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The Canadian Adverse Events Study and Medication Safety

On May 25th 2004, "The Canadian Adverse Events Study: the incidence of adverse events among hospital patients" was published in the Canadian Medical Association Journal (CMAJ). It was the first national study undertaken in Canada to examine the rate of adverse events in Canadian hospitals. The study was headed by Dr. Ross Baker and Dr. Peter Norton. The researchers defined an adverse event "as an unintended injury or complication that results in disability at the time of discharge, death, or prolonged hospital stay, and that is caused by healthcare management rather than by the patient's underlying disease process."

Upon release, the results of the study came as no surprise to those of us who work in patient safety. Many of us have long speculated that comparing Canadian error data to the earlier data of other countries such Australia, New Zealand, Denmark, the United States and the United Kingdom would reveal distinct similarities. the United States Institute of Medicine released a 1999 report called "To Err is Human" that indicated between 44,000 and 98,000 deaths occurred in the U.S. every year due to medical error. At the time this report was released, it came as a wake-up call to healthcare and various levels of governments.

So what does the recent Canadian Adverse Events study tell us?

- The three most common areas for adverse events to occur include surgery, medication, and infection.
- 1 out of 13 adult patients admitted to a Canadian hospital encounter an adverse event.
- 1 out of 9 adults will potentially be given the wrong medication or wrong medication dosage.
- 187,500 out of 2.5 million patients admitted annually to acute care hospitals experience an adverse event.
- Between 9,000 and 24,000 patients die per year due to adverse events.
- 37% of adverse events are 'highly' preventable.
- 24% of preventable adverse events are related to medication error.

Many of our hospital medication systems are manual systems that rely heavily on human precision and accuracy. They leave little room for human fallibility with regards to memory or attention span. They take little heed of the infamous rule, "to err is human."

Still, many systems studied have shown to decrease medication error. Some of these include computerized physician order entry (CPOE), bar coding, and "smart" infusion pumps for intravenous (IV) therapies. Computerized physician order entry can eliminate medication errors caused by poor handwriting of physicians and other prescribers. Computerized physician order entry can also eliminate the need for confusing

abbreviations that have led in the past to serious medication errors. In addition, CPOE can be configured to provide prescribers with up-to-date patient and drug information so that alerts will be immediately available when inappropriate medications or incorrect doses are ordered.

Bar coding technology has been around for years in other industries and business transactions, including grocery and department stores. Yet still, its application to healthcare continues to develop slowly. Bar coding can increase the accuracy of medication preparation and dispensing by pharmacy staff, such as selecting the right medication and the right dose. At the patient end of the process, nurses using this technology can observe the "five rights" (*right patient, right drug, right dose, right route and right time*) by scanning bar codes on the patient's wrist band, medication, and profile. This system can alert a nurse to any deviations from the "five rights" before the patient receives the medication. Unfortunately, introducing such new technology to an environment is not without challenge. One of the biggest challenges is that not all drug items have bar codes imprinted on them, especially small ampoules or vials of injectable drugs and unit dose packages. Another obstacle is the lack of standardization of bar codes issued by the pharmaceutical industry.

Infusion pump technology has advanced over the last few years and recently "smart pumps" have been introduced to Canadian hospitals. These pumps are equipped with computer software that can be programmed according to hospital protocol to provide critical information for nurses at the patient's bedside. Such protocol may include maximum doses for the particular IV medication being administered. These maxima can also be tailored to specific patient type, for example, "paediatric". Programmed protocols can also alert nurses to specific monitoring requirements and thus help to prevent potential adverse drug effects.

Though new technologies offer safety solutions, they can also generate new problems or magnify existing ones. All-new technologies need to be evaluated and tested before they are purchased and implemented within individual hospitals. ISMP Canada has recently developed a tool called Canadian Healthcare Failure Mode and Effects Analysis (CH-FMEA) that was introduced in a one-day workshop in Winnipeg during June, 2004. CH-FMEA can assist hospitals in identifying potential problems and help them to apply solutions <u>before</u> problems occur. Other models of FMEA have been previously used in high risk industries such as aviation and the automotive industry with great success. Furthermore, this tool can be applied to new or existing technologies or processes. CH-FMEA helps healthcare teams to analyze technologies and processes and consider potential failure modes. Technology in hospitals should cater to human beings rather than forcing human beings to cater to it.

Although The Canadian Adverse Event Study and many smaller studies focus on adverse events primarily within the hospital, medication adverse events also occur outside of hospitals. Care transfers within hospitals and from hospitals to broader communities (and vice versa,) are high in risk and provide ample opportunity for error. During such transitions, pharmacists in hospitals and community settings play an important role in

helping to maintain medication safety. Clinical or front-line patient care pharmacists in hospitals are an important resource for the healthcare team and the patient, especially when they work directly on nursing units. The Canadian Society of Hospital Pharmacists and the Canadian Pharmacists Association are strong advocates of "seamless care". This concept promotes communication between healthcare providers in-hospital and community members outside of hospital regarding patients that rotate between the hospital and home. "Seamless care," in practice, advocates clear and complete documentation so that patient care is continuous and critical patient-specific information is not lost during transfer. The patient and their family/caregiver are integral to this communication process and the healthcare continuum.

The Canadian healthcare system is admired by many and continues to serve the broad Canadian public well. The Canadian Adverse Events Study is a reminder to all of us that patient safety and medication safety are the collective responsibility not only of healthcare providers, but also patients and their families, consumer groups, manufacturers, Health Canada, professional regulatory bodies and concerned special interest groups. Together, we can help to bring safer healthcare to the forefront.