IMPROVING PATIENT SAFETY IN RURAL HOSPITALS:

A WORKSHOP WITH WISCONSIN HEALTH CARE LEADERS

WORKSHOP SUMMARY REPORT

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I. Introduction

The Employer Health Care Alliance Cooperative (The Alliance) sponsored a workshop entitled "Improving Patient Safety in Rural Hospitals: A Workshop with Wisconsin Health Care Leaders" on October 22-23, 2001 in Madison, Wisconsin. The workshop was supported by the Agency for Healthcare Research and Quality User Liaison Program. The purpose of this workshop was to allow a diverse group of stakeholders to discuss the research evidence related to certain patient safety interventions, explore their own goals and concerns related to changing the current systems, and brainstorm potential patient safety standards that they could view as feasible and measurable. Participants explored issues related to improving patient safety in rural community hospitals in Wisconsin, including hospital and health system administrators, physicians, employers, State officials, and health services researchers. **The group discussed relevant research findings, implementation issues, and both advantages and obstacles that rural community hospitals encounter in reducing medical errors.** Participants also considered potential roles that regional and statewide organizations could play to support patient safety initiatives in rural facilities.

The specific workshop objectives were to better prepare participants to:

- **Understand the perspectives of major stakeholder groups** concerned with improving patient safety in Wisconsin (e.g., employers, hospitals, physicians)
- **Discuss the characteristics of "high reliability organizations"** and implications for developing a "culture of safety" in hospitals.
- Identify research-based **evidence related to the staffing of intensive care units (ICUs)** and the **reduction of medication errors.**
- **Describe the kinds of barriers/obstacles that rural community hospitals are likely to face** when implementing new patient safety practices, as well as their strengths/assets for launching these initiatives.
- **Identify the roles that regional and statewide stakeholders can play** to help rural community hospitals institute new patient safety measures.

The invitational workshop was a day and a half in length, with plenary presentations and panel discussions by researchers, business leaders, and practitioners on the first day. On the second day participants formed three workgroups to address in greater depth issues related to ICU safety; medication safety; and how local, regional, and statewide organizations can contribute to a culture of safety.

Building on systems-based quality improvement programs has proven to be effective in reducing medical errors, and this workshop presented evidence on patient safety strategies in the areas of staffing and managing intensive care units, and reducing adverse drug events, including many strategies identified by the Wisconsin Patient Safety Institute. Since most patient safety research studies to date have taken place in large, urban-based hospitals, and Wisconsin is a largely rural state, participants and faculty explored **how concepts, techniques, and lessons from urban-based studies can inform rural health care providers and purchasers.** In light of growing recognition that reducing medical errors requires more than changing the behaviors of individual workers, participants considered how rural hospitals can make safety improvement an explicit organizational goal and implement the kinds of systemic

changes needed to make it a cultural norm.

This report provides a summary of each of the substantive workshop sessions, followed by a synthesis of the discussions that took place in three workgroups.

II. Research Findings

A. Improving ICU Safety

Presenter:
Michael Young, M.D., M.S.
Medical ICU Director
Division of Pulmonary and Critical Care
University of Vermont, Fletcher Allen Health Center
Burlington, VT

Research Summary:

Dr. Michael Young, **Medical Director of the medical ICU at the University of Vermont**, addressed challenges to caring for critically ill patients in rural hospitals. He explained the scope and cost of ICU care, reviewed methods of assessing their performance, presented research findings supporting intensivist models, and suggested options that may be realistic for rural ICUs to implement for the care of critically ill patients.

Young explained that **ICU care is ubiquitous, expensive, and associated with high mortality.** He stated that 4.4 million people are admitted to ICUs in the US every year. Currently, over 70% of US hospitals have ICUs and ICU beds account for approximately 10% of total hospital beds. ICUs consume 20-30% of total hospital costs and approximately 1-1.5% of the Nation's gross domestic product. (Groeger, 1992; Jacobs, 1990). Mortality rates in ICUs vary widely between individual ICUs due to case mix and other factors. Two large surveys of ICUs found mean mortality rates of 12% and 16%. Nationwide, approximately 500,000 people die annually in ICUs (Zimmerman, 1998; Shortell, 1994).

Young attributed **variation in ICU outcomes to various factors** including:

- Type of illness
- Acuity of illness
- Age of patients

However, Young also explained that the mortality differences between ICUs cannot all be explained by patient characteristics. In other words, **some ICUs perform much better than others.** Young explained that characteristics of better performing ICUs often include:

- Size of institution (Some studies reveal that outcome appears independent of size)
- Teaching status of institution (Some research reveals that outcomes were

independent of teaching status)
- Access to newest technologies
- Nursing ratios
- "Open" versus "closed" ICU models
- Dedicated intensivists

He defined an **"open" ICU model** as one that allows many or most physicians on staff to admit and care for ICU patients (85% of ICUs are open model), and defined a **"closed" ICU model** as one that only allows ICU staff physicians to admit and write orders. Closed model ICU physicians are also known as **intensivists. The Leapfrog Group considers hospitals to have fulfilled their ICU Physician Staffing standard** if they operate adult ICUs that are managed by physicians board-certified (or -eligible) in critical care medicine who:

1. are present during daytime hours and provide clinical care exclusively in the ICU; and,
2. at all other times can return more than 95% of calls to the ICU within 5 minutes and, 95% of the time arrange for a FCCS (Fundamental Critical Care Support of the Society for Critical Care Medicine) certified physician or physician extender to reach the ICU patient within 5 minutes.

(Leapfrog Group Fact Sheet, 2000)

Young presented research data to demonstrate that **hospital mortality rates tend to decline markedly when an intensivist model is employed**, suggesting that an intensivist model does improve outcomes. He also presented data that showed that patient to nurse ratios also have an effect on mortality and that outcomes worsen when the patient to nurse ratio is elevated from the tradition 2:1 to 3:1. Young explained that outcomes tend to improve with **an intensivist model because it is likely to provide**:

- Increased on-site physician availability
- Increased physician expertise
- Increased use in protocols; and decreased variation in care
- Increased collaborative care (with other doctors, nurses, respiratory therapists, physical therapists, social services, and pharmacies, etc.)
- Decreased delays to treatment
- Decreased specialty or "organ-focused" care with increased focus on entire patient
- Likelihood that intensivist team goals are aligned with institutional goals
- Improved communication with families

While intensivist models have many benefits, **implementing them can have costs and disadvantages**. It can have disadvantages including a potential loss of continuity of care, a reduction of ICU skills among non-ICU physicians, costs of supporting ICU physicians, and manpower issues that could require ICU regionalization. Also, certain political constraints can inhibit adopting an intensivist model, such as the facts that historically there has been little physician focus on ICU organization, administrators are wary of the medical complexity in ICUs, and intensivist models may pose a threat to physicians' autonomy and income.

Given the charge of this workshop to address issues of improving patient safety in rural

hospitals, Dr. Young offered some **suggestions of realistic options for ICU care in rural hospitals** especially when adopting an intensivist model may not be feasible. He stressed that it is important for all hospitals, including rural ones, to **establish clear criteria** to define a critically ill patient. Such characteristics of criteria could include impending respiratory failure, new mechanical ventilation, use of vasopressors, and evidence of multi-organ failure. He **suggested that rural hospitals pay** particular attention to nursing and pharmacy staffing, adopt a 1:1 nurse to patient ratio for critically ill patients, and dedicate a clinical pharmacist to intensive care units. While an intensivist model may not be feasible for most hospitals with fewer than 200 beds, Young suggested that rural hospitals **consider adopting a hospitalist model** of physician staffing which is associated with improved ward outcomes (Wachter, 1996; Lurie, 1999). A hospitalist is a physician who specializes in inpatient medicine and manages the care of inpatients in the same way that a primary care physician manages the care of outpatients. In addition to hospitalists, rural hospitals should **consider expanding the depth of their current staff** by utilizing physician extenders, such as nurse practitioners and physician assistants, in ICU settings. Given the isolated nature of some rural hospitals, Young suggested that rural hospitals **consider regionalizing care** for critically ill patients. He presented studies that revealed that regionalization improves outcomes for trauma, burn units, neonatal ICUs, and pediatric ICUs, and some limited data that suggests that mobile transport of the critically ill in adult ICU models can be safe (Gebremichael, 2000). Young also reviewed novel approaches to improving ICU outcomes in rural hospitals including increased use of electronic decision support tools and telemedicine.

To summarize, Young explained that providing the best ICU care in rural settings is challenging. When employing a dedicated intensivist is not a viable option, rural hospitals can utilize hospitalists and physician extenders. He also stressed the importance of setting explicit guidelines to identify patients for early transfer to regional centers. Finally, he raised the issue of making greater use of decision support mechanisms, telemedicine, and developing a common database to track outcomes in rural ICUs to identify opportunities for ongoing improvement.

AHRQ's Evidence-based Practice Program's report published in July 2001, "Making Health Care Safer: A Critical Analysis of Patient Safety Practices" (EPC report: http://www.ahrq.gov/clinic/ptsafety/index.html) includes several chapters with information pertinent to Dr. Young's presentation, such as:

- **Chapter 38 - "Closed" Intensive Care Units and Other Models of Care for Critically Ill Patients** http://www.ahrq.gov/clinic/ptsafety/chap38.htm
- **Chapter 47 - Safety During Transport of Critically Ill Patients** http://www.ahrq.gov/clinic/ptsafety/chap47.htm
  - **47.1** - Interhospital Transport
  - **47.2** - Intrahospital Transport
- **Chapter 51 - Practice Guidelines** http://www.ahrq.gov/clinic/ptsafety/chap51.htm
- **Chapter 52 - Critical Pathways** http://www.ahrq.gov/clinic/ptsafety/chap52.htm

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B. Improving Medication Safety

Presenter:
Steven Rough, M.S., M.Ph.
Director of Pharmacy Services
University of Wisconsin Hospital and Clinics
Madison, Wisconsin

Research Summary:

Steven Rough, **Director of Pharmacy Services at the University of Wisconsin Hospital and Clinics** discussed the research that explains the scope of the medication error problem. He also highlighted ten medication safety recommendations published by the **Wisconsin Patient Safety Institute (WPSI)** and supported each recommendation with research. Finally, Rough summarized by offering suggestions for practical ways that Wisconsin health care providers can improve safety in the medication use process.

To set the context, Rough reiterated some common patient safety related facts drawn from the **Institute of Medicine's report "To Err is Human: Building a Safer Health System"** report (IOM, 1999):

- Medical errors are the 4th - 8th leading cause of death in the U.S.
- Medication errors account for >7000 deaths/ year
- 2 out of every 100 patients admitted to the hospital experience preventable adverse drug events (ADEs)

And from a JAMA article by Bates et. al. (Bates, 1997):

- 28% of ADEs are preventable
- Preventable ADEs result in additional lengths of stay of 4.6 days, and increase costs by $5,857.
- Annual costs attributable to preventable ADEs = $5.6 million (700 bed hospital)

Rough explained that 56% of errors resulting in preventable ADEs occur during the ordering process, 34% occur during the administration process, 6% in the transcription process, and 4% in the dispensing process (Bates, 1995).

Rough presented a chart outlining the **ten patient safety recommendations** published by the **Wisconsin Patient Safety Institute** and his personal ratings on the difficulty to implement and the amount of supporting research evidence.

Recommendation	Difficulty to Implement	Supporting Evidence
1. 24-hour pharmacy coverage	L	I
2. Computerized prescriber order entry (CPOE)	H	I
3. Unit dose distribution system	L	I
4. RPh managed IV admixture preparation	L	II
5. Generic drug names on labels	L	II
6. Computer screening prior to dispensing	M	I
7. Bar-coding system for medication packaging & administration (point of care technology)	H	I
8. High-risk medication policies & procedures	L	II
9. Eliminate commonly misinterpreted symbols and phrases	M	III
10. Include intended use on all drug orders, labels, and packages	M	III
Difficulty to Implement: L = Low, M = Medium, H = High **Supporting Evidence:** I = Substantiated research (randomized trials) II = Case studies (e.g., lay press or professional literature) III = Expert opinions		

Dr. Rough discussed several of the recommendations for which, in his opinion, there are substantial research findings. The following is a brief synopsis of the recommendations most strongly supported by research (i.e., given a rank of I). For an explanation of the research about the remaining recommendations, please see **Appendix B**: **"Medication Safety Recommendations for Wisconsin Health Care Providers."**

Recommendation one, 24-hour pharmacy coverage by a registered pharmacist, is increasingly important given the increasing complexity of treatment for inpatients, the increased number of medications per patient, increased frequency of change in medication use, and increased potency of modern medications. One study revealed that implementing such coverage has result in a 66% decline in adverse drug events ADEs for ICU patients and an annual savings of $270,000. Rough stressed that this recommendation is one of the strongest and is supported by ample literature showing a positive cost-benefit relationship.

The second recommendation to implement a computerized prescriber order entry (CPOE) system is also widely supported by research, according to Rough. A CPOE system

allows physicians and other prescribers to type prescriptions in to a computer and send them directly to the pharmacy, rather than using pencil and paper methods. Ideally, CPOE can be used to order medications, labs, and other diagnostic tests, and will compare drug orders against standards for dosing, possible allergic reactions, and will warn prescribers about potential problems. In some cases, CPOE has resulted in a 55% decline in overall medication errors, 17% decline in preventable ADEs, and 84% decline in non-intercepted potential ADEs (Bates, 1998). Rough explained that while the benefits are great, it is important that the system chosen is compatible with the providers and hospitals that will be using it. He stressed that it is key to involve physicians in the process of choosing and designing a system, since they will ultimately be the ones using it. He also explained that implementation can be a long process and that health systems should plan on at least five years for system development and enhancement.

The third recommendation, unit dose distribution, is also strongly supported by research. Unit dosing involves packaging medications in single unit packages so they can be dispensed in a ready-to-administer form. The advantages to unit dosing include a reduction in medical errors, a decrease in total costs due to waste and expired medications, and less clutter and more efficient use of nursing personnel. When compared to multidose medication administration, unit dosing reduced errors by 81%. (Means, 1975).

The next recommendation supported by ample research is **number six on the list, or computer screening prior to dispensing.** Such systems are designed to aid clinicians in making diagnostic and therapeutic decisions in patient care and are able to make patient-medication specific recommendations. Rough explained that this type of system still needs to be developed further but holds great promise in:

- Simplifying access to data needed to make decisions
- Providing reminders and prompts
- Assisting in order entry
- Assisting in diagnosis
- Reviewing new clinical data
- Alerting when important patterns are recognized

When implemented effectively, computer screening has been shown to decrease adverse drug events by 66% (Raschke, 1998).

The seventh recommendation, implementing a bar-coding system for medication packaging and administration (point of care technology), is the remaining recommendation supported by the strongest research base. Bar coding has the advantage of encouraging the safe and accurate administration of medicines to the right patient by drug, dose, time, and route. It also increases accuracy of documentation and increases staff efficiency. It has been shown in studies to reduce overall medication errors by 71%, omitted doses by 52%, doses given at the wrong time by 43%, and the wrong dose administered by 33% (Puckett, 1995). It does have limiting factors, however. To be effective it requires that all medications are bar-coded and currently there is a lack of manufacturing bar coding standards. Implementing the system can be cost-prohibitive and necessarily require training and an alteration in nursing and pharmacy practices and workflow.

AHRQ's Evidence-based Practice Program's report published in July 2001, "Making Health Care Safer: A Critical Analysis of Patient Safety Practices" (EPC report:

http://www.ahrq.gov/clinic/ptsafety/index.html) also discusses the existing research evidence related to many of the WPSI recommendations. **See Section A. "Adverse Drug Events"** for the following chapters:

- **Chapter 6 - Computerized Physician Order Entry (CPOE) with Clinical Decision Support Systems** http://www.ahrq.gov/clinic/ptsafety/chap6.htm
- **Chapter 7 - The Clinical Pharmacist's Role in Preventing Adverse Drug Events** http://www.ahrq.gov/clinic/ptsafety/chap7.htm
- **Chapter 10 - Unit-Dose Drug Distribution Systems** http://www.ahrq.gov/clinic/ptsafety/chap10.htm
- **Chapter 11 - Automated Medication Dispensing Devices** http://www.ahrq.gov/clinic/ptsafety/chap11.htm

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C. Reducing Medical Errors: Leadership, Tools, and Culture

Presenters:
David Musson, M.D.
University of Texas Human Factors Project
The University of Texas at Austin
Austin, TX

Terrance Borman, M.D.
Medical Director
Luther-Midelfort, Mayo Health System
Eau Claire, WI

Research Summary:

Dr. David Musson of the Human Factors Research Project at the University of Texas, Austin (UTHFRP) discussed establishing a culture of safety in aviation and how approaches taken in aviation might be translated to health care.

The UTHFRP has focused on aviation in relation to medicine since 1993, before the release of the 1999 Institute of Medicine report, *To Err is Human.* That report emphasized that many medical errors are attributable to systems failures and the health care system should recognize that unintentional human factors play a large role in the formation of the system. The aviation industry has a long history of reducing error at they system level and has made safety a "super-ordinate" goal, according to Musson. Similar to medicine, teamwork is essential in aviation, risk level varies from low to high, and threat and error come from multiple sources.

The UTHFRP **addresses medical errors using an aviation approach**, including a system approach to system error, organized development of error countermeasures, and ongoing research and data collection in support of safety. Aviation's countermeasures for enhancing safety includes:

- **Crew resource management (CRM)** which involves training in leadership, communication, and information management.
- **Automation**. Automation was introduced for the purpose of improving safety, and has been effective, according to Musson, but has also presented new types of unanticipated errors.
- **Standardization.** Standardized training, standard operating procedures, and the use of checklists have all been implemented in the aviation industry to reduce variation and likelihood of error.
- **Data collection** for safety improvement. Two incident reporting systems, the Aviation Safety Reporting System (ASRS) which is system wide and the Aviation Safety Action Partnership (ASAP) which is carrier specific, are used to record and track erroneous incidents and provide a background for improving them in the future.

Musson stressed that **data collection in crucial** in developing any strategy to reduce errors. In addition to the ASRS and the ASAP, the UTHFRP has collected data on behavior, attitudes and cultures in aviation safety through the use of multiple methodologies, including surveys as well as direct observations of human behaviors. In repeatedly administering the **Flight Management Attitudes Questionnaire (FMAQ),** researchers found:

- A general improvement in crew resource management related attitudes over the years;
- A unique profile of attitudes for each airline;
- An improvement by specific airlines between successive FMAQs;
- National variation in terms of power distance and automation preferences.

UTHFRP researchers also studied human behavior through the **UT Line Operations Safety Audits (LOSA)** program. LOSA involves in-cockpit observations and interviews, non-jeopardy assessments, collecting demographic information, rating CRM and error management behavior, and threat assessment. As a result of the LOSA study, researchers found:

- Automation errors are the most common, yet are hard to observe and insidious;
- Violation of standard operating procedures are common and often inconsequential;
- Crew members have high levels of proficiency;
- Variation exists between carriers with respect to adherence to standard operating procedures, stable approach bottom lines, and cockpit structure.

Musson explained that data collection is one way to begin to address the problem of medical errors in the health care system. In addition to data, he recognized that **culture change is a necessary step** as well. **Musson presented the following model** for implementing change in high-risk organizations such as aviation and medicine. He asserted that such a model could be applied within health care to address medical errors.

A Model for Implementing Change

1. Conduct an initial assessment through:
   a. Interviews
   b. Surveys

2. Collect data through:
   a. Error reporting systems
   b. Focused surveys
   c. Non-jeopardy observations

3. Design and implement strategies such as:
   a. Culture change
   b. Human factors training (such as crew resource management)

4. Assess the impact of interventions through:
   a. Outcomes analyses
   b. Surveys of practitioners

5. Maintain iterative modification and implementation of strategies through:
   a. Performance appraisal and feedback

Dr. Terrance Borman, **Medical Director of the Luther Midelfort Hospital of the Mayo Health System**, explained how his hospital responded to the national health care priority of addressing patient safety. Luther Midelfort 310 bed hospital in Eau Claire, Wisconsin. Due to the impetus started by a 1991 article in the New England Journal of Medicine, “Incidence of adverse events and negligence in hospitalized patients” (Brennan, 1991), the Institute of

Medicine's 1999 report, "To Err is Human" (IOM, 1999), and the 2001 publishing of the Joint Commission standards, Luther Midelfort began **to take note of its own adverse events and safety culture.** Borman explained that **Luther Midelfort developed a cultural commitment to quality** by dedicating time, training, and resources to patient safety. It connected itself with groups such as Mayo Rochester, the Institute for Healthcare Improvement, and the Institute for Safe Medication Practices. It also committed to taking an honest appraisal of the hospital's safety outcomes.

Luther Midlefort's honest appraisal provided strong justification for increasing the intensity of patient safety efforts. By examining chart reviews, interviews with staff, incident reports, staff complaints, and patient complaints, Luther Midelfort noticed **a great discrepancy between the number of errors occurring and the number being reported**. They realized that the hospital would need to change its culture to reconcile the two numbers to adequately address the issue. The death of an infant due to **an adverse drug event caused Luther Midelfort to take aggressive action towards improving medication safety** and operate under the attitude of adopting known improvements even if the hospital has not yet measured its rate of error. While adopting know medication error improvement standards, Luther Midelfort also used a list of high risk drugs and began measuring the rates and types of adverse drug events occurring in the hospital.

Borman stressed that amidst altering protocols and implementing specific patient safety strategies, **the ultimate goal for Luther Midelfort was to change the culture in the hospital** to one of safety. He described many discrepancies between current perceptions of safety cultures and desired outlooks of safety cultures, and emphasized that Luther Midelfort aspires to the desired goals.

Traditional Perception	**Desired Outlook**
Error can be eliminated by striving for perfection - **mistakes are the result of carelessness**.	Humans make errors even at the highest level of performance - **mistakes are most often the result of system design**.
Autonomy and professional roles trump teamwork.	**Interdisciplinary team** training is necessary, especially in high risk areas such as the OR, ER and Labor and Delivery.
Errors and near misses are hidden for fear of blame, embarrassment, or in the case of near misses, the idea that since nothing reached the patient that things are okay.	**Identification and intense study of errors** and near misses is necessary to expose the system and improvement opportunities.
Advances in **technology and therapy applied without analysis** of new sources of error - acceptance of adverse events as a necessary risk of these new approaches.	"**ALL technologies introduce new errors**, even when its sole purpose is to prevent errors" (*To Err is Human*, 1999). Use of failure mode analysis, simulation to identify risks. Recognition that system design can reduce adverse drug events.
Safety is the **responsibility of individuals**.	Safety is a **property of systems**. Safe systems are everyone's responsibility.

The **patient is dependent** and an non-participant in safety errors.	The **patient is involved and informed** and a participant.

In its goal on producing a safety culture, Luther Midelfort surveyed staff perceptions of error. As a result, they **developed a non-punitive error reporting policy**, created a central error reporting and analysis system, involved the hospital's leadership, and took a culture evaluation and measurement. Borman explained that Luther Midelfort met success by becoming a student of safety, recognizing that safety is a property of systems, looking closely at its own systems performance, and committing to patient safety as an organizational priority.

Borman suggested the following steps to other hospitals or health care provider groups looking to establish a culture of safety within their own organization:

- Simplify the number of steps and processes involved in procedures
- Standardize (e.g., eliminating 4 different intravenous pumps in ICUs)
- Stratify - recognize and separate adult and pediatric equipment
- Improve auditory communication patterns (e.g., hear back and using standard vocabulary)
- Support communication against the authority gradient
- Use defaults properly
- Automate cautiously (every technology presents a new source of error)
- Use affordance and natural mapping (devices and equipment that force people to use it properly)
- Respect limits on vigilance and attention
- Encourage reporting of errors and standards

AHRQ's Evidence-based Practice Program's report published in July 2001, "Making Health Care Safer: A Critical Analysis of Patient Safety Practices" (EPC report: http://www.ahrq.gov/clinic/ptsafety/index.html) devoted **Section F. "Organization, Structure, and Culture," and Section H. "Role of the Patient"** to the issues raised in both Dr. Musson and Dr. Borman's presentations. Particularly pertinent chapters include:

- **Chapter 40 - Promoting a Culture of Safety**
  http://www.ahrq.gov/clinic/ptsafety/chap40.htm
- **Chapter 41 - Human Factors and Medical Devices**
  http://www.ahrq.gov/clinic/ptsafety/chap41a.htm
  - **41.1** - The Use of Human Factors in Reducing Device-related Medical Errors
  - **41.2** - Refining the Performance of Medical Device Alarms
  - **41.3** - Equipment Checklists in Anesthesia
- **Chapter 44 - Crew Resource Management and its Applications in Medicine**
  http://www.ahrq.gov/clinic/ptsafety/chap44.htm
- **Chapter 45 - Simulator-Based Training and Patient Safety**
  http://www.ahrq.gov/clinic/ptsafety/chap45.htm
- **Chapter 46 - Fatigue, Sleepiness, and Medical Errors**
  http://www.ahrq.gov/clinic/ptsafety/chap46a.htm
- **Chapter 53 - Educational Techniques Used in Changing Provider Behavior**
  http://www.ahrq.gov/clinic/ptsafety/chap53.htm

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III. Workgroup Report

The workgroups were titled as follows:

Workgroup A. Improving Intensive Care Unit Safety in Rural Community Hospitals
Workgroup B. Improving Medication Safety in Rural Community Hospitals
Workgroup C. Roles of Local, Regional, and Statewide Organizations in Creating "Culture of Safety"

Workgroup Goals

Each workgroup was charged with the task of reporting back to the larger plenary group having discussed a series of issues. The primary goals for workgroups A and B were as follows:

- Discuss the relative importance of adopting and promoting particular practices and standards to improve ICU or medication safety.
- Discuss strategies for implementing practices and standards, including strengths, barriers, and time frames for implementation.
- Discuss key stakeholder roles, both internal and external to organizations, in assisting implementation and focusing on incentives purchasers can create to encourage implementation of patient safety practices and standards.
- Suggest questions related to the issue of implementing patient safety practices and standards that need to be answered by further research.

As workgroup C had a slightly different topic area, the goals for workgroup C were as follows:

- Discuss the kinds of patient safety changes rural community hospitals can be expected to make and reasonable time frames to do so.
- Discuss what kinds of external incentives would be most useful to rural community hospitals to help them improve patient safety.
- Discuss which major stakeholders, (including purchasers, regulators, hospital associations, and health systems) can influence rural community hospitals to achieve patient safety improvements, and how stakeholders can help hospitals reach their goals.
- Suggest questions related to the issue of implementing patient safety practices and standards that need to be answered by further research.

Results

Each workgroup recorder prepared a report of the outcomes of the workgroup meetings. This report encompasses reports from the three separate groups in a few broad categories of results. However, since each workgroup approached their work differently their reports are not uniform in structure. Each workgroup touched on some combination of the following categories, but varied in the level of emphasis they gave to each category.

A. Environmental Sketch/Environmental Factors
B. Priorities for Patient Safety Initiatives/Ideal Outcomes
C. Actions for Implementing Initiatives
    - Barriers to implementation
    - Strengths related to implementation
D. Suggested Roles for Key Stakeholders in Implementation
E. Researchable Questions
F. Additional Comments/Observations (if given)

Workgroup A: Improving Intensive Care Unit Safety

Workgroup A was devoted to discussing how to improve patient safety in intensive care units. The group was primarily comprised of mid- to high-level administrator/practitioners. The majority of workgroup participants held some type of clinical degree and most serve as directors of medical, surgical, nursing, or critical care units

A. Environmental Sketch/Environmental Factors

The group recognized that ICU's in rural community hospitals throughout Wisconsin generally fall into one of two categories (types):

Type 1

- 100+ hospital beds
- 10 ICU beds (average daily census = 4)
- Handles cardiac, open chest, neurological, and trauma cases
- Open ICU staffing model
- Patient-Nurse ratio - 2:1
- Support staff includes consistent:
  - Shared Respiratory Therapy/Therapist services
  - Clinical pharmacist
- Treatment profile:
  - Treating physicians have varying skills in critical care – all may not be ACLS certified.
  - Do not treat burns, head injuries, pediatrics with central lines.
  - Do not perform open chest procedures
  - Traumas are transferred
  - Elective cases are not taken

Type 2

- <100 hospital beds
- 3 – 6 ICU beds (average daily census = 1.6)
- Open model
- Patient-Nurse - 1:1 or 2:1
- Support staff varies:
  - Clinical pharmacist and RT may not be on site nights and weekends
  - Are available on call
- Treatment profile:
  - Treating physicians have varying skills in critical care – all may not be ACLS certified.
  - Primarily treat Medicare patients with cardiac problems
  - Sometimes move the sickest Med-Surg patients to ICU if ICU beds are vacant - strategy to keep nurses busy (still charged regular rates).

B. Priorities for Patient Safety Initiatives/Ideal Outcomes

The group approached this topic by considering, given the two types of ICU environments, which organizational structure and characteristics of ICUs are the most important to adopt for improving patient safety. The group noted that adoption strategies may differ depending on ICU type, but the prioritization remains the same for both. The group listed the following priority areas, in order of importance, for improving ICU safety:

1. Admission/discharge/transfer criteria
2. Patient care protocols
3. Intensive model (or intensivist model)
4. Collaborative intensive care model
5. Clinical pharmacist
6. Nursing ratio
7. Support staff

C. Possible Actions for Implementing ICU Patient Safety Practices

The workgroup discussed some priority areas in greater depth than others due to time constraints. They tended to focus on three sets of implementation issues.

- What would it take to implement these particular practices or standards?
- Barriers to implementation
- Strengths related to implementation

1. Admission/discharge/transfer criteria

- Determine, given the infrastructure and resources, which diagnoses and procedures can be safely treated in each ICU.
- Define resource-based admission and discharge/transfer criteria to be "decidable and executable". Criteria should be such that different physicians will come to the same conclusion about patients using the criteria.
- Recognize that this requires an honest assessment of capacity by each facility.

Barriers:

- Lack of common, clear definitions
- Insurance issues
  - Admission and transfer decisions can be driven by the hospital's HMO affiliation, or lack thereof.
  - Takes time to receive prior authorization to transfer a patient.

- Transfer issues
  - ➢ If accepting facilities don't have nursing coverage for beds, they may not accept transfers.
  - ➢ Family and patient transfer preferences - many don't want to travel, "cause a fuss", or undergo extraordinary care
  - ➢ Transfer issues are complicated when the utilization patterns in large institutions play a role in reducing the number of available beds. When beds are allocated by specialty, it creates incentives to "use them or lose them".
- Transfer staff expertise
  - ➢ No agreement on criteria to determine level of staff expertise needed to transfer a patient from a rural to an urban facility
  - ➢ Lack of available appropriately trained transfer staff – rural transfer teams may be the only ambulance crew in the area.
- Provider issues
  - ➢ Could have difficulty agreeing on criteria
  - ➢ Differences in skill levels and on-call issues: non-critical care physicians in practice who rotate call may be less skilled and/or comfortable with critical patients.
- Transportation problems
  - ➢ Transportation problems can make transfers difficult. Far distances and bad weather can prevent helicopters from flying and cars from driving. Under these circumstances, rural ICU's have to keep patients and do the best they can.

2. Patient care protocols

- Develop or adopt and implement evidence-based, patient care protocols for treating patients that meet admission/discharge/transfer criteria defined above.

Barriers:

- Provider resistance to accept new protocols over existing protocols.
  - ➢ "not invented here" syndrome.
- Implementation is resource intensive.
  - ➢ Facility-specific customization
  - ➢ Staff education and training
  - ➢ Monitoring of use and impact on care
- Compliance with protocols needs to be monitored.
- Protocols are not available at the point of treatment decision-making.
  - ➢ No compensation for physicians to review and implement protocols.

Strengths:

- Many protocols that improve care and reduce errors already exist.

3. Intensive model (or intensivist model)

- Define intensive model as having an appropriately trained physician, readily accessible to staff and patients, who interacts with ICU staff regularly, has a team-orientation to care, applies best-practice protocols on a consistent basis.
- Further define criteria for regarding physicians as "appropriately trained" and "readily accessible."
- Recognize that the intensive model provides value regardless of the presence of a designated "intensivist," and that some value of an intensivist may be derived by having an intensive model even if an intensivist isn't on staff.

Barriers:

- Some physicians are not willing to be trained (see no value or need)
- Appropriate training and process to train is not clearly defined
- Difficult to ensure 24 hour availability and commitment to ICU
- Resistance to the reduced autonomy of a personal physician
- Credentialling
- Difficulty securing a dedicated medical director who oversees ICU care
  - ➢ Having a paid medical director would help, however in many rural hospitals, this is a volunteer position, which generally means the physician spends minimal time on ICU-related issues
- Low volume ICU's may not have enough patients to keep intensivists busy. Consequently, intensivists leave after a short time due to boredom and lack of revenue.
  - ➢ Open question as to whether purchasers can increase reimbursement for hospitals with intensivists, if there is evidence that length of stay is decreased.

4. Collaborative model

- Foster a collaborative approach to critical care.

Barriers:

- Takes resources.
- Need to develop a structure to ensure that team approach occurs on a formal and daily basis.
- Need support from administration to reinforce team approach.
  - ➢ Open model ICU's are a barrier to team approach.

Strengths:

- May occur more naturally in small hospitals – such as rural community hospitals.

5. Clinical pharmacist

- Ensure that pharmacist is clinically focused.
- Ensure that pharmacist is available on the unit during days.
- Ensure that pharmacist attends rounds with care team.

6. Nursing ratio

7. Support staff

- To include a respiratory therapist.
- To include a Lab/x-ray technician.
- To include an anesthesiologist.

D. Suggested Roles for Key Stakeholders in Implementation

The group discussed the roles that key stakeholders can play in implementation. Giving particular thought to the kinds of supports and incentives and purchasers and other external stakeholders could provide organizations in order to encourage patient safety in the ICU. While the group recognized that there was more to discuss on this topic, they agreed on the following points:

- Payers could increase reimbursement rates for hospitals that have put in place structural characteristics that will reduce length of stay.
- It is necessary for an external stakeholder to encourage "receiving hospitals" to accept patients.
- It is necessary to have an independent, external review of hospitals (suggested that the Rural Wisconsin Health Cooperative could play this role)
- Hospitals need help identifying protocols, purchasers could help provide this service.

E. Researchable Questions

Rather than suggesting specific research questions to answer, the group recommended systems or methods that could be investigated and/or developed to help improve ICU safety. Their recommendations include:

- **Common database:** Investigate developing a rural ICU/ER/Trauma database that would categorize and stratify rural Wisconsin ICU types and patient outcomes. Such a database would help ICU physicians and administrators to develop admission and transfer criteria, while improving care for those patients who are admitted and treated. Such a database would also enable providers to track frequency of ICU utilization for specific disease states, length of stay and complications, and resource needs and utilization. Data elements could include:

  - ER descriptors – staffing, yearly volume, distance to next facility
  - ICU descriptors – beds, RN training, support staff availability, medical staff training
  - Patient descriptors – disease states, health/illness index (APACHE, etc.)
  - Transfer data
  - State-wide ICU data - initial presentation factors, demographics, transfer and outcomes data

- **Protocol evaluation:** Conduct further research to investigate which are high leverage protocols most likely to be used by small rural ICU's.

- **Care models:** Conduct further research on which care models, including organizational and structural characteristics, can improve care in rural hospitals. Examples to consider include multidisciplinary models, staffing intensity, and use of clinical pharmacists. Understanding the impact that certain care models can have on patient care will help hospitals know where to focus their efforts, and will give purchasers another potential incentive lever when considering reimbursement, plan design, etc.

- **Transfer data:** Urban hospitals may refuse admitting critical care patients that rural hospitals want to transfer, because they have a shortage of nurses to staff the ICUs. Track and aggregate data on the frequency with which transfers are refused to learn more about the magnitude of the problem. Consider whether RWHC could potentially help with this.

Workgroup B: Improving Medication Safety in Rural Community Hospitals

Workgroup B was devoted to discussing how to improve medication safety in rural community hospitals. The group was primarily comprised of mid- to high-level administrators with management responsibility for specific hospital or clinic departments. While this group had a strong administrative representation, members brought perspectives from the fields of medicine, nursing, pharmacy, and quality improvement.

A. Environmental Sketch/Environmental Factors

Not explicitly discussed.

B. Priorities for Patient Safety Initiatives/Ideal Outcomes

In developing the following list of priorities, the group recognized that the most important safety practices and standards to be adopted or promoted differ by institutions based on their situation. The group also asserted that it is important for institutions to begin their medication safety efforts by adopting known standards and improvements, rather than starting by measuring adverse drug events and errors. Using identified standards will lead to safer care and less harm while measuring takes place.

Implementation priorities

1. Implement the ten Wisconsin Patient Safety Institute standards
2. Have dedicated medication administration personnel
3. Reduce verbal orders and use best practices when accepting verbal orders
4. Work on transition points/reconciliation (continuum of care for patients when admitted to the hospital and when transferring between providers)
5. Provide baseline (and ongoing) orientation for all staff regarding the medication error problem, and to accommodate staff turnover.

Recommended implementation steps

The group also recommends the formation of a centralized entity that would coordinate the following four steps across all Wisconsin hospitals. To coordinate the steps, the entity would be responsible for distributing information, gathering resources, answering questions, compiling results, and encouraging hospitals throughout the implementation process. To work effectively with this group, individual hospitals and organizations should take the following key steps:

Step 1: Identify organization-specific standards for medication safety

- Begin by implementing the ten Wisconsin Patient Safety Institute recommendations.
- Use sources such as the Pharmacy Society of Wisconsin (www.pswi.org)/Wisconsin Patient Safety Institute Medication Use Practice Standards, the Institute for Safe Medication Practices, the Institute for Healthcare Improvement, and others to tailor efforts to your organization.
- Cross check your organizational standards with JCAHO's standards for the PSW/WPSI Standards.

Step 2: Perform a self-assessment of standards

- Utilize the PSW/WPSI Medication Use Practice Standards Assessment Tool

- Based on responses to the tool, which takes 4 hours to complete, the tool will provide specific strategies for your organization to consider for improving medication safety.

Step 3: Develop an Action Plan

- Implement "minimum practice standard" projects before other more difficult standards.
- Determine short-term and long-term plans and goals, and update them annually.

Step 4: Implement the plan

- Utilize available tool kits (some to be developed and disseminated by WPSI and MetaStar) that will help organizations reach their goals.
- Look for the following contents when assessing tool kits:
  - Reputable background
  - A checklist for implementation
  - Guidelines of what works and what doesn't work
  - Examples of policies and procedures from organizations that have implemented standards
  - Contact names and phone numbers
- Look for results from the MetaStar project to glean knowledge and expertise.
  - A research project based on results of workgroups with several WI hospitals based the ten WPSI standards. Results are expected in June 2002: including information sharing on the experience of organizations.

C. Actions for Implementing Initiatives

- What would it take to implement these particular practices or standards?
- Barriers to implementation
- Strengths related to implementation

The group addressed this category of questions by focusing on the factors needed to implement the practices and standards, and did not address specific barriers and strengths. The group asserted that creating a culture of safety is key to implementing particular practices and standards, and that the culture needs to begin with a commitment from the senior leadership (BOD, CEO, Administrators/Directors) to "do less harm." The group also asserted that information sharing between organizations is necessary for effectively implementing medication safety practices and standards. Other suggested actions include utilizing existing resources, developing new resources (i.e. toolkits), and recognizing and utilizing purchasing power to leverage systemic changes.

Create a culture of safety:

- Establish a non-punitive reporting mechanism
  - Recognize that safety is a property of systems, not individuals.
  - Assume errors will happen and be vigilant to recognize problems and opportunities to address them.
  - Expect that all personnel accept the responsibility for quality and safety outcomes in their area of work
- Provide a baseline orientation for all staff on safety fundamentals and the expectations and policies regarding medication errors
  - Educate staff that human factors are involved in errors, and need to be addressed to design safer systems.
  - Encourage staff to watch for "everyday" errors.
- Establish an ongoing educational process for all on safety and the issues in the institution
- Empower those in leadership to set an agenda and provide resources for improving safety

Facilitate information sharing between organizations:

- Utilize tool kits for implementing medication safety practices and draw on key contacts listed within for more information from institutions with systems in place.
- Develop and convene workshops for information sharing between organizations. Include presentations by organizations that have already implemented strategies.
- Conduct site visits between organizations to share ideas and strategies.
- Pursue a common infrastructure for sharing information statewide to reduce the redundancy between organizational efforts and what institutions are required to report. Possible organizations to facilitate the information exchange include:
  - Metastar
  - Wisconsin Patient Safety Institute (WPSI)
  - Rural Wisconsin Health Cooperative (RWHC)
  - Agency for Healthcare Research and Quality (AHRQ)

Utilize resources already available:

- Hospitals should seek and utilize resources that are already available. Examples include:
  - California HealthCare Foundation website - www.quality.chcf.org
  - PSW Medication Use Practice Standards and forthcoming self-assessment tool www.pswi.org
  - PRO tools (e.g., Utah PRO)

Develop medication safety toolkits:

- Organizations with an interest in medication safety could develop a package of tools (clearinghouse function). Contents of a Tool Kit should include:
  - Methods for conducting organizational self-assessment
  - Strategies for prioritizing and evaluating where to start
  - Strategies for setting realistic timeframes for different desired projects
  - Strategies for selling initiatives to key members of the organization by using standardizations and providing credibility for projects
  - Implementation guidelines (Including simpler plans for smaller facilities with ideas, tips, examples, and contact information from institutions who have implemented specific initiatives)
  - Methods for collecting and analyzing data to measure and demonstrate safer systems. (Robust outcomes are needed to identify how "less harm" is achieved, yet it is important to realize that outcome goals and process goals may be unattainable or unproven predictors of safe systems.)
  - Strategies for maintaining safe systems: How to provide rewards/reinforcement for achieving goals and how to sustain and maintain a safe system over time.

Create industry-wide standards/specifications:

- Seek to create/promote industry-wide standardization that will assist in the implementation of technology (i.e., CPOE functionality, bar-coding standardization for unit dose medications, error reports, etc.)
- Engage manufacturers directly in these efforts.
- Obtain grant monies to help hospitals implement new technologies to improve safety.

D. Suggested Roles for Key Stakeholders in Implementation

Internal stakeholder roles
The group identified internal stakeholders as the leadership of each hospital organization (BOD, CEO, Administrators/Directors) as well as each person working in the institution. The group reemphasized the importance that all internal stakeholders should accept the responsibility for quality and safety outcomes in their area of work. Internal stakeholders have a key role in implementing standards for their organization as outlined above.

"Clearinghouse" Role
The group recognized that a central clearinghouse is needed to promote coordination and consistency of patient safety activities across Wisconsin hospitals. The group believed that the WPSI is well positioned to carryout this clearinghouse function.

For example, it would be very useful to have a central organization to provide hospitals with information on medication safety initiatives and standards known statewide and nationally, as well as provide lists of resources on these initiatives.

It would also be useful to develop a catalogue of available Tool Kits so they are easily accessible resources that institutions can access to implement change. The group noted that such a clearinghouse could facilitate the voluntary sharing of information across hospitals.

Purchaser Role
Purchasers may desire to distinguish between best practice standards and minimum practice standards. Institutions may be reasonably expected to demonstrate to purchasers that the facility is meeting a basic set of standards, has a plan in place to make improvements, and is making progress.

It is important for purchasers to recognize that currently there exist no good outcome measures that are applicable across institutions that would definitively verify the level of "safety related outcomes" an organization achieves. Process measures may not be truly indicative of "outcomes", but they are probably the best measurement available to date. As a result, organizations should be rewarded and recognized for the extent of minimum and best practices they have implemented for improving safety.

Purchasers can assist providers in improving medication safety by petitioning for standardization across the healthcare industry in areas such as barcoding, CPOE, and the reduction of confusing names. Purchasers can also help by petitioning for grant monies to go to institutions to assist them in implementing expensive technology systems.

E. Researchable Questions

The group agreed generally that there is little literature on the differences and similarities of rural and urban hospitals, particularly on how system improvements demonstrated to be useful in urban are applicable to rural settings. They also raised the following questions that could be answered by further research:

1. What are meaningful outcome measures for medication safety? In what ways can rural community hospitals, particularly those with low volumes, demonstrate that interventions result in less harm?

2. How do occurrences of medication errors in rural and urban settings compare and contrast with respect to (1) rate of errors (2) the types of errors (preventable, types of harm incurred), and (3) root causes of errors?

3. How do medication use processes in rural and urban settings compare and contrast with respect to: (1) decision-making, (2) prescribing, (3) verification, (4) dispensing, (5) delivery, and (6) administration?

F. Comments/Observations

1. Do something that is cost-effective and within budget constraints
2. Focus on initiatives with the greatest impact
3. Recognize that safe systems are the same regardless of facility size, but that the key differences lie in implementation strategies
4. Create an institutional structure for safety that is multidisciplinary
5. Every organization needs to develop a plan/strategy for improving medication safety and update it regularly (annually). This plan should set both short-term and long term goals and objectives

Workgroup C: Roles of Local, Regional, and Statewide Organizations in Creating a "Culture of Safety"

Workgroup C mainly consisted of high-level health care administrators with responsibility for shaping their organizations' missions and programs. Members of this group represented viewpoints of hospitals and clinics, insurers and payers, and health care purchasing coalitions and alliances. Due to the nature of this workgroup's composition, the discussion of the six categories of workgroup results centered around big-picture, thematic, culture-change concepts rather than field-specific actions, as discussed in groups A and B.

A. Environmental Sketch/Environmental Factors

Workgroup C discussed the rural environment in the context of developing a culture of safety and how local, regional, and statewide organizations can contribute to the effort. Since this group focused on the broad issue of changing organizational culture, their comments reflect various opinions, brainstorms, and "out-of-the-box" conceptual thinking. While much of their report about environmental factors is factual, it is important to remember that this group aimed to push the boundaries of current patient safety conventions and, in doing so, needed to push the boundaries between opinion and fact.

Rural Wisconsin Health Care Factors

- Rural Wisconsin hospitals know that they can do better in preventing medication errors.
- Wisconsin's rural hospitals are currently making more use of clinical pharmacists and working towards being able to implement CPOE for the long term.
- Rural Wisconsin is unique from other rural locales in that it has high levels of HMO market penetration and multi-specialty clinic-based systems.
- Rural Wisconsin, and the upper Midwest in general, differs from other rural areas in that there is substantial Medicare and Medicaid cost-shifting to the private sector.
- Employers and insurers in rural Wisconsin are desperate for ways to address cost issues.
- Most rural Wisconsin hospitals are quite small, with fewer than 50 beds and an average daily census of less than 25.

Rural Health Care Factors

- Hospitals that stand-alone and hospitals in systems access assistance in substantially different ways.
- There is a perception among some that the quality of care and services given in rural facilities is lower than that given in urban hospitals. Some believe that, until data to compare rural and urban quality measures is presented, this perception will continue.
- Rural providers touch most people in the emergency room. ERs are important to rural communities and a good place to focus patient safety errors.
- Rural hospitals purchase health insurance for their employees and even as such, pay little to no attention to quality and make benefits decisions based largely on price.
- Rural and urban consumers are more similar than they are different. Both types of consumers are exercising their many choices in increasingly larger numbers.
- As more costs shift to the consumer, they will become increasingly concerned with safety issues and actively seek more information about patient safety.

General Health Care Factors

- Some consumers feel a sense of betrayal by the health care system and the medical community, as a result, have developed a posture of defensiveness.
- Cost imperatives will necessitate that individuals play a substantially increased role as stakeholders in influencing hospital quality and patient safety agendas (regardless of increased enrollee cost-sharing with employees).
- A group of large employers has developed the Leapfrog Group initiative to help purchasers focus their actions related to improving patient safety.

B. Priorities for Patient Safety Initiatives/Ideal Outcomes

In developing a list of priorities for fostering a culture of safety, participants' discussed several different types of priorities. Rather than focusing solely on actions for safety initiatives, participants' comments reflected what they believed to be top priority postures, attitudes, actions, needed buy-in, and models and examples to adapt in order to develop a safety culture effectively.

Priority Posture

- Rural hospitals believe they can become safer and need not take a defensive posture.
- Rural hospitals need to challenge the assumption that rural quality is lower than urban quality. It is rarely backed by any data.
- Double standards for rural and urban hospitals are not acceptable.
- Societal issues are important. Currently, the health care system is based upon what is expected by payers and not necessarily designed to deliver quality health care.

Priority Attitude

- Pick your spot and start. It is easy to be overwhelmed by the challenge of changing a large complex system, but hospitals must start somewhere.
- Focus on doing what is good for rural.
  - ➢ If rural hospitals simply mimic the approaches implemented in large urban facilities they are bound to fail.
  - ➢ Much can be done by doing what makes sense in the environment.
- We need to become comfortable trying to do better and to remember that the patient safety challenge is not a crisis.
  - ➢ It is fine to recognize that human beings are not perfect, but better to recognize that we can get better.
- It is important to get beyond the "victim mentality."
  - ➢ This is not about purchasers singling out hospitals, but about hospitals coming up to speed.
- It is a tough world for all businesses and organizations, and hospitals need to take some responsibility and be accountable.

Priority Actions

- Rural hospitals can implement numerous best practices and can adopt a culture of safety before tackling capital-intensive issues like CPOE. "We just need to get to work."
- Rural hospitals need to share resources and make greater use of long distance learning opportunities.
- To develop a culture of safety we need good data.
  - ➢ We need trending of that data so that we can see the system improving.
  - ➢ When a hospital adopts a non-punitive approach it will see reported problems go up substantially before they are brought down.

- Employers, payers, providers, and patients need to have more dialogues like the one held in Madison, October 2001. They are all facing the same challenges.
- Money is only one part of a complex equation. Simply spending more money for quality seems wrong.
- Workforce issues potentially stand to jeopardize hospitals' ability to improve quality and patient safety.
    - ➢ Universities and vocational technology schools are key stakeholders should become much more involved in this dialogue to help address the workforce issues.

Priority Buy-in

- Employers are greatly interested in this topic.
- Patient safety needs to be a higher priority for our boards.

Priority Models and Examples

- The success stories come from organizations taking an integrated approach to safety.
    - ➢ Hospitals need to be creative to integrate efforts.
    - ➢ All concerned stakeholders need to take ownership of addressing the issue.
- Improving hospital quality is similar to improving quality in other industries - Improvement requires a change in attitudes and a change in corporate culture.

C. Actions for Implementing Initiatives

1. What would it take to implement these particular practices and standards
2. Barriers to implementation
3. Strengths related to implementation

In discussing actions for adopting or implementing the listed priorities, the workgroup discussed specific things that hospitals, health system leaders, and the field of health care services can do to further their adoption.

What would it take?

Hospitals can:

- Identify a physician advocate or champion to make any progress with the medical staff.
- Begin implementing WPSI's (Wisconsin Patient Safety Institute) 10 interventions to reduce medication errors immediately.
- Utilize *AHRQ's Making Health Care Safer: A Critical Analysis of Patient Care Safety Practices* and work on implementing a few at a time
- Coordinate more effectively with regional centers when patient is transferred in and transferred back.
    - ➢ Implement good transfer agreements and better guidelines about when we can serve and when we need to transfer.
- Develop an admission agreement in Madison to more readily get our patients admitted in Hospital X with HMO X when Hospital Y with HMO Y has a full ICU.
- Consider the Joint Commission as a surrogate and focus on the WPSI initial recommendations.
- Benchmark with similar facilities.

Hospital or health system leaders can:

- Encourage data driven, non-punitive approaches.
- Focus on implementing initiatives within a rural context
- Encourage better staff use of free information-gathering opportunities, such as less expensive audio-conferences.

The field of health services can:

- Create a demand for assistance, such as a best practices repository.
- Remember that not all rural facilities are the same when considering patient safety initiatives.

Barriers to implementation

Workforce Barriers

- Rural organizations lack, and are less likely to get, dedicated resources for patient safety efforts.
- In rural facilities, many people wear multiple hats and this whole subject quickly becomes overwhelming.

Structural/Systemic/Environmental Barriers

- Varied parties are asking for a response to patient safety, making it very difficult to focus energies specifically.
- The lever of using quality report cards stems from the sense that there are no other alternatives for employers, yet it comes across as punitive.
  - ➢ It will be a challenge to leverage creating a statewide culture of patient safety and accountability that is not punitive and penalizing.
- We face the prospect of moving back to discounted fee-for-service purchasing which is in a direction against an emphasis on purchasing quality.
- The lever of dropping a provider group is not realistic in a rural areas.
- Multiple and often contradictory external expectations often confounds hospitals with tight resources.
  - ➢ We spend so much time and money on JCAHO that it is very discouraging to hear that doing well with JCAHO is not enough
- Malpractice carriers often send mixed messages.
  - ➢ Some believe that while malpractice carriers take some steps to encourage providers to change and better identify problems, they still function under the old paradigm of quality assurance that involves inspecting, identifying, and holding providers personally and/or solely responsible for errors.
  - ➢ Following old quality assurance practices directly contrasts with a systems-based approach to addressing medical errors.

Attitudinal Barriers

- The initial response to the IOM (Institute of Medicine) report was to reinforce the "Gotcha Culture."
  - ➢ It will be important to eliminate that mentality to make patient safety strides.

Purchasing Barriers

- Employers are in the untenable position of needing to purchase higher quality care at lower prices.
  - ➢ The Minnesota State employee strike is just the beginning of things to come.

- Increased cost sharing may not be feasible, particularly with unionized public employees, or have much influence on consumers to make better decisions.

Data/Measurement Barriers

- Available data does not provide clear guidance about where to act first.
  - ➢ Too many competing priorities make it more confusing – both within and besides the patient safety discussion.
  - ➢ This is a tough problem to get your arms around.
- There is little consensus in the state about appropriate uses for collecting and publicizing quality improvement data.
  - ➢ Data sets are collected and disseminated according to on the intention behind their use.
  - ➢ Intentions for data collection and dissemination can include fostering external accountability by publishing data for purchasers and consumers to use in decision-making; or addressing internal improvement issues by collecting and using data to support internal improvement studies or projects.
- Validity of quality improvement information and measures continue to be a challenge within rural hospital.

Strengths related to implementation

Structural/Systemic/Environmental Strengths

- Many people choose to work in rural health and have loyalty and pride in doing so.
- There are more opportunities for collaboration with rural hospitals through networks such as the Rural Wisconsin Health Cooperative.
  - ➢ Group purchasing for things like CPOE, for example, might be more achievable among rural hospitals, given the rural tendency to collaborate.

Attitudinal Strengths

- Rural hospitals are not asking for exemption from Leapfrog.
- The second-class label is inappropriate.
- Rural hospitals are not as consumed by competition.

Other Strengths

- Reducing variation in practice is key for decreasing errors, and rural has many opportunities to do so.

D. Suggested Roles for Key Stakeholders in Implementation

Purchasers:

- Do much statewide to assist the local hospitals. We can collect data, research and encourage appropriate state policy changes that will be relevant to small rural hospitals.
- Provide financial assistance and help coordinate resources.
- Conduct an analysis of equipment being used in Wisconsin (e.g., which IV pumps are safest).
- Pick an issue and focus regional and statewide support of it.
- Survey or publicize the safe practices being used in Wisconsin rather than surveying and publicizing the incidence of problems.

- Try to reach a national agreement about:
  - ➢ which data we expect to be disclosed and which can be kept private.
  - ➢ what we can do to educate the public.
- Be more thoughtful about what they pay for (CMS, insurers, Alliance, etc.) regarding quality.
- Business needs to set standards for what it will buy and be prepared to take the flack when it drops a provider who can't deliver the quality requested.
- Educate employees to be better consumers, particularly as we increase "cost sharing" with them.
- Note that Leapfrog is becoming increasingly sensitive to the provider perspective that multiple purchaser voices about what should or should not be disclosed is confusing and counterproductive.

Hospitals:

- Can participate in MetaStar activities and in ORYX activities, it would be helpful if the State Medical Society and American Medical Association did more to encourage physicians to get more involved with us.
- Need to establish a basic level of quality and those of us who can't maintain it need to get out of the business.

Physicians:

- One physician commented, "As a physician, I can assure you that many of my patients challenge my recommendations. Maybe I am trying to be too provocative but I would advise purchasers that "you are on your own" regarding the development of any system of public accountability. We as providers will remain defensive and that no approach will ever satisfy us and lead us to believe that it is fair."

Other:

- We can combine data from ISMP (Institute Of Safe Medication Practices), MetaStar (the WI PRO) and JCAHO.
  - ➢ There needs to be public accountability and reporting regarding egregious (extreme/gross/flagrant) errors.
- From the purchasers perspective, we think we are already paying for quality and we are not looking to pay more (In the room we have purchasers representing over half a million individuals).
- Currently, costs are going through the ceiling which makes it difficult for purchasers to focus on quality.
  - ➢ Some elements of cost inflation are due to quality problems.
  - ➢ At the very least, we should be focusing on the "low hanging fruit."
- As consumers need to share more costs, they will demand more information about providers.
- Employers frequently purchase insurance, not healthcare. What is the role of insurers in this discussion?
- We need more of an effort to remove disincentives than to create incentives. This is a key conceptual difference.
- Leapfrog employers believe that they need to
  - (1) to create incentives for disclosure
  - (2) work in good faith to create safe harbors around quality improvement data
  - (3) support malpractice reform.

E. Researchable Questions

General Research Suggestions

- Research should be conducted in and about smaller hospitals, not just larger ones.
- Drill down into the data about the use/benefits of clinical pharmacists in smaller, rural hospitals.
- We need more research about outcomes in rural hospitals and about the best measures and measurement processes.
- Hospitals can be seen as the point in the system where a lot of external resources come together. We need more research regarding how we can reduce the variation in these inputs (pumps, uniform bar codes, etc.).
- We need to pool data about smaller volume facilities to better understand the outcomes of rural ICUs, as an alternative to simply extrapolating from studies of much larger urban ICUs.
- The research data supporting CPOE was not from small rural hospital; it should be an open question whether this expensive investment is valid for these environments.

Specific Research Questions

- What variation exists in utilizing critical pieces of equipment and processes?
- How can quality improvement data be protected?
- What are hospitals currently doing for patient safety and how we can best learn about their best practices?
- What are the legislative alternatives for limiting discoverability of incidence reporting?
- How can education and training programs better prepare practitioners to help develop and be part of "cultures of safety?"
- What is the relationship between staffing ratios and patient safety?
- What is the correlation between single task workers and patient safety?
- How do licensing and regulation sometimes present barriers as well as supports for safety?

    - ➢ Example: Single task workers were found to be very successful in nursing homes, and gave better quality care, but this practice was in conflict with a current regulation, so these workers had to eliminated.
    - ➢ We need to see more collaboration between RWHC and WHA is needed around this issue.

F. Additional Comments/Observations

- We need legislation to deal with the barriers related to discoverability of quality improvement data.
- The Wisconsin Patient Safety Institute is an important and useful forum for the state to come together to create a state culture of patient safety.
- There is a general and mistaken assumption that the solutions are the same in all settings (this is basically a misapplication of the "medical model") but sociology and anthropology tell us otherwise.
- There is no perfect set of behaviors and patients will make choices based on a variety of factors in addition to "data": experiences of friends and families, location, their own values, community support, personality of providers.
- We need to direct more dollars directly to rural hospitals as seed dollars for patient safety initiatives (this was from an employer representative).

IV. Appendices

Appendix A: Workgroup Participants

* Denotes resource person or staff

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Workgroup C: Roles of Local, Regional, and Statewide Organizations in Creating a Culture of Safety

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Appendix B: Wisconsin Patient Safety Institute Research Supported Recommendations

(draft 10/18/00, 6:00pm)

Synopsis of the Patient Safety Work Group

RECOMMENDATIONS TO THE PATIENT SAFETY FORUM

November 16, 2000

EXECUTIVE SUMMARY

Representatives from a number of diverse organizations and health care professionals have been meeting since May 2000 to consider methods to improve patient safety and reduce medical errors in Wisconsin. While our initial discussions have focused on patient safety initiatives in hospitals, extended care facilities, nursing homes and other health care facilities, it is the belief of the group that patient safety must be embraced in all settings and as a part of the "culture" of health care in Wisconsin. As an outgrowth of a patient safety meeting on May 24, 2000, attended by more than 50 people (list attached), a smaller working group was established and has been meeting on a monthly basis to investigate, discuss and come to consensus on recommendations to improve patient safety. Representatives from the following organizations contributed to the final recommendations:

AARP

Dean Health Systems
Employer Health Care Alliance Cooperative
Marshfield Clinic
Medical College of Wisconsin
MetaStar
National Patient Safety Foundation
Pharmacy Society of Wisconsin
Rural Wisconsin Health Cooperative
State Medical Society of Wisconsin
WEA Trust
Wisconsin Association of Health Plans
Wisconsin Health & Hospital Association
Wisconsin Manufacturers & Commerce
Wisconsin Nurses Association

The work of this ad hoc group was prompted by a desire to proactively address the serious issue of patient safety and medical errors. A report recently released by the Institute of Medicine titled "To Err is Human: Building a Safer Heath System" estimated that medication errors could be within the top 10 causes of death in the United States.

The group has spent the majority of its time evaluating medication errors as one type of medical error. Medication errors occur largely as a process function and can be categorized into the following process components: prescribing errors, dispensing errors, administration errors, and errors in consumer use. Steps are needed to reduce medication errors in both inpatient institutions, like hospitals and nursing homes, and outpatient environments, including physician practices and community pharmacies. Maintaining the status quo has been recognized as inadequate. Purchasers of health care must also work to create payment systems that reward quality and high levels of service.

Given the tight timetable the group imposed on itself in order to bring recommendations to the November 16th Patient Safety Forum, the group focused its discussion mostly on inpatient care at hospitals and other appropriate health care facilities. The following list is not to be considered an exhaustive one. In fact, there may be other means of achieving the same results. These recommendations are offered as areas warranting immediate attention by providers, purchasers and consumers of health care in Wisconsin.

1. Hospitals, extended care facilities, nursing homes and other health care facilities need to provide 24-hour pharmacy coverage either on-site or on-call (by telephone access to a staff pharmacist or contracted through a community pharmacist).

2. Hospitals and other appropriate health care facilities should work toward implementation of an integrated computerized prescriber order entry (CPOE) system with clinical decision support for medications and other ordered services.

3. Hospitals, extended care facilities, nursing homes and other appropriate health care facilities responsible for the administration of medications to patients should implement an oral and inhalant unit dose distribution system for all non-emergency medications administered within the facility by January 1, 2001. The long-range goal would be to use unit dose distribution of all oral and inhalant medications by January 1, 2002.

4. Hospitals and ambulatory health care centers should utilize a pharmacy based and pharmacist managed process for the preparation of intravenous admixture solutions.

5. Pharmacies and physicians should include the generic name on the label of prescription medications dispensed to patients.

6. Hospitals, community pharmacies, ambulatory clinics, and any other health care facility that dispense medication should utilize available computer software to provide clinical screening to maximize patient safety in the dispensing of all prescription medications.

7. Hospitals and other appropriate health care facilities should investigate and evaluate the use of bar-coding systems for the packaging and administration of medications by December 31, 2001.

8. Hospitals and other appropriate health care facilities should prepare and maintain written policies and procedures for the use of select high-risk medications within the facility.

9. Prescribers should institute actions to eliminate the use of symbols and phrases that are commonly misinterpreted by pharmacists and other health care providers.

10. Prescribers and pharmacists should include the intended use on all prescription orders and prescription drug labels and packages for consumers.

MEDICATION SAFETY RECOMMENDATIONS FOR WISCONSIN HEALTH CARE PROVIDERS

1. **Hospitals, extended care facilities, nursing homes and other health care facilities need to provide 24-hour pharmacy coverage either on-site or on-call (by telephone access to a staff pharmacist or contracted through a community pharmacist).**

Access to the clinical skill and knowledge of pharmacists is essential today given the complexity of therapies provided to hospitalized patients. Most of the larger and busier hospitals employ pharmacists on a 24-hour, 7-day per week basis. However, some hospitals and other health care facilities do not have the patient demand for full-time pharmacist services on a 24-hour basis. In those cases where a pharmacist is not physically present within the hospital and medication services are called for, it is recommended that the hospital staff follow written procedures to contact a pharmacist on call for either a verbal consultation or to attend to the situation directly[1, 2.]

Pharmacist review of prescription orders and the provision of information by pharmacists to prescribers have clearly resulted in a decrease in adverse drug events and medication errors[3]. Literature consistently demonstrates patient safety and financial benefits when pharmacists work "decentrally" on patient care units with doctors and nurses to monitor patient drug therapy and provide drug information services[4, 5, 6]. A 1999 JAMA article published by Leape, et al. showed a 66% decline in adverse drug events for patients in an intensive care unit when clinical pharmacist services were provided[7]. Pharmacist services are also important in the preparation of intravenous and other injectable solutions commonly provided in a hospital.

1.

1. American Society of Hospital Pharmacists. ASHP guidelines on preventing medications errors in hospitals. *Am J Hosp Pharm*. 1993;50:305-314.

2. Kohn LT, Corrigan JM, Donaldson MS, eds. To err is human: building a safer health system. Washington, DC National Academy Press. 1999.

3. Mason JD, Colley CA. Effectiveness of an ambulatory care clinical pharmacist: a controlled trial. *Ann Pharmacother*. 1993;27:555-559.

4. Stroup JW, Dinel BA. Implementation and evaluation of a decentralized pharmacy service. *Can J Hosp Pharm*. 1985;38:94-97.

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2. Hospitals and other appropriate health care facilities should work toward implementation of an integrated computerized prescriber order entry (CPOE) system with clinical decision support for medications and other ordered services[1].

Systematic approaches toward improving the entry of prescription orders formally into the health care system are needed to reduce the prevalence of medication errors. Computer systems and approaches which may involve services through the Internet can enable prescribers to enter orders electronically, thereby eliminating errors associated with transcription or miscommunication with other health care professionals and improving system response time[2,3]. These systems also provide the ability to incorporate relevant information for the prescriber as an aid in his/her decision-making process[4]. Practical information regarding drug formularies, standard doses and dosing intervals, instructions for use of high-risk drugs, laboratory parameters, etc. can also be provided through sophisticated prescriber order entry systems[4,5].

Prescription order legibility is a common and well-known problem within the traditional delivery system. Although systems are available to enable the entry of orders electronically which dramatically reduces the prevalence of error in the order process, it is estimated that less than 5% of hospitals and clinics have incorporated the use of such technology[6].

One reason for the slow adoption of such technology is that it is extremely expensive and complex. Most hospital systems currently cost in excess of one million dollars. In addition, significant administrative, interfacing and training issues also must be addressed with the consideration and implementation of any prescriber order entry system[7].

Although significant organizational issues must be addressed by Wisconsin's hospitals, prescribers and other health care providers, the elimination of handwritten prescriptions in both inpatient and ambulatory settings by January 1, 2004 is recommended as a universal goal. By January 1, 2002, hospitals, clinics and other appropriate health care facilities must evaluate the feasibility of adopting and implementing a CPOE system. This evaluation must address human resource, financial and technological needs as well as cultural and geographic issues specific to the individual facility.

Health care organizations must also begin the process of gaining organization-wide support and develop system criteria and an implementation plan and schedule to take advantage of the benefits associated with the use of this technology. CPOE is consistently touted in the literature as the single best system improvement, which will improve medication use safety[2]. Literature consistently demonstrates that 50-60% of all medication errors occur at the prescribing/decision making stage of the medication use process[8].

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2. Bates DW, Leape LL, Cullen DJ, et al. Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. *JAMA*. 1998;280:1311-1316.

3. Teich JM, Merchia PR, Schmiz JL, Kuperman GJ, Spurr DC, Bates DW. Effects of computerized physician order entry on prescribing practices. *Arch Intern Med*. 2000:160:2741-2747.

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8. Bates DW, Cullen D, Laird N, et al. Incidence of adverse drug events and potential adverse drug events: implications for prevention. *JAMA*. 1995;274:29-34.

3. Hospitals, extended care facilities, nursing homes and other appropriate health care facilities responsible for the administration of medications to patients should implement an oral and inhalant unit dose distribution system for all non-emergency medications administered within the facility by January 1, 2001[1]. The long-range goal would be to use unit dose distribution of all oral and inhalant medications by January 1, 2002.

The use of unit dose medication packaging and distribution systems has proven to reduce the incidence of medication errors in the administration process within health care facilities[2-4]. The special packaging and labeling of medications individually assures that each dose is administered or accounted for. Unit dose systems have been successfully used in most Wisconsin hospitals since the 1970's. However, many hospitals do not regularly use unit of use containers for some liquid and injectable medications which creates a greater potential for error in the administration of the medication. For example, a common practice in some hospitals is to keep a bulk vial of an injectable drug in the hospital floor stock and then withdraw the necessary amount of medication into a syringe at the patient's bedside immediately prior to administration[1,5]. This practice creates a greater potential for inaccuracy than a system that provides pre-drawn syringes. Comprehensive unit of use packaging should be provided in all Wisconsin facilities.

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2. Means BJ, Derewicz HJ, Lamy PP. Medication errors in a multidose and a computer-based unit dose drug distribution system. *Am J Hosp Pharm*. 1975 Feb;32(2):186-91.

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4. Hospitals and ambulatory health care centers should utilize a pharmacy based and pharmacist managed process for the preparation of intravenous admixture solutions[1].

All sterile medications should be prepared and labeled in a suitable sterile environment by appropriately trained personnel. Quality assurance procedures for the preparation of sterile products must exist[2]. Pharmacists must be responsible for the correct preparation of sterile products in all practice settings[3]. The increased rate of development of new drugs, and look-alike/sound-alike drug names has resulted in a dramatically increased rate of medication errors and adverse drug events if such products are prepared in the absence of a pharmacist. Patient morbidity and mortality have resulted from incorrectly prepared or contaminated sterile products. Recent ISMP publications and lay press articles (e.g. 9/00 Chicago Tribune nursing series) provide many specific examples in which sentinel events have occurred when nurses mistake one sterile product for another, as well as examples of patient infections resulting from poor aseptic technique[4]. A comprehensive rule was recently passed by the Wisconsin Pharmacy Examining Board to assure safe and appropriate sterile product preparation in all Wisconsin pharmacies[5]. This standard should be followed in all practice settings and by all health professionals involved in the preparation of sterile products.

Patient morbidity and mortality have resulted from incorrectly prepared or contaminated sterile products. By eliminating the need for nursing personnel and others to calculate, manipulate and mix intravenous medications, errors and adverse events can be reduced. Except in emergency situations, pharmacies should be responsible for the accurate preparation of sterile products and should follow standards established to ensure that products prepared are of the highest quality[6]. In addition, written guidelines and standard concentrations should be used by the pharmacy to reduce adverse events associated with certain high-risk medication infusions such as heparin, insulin, concentrated electrolytes, opiate narcotics, and chemotherapy[7].

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4. Institute on Safe Medication Practices. Hazard Alert! Action needed to avert fatal errors from concomitant use of heparin products. *ISMP Medication Safety Alert*. 2001 Feb,21.

5. WI Phar Ch 15

6. American Society of Hospital Pharmacists. ASHP guidelines on preventing medication errors in hospitals. *Am J Hosp Pharm*. 1993;50:305-14.

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5. Pharmacies and physicians should include the generic name on the label of prescription medications dispensed to patients.

Countless examples of look-alike/sound-alike brand name products exist (e.g. Celebrex, Celexa, Cerebyx). Additionally, many generic drugs are multi-sourced which may result in patient confusion and therapeutic duplication if generic names are not used on prescription labels (e.g. generic drugs are often interchanged within pharmacies due to contracting and product availability reasons). Competing generic drugs may appear physically different yet be absolutely equivalent[1]. The use of generic names should provide patients with information to avoid unintentional duplication, which may otherwise occur[2,3]. Brand names may be recommended on a label, in addition to the generic name, if the brand name product is dispensed[3,4].

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4. Berger MS. Prescription labeling. *Am Fam Physician*. 1993;48:588.

6. Hospitals, community pharmacies, ambulatory clinics, and any other health care facility that dispense medication should utilize available computer software to provide clinical screening to maximize patient safety in the dispensing of all prescription medications.

Drug allergy, drug-drug interaction, maximum dose alerts for high-risk drugs and therapeutic duplication alerts should be minimum requirements. The growing complexity of drug regimens coupled with the rapid influx of newly approved medications makes automated computerized screening imperative[1,2]. The literature is replete with examples of adverse drug events that could have been prevented if appropriate computerized clinical screening was in place.

Computerized prescriber order entry systems may include this type of computerized clinical support service. However, many pharmacy based software systems also are readily available and used to provide this function. Because the experience in the use of pharmacy-based systems is considerably greater than the prescriber order entry systems, implementation of a dispensing based software system is both less expensive and easier to accomplish from a systems standpoint. The use of such software, however, should not supplant the evaluation of a prescription/medication order by the responsible physician or pharmacist prior to the dispensing of the medication.

1. Evans RS, Pestotnik SL, Classen DC, et al. A computer-assisted management program for antibiotics and other anti-infective agents. *N Engl J Med*. 1998 Jan 22;338(4):23

2. Pestotnik SL, Classen DC, Evans RS, Burke JP. Implementing antibiotic practice guidelines through computer-assisted decision support: clinical and financial outcomes. *Ann Intern Med*. 1996 May 15;124(10):884-90. 2-8.

7. Hospitals and other appropriate health care facilities should investigate and evaluate the use of bar-coding systems for the packaging and administration of medications by December 31, 2001.

Multiple studies within the medical literature consistently demonstrate that more than 30% of medication errors and adverse drug events occur at the administration stage of the medication use process[1]. Systems exist that utilize bar code technology to assure accurate medication selection and dispensation by the pharmacist[2]. Other systems exist that utilize handheld personal digital assistants, barcode technology, and wireless communications to assure the safe administration of medications to patients by nurses and other health care professionals at the patient's bedside[3]. These systems can drastically improve the accuracy of medication administration as well as automate the documentation process. Unfortunately, although many such systems are marketed, very few of these systems have been effectively implemented in hospitals to date[4,5, 6, 7, 8]

1. Leape LL, Bates DW, Cullen DJ et al. Systems analysis of adverse drug events. *JAMA*. 1995;274:35-43.

2. American Society of Hospital Pharmacists. ASHP guidelines on preventing medication errors in hospitals. *Am J Hosp Pharm*. 1993;50:305-14.

3. Kohn LT, Corrigan JM, Donaldson MS, eds. To err in human: building a safer health system. Washington, DC National Academy Press. 1999.

4. American Society of Health System Pharmacists. Top-priority action for preventing adverse drug events in hospitals. *Am J Health-Syst Pharm*. 1996;53:747-51

5. Yang M, Brown MM, Trohimovich B, Dana M, Kelly J. The Effect of Barcode-enabled Point of Care Technology on Medication Administration Errors. MedErrors website. Available at: http://www.mederrors.com/resource_main_set.html. Accessed June 24, 2001.

6. Hennessy S. Potentially remediable features of the medication-use environment in the United States. *Amer J Hosp Pharm.* 2000;57:543-548.

7. Crane VS. New perspectives on preventing medication errors and adverse drug events. *Amer J Hosp Pharm.* 2000;57:690-697.

8. Grasha AF. Into the abyss: Seven principles for identifying the causes of and preventing human error in complex systems. *Amer J Hosp Pharm.* 2000;57:554-564

8. Hospitals and other appropriate health care facilities should prepare and maintain written policies and procedures for the use of select high-risk medications within the facility[1].

The most serious and sometimes lethal medication errors have been attributed to medications in concentrated form or with narrow therapeutic indices. Health care facilities can minimize errors and adverse events with the implementation of written guidelines, checklists, dose limits, preprinted order forms and elimination of certain high-risk floor stock medications[1,2, 3, 4, 5, 6]

Select medications are frequently implicated in medication misadventures. Insulin, heparin, thrombolytics, potassium chloride, hypertonic saline, dextrose 50% solution, epidurals, patient controlled analgesia (PCA), and chemotherapeutic agents are some of the medications, medication classes, or routes that are frequently implicated in medication errors and/or adverse drug events[1,3]. These medications can be problematic for a variety of reasons including: look-alike/sound-alike potential; narrow therapeutic index; side effect profile; confusing or multiple dosing regimens; and/or complex administration requirements. Policies and procedures can be drafted and implemented that minimize the potential for errors with these agents. Written policies for hospitals and other appropriate health care facilities should include special protocols for high-risk medications and should specify educational programs for training personnel. For instance, removing concentrated potassium chloride and hypertonic saline from patient care units prevents the inadvertent and unintended administration of these agents. Requiring double checks on pump programming for epidurals and PCAs as well as double checks for all chemotherapy administration can also minimize the likelihood of error.

1. Kohn LT, Corrigan JM, Donaldson MS, eds. To err in human: building a safer health system. Washington, DC National Academy Press. 1999.
2. Opfer KB, Wirtz DM, Farley K. A chemotherapy standard order form: preventing errors. *Oncol Nurs Forum*. 1999;26(1):123-8.
3. Edgar TA, Lee DS, Cousins DD. Experience with a national medication error reporting program. *Am J Hosp Pharm*. 1994 May 15;51(10):1335-8.
4. Bates DW, Cullen DJ, Laird N, Peterson LA, Small SD, Servi D, et al. Incidence of adverse drug events and potential adverse drug events. Implications for prevention. ADE Prevention Study Group. *JAMA* 1995;274:29-34,
5. Cohen MR, Anderson RW, Attilio RM, Green L, Muller RJ, Pruemer JM. Preventing medication errors in cancer chemotherapy. *Am J Health Syst Pharm*. 1996; 53:737-746.
6. Leappe LL, Kabcenell Al, Berwick DM. *Reducing Adverse Drug Events*. Boston: Institute for Healthcare Improvement; 1998.

9. Prescribers should institute actions to eliminate the use of symbols and phrases that are commonly misinterpreted by pharmacists and other health care providers.

Symbols and abbreviations are frequently used to save time and effort when writing prescriptions and documenting in patient charts. **(See attachment A)** However, some symbols and abbreviations have the potential for misinterpretation or confusion[1,2]. Examples of especially problematic abbreviations include: U for units and mg for micrograms. When U is handwritten, it can often look like a zero. There are numerous case reports where the root cause of sentinel events related to insulin has been the interpretation of a U as a zero. Using the abbreviation mg instead of mcg has also been the source of errors because the symbol m, when handwritten can look like a zero. The use of trailing zeros (e.g., 2.0 vs. 2) is another dangerous order writing practice. The decimal point is sometimes not seen when orders are handwritten using trailing zeros. Misinterpretation of such an order could lead to a 10-fold dosing error. To minimize the

potential for error and to maximize patient safety, prescribers need to avoid select abbreviations and phrases[3].

1. Fox GN. Minimizing prescribing errors in infants and children. *Am Fam Physician*. 1996 Mar;53(4):1319-25.
2. Kohn LT, Corrigan JM, Donaldson MS, eds. To err in human: building a safer health system. Washington, DC National Academy Press. 1999.

3. Institute for Safe Medication Practices. Please don't sleep through this wake-up call. Retrieved from the world wide web on July 24, 2001. http://www.ismp.org/

10. Prescribers and pharmacists should include the intended use on all prescription orders and prescription drug labels and packages for consumers.

Incorporation of the indication for use of a medication on prescription orders has been demonstrated as an inexpensive and efficient method to enable enhanced patient education regarding their therapy and minimize errors associated with either misinterpreted prescription orders by pharmacists or sub-optimal ordering by a prescriber. The absence of indications on prescription orders and drug labels can be a barrier to providing appropriate and safe medication therapy[1]. A large number of medications currently available are used for a variety of disease states. In many cases, a single agent can have many different indications. A patient's confidence can be severely undermined if they are educated that their medication is for one problem when the physician intended for the medication to be used for something completely different. For instance, a pharmacist counseling a patient on propranolol could easily assume that it is being used to treat hypertension when it was really intended to be used for migraine headache prophylaxis. Obviously, this could lead to significant confusion for the patient.

Including the indication on prescriptions can also assist the pharmacist in screening the medication order for proper dose, duration, and appropriateness[2]. Having the indication on prescription orders minimizes the risk of confusion due to look-alike medications as well as the risk of misinterpretation due to poorly handwritten orders[3]. Knowledge of the intended use may also enable pharmacists to intervene when multiple prescribers unknowingly order duplicative therapy for the same patient.

1. Kohn LT, Corrigan JM, Donaldson MS, eds. To err in human: building a safer health system. Washington, DC National Academy Press. 1999.

2. Fox GN. Minimizing prescribing errors in infants and children. *Am Fam Physician*. 1996 Mar;53(4):1319-25.

3. Institute of Safe Medication Practices. Drug name mix-ups: Much more than look-alike names. *ISMP Medication Safety Alert*. 1998, July 1.

Because of the complexity and importance of this issue, the Patient Safety Work Group has decided to continue meeting to address other methods and opportunities to improve patient safety. No specific meeting dates have been identified at this time and there is recognition that a budget may need to be pulled together to coordinate these meetings and subsequent follow-up activities. Below are items for future discussion.

ITEMS FOR FUTURE DISCUSSION

1. Expand the scope of discussion to include ambulatory care facilities.
2. Study uniform bar coding.
3. Evaluate steps needed to make prescription usage safer for patients at home.
4. Create educational programs for consumers and providers on “look alike, sound alike” drugs to reduce confusion and errors.
5. Create standardization of drug labeling and packaging.
6. Look at improvements in IV machine pump technology, which includes improvements in safeguards, coupling technology and training in their use.
7. Evaluate nosocomial infections (institution acquired infections) prevention
8. Study institutional falls prevention programs
9. Wrong site surgery prevention
10. Transfusion procedure error prevention

ATTACHMENT A

Commonly Misinterpreted Abbreviations

Abbreviation	***Intended meaning***	***Common Error***
U	Units	Mistaken as zero or a four resulting in overdose. Also mistaken for “cc” (cubic centimeters) when poorly written.
mg	Micrograms	Mistaken for "mg" (milligrams) resulting in a ten-fold overdose
*Q.D.	Latin abbreviation for every day	The period after the "Q" has sometimes been mistaken for an " I, " and the drug has been given "QID" (four times daily) rather than daily.
*Q.O.D.	Latin abbreviation for every other day	Misinterpreted as "QD" (daily) or "QID" (four times daily). If the "O" is poorly written, it looks like a period or "I." SC or SQ
Subcutaneous		Mistaken as "SL" (sublingual) when poorly written.
TIW	Three times a week	Misinterpreted as "three times a day" or "twice a week”
D/C	Discharge; also discontinue. Patient's medications have been prematurely discontinued when D/C, (intended to mean "discharge")	Misinterpreted as "discontinue," because it was followed by a list of drugs.
HS	Half strength	Misinterpreted as the Latin abbreviation "HS" (hour of sleep).
Trailing Zero	_____.0	Missing decimal point
cc	Cubic centimeters	Mistaken as “U”(units when poorly written.
AU, AS, AD	Latin abbreviation for both ears; left ear; right ear	Misinterpreted as the Latin abbreviation "OU" (both eyes); "OS" (left eye); "OD" (right eye)

*High Percentage of Errors