ISMP Canada Safety Bulletin

Errors Associated with Hospital Discharge Prescriptions: A Multi-Incident Analysis

- *Communicate with patients and their caregivers when reviewing prescription information during the transition at discharge.*

- *Implement standardized discharge processes to enable the creation of discharge prescriptions that are accurate, unambiguous, appropriate, and understood by all in the patient's circle of care.*

- *Community caregivers and providers are encouraged to review how they process hospital discharge prescriptions to minimize or improve upon error-prone processes and procedures.*

During a hospital stay, a patient's medication regimen may undergo multiple changes. If these changes are not captured accurately on the patient's discharge prescription, these discrepancies can lead to medication errors. A recent study of the medication lists for geriatric patients at the time of discharge from hospital revealed that 56% of patients experienced at least 1 prescribing error.[1] Such errors can result in patient harm, readmission to hospital, and/or an increased workload for care providers, as well as having the potential to undermine patients' confidence in the healthcare system. A multi-incident analysis of medication incidents involving discharge prescriptions was conducted to better understand the challenges around the creation and processing of hospital discharge prescriptions and to share opportunities for system-based improvements.

Methodology and Quantitative Findings

Reports of medication incidents related to discharge prescriptions were extracted from voluntary reports* submitted to 3 ISMP Canada reporting databases (Individual Practitioner Reporting, Community Pharmacy Incident Reporting, and Consumer Reporting) and the National System for Incident Reporting† (NSIR) from April 1, 2010, to November 8, 2016. Key phrases used to search the databases included "discharge prescription", "discharge Rx", "hospital prescription", "hospital Rx". A total of 156 incidents were extracted for review. Reports unrelated to discharge prescriptions, those containing insufficient detail, and duplicate entries were omitted from the dataset. After these exclusions, 134 incidents were included in the final analysis, which was conducted according to the methodology outlined in the Canadian Incident Analysis Framework.[2] About 10% of these cases resulted in harm.
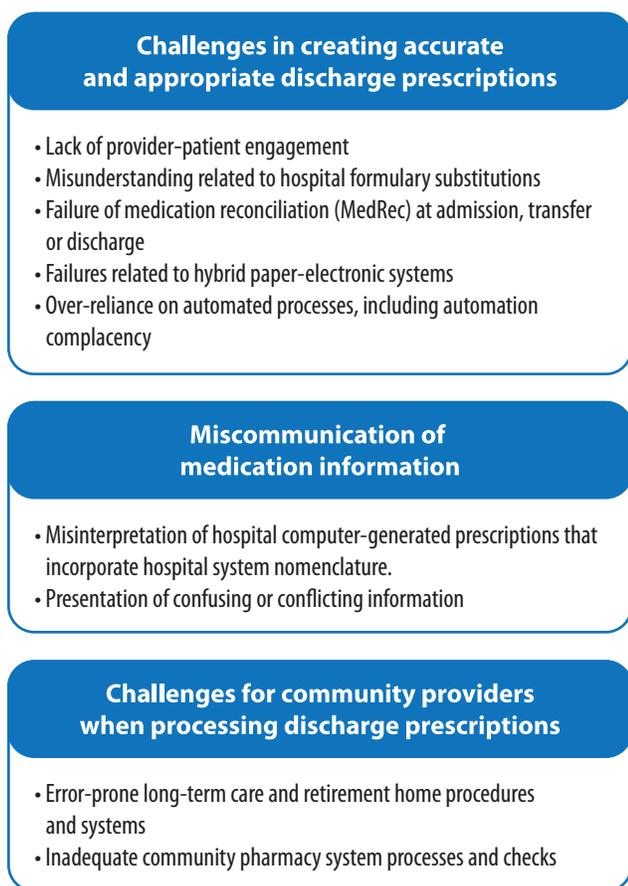
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* It is recognized that it is not possible to infer or project the probability of incidents on the basis of voluntary reporting systems.

† The NSIR, provided by the Canadian Institute for Health Information, is a component of the Canadian Medication Incident Reporting and Prevention System (CMIRPS) program. More information about the NSIR is available from: http://www.cmirps-scdpim.ca/?p=12

Qualitative Analysis

Analysis of the incidents identified 3 main themes and associated subthemes (Figure 1).

Figure 1. Main themes and subthemes from the qualitative analysis

Challenges in creating accurate and appropriate discharge prescriptions

- Lack of provider-patient engagement
- Misunderstanding related to hospital formulary substitutions
- Failure of medication reconciliation (MedRec) at admission, transfer or discharge
- Failures related to hybrid paper-electronic systems
- Over-reliance on automated processes, including automation complacency

Miscommunication of medication information

- Misinterpretation of hospital computer-generated prescriptions that incorporate hospital system nomenclature.
- Presentation of confusing or conflicting information

Challenges for community providers when processing discharge prescriptions

- Error-prone long-term care and retirement home procedures and systems
- Inadequate community pharmacy system processes and checks

Theme: Challenges in Creating Accurate and Appropriate Discharge Prescriptions

A key component of the patient discharge process is the creation of accurate and appropriate discharge prescriptions. Table 1 highlights the challenges identified within this theme that led to problems with discharge prescriptions.

Factors contributing to the incidents included lack of a systematic discharge medication reconciliation (MedRec) process that incorporates patient

engagement, lack of a standardized discharge prescription template across hospitals, and missed opportunities for communication with community pharmacists. The Facilitating Medication Safety at Transitions toolkit and checklist are available for hospitals to help re-examine some of these processes, with the goal of optimizing the transition of patients and their medications at discharge.

- **Recommendation:** Implement standardized discharge processes to enable the creation of discharge prescriptions that are accurate, unambiguous, appropriate, and understood by all in the patient's circle of care.

There is preliminary evidence that electronic MedRec solutions, especially those that incorporate the creation of a discharge prescription, can reduce prescribing discrepancies and errors at discharge.[3] However, with the adoption of new technologies, new sources of error can arise; therefore, hospitals that are designing electronic systems are encouraged to refer to the *Discharge Medication Reconciliation – Clinical Requirements* expert panel workshop proceedings for guidance.[4]

Theme: Miscommunication of Medication Information

Discharge prescriptions are the most common method of communicating changes to medication regimens to the next care providers, which makes the information contained in these documents vital. The multi-incident analysis showed that computer-generated discharge prescriptions included hospital system nomenclature that was misinterpreted by community providers, and led to errors and delays in the dispensing process. Use of ambiguous dose and nonstandard abbreviations were noted. Opportunities exist both to standardize discharge prescriptions and to have community stakeholders involved in testing the clarity of hospitals' computer-generated discharge prescriptions.

Incident Example

A patient recently discharged from hospital was given a computer-generated discharge prescription that read "warfarin 4mg WRF". The

Table 1. Subthemes for challenges related to creating accurate and appropriate discharge prescriptions

Subtheme	Discharge Prescription Problem and Example
Lack of provider–patient engagement	**Incorrect patient or inappropriate agent/formulation** – Failure to correctly identify a patient led to the patient receiving another patient's discharge prescriptions. Lack of consideration of patient-specific factors led to prescribing of a less-than-desirable agent/formulation (e.g., medication not covered by insurance, devices requiring manual dexterity).
Misunderstanding related to hospital formulary drug substitutions	**Therapeutic duplication** – Hospital formulary drug was substituted for patient's at-home medication during inpatient stay and was subsequently prescribed at discharge; patient resumed preadmission medication at home along with newly prescribed formulary drug, which resulted in therapeutic duplication.
Failure of medication reconciliation (MedRec) at admission, transfer or discharge	**Medication omissions** – Home medications not identified during admission MedRec (whether or not they were to be continued in hospital) resulted in omissions from discharge prescriptions and led to confusion on the part of patient and community providers.
Failures related to hybrid paper–electronic systems	**Incomplete information** – Paper-based systems not communicating with electronic systems within the same organization resulted in information being omitted from the discharge prescription.
Over-reliance on automated processes, including automation complacency	**Inappropriate medications** – Prescribers signed the computer-generated discharge prescriptions without assessing each medication for appropriateness for continuation at home (e.g., analgesia, routine post-operative bowel regimen).

community pharmacist interpreted "WRF" as "Wed, Thurs, Fri". Upon checking with the hospital, however, the pharmacist discovered that "WRF" was a short form for "WaRFarin" used by that particular hospital to indicate its usual warfarin daily dose administration time.

Effectively communicating key medication information, including changes in therapy, to the patient and family is integral to the success of the discharge medication plan. This analysis identified many gaps and discrepancies in the information provided to patients, including provision of information that conflicted with the directions on the prescription, which resulted in the patient using medication(s) in a different way than intended. ISMP Canada has **previously recommended** that prescriptions be written in a manner that patients can

read and understand (e.g., without unnecessary abbreviations).[5]

Hospital staff can engage patients and caregivers by using the "5 Questions to Ask about your Medications" to foster discussions about medication changes during this critical time and by using teach-back techniques to enhance uptake. There is also evidence that a post-discharge follow-up phone call to certain high-risk patients can help to prevent readmissions.[6]

- **Recommendation:** Engage patients and their caregivers at or before discharge to communicate changes in the medication regimen and to support an independent check of the discharge prescriptions.

Theme: Challenges for Community Providers when Processing Discharge Prescriptions

The analysis identified unique challenges faced by community providers in dealing with hospitals' discharge prescriptions. For example, some community pharmacies that service retirement or long-term care facilities use a system that requires the facilities to transcribe information from the hospital discharge prescription onto a digital MedRec form. This form is then sent to the community pharmacy for dispensing. The additional process of interpretation and transcription led to errors, including omission of medications, ordering of incorrect drugs, and dosing errors. When a resident is discharged to a long-term care facility, the hospital's original discharge prescriptions and/or discharge plan should be shared with the dispensing pharmacy to support accurate dispensing and thorough MedRec processes.

Incident example

A long-term care resident who had been in hospital was given a prescription for a beta-blocker at the time of discharge back to the care facility. The nurse transcribed the discharge prescription onto the partner pharmacy's order form, but misinterpreted the instructions. Fortunately, the mistake resulted in a subtherapeutic dose of the medication, which was questioned by the pharmacist. After the pharmacist requested a copy of the hospital's discharge prescription form, the discrepancy was resolved.

• **Recommendation:** Long-term care and retirement facilities should forward to their partner community pharmacies, the hospital's discharge prescriptions along with the electronic order forms containing the transcribed information, to support an independent check process.

Patients are often discharged home with prescriptions for a large number of medications, including both new therapies started in hospital as well as preadmission medication to be continued. These latter prescriptions are handled in various ways by the community pharmacy. New prescriptions for existing and unchanged therapies are often logged as inactive or "for future use" in the computer, meaning that they will be activated and dispensed when the current prescription runs out. Prescriptions with changes are processed by copying and modifying existing orders in the computer, while also discontinuing the original order. This helps with pharmacy workflow and saves time in processing the prescriptions. However, the copying process is error-prone.

• **Recommendation:** Community pharmacies processing hospital discharge prescriptions should minimize "electronic copying" when entering changes into pharmacy dispensing systems.

Conclusion

The creation of a complete, accurate, and unambiguous hospital discharge prescription is a vulnerable point in the process of transferring medication information. Findings from this multi-incident analysis concurred with the findings of an observational study that reported omissions and incomplete, conflicting, or unclear information in many discharge prescriptions.[7] The analysis findings also led to recommendations. Opportunities exist for hospitals to implement a standardized discharge process that includes clarifying discrepancies, validating the accuracy, completeness, and clinical appropriateness of the prescriptions, and a review of the discharge regimen with patients and caregivers.[1,8] Additionally, it is important to capture incidents related to discharge prescriptions in hospital incident reporting systems so vulnerable processes and systems can be identified. Community partners can likewise review how they handle hospital discharge prescriptions in the context of the error-prone processes identified in this analysis to minimize errors.

References

1. Moro Agud M, Menéndez Colino R, Mauleón Ladrero M del C, Ruano Encinar M, Díez Sebastián J, Villamañán Bueno E, et al. Analysis of an electronic medication reconciliation and information at discharge programme for frail elderly patients. Int J Clin Pharm. 2016;38(4):996-1001.
2. Incident Analysis Collaborating Parties. Canadian incident analysis framework. Edmonton (AB): Canadian Patient Safety Institute; 2012 [cited 2016 Nov 14]. Incident Analysis Collaborating Parties are Canadian Patient Safety Institute (CPSI), Institute for Safe Medication Practices Canada, Saskatchewan Health, Patients for Patient Safety Canada (a patient-led program of CPSI), Paula Beard, Carolyn E. Hoffman, and Micheline Ste-Marie. Available from: http://www.patientsafetyinstitute.ca/en/toolsResources/IncidentAnalysis/Documents/Canadian%20Incident%20Analysis%20Framework.PDF
3. eMedication reconciliation (The Ottawa Hospital) [emerging (commendable) practice]. Ottawa (ON): Accreditation Canada; 2013 [cited 2016 Dec 8]. Available from: https://accreditation.ca/emedication-reconciliation-ottawa-hospital
4. Discharge medication reconciliation clinical requirements [workshop proceedings]. Toronto (ON): Canada Health Infoway; 2016 Oct [cited 2016 Dec 8]. Available from:
   https://ic.infoway-inforoute.ca/en/resources/docs/711-discharge-medrec-clinical-requirements/view-document
5. Eliminate use of dangerous abbreviations, symbols, and dose designations. ISMP Can Saf Bull. 2006 [cited 2017 Jan 4];6(4):1-3. Available from: https://www.ismp-canada.org/download/safetyBulletins/ISMPCSB2006-04Abbr.pdf
6. Mourad M, Rennke S. Postdischarge follow-up phone call. Rockville (MD): Agency for Healthcare Research and Quality, Patient Safety Network; 2012 Mar [cited 2017 Jan 4]. Available from:
   https://psnet.ahrq.gov/webmm/case/263/postdischarge-follow-up-phone-call
7. Riordan CO, Delaney T, Grimes T. Exploring discharge prescribing errors and their propagation post-discharge: an observational study. Int J Clin Pharm. 2016;38(5):1172-81.
8. Beardsley JR, Schomberg RH, Heatherly SJ, Williams BS. Implementation of a standardized discharge time-out process to reduce prescribing errors at discharge. Hosp Pharm. 2013;48(1):39-47.

Diabetic Ketoacidosis with SGLT2 Inhibitors

Diabetic ketoacidosis (DKA) is a rare medical emergency resulting from insulin deficiency, making it difficult for the body to use glucose for energy. In this situation, complex metabolic changes occur that result in a dangerous build-up of ketones in the body, leading to ketoacidosis. Hyperglycemia is a typical finding of DKA, resulting from the unused glucose. Symptoms of DKA include thirst, excessive urination, nausea, vomiting, abdominal pain, confusion, fever, a fruity odour on the breath, and a sense of air hunger.

The sodium-glucose cotransporter 2 (SGLT2) inhibitors (canagliflozin, dapagliflozin, and empagliflozin) are a new class of hypoglycemic medications (for patients with type 2 diabetes mellitus) that have been associated with an atypical presentation of DKA. Affected patients may present with euglycemia or only a slight increase in blood glucose level, rather than the high blood glucose levels typical of DKA. Although, SGLT2 inhibitor-induced DKA in patients with type 2 diabetes is considered rare (≤0.1%), its atypical presentation may delay diagnosis and treatment. A recently published review provides practical recommendations for prevention and diagnosis of SGLT2 inhibitor-induced DKA.[1]

Selected Key Learning
- All patients with diabetes who are being treated with an SGLT2 inhibitor should be advised to withhold their SGLT2 inhibitor therapy during any situation that might precipitate DKA (e.g., acute illness, surgery, dehydration, missed insulin doses).
- Any patient who is taking an SGLT2 inhibitor and who experiences symptoms of DKA should go to the emergency department for evaluation, even if initial blood glucose testing shows euglycemia. If DKA is diagnosed, the SGLT2 inhibitor should be stopped.

Reference
1. Goldenberg RM, Berard LD, Cheng AY, Gilbert JD, Verma S, Woo VC et al. SGLT2 inhibitor-associated diabetic ketoacidosis: clinical review and recommendations for prevention and diagnosis. Clin Ther. 2016;38:2654-2664e1.

This segment of the bulletin describes a recent SafeMedicationUse.ca publication from ISMP Canada's Consumer Program.

January 2017 Newsletter

What to Expect if the Pharmacy Makes a Mistake

Although pharmacists aim to give their patients the best care, errors sometimes happen at the pharmacy. How pharmacists handle the situation when a medication error occurs is critical to continuing their trusted relationship with patients. The most recent SafeMedicationUse.ca newsletter shares with patients what they should expect from the pharmacist, should they discover a medication error.

In general, the following steps should be taken by the pharmacist if a medication error is discovered:

- When a patient reports a medication error, acknowledge and listen to the patient's concern in a private area of the pharmacy.

- Conduct an investigation to confirm whether an error has occurred. If there was an error, acknowledge it and offer the patient a sincere apology.

- Inform the prescribing physician of the error. If the patient is experiencing adverse effects, or there is a risk of adverse effects, send the patient to the doctor or the emergency department.

- Develop an action plan to prevent similar errors in the future. Involve the pharmacy team, and possibly the patient, in the processes of developing and implementing the action plan.

- Follow up with the patient to describe the action plan and to thank the patient for identifying and reporting the incident.

- Consider reporting the medication error to a third party (e.g., ISMP Canada) if the learning can help to prevent errors in other pharmacies and/or inform standards of practice.

Consumers Can Help Prevent Harmful Medication Incidents

SafeMedicationUse.ca

The Use of Abbreviations on Prescription Health Product Labels in Canada

An abbreviation may have more than one perceived meaning and may be susceptible to misinterpretation–particularly if users are unfamiliar with its intended meaning.

To provide consistency and direction, ISMP Canada has developed a list of acceptable abbreviations, including abbreviations used in drug name suffixes. The aim is to minimize misinterpretation of information on prescription health product labels.

ISMP Canada is seeking consultation from pharmaceutical manufacturers, healthcare providers, and other interested stakeholders.

Provide your feedback!
(https://www.ismp-canada.org/abbreviations/feedback.htm)

We appreciate your participation in this consultation, and look forward to your input by *Friday, March 3rd, 2017*.

YOUR FEEDBACK IS REQUESTED

CMIRPS ❖ SCDPIM
Canadian Medication Incident Reporting and Prevention System
Système canadien de déclaration et de prévention des incidents médicamenteux

The Canadian Medication Incident Reporting and Prevention System (CMIRPS) is a collaborative pan-Canadian program of Health Canada, the Canadian Institute for Health Information (CIHI), the Institute for Safe Medication Practices Canada (ISMP Canada) and the Canadian Patient Safety Institute (CPSI). The goal of CMIRPS is to reduce and prevent harmful medication incidents in Canada.

HIROC

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

ISMP CANADA

The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent national not-for-profit organization committed to the advancement of medication safety in all healthcare settings. ISMP Canada's mandate includes analyzing medication incidents, making recommendations for the prevention of harmful medication incidents, and facilitating quality improvement initiatives.

Report Medication Incidents

(Including near misses)

Online: www.ismp-canada.org/err_index.htm
Phone: 1-866-544-7672

ISMP Canada strives to ensure confidentiality and security of information received, and respects the wishes of the reporter as to the level of detail to be included in publications. Medication Safety bulletins contribute to Global Patient Safety Alerts.

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This bulletin shares information about safe medication practices, is noncommercial, and is therefore exempt from Canadian anti-spam legislation.

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