

# Medication incidents involving immunosuppressive agents

By Melody Truong, Amanda Chen, Jim Kong, and Certina Ho

Immunosuppressive agents or immunosuppressants are a class of medications indicated for their immunomodulatory effects on autoimmune disease progression. They are typically cautiously prescribed due to their unique dosing regimens and broad spectrum of potential drug interactions. Their overall complexity and therapeutic role, while important, can cause significant patient harm when used incorrectly due to medication errors. The Institute for Safe Medication (ISMP) has identified immunosuppressant agents (such as Azathioprine, Cyclosporine, Tacrolimus) as high-alert medications in community/ambulatory settings. A list of high-alert medications in community/ambulatory settings is available at <https://www.ismp.org/recommendations/high-alert-medications-community-ambulatory-list>

At ISMP Canada, we conducted a multi-incident analysis on medication incidents involving immunosuppressants in community pharmacy practice. All relevant medications of interest were extracted according to the American Hospital Formulary Service (AHFS) classification system from the American Society of Health-System Pharmacists. The list included Azathioprine, Cyclosporine, Mycophenolate, Sirolimus, and Tacrolimus. Intravenous immunosuppressants were excluded from this analysis as they are not typically prescribed/dispensed in the community/ambulatory setting. All medication incident data were gathered from the ISMP Canada's Community Pharmacy Incident Re-

porting (CPhIR) program from a five-year period between January 2010 and May 2015. Three main themes and five sub-themes were realized from this qualitative, multi-incident analysis.

### MAIN THEME 1: WRONG INDICATION

Given the plethora of drug names on the market, comparable or similar drug products were often prescribed and/or dispensed for the wrong indication. Immunosuppressants are no exception to this, with contributing factors such as look-alike/sound-alike drug names and similar formulation titles perpetuating these errors. An example of a medication incident involving wrong indication was that of Azathioprine, whose brand name is Imuran®, being mistakenly read as Januvia®, a medication used for diabetes. As well, extended-release Tacrolimus, which is branded under Advagraf®, was commonly mistaken for Prograf®, the immediate-release formulation. Through this multi-inci-

dent analysis, we identified the underlying contributing factors to these incidents and recommended system-based solutions to help prevent future errors (Table 1).

### MAIN THEME 2: EFFECTIVENESS

The theme of effectiveness refers to medication incidents that were due to under-dosing of the medication. Immunosuppressants are prescribed under a wide range of therapeutic dosing schedules and it is crucial to confirm the indicated dose with prescribers and/or patients at each stage of the medication-use process. An example of a medication incident involving under-dosing of Mycophenolate 1000 mg twice daily, i.e. a total daily dose of 2000 mg, being dispensed as Mycophenolate 500 mg with instructions to take two tablets once daily, i.e. under-dosing by 50 per cent of the original intended total daily dose. Table 2 summarizes recommended solutions to prevent these incidents.

Table 1. Recommendations for Prevention of Wrong Indication Related Medication Incidents		
Sub-themes	Potential Contributing Factors	Recommendation
Look-alike/Sound-alike (LASA) Drug Names	Handwritten prescriptions	Utilize electronic prescription order sets
	Confirmation bias	Perform independent double checks in the medication-use process Request prescribers to include indication on prescription orders Gather information from patients during counselling and monitoring of drug therapy
Formulation Mix-up	Knowledge gaps Confirmation bias	Implement computerized alerts and reminders for high-alert drugs Relocate or segregate LASA drug pairs in storage areas to prevent association by proximity

### MAIN THEME 3: SAFETY

Medication incidents involving safety concerns are critical issues to address with any class of medications, especially immunosuppressants. The potency of immunosuppressants may lead to severe harm in patients when toxicity occurs due to either over-dosing or drug interactions. Toxic effects can range from secondary infections to bone marrow suppression and blood dyscrasias, all of which can be fatal. Clinicians should remain vigilant regarding dosing instructions and confirm that they are safe and appropriate for the patient. Any marginal

errors may easily result in over-dosing and elevated serum levels of the immunosuppressant. Table 3 summarizes recommendations to prevent safety related medication incidents.

Medication incidents highlight the vulnerability of our current healthcare system regarding the use of high-alert medications such as immunosuppressants and many others. The recommendations provided here is a starting point for healthcare practitioners to share and generate more open discussions regarding medication incidents, with an ultimate goal to provide safe and effective patient care. ■

Table 2. Recommendations for Prevention of Effectiveness Related Medication Incidents		
Sub-themes	Potential Contributing Factors	Recommendation
Under-dosing	Confirmation bias Reliance on mental calculations	Perform independent double checks in the medication-use process Implement rules and policies for handling high-alert medications (e.g. documenting calculations on prescriptions during order-entry)

Table 3. Recommendations for Prevention of Safety Related Medication Incidents		
Sub-themes	Potential Contributing Factors	Recommendation
Toxicity Due to Over-dosing	Lack of independent double checks	Perform independent double checks in the medication-use process
	Lack of patient-practitioner communication	Engage in counselling and follow-up conversations with the patient to address potential misuse of medications and ensure compliance
	Knowledge gaps	
Toxicity Due to Drug Interactions	Lack of patient-practitioner communication among multiple healthcare providers in the patient's circle of care	Encourage regular communication amongst healthcare providers within the patient's circle of care whenever changes are made to a patient's drug therapy
	Incomplete continuity of care (e.g. lack of medication reconciliation at the transition points of care)	Encourage patients to pick up medications from the same pharmacy for consolidated and comprehensive medication profiles

Melody Truong is a Clinical Pharmacist at Credit Valley Hospital, Trillium Health Partners, and a Consultant Pharmacist at the Institute for Safe Medication Practices Canada (ISMP Canada); Amanda Chen is a Clinical Pharmacist at Sunnybrook Health Sciences Centre; Jim Kong is a Program Development Manager at ISMP Canada; and Certina Ho is a Project Lead at ISMP Canada.

## Do you need capital equipment?



### HealthPRO's Capital Equipment contracts offer:

- Flexibility – commit at any time
- Up to 15% savings – additional volume incentives available
- Flexible supplier selection
- Multitude of product configurations
- Compliant with procurement regulations

Join today to benefit from national pricing and resource efficiencies.

Rafael Perez  
Director, Capital Equipment  
[rperez@healthprocanada.com](mailto:rperez@healthprocanada.com)  
905-568-3478 ext. 275



# Careers

VIEW CAREER ADS AT: [www.hospitalnews.com](http://www.hospitalnews.com)



## Seeking RNs for ICU, CCU, CSICU

HR Associates is Trillium Health Partners' search partner for nursing and allied health professionals.

Visit us at [trillium.hrassociates.ca](http://trillium.hrassociates.ca)





# Health

**NOW HIRING!**

## RN, RPN, PSW & Therapists

for Full time and Part time Virtual, hospital and community roles across Canada

SE Health (Saint Elizabeth Health Care) is a social enterprise applying our knowledge, vision and drive to forever impact how people live and age at home, today and into the future. As a not-for-profit organization with Canadian roots and 110 years of expertise, we bring quality excellence and innovation to home care, seniors lifestyle and family caregiving. Through our team of 9,000 Leaders of Impact, we deliver 20,000 care exchanges daily, totaling 50 million in the last decade alone.

If you join our team you will become a part of a distinguished Canadian, not-for-profit organization with a century of experience.

- You will have access to a total rewards program which includes group benefits and pension plan
- You may be eligible for our education bursaries and tuition assistance program
- You may have flexible working hours

- You will be provided with an extensive paid orientation and preceptorship program
- You will be eligible for subsidized RNAO/RPNAO memberships

**JOIN OUR HEALTH CARE TEAM TODAY!**

PLEASE APPLY ONLINE | [www.sehc.com](http://www.sehc.com)