't realize the seriousness of errors and their roles in the process. Other pharmacists worry that there is an over-reliance on technicians, especially in community pharmacies.

- “Education for technicians – just because a pharmacist checks their work, doesn't mean they are not an integral part of safety.”
- “Technician training and periodic check-offs. Monthly pharmacy meetings.”

Physician Mistakes (21)

There are many instances in which a prescription or other patient information is obtained from a physician and is incorrect. Pharmacists may be without a diagnosis or other necessary information, or a wrong medication or dose may be ordered.

- “We call the physician and discuss use and recommend changes. We document any conversations and refuse to fill if contraindicated.”
- “If pharmacist thinks that drug does not match with the standard indication, contact physician to let him know.”

Generics (15)

The constant changing of generic medications, from different manufacturers, to the size, shape, and color of the medication (and/or medication bottle) has caused problems for both pharmacists and patients. Pharmacists may pull the wrong medication from the shelf, and patients accept the change in medication appearance without asking questions.

- “Separate them on the shelves.”
- “Place stickers or container lid for patient indicating change.”

Appendix D

How New Technologies Reduce and Increase Errors

E-prescribing

Errors Reduced (234 responses)

- Legibility problems (170)
 - “Enhanced legibility -- reduction in errors”
- More accurate and complete information provided (21)
 - “ID -- provider, drug, s.i.g.(instructions), etc.”
- Time savings (11)
 - “Not necessarily seen errors reduced but it saves me time that I can use doing other work.”

Errors Observed (237 responses)

- Wrong information provided – e.g. drug, dose, patient, etc. (129)
- System incompatibilities/outdated information/drug and product not in system (51)
 - “Not only wrong drug but quantities: 1 ½ will look like 1? because system doesn't recognize fractions”
 - “Information is not always compatible with system-directions may get messed up”
 - “Doctor ordered wrong drug strength and our system does not match doctor’s NDC, so we have to retype drug by just remembering what it was”
- Error directly due to drop down menu selection (46)
 - “Wrong drug selected from menu (ie oral, dissolve tab). Days supply may not match day supply calculated by s.i.g.”

Computer Physician Order Entry (CPOE)

Errors Reduced (201 responses)

- Legibility problems (118)
 - “Legibility corrected thank you!”
 - “Decimal placing is clear”
- Faster/saves time (6)

Errors Observed (150)

- Wrong information provided – e.g. drug, dose, patient, etc. (114)
 - “Often wrong s.i.g. or wrong drug form (XL, SR, or LA, etc.) are sent across”
- System incompatibilities/drug and product not in system (21)
 - “Confusing format with additional directions in a different field than original s.i.g.”
 - “Some systems put in default directions. Physician writes another set of directions, both are sent -- we have to clarify which is correct”

Automated Dispensing Machines

Errors Reduced (220)

- Increased accuracy – correct drug, dosage, number of tablets/capsules (133)
 - “Accurate acquisition of drug and count”
- Saves time (24)
 - “More time to spend on counseling and verification”
- Better regulation of controlled substances (9)
 - “Better accountability for narcotic use”
 - “Robotic dispensing: labels on perfectly, decreased wrong drug and decreased wrong quantity”

Errors Observed (178)

- Incorrect drug loaded into machine (71)
 - “Human error -- wrong drug dispensed due to incorrect use or filling of machines”
- Incorrect counting – often due to broken tablets (42)
 - “Wrong number of pills counted due to static or tablet weight”
 - “Broken tablets cause inaccurate counts”
- Broken tablets (15)
- Override via nurses (7)
 - “RN's may remove drugs on override and can choose wrong drug or dosage form”

Prescription Vending Machines

Errors Reduced (78)

- Right drug selected (7)
 - “Accurate drug, acquisition, and count”
 - “Selection of wrong product reduced”

- Accurate counting (5)

Errors Observed (49)

- Incorrect drug loaded into machine (7)
 - “Incorrect stocking”
- Incorrect counting (2)
 - “Counting errors (if the cassette runs out, but the robot doesn't know)”

Bar Code Scanning (BCMA)

Errors Reduced (249)

- Accurate drug/dosage/patient (179)
 - “Patients getting correct medications”
 - “Prevents wrong drug, strength, or dosage form from being dispensed”

Errors Observed (156)

- Overrides/workarounds (50)
 - “Barcode scanning done AFTER drug given”
 - “Only scan 1 bottle, but use from 2 stock bottles and 2nd bottle was not the same; or scan 1 bottle but use bottle behind on shelf and bottle behind wasn't the same product”
- System incompatibilities (34)
 - “Medicines from new manufacturer (s/a different generic drug companies) might not scan”
 - “If bar code is too small have to type in NDC number”
 - “If bar code is UPC code, does not co-relate to product NDC -- incorrect drug comes up”
 - “Often does not allow for difference in package sizes even though drug is correct”
- Mislabeled barcode (13)
 - “Wrong drug packaged in bar coded bottle”

Radiofrequency Identification Tags (RFID)

Errors Reduced (71)

- “Dispensing/pick errors” (1)
- Right patient (1)
 - “Ensures the right patient is getting the drug”
- “Pedigree” (1)

- “Reduce counterfeit drugs” (1)
- Not used/no experience (8)

Errors Observed (34)

- “Failure to recognize ½ tab doses” (1)
- “FDA – needs better control – higher involvement better design” (1)
- “No access in power outage – must remember physical badge” (1)
- Not used/no experience (4)

Infusion Pumps

Errors Reduced (117)

- Increased accuracy – calculations/programmed rates (42)
 - “Less errors by calculations by RNs and pharmacy”
 - “Rate more consistent and accurate”
 - “Prevented inadvertent overdose”
 - “Now have Alaris pumps we programmed w/ “rails.” So if nurse programs to run outside set rails, pump will not run.”

Errors Observed (79)

- Programming errors (24)
 - “Programmed incorrectly”
 - “Can't change concentrations unless reprogram pump”

PYXIS System

Errors Reduced (142)

- Accurate drug/dosage/patient (44)
 - “Wrong medicine, wrong dose, wrong patient, wrong counts”
- Documentation/inventory control (21)
 - “Documentation on errors made by nurse. Inventory control decreased errors”
 - “Accountability for narcotics much better to track issues”

Errors Observed (90)

- Incorrect drug loaded into machine (37)
 - “Putting incorrect medicines in the wrong slot either by pharmacy tech (error rate lowered now that we have bar codes) or by nurse returning med to drawer”

Baker Cells

Errors Reduced (110)

- Increased accuracy – correct drug, dosage, number of tablets/capsules (46)
 - “Decrease wrong drug. Decrease wrong quantity”
- Saves time (12)
 - “Faster filling”

Errors Observed (88)

- Incorrect drug loaded into machine (41)
 - “Wrong drug filled in baker cells -- human error”
- Miscounts (22)
 - “When cell runs out wrong quantity can be dispensed”

Smart Infusion Pumps

Errors Reduced (97)

- Increased accuracy – calculations/programmed rates (30)
 - “Calculates complex dose and correct infusion rate”
 - “Using built-in programs decreases incorrect drip rates”
 - “Lockouts provide safety features (MAX - MIN dosing and rates)”

Errors Observed (56)

- Programming errors/entering wrong drug or dose (18)
 - “Programmed wrong or wrong face plate”
 - “Pumps programmed incorrectly into drug library (ie entered in as mL/Hr vs. mcg/Hr)”
 - “Medicine and concentration must be pre-loaded”
- Overrides/workarounds (7)
 - “Nursing staff over-rides pump settings and gives drug too fast/too slow”

Insulin Infusion Pumps

Errors Reduced (76)

- Increased glycemic control (15)
 - “Tighter glycemic control”
 - “Decrease injections having to be drawn up”
 - “Missed doses”

Errors Observed (44)

- Incorrect programming/set up by humans (6)
 - “Pump can be programmed erroneously by staff”

Electronic Drug Information Sources

Errors Reduced (205)

- Increased accessibility – faster and/or easier to find information (95)
 - “Quick and easy access to info -- confirm your counseling -- usually have time to do this compared to a book”
 - “Easier to find info instead of searching package insert”
- More current/complete info on drug – dosage, drug-drug interactions (92)
 - “Up-to-date information for new dosing or products”
 - “More detailed info readily available. Fewer problems with correct dosages, drug interactions and IV compatibilities”
 - “Increased consistency of information/dosing”
 - “Appropriateness of therapy, dosing, administration, multiple clinical applications”

Errors Observed (114)

- Not enough information (15)
 - “Need to have more OTC/herbal/vitamin info on-line”
 - “May not include all information needed”
- Computer/system failure (13)
 - “Cannot be accessed if computer malfunctions or link is down”
- Difficulty in interpreting information (13)
 - “RNs have misinterpreted IV compatibilities by not looking at diluents and concentrations”
 - “Incorrect interpretation of information leading to errors”
- Information is not current (9)
 - “Relying on information as up to date”
 - “Not always up to date e.g. black box warning”
- Too much information (7)
 - “There is too much information – there needs to be summaries”
- Reliability of sources (5)
 - “Need to watch source of information to make sure it's reliable source”
- Inaccurate information (5)
 - “Errors in information”

Clinical Decision Support Rules in Computer System

Errors Reduced (108)

- Decrease in interactions – allergies, duplications, diseases, drug-drug (36)
 - “Drug/disease interactions caught”
 - “Allergy checks and duplicate therapy”
 - “DUR intervention warnings on the computer”
- Provides double-check for correct dosage (10)
 - “Proper record dosing for drugs alerts about proper dosage form”

Errors Observed (69)

- Alert fatigue/overrides/ignore warnings (22)
 - “Too many irrelevant warnings can cause inattention to this system”
 - “Missed interactions because of not fully paying attention to override”
 - “Alert Fatigue -- makes you ignore alerts”