The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent Canadian non-profit agency established for the collection and analysis of medication error reports and the development of recommendations for the enhancement of patient safety.

The Healthcare Insurance Reciprocal of Canada (HIROC) is a member-owned expert provider of professional and general liability coverage and risk management support.

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More on Potassium Chloride

In this issue:

- ISMP Canada shares the results of an Ontario potassium chloride project carried out in conjunction with the Ontario Hospital Association and the Ontario Ministry of Health and Long-Term Care. The success of the project can be attributed directly to the initiatives undertaken by Ontario hospitals and to the support of an Advisory Group representative of key stakeholders.
- ISMP Canada and AstraZeneca Canada Inc. worked together to re-design the packaging and labelling of AstraZeneca's 10 mL size of concentrated potassium chloride for injection, within the limitations of manufacturing equipment. The changes are briefly described in this bulletin.
- Two unique errors involving potassium chloride oral liquid, as reported to ISMP Canada, are discussed.

Potassium Chloride Project in Ontario

The deaths of two Ontario patients that were related to the accidental injection of concentrated potassium chloride (KCl) prompted the Ontario Ministry of Health and Long-Term Care (MoHLTC), the Institute for Safe Medication Practices Canada (ISMP Canada) and the Ontario Hospital Association (OHA) to take action designed to prevent a repeat tragedy. That action took the form of the establishment of the Medication Safety Support Service. The first project of the Medication Safety Support Service was to assist Ontario hospitals in implementing safeguards to prevent further incidents with concentrated KCl. The project provided suggested interventions and guidance to hospitals for the removal of concentrated KCl from patient care areas, thereby reducing the potential for inadvertent administration and subsequent patient harm from concentrated KCl.

The project began with a pre-intervention survey distributed to Ontario hospitals in November, 2002. The results identified that 62% of Ontario hospital respondents stored concentrated KCl in patient care areas. Next, a resource kit, prepared by ISMP Canada, was made available to all Ontario hospitals. The resource kit includes safe medication practice recommendations pertaining to the prescribing, distribution, storage and preparation of KCl solutions in hospitals. Hospitals were also communicated with directly, at conferences, through the North Network and via an interactive website.

In July, 2003, Ontario hospitals were re-surveyed. The respondents' results indicated that between November, 2002 and June, 2003:

- The number of Ontario hospitals storing concentrated KCl in patient care areas decreased from 62% to 26%.
- The number of Ontario hospitals storing concentrated KCl in Emergency Departments decreased from 65% to 35%.
- The number of Ontario hospitals storing concentrated KCl in Intensive Care Units decreased from 50% to 35%.
- 71% of hospitals indicated that they had made changes to KCl distribution in the 6-month period (i.e., during the time of the project).
- 63% of hospitals planned to make changes in the near future.
- 63% of hospitals had used the resources of the Medication Safety Support Service.

ISMP Canada continues to receive communication from Ontario hospitals regarding ongoing system enhancements being made. It is ISMP Canada's goal to provide similar services to hospitals in other provinces.

Upcoming Changes to Packaging and Labelling by AstraZeneca Canada

As part of patient safety enhancement strategies, ISMP Canada has worked with AstraZeneca Canada Inc. to make changes to the packaging and labelling of their 10 mL size of concentrated potassium chloride for injection. The new product packaging and labelling have been deliberately designed to reduce the potential for substitution errors with sodium chloride for injection and sterile water for injection (also provided by AstraZeneca). The new 10 mL concentrated potassium chloride product will be available to Canadian hospitals by mid-2004 or earlier. ISMP Canada acknowledges and commends AstraZeneca's initiative in re-designing a product for enhanced patient safety.

Two Error Reports Involving Potassium Chloride Oral Liquid:

Error Description One: A nurse received an order for KCl 20 mEq/L in Ringer's Lactate to be administered at 100 mL/h. The nurse found only the KCl 40 mEq/L bags of Ringer's Lactate available on the nursing unit. She then went to the automated dispensing cabinet for 'potassium chloride'. Since the order had not yet been profiled by Pharmacy, and since an

override was allowed, the nurse was able to obtain "K-10 20MEQ/15ML LIQ". The nurse removed the potassium chloride oral solution 20 mEq/15 mL (pre-packaged in a 50 mL amber bottle by Pharmacy and sealed with a cellulose seal). The nurse then proceeded to withdraw 15 mL of the oral potassium chloride liquid using a needle and syringe and injected the volume into a one-litre Ringer's Lactate IV bag. Approximately one hour later, a second nurse noticed that the IV had an unusual yellow colour and stopped the infusion. No serious harm to the patient was reported.

Recommendations:

- Ensure widespread education (during implementation and ongoing orientation sessions) about system changes, such as the removal of the concentrated KCl for injection product, so that all nurses know that IV solutions with potassium chloride are either available pre-mixed or must be prepared by Pharmacy.
- Ensure that Pharmacy labels on repackaged products highlight and emphasize important information such as "for oral use". Consider an auxiliary label **"For ORAL USE only".**
- Review the screens of automated dispensing cabinets to ensure that important information such as 'for oral use only' is easily identifiable by the nurse obtaining the medication.
- Review the automated dispensing cabinet 'override' list on a regular basis with an interdisciplinary team, such as a Safe Medication Practices Committee.
- Avoid repackaging oral liquids in 'stock bottles'. Where possible, prepare unit dosed oral liquids.

Error Description Two: An infant requiring short-term ventilation and sedation was admitted to a Neonatal Intensive Care Unit. Chloral hydrate oral liquid 70 mg was ordered for administration on an "as needed" basis. Pharmacy inadvertently prepared and dispensed potassium chloride oral liquid instead. A dose of 0.93 mmol of KCl might have been administered to the patient. The hospital, in investigating and analyzing the incident, identified that the two stock bottles of liquid preparation (chloral hydrate and potassium chloride) appear very similar. Both products, as manufactured by Pharmascience, are illustrated in the photograph in Figure 1.

Figure 1. Chloral Hydrate *vs* Potassium Chloride

Recommendations:

- In order to prevent a similar mix-up, consider purchasing one of the products from an alternate supplier. This will prevent the two products from having a similar appearance.
- Apply auxiliary labels on products that have similar labelling and packaging to warn of a potential mix-up. Use TALL-MAN lettering on these labels, e.g., POTASSIUM chloride and chloral HYDRATE.

ISMP Canada is a national voluntary medication incident and 'near miss' reporting program founded for the purpose of sharing the learning experiences from medication errors. Implementation of preventative strategies and system safeguards to decrease the risk for error-induced injury and thereby promote medication safety in healthcare is our collaborative goal.

To report a medication error to ISMP Canada: (i) visit our website www.ismp-canada.org ***or (ii) email us at info@ismp-canada.org or (iii) phone us at 416-480-4099. ISMP Canada guarantees confidentiality and security of information received. ISMP Canada respects the wishes of the reporter as to the level of detail to be included in our publications.***