Kaiser Permanente Northern California (KPNC) High Alert Medication Program

Background

According to the Institute of Medicine's report *Preventing Medication Errors*[1], between 380,000–450,000 preventable adverse drug events (ADEs) occur in hospitals each year. These errors most frequently occur in the prescription and administration stages. Medication errors are a significant healthcare problem and many of them are preventable.[2] While many medication errors may not cause grave harm to patients, some medications are known to carry a higher risk of harm than other medications and errors in the administration of these medications can have catastrophic clinical outcomes. These medications are identified as "high alert" medications and require special considerations. One of the National Quality Forum's 30 Safe Practices for Better Healthcare is to "identify all high alert drugs, and establish policies and processes to minimize the risks associated with the use of these drugs."

More than 500,000 doses of high alert medications are administered throughout Kaiser Permanente Northern California (KPNC) on an annual basis. Following three major adverse medication safety events, it was determined by KPNC leadership that there must be a more focused approach for high alert medications. To ensure safe medication practices and to eliminate medication errors that cause harm to our patients, KPNC implemented the High Alert Medication Program (HAMP) in December of 2005.

In July of 2005, a 21-year-old patient was admitted to the hospital for treatment of lymphoma. This patient began receiving chemotherapy and was responding well to the treatments. On August 26, 2005, the patient received what was to be the fourth chemotherapy treatment, injected intrathecally. Almost immediately, the physician recognized that what had been injected in the patient's spine on August 26 was not the prescribed treatment, but rather Vincristine, a chemotherapy medication intended for another patient, which is lethal when administered intrathecally. Three days later, this 21-year-old died from the lethal medication error.

Multiple system failures and human errors led to this tragic incident. While the pharmacist noted that there were four chemotherapy medication orders for two patients that day, the medications were

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1   Institute Of Medicine. Preventing Medication Errors: Quality Chasm Series. Washington, DC: National Academies Press; 2007.

2   Winterstein AG, Sauer BC, Hepler CD, et al. Preventable drug-related hospital admissions. *Ann Pharmacother*. 2002;36(7–8):1238–48.

Introduction to this Special Supplement

This issue of *CHPSO Patient Safety News* includes the first in a new series of reports providing examples of how organizations are successfully implementing patient-safety measures. These reports are intended to be brief but informative.

Often, knowing what patient-safety measures to implement is not the major challenge; the challenge is how to do it. For example, hospitals know they want to safely administer high-risk medications; the challenge is consistently doing that.

The health care system is complex, and built on the work of many different people, work environments, equipment and materials. Progress toward a particular goal may take time and may not be direct — there are times when a plan does not work well and revisions have to be made. By sharing the experiences of others, hospitals can save resources and accelerate progress. They can learn from others' successes and failures.

But, ultimately, each organization is unique, and successful change needs to be customized for each situation. Thus, the "implementation examples" provided in these updates are meant to show how it *can* be done, not how it *must* be done.

Barbara Crawford, Vice President of Quality and Regulatory Services, Kaiser Permanente Northern California, and Suzanne Graham, California Patient Safety Leader, Kaiser Permanente, provided the first report. CHPSO will periodically issue reports from other hospitals and health systems. Many have learned important lessons through difficult experiences. Now hospitals can share and help each other.

— Rory Jaffe, MD MBA, rjaffe@calhospital.org

mixed up and delivered to the wrong nursing units. When delivering the medication, the pharmacist placed the syringe directly in the refrigerator rather than performing face-to-face delivery. Additionally, the Vincristine was not labeled and packaged according to the manufacturers' recommendation, displaying the warning "Fatal if given Intrathecally. FOR IV USE ONLY." Neither the nurse nor the physician checked the label on the syringe with the patient's name or used the five rights (5Rs[3]) of medication administration before administering the medication. The nurse removed the medication label before handing the syringe to the physician so as to see the graduations clearly, thus the physician had an unlabeled syringe. The independent double-check between two licensed personnel never occurred. This series of errors was preventable had the established policies been followed.

Objectives

The overall purpose of the HAMP was to ensure safe medication practices and to eliminate medication errors that cause harm to our patients. These goals were to be achieved by:

- Standardizing medication handling practices.

- Enhancing education programs related to medication practices, embedding these into annual core competencies of all staff who handle medications.

- Developing monitoring functions at both the regional and local levels to ensure sustainability and on-going systems improvements.

Methodology

In November of 2005 the Regional Medication Safety Committee chartered the High Risk Medication Safety Task Force for the purpose of drafting a proposal for standardizing the handling of High Alert Medications (HAMs) throughout KPNC. This core multidisciplinary group including Kaiser Foundation Health Plan/Hospital & The Permanente Medical Group leaders, managers, and frontline staff and physicians was brought together for a full-day, intensive decision making event to establish a plan, determine the working groups, define the scope and establish the limited list of HAM, processes and patient types that would be the HAMP for KPNC.

Step 1: Development of the HAM List

Using the current literature, recent medication related events in KPNC and the expertise of the participants, the group broke down into working groups where the list was developed. Each group had content and experience experts and was charged to bring forth the listing of drugs, methods of administration and patient specific requirements that the large group would evaluate. Decision making was by consensus and the HAMP List and management requirements were established.

Step 2: Establish the Scope of the Program

The group established that the HAMP would have the following requirements:

- The HAM List and management requirements would be standardized at all facilities throughout the region

- Any change to the list would require approval by the Regional Medication Safety Committee

- The HAMP would apply across the continuum of care, including special practice

- Senior leadership would ensure the appropriate resources were available for design, implementation and equipment requirements

Step 3: Policies and Procedures

A team of pharmacists, nurses and quality practitioners, with the guidance of physician partners, developed the policies and procedures of the HAMP. Over a period of two months these were sent to subgroups of staff for comment and through a dynamic change process the policies and procedures were finalized into a working document. These received final approval from leadership and the Regional Medication Safety Committee.

Step 4: Communication

A communication plan was developed to ensure that the message of medication safety would be consistent and that all in KPNC would be aware of the program. Support for the program at the facility level was critical and specific communication steps were taken to enlist the support of local leadership to ensure success.

Step 5: Education

An education plan was established to accomplish the goal of training all pharmacy, nursing and medical staff within a very short time frame. Standardized education

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[3]   The 5Rs are the right drug, right dose, right time, right route, right patient.

tools were developed for use across the region. All training was accomplished in less than two months.

Step 6: Monitoring

An Audit Subgroup of the Regional Medication Safety Committee was established to design monitoring tools and procedures to ensure complete implementation, staff competency and the consistent application of the requirements of the program. Regionally, reporting was to be ongoing, using the regional Quality and Risk database (MIDAS) to track the trends in HAM involved in adverse events.

Measurement

As the HAMP has matured the measurement strategy has evolved. The first phase of the facility monitoring process was checking for compliance with implementation of the program. The implementation threshold was set at 90%. Four facilities reported below threshold results and developed corrective action plans. Three of the four facilities subsequently reported results of greater than 98% compliance, bringing the regional overall compliance result to 95%.

Following this initial process, Observational Audit monitoring tools were developed. These audits were designed to measure whether or not all medications on the high alert medication list were handled specifically to policy requirements. Audits were done on a quarterly basis throughout 2006 and 2007. During 2007 the average compliance reached 98%. The Audit Subgroup surveyed facilities regarding their experience with the audit process. Most respondents felt that the audits had been effective in monitoring the initial implementation of the HAMP policy, but that it was time to explore more actionable metrics that would support continued performance improvement. Following this input it was decided that the process was stable and auditing was reduced to an annual audit. In the case of permanent harm, life-threatening injury or death from a HAMP error, observational audits are to continue monthly for a minimum of three months or until a 95% compliance level has been achieved, whichever is greater.

Based on additional input from the Medical Centers, the decision was made to work with the Institute for Healthcare Improvement (IHI) to modify the global Trigger Tool making it specific to HAMs and, through small tests of change, pilot its use. The use of "triggers," or clues, to identify ADEs is an effective method for measuring the overall level of harm from medical care in a health care organization. Two facilities volunteered to pilot use of the Trigger Tool methodology to focus on the care experience of patients receiving certain high alert medications. These audits identified several opportunities for improvement and action plans were developed an implemented. In 2008 all Medical Centers were required to utilize the focused trigger tool audit. A review of the data after two quarters provided little actionable information. Evaluation revealed that the Trigger Tool process was very time consuming and that the sampling technique was not effectively identifying records of patients who had received high alert medications. The Trigger Tool audit as it existed in 2008 was put on hold so that work could be done at the regional level to determine other strategies for performing the Trigger Tool audits using our automated medical record. Currently two Medical Centers are involved in a research project using the automated medical record to detect and evaluate triggers (includes high alert medications) that will allow for the measurement of adverse events or harm in our system. Results to date are encouraging in that we no longer have to use sampling techniques which may or may not "pick up" all of the HAMs administered. This makes it possible to focus in on patients receiving HAMs that may have resulted in a preventable adverse outcome.

Since the inception of our work we have utilized data from our Responsible Reporting Forms (aka unusual event forms). This data is analyzed using the control chart methodology in which one determines whether variations from the mean are caused by "special cause," in this case, the implementation of HAMP. We have seen substantial improvement in our volumes of employee-reported medication events and HAMP events. A powerful indicator of improvement is the Days between major injury and death from all medication events control chart. Through these measurements, we know we have sustained a new and improved process. Our data shows that we have not had a HAMP error with major injury or death since February 2006.

Abbreviations used in this article	
Abbreviations used in this article	HAM: High alert medication
5Rs: The five rights of medication administration	HAMP: High alert medication program
ADE Adverse drug event	IHI: Institute for Healthcare Improvement
CPOE: Computerized physician order entry	KPNC: Kaiser Permanente Northern California

Key Success Factors

Making a change of this magnitude across a region the size of KPNC (20 Medical Centers) can be extremely difficult. Our culture is one of innovation and focus on results, and not one where a specific process approach is often mandated. Given the seriousness of our issue, however, we recognized the importance of consistency in meeting our goals. Our approach to successful implementation included the following key steps:

1. Leadership endorsement: Key physician and nursing leaders from both the hospital and the medical group endorsed the program and created visible support through the use of email communications as well as direct communication with Medical Center leadership. They worked with the established Regional Committee, the Medication Safety Committee, and a small workgroup, affectionately nicknamed the HAMPsters, to create the policy and procedures and establish the implementation plan. They supported the work through weekly phone calls with the HAMPster group and the Medical Centers to make sure the program was being implemented, lending their support to address pockets of resistance, and in-person presentations to the region's leadership team.

2. Constant communication and education: We held routine phone calls with the Medical Center leaders accountable to implement the HAMP policy and procedure, to answer questions, clarify misunderstandings, and continue to communicate the consistent message. For the first few months of the program these calls were weekly. The calls are now monthly. We met with chiefs' groups, nursing leadership groups and staff nurse leadership groups to convey the need for a consistent program approach. In addition, all nursing staff and others who give medications, such as radiology technologists, completed a self-study module and brief test on the 5Rs of medication administration.

3. Feedback loop: We established a process for Medical Centers to use to request changes to the policy. We review changes at the Medication Safety Committee meetings, and make a decision to modify the policy and procedure or leave it as is. We also chartered subgroups to work on particular areas, such as anesthesia and pediatric oncology, to ensure that we honored the specific needs of these specialties while adhering to the HAMP principles.

4. Local accountability: Each Medical Center has a Medication Safety Committee. This committee's responsibility is to ensure HAMP is in place locally and to review trends and local issues for course correction and action. The local committee chairs are invited on a rotational basis to present their local initiatives and issues to the Regional Medication Safety Committee.

5. A collaborative conference call was established on a monthly basis to discuss changes in the program; barriers; successful practices; etc. This call not only provides a means of exchanging information but also is important to sustaining the program.

Sustaining over time

We believe that in addition to ongoing monitoring, constant attention to the voice of our staff, physicians, and patients is key to successfully sustaining the HAMP over time. Improvements to the program as a result of this input include:

- Updating of the policy and procedure to improve usability.

- Introduction of the "MedRite" program to decrease interruptions to nurses during the medication administration process. This coupled with the introduction of Computerized Physician Order Entry (CPOE) has dramatically reduced medication errors related to administration.

- Production of a video "starring" our nurses demonstrating the proper technique for performing and independent double check.

- Patients coming to our Regional Medication Committee to provide input on how we can improve our medication delivery process.

- Purchase of gurney scales for Emergency Departments in each Medical Center to facilitate the accurate weighing of patients, thus improving the accuracy of dosage for weight-sensitive HAMs, such as tPA.

- Replacing of existing IV pumps with smart pumps that alert the nurse if the dose is out of an acceptable range

— Barbara Crawford, RN MS, VP, Quality & Regulatory Services, Kaiser Foundation Health Plan & Hospitals, Northern California barbara.crawford@kp.org and Suzanne Graham, PHD RN, Kaiser Permanente California Patient Safety Leader suzanne.graham@kp.org

The following materials are available on the CHPSO web site:

KPNC High Alert Medication List
KPNC High Alert Medication Policy