The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent national not-for-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.

Volume 10, Number 9 **ISMP Canada Safety Bulletin** December 10, 2010

Medication Incidents Occurring in Long-Term Care

This bulletin shares information about medication incidents occurring in the long-term care environment that have been voluntarily reported to ISMP Canada. The bulletin includes an overview of the medication incidents that had an outcome of harm or death and highlights the major themes identified through an aggregate analysis. Specific examples of the reported incidents are summarized to provide insights into opportunities for system-based improvement.

Background and Overview of Findings

To gain a deeper understanding of medication incidents occurring in the long-term care environment, data were extracted from voluntary reports submitted to ISMP Canada's medication incident database. The data reviewed for this analysis spanned a period of almost 9 years (August 1, 2000, to February 28, 2009). The analysis (which encompassed both quantitative and qualitative aspects) focused on medication incidents in which the outcome was harm or death.

The database search identified a total of 4740 medication incidents in the long-term care environment. Of these, 131 (2.8%) had an outcome of harm or death. Further quantitative analysis revealed that 116 (88.5%) of the 131 incidents were associated with an outcome of harm and 15 (11.5%) with an outcome of death.* Administration of an incorrect dose was the single most common type of incident, followed by dose omission, administration of the incorrect drug, and administration of a medication to the incorrect patient (Figure 1).

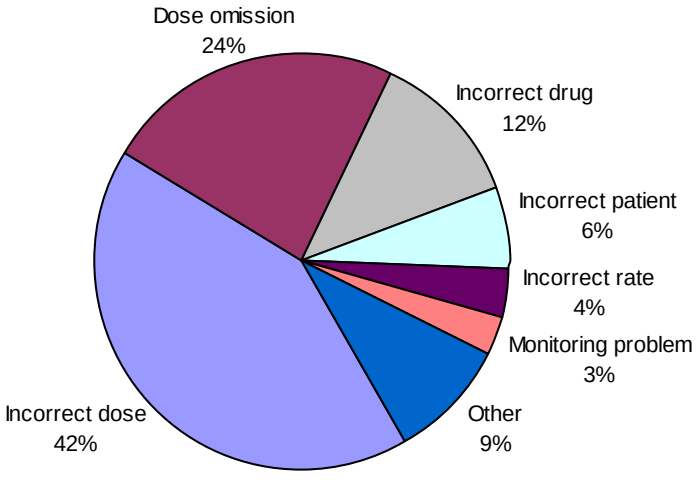

Figure 1: Types of incidents in long-term care facilities that resulted in harm or death (n = 131), identified in an analysis of aggregate data from the ISMP Canada medication incident database for the period August 1, 2000, to February 28, 2009. Incorrect dose, dose omission, incorrect drug, and administration of one or more medications to the wrong patient accounted for almost 85% of the harmful incidents reported.

Qualitative Analysis

The qualitative analysis of the 131 incidents that were associated with harm or death generated 3 main themes:

- incidents involving high-alert medications
- incidents involving anxiolytic–sedative and/or antipsychotic medications, including incidents leading to falls
- incidents involving patient transfers

The sections below present more detail about the medication incidents within these 3 main themes, and selected examples from the analysis.

Main Theme: Incidents Involving High-alert Medications

The majority of the harmful incidents reported involved 1 of 3 classes of medications that are considered high-alert medications: anticoagulants, insulin, and opioids (narcotics).

Anticoagulants

The majority of anticoagulant incidents involved errors in monitoring warfarin therapy. A number of anticoagulants, including warfarin, require monitoring via blood tests to ensure that the drug is maintained within a therapeutically effective range. The processes of ordering, transcribing, dispensing, and administering warfarin are tightly coupled with the concurrent processes associated with monitoring the international normalized ratio (INR) in the serum: ordering blood tests, drawing blood, ensuring timely availability of test results, checking the results, and updating orders for warfarin. Missing or weak links in any of these processes may result in warfarin-related medication incidents.

Example

- Warfarin was initiated for a nursing home resident, but the patient's INR was not ordered at the time of initiation. More than a month later, the patient's condition was deteriorating, and it was identified that no INR results had been recorded in the chart. A sample of blood was

obtained and sent to the laboratory, but the measured value was above the test limits, and a numeric value could not be reported. The patient was admitted to hospital and died shortly thereafter.

Insulin

Insulin has a narrow therapeutic index. Administration of an excessive dose of insulin can rapidly lead to hypoglycemia, which can progress to seizure, coma, and death if left untreated. Missed doses can also cause harm, because the patient's hyperglycemia may worsen, leading to other problems, such as ketoacidosis. The amount of insulin required for a particular patient varies according to a number of patient-specific factors, including serum glucose level and dietary intake.

Examples

- A patient was given a short-acting formulation of insulin, Humulin-R, instead of the intended longer-acting Humulin-N. Treatment with glucagon was required.
- A patient did not receive the prescribed morning dose of long-acting insulin because of absence from the patient care area. Upon returning to the floor, the patient was given 8 units of short-acting insulin, on the basis of an insulin scale for elevated blood glucose between scheduled insulin doses. At the time of the patient's scheduled evening insulin dose, the blood glucose level was well over 30 mmol/L. Omission of the morning dose of long-acting insulin was then identified.

Opioids (Narcotics)

Analysis of the opioid-related medication incidents revealed 4 subgroups: incorrect dose, medication mix-up, dose omissions, and incidents involving fentanyl patches.

Examples:

- A resident was to receive morphine 10 mg orally for pain but was instead given 10 mL (50 mg) of morphine suspension.
- An order for hydromorphone ".5 mg" (i.e., 0.5 mg) was interpreted as "5 mg"; and the larger dose was administered to the patient.
- A prescription for morphine 7.5 mg subcutaneously was interpreted as hydromorphone 7.5 mg subcutaneously, and the incorrect drug was administered to the patient.
- An order for hydromorphone was not transcribed. The patient missed several hours of therapy and experienced a significant escalation of pain.
- A patient was found unresponsive with abnormal vital signs. The patient had a prescription for fentanyl patch 12 mcg/hour, but a 75 mcg/hour fentanyl patch had been applied. The patch was removed, naloxone was administered, and continuous monitoring was initiated.
- A patient was found unresponsive in a long-term care facility and was transferred to the emergency department of a local hospital, where staff found multiple fentanyl patches in situ. The staff interpreted this to mean that existing patches were not removed when each new patch was applied. The patient was given naloxone, to which there was a response. However, pneumonia was also diagnosed, and the patient was admitted. The patient died about a week later because of the pneumonia.
- A patient with a prescription for fentanyl by patch was experiencing increasing pain. It was determined that a dose of fentanyl had been missed. Administration of a short-acting opioid was required to bring the pain under control.

Main Theme: Incidents Involving Anxiolytic–Sedative and/or Antipsychotic Medications

The majority of reported incidents involving anxiolytic–sedative and/or antipsychotic medications led to falls.

Examples

- An elderly resident of a long-term care facility was given extra doses of zopiclone, which might have led to an injury when the resident attempted to walk without assistance.
- A resident had a prescription for lorazepam 1 mg as needed for escalation of aggressive, agitated behaviour. About 30 minutes after administration of a dose of the lorazepam, the resident was started on clonazepam. The combination of drugs led to disorientation and difficulty walking, which resulted in a fall. The resident was admitted to a nearby emergency department, where staff concluded that the combination of the 2 benzodiazepines likely contributed to the disorientation.
- A resident of a long-term care facility was admitted to hospital with behavioural challenges. The patient's condition was stabilized on olanzapine, among other medications. After discharge from the hospital, the resident required readmission a short time later because of oversedation and falls. At the time of the second admission, the resident's pills were counted, and it was determined that the resident had received 4 times the prescribed dose of olanzapine.

Main Theme: Incidents Involving Patient Transfers

Transfers between facilities and care areas within a facility represent high-risk situations in which medication incidents may occur.

Example

- A patient was transferred from acute care to a long-term care facility. Information about the patient was sent from the hospital to the long-term care facility by fax. The fax consisted of multiple documents, including the patient's MAR and a copy of the "orders and progress notes" which listed the most recent updates to the morning and evening doses of

insulin that the patient was to receive. The nurse at the long-term care facility copied the medication orders from the MAR, which did not specify the insulin dosage, using the insulin concentration of 100 units/mL as the "dosage". Staff in the long-term care facility called the physician to request admission orders. Because the physician had known the resident previously and had followed the resident during the hospital stay, the physician instructed the long-term care staff to "continue the same orders". A pharmacist processed the insulin order as 100 units in the morning and 100 units in the evening. The resident experienced a severe hypoglycemic reaction, at which point the physician recognized the incorrect dose. The resident was transferred to acute care but died shortly thereafter.

Conclusion

Reporting medication incidents is important both for identifying opportunities for enhancing medication safety and for monitoring the effects of system changes. The findings from this analysis can be used to support local quality improvement initiatives. ISMP Canada incorporates learning from incidents such as those described above into its self-assessment programs, to facilitate enhancement of medication-use systems. (Refer to sidebar for additional information about the Medication Safety Self-assessment for Long Term Care.)

Acknowledgements

Sincere appreciation is expressed to the many healthcare professionals who have demonstrated support for a culture of safety, exemplified by their willingness to share information about medication incidents.

*The original version of this bulletin, published in December 2010, showed a value of "11" for outcome of death; this value has been corrected to read "15". The associated percentage (11.5%) was correct in the original — June 6, 2018.

Risk Assessment Program for
Medication System Safety in the Long-Term Care Setting

The long-term care environment presents unique challenges for the development and implementation of safe medication systems.

ISMP Canada developed the Medication Safety Self-Assessment® (MSSA) for Long Term Care to assist and guide individual long-term care facilities in identifying opportunities to improve their medication-use systems. The program, which complements other efforts to decrease the risk of harm to residents, can be used by facilities of any size, organizational structure, and geographic location. The program's self-assessment criteria are related to potential system improvements that have been identified through analysis of medication incidents. Completion of this Medication Safety Self-Assessment helps facilities to prepare for accreditation, and it can also be an important element of a facility's quality improvement program.

The program's web-based interface allows individual long-term care facilities to compare their own results over time, thereby tracking the impact of any changes made, as well as to compare their results with the aggregate results of other participants in the program, both regionally and nationally. Several Canadian provinces have supported the use of this program as a component of quality improvement. The program is also available at a reasonable cost to individual facilities that are not covered by a regional or provincial agreement.

For more information about the MSSA program for long-term care facilities, please contact ISMP Canada by email (mssa@ismp-canada.org) or by telephone (1-866-544-7672).

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.

Medication Incidents (including near misses) can be reported to ISMP Canada:
(i) through the website: http://www.ismp-canada.org/err_report.htm or (ii) by phone: 416-733-3131 or toll free: 1-866-544-7672.

ISMP Canada can also be contacted by e-mail: cmirps@ismp-canada.org. ISMP Canada guarantees confidentiality and security of information received, and respects the wishes of the reporter as to the level of detail to be included in publications.

A Key Partner in the Canadian Medication Incident Reporting and Prevention System