

This report was developed by the [AIMS Safety Insights Group \(SIG\)](#), an arms-length group made up of system partners with pharmacy and data analytics expertise. These individuals analyze AIMS data, share key findings, and provide guidance and actionable recommendations for pharmacy professionals on how to improve medication safety.

# ASSURANCE AND IMPROVEMENT IN MEDICATION SAFETY:

## *Findings from the Safety Insights Group*

### Focus

- Recent analyses of AIMS Program data found a high proportion of medication events were related to antibiotic dispensing.
- This report presents insights obtained from the data and discusses potential measures to minimize the risk of errors related to antibiotic dispensing.

### Introduction

*Antibiotics play a vital role in combatting bacterial infections, either by eliminating bacteria directly or by creating an inhospitable environment for bacterial growth and reproduction.<sup>1</sup>*

Antibiotic use is widespread in Canada. About one-third of Canadians (33.9%) reported being dispensed antibiotics in 2021–2022. More than 1 in 7 Canadians used antibiotics on two or more occasions, while nearly 1 in 20 used antibiotics more than five times. In 2019, outpatient pharmacies across Canada dispensed a staggering total of 23,406,640 antibiotic prescriptions, highlighting the major role of these medications in healthcare.<sup>2,3</sup> The high volume of antibiotic use leads to increased risk of medication incidents and good catch (near miss) events.<sup>4</sup> Examining errors helps to identify potential weaknesses in the dispensing process to prevent future errors.<sup>5,6</sup>

A focus on antibiotic medication events is increasingly crucial as pharmacists take on antibiotic prescribing as part of their expanded scope of practice.

Prescribers consider several factors in the decision to prescribe an antibiotic that is the most suitable option for an individual and reduces opportunities for medication errors:

- 1) Patient characteristics: age, overall health, and any specific medical conditions that might serve as contraindications for medication prescribing.
- 2) Causative organism of the infection.
- 3) Site of infection, to establish antibiotic type and drug delivery mechanism to ensure adequate exposure.

## AIMS Data and Data Analysis

The AIMS Program promotes ongoing quality improvement and establishes a uniform standard for medication safety across all community pharmacies within the province. The primary objective of the program is to minimize the likelihood of patient harm stemming from medication-related incidents occurring within or connected to Ontario's pharmacies.<sup>7</sup>

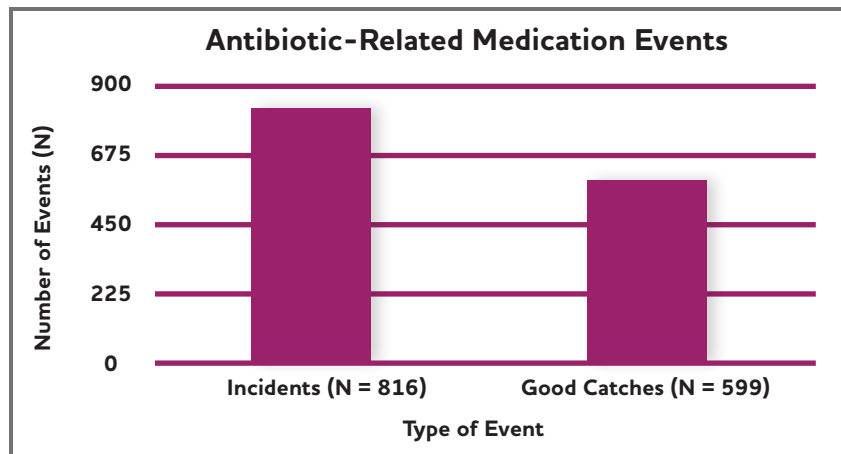
Some context for this report:

- Pharmacy teams anonymously input information about a medication event into the AIMS (Assurance and Improvement in Medication Safety) Pharmapod platform.
- Aggregate, de-identified data from Pharmapod are analyzed by the Ontario Drug Policy Research Network (ODPRN) and presented to the AIMS Safety Insights Group (SIG) for assessment and interpretation.

- AIMS data describe many types of medication events, some of which have a higher prevalence than others.
- Antibiotics were selected as a high priority by the AIMS SIG because of the high frequency of medication events in this drug category. Additionally, antibiotics are prescribed by a variety of healthcare providers, some of whom may not be as familiar with antibiotic prescribing.

Additional details regarding AIMS data can be accessed through the [OCP website](#).

## Key Findings



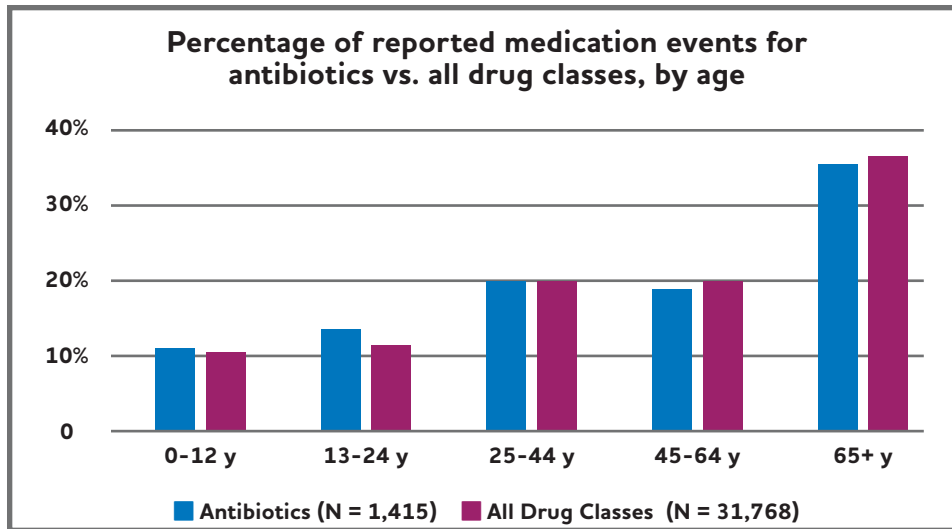
### NUMBER OF ANTIBIOTIC-RELATED MEDICATION EVENTS

A total of 1,415 medication events were reported between April 1, 2018, and June 30, 2021. Actual incidents accounted for 816 (57.7%) of all medication events, while good catches comprised 599 (42.3%) of all medication events.

- Antibiotic-related events comprised nearly 5% (n = 1,415) of all reported medication events (N = 31,768). They were the fourth most reported drug class of all medication events.
- The most common antibiotics reported in a medication event were cephalexin and amoxicillin.

### RELATIONSHIP BETWEEN ANTIBIOTIC MEDICATION EVENTS AND AGE

Antibiotic medication events were reported in individuals across all age groups, particularly among older adults (65+ y). There was no statistically significant difference in the proportion of antibiotic-related medication events compared to the proportion of overall events in any age group, including younger individuals (0-24 y).



**Note:** Patient age was missing in 10.5% of antibiotic-related events and 4.4% of overall medication events, respectively.

## Antibiotic-Related Medication Events

When comparing medication events reported for antibiotics with those related to medications overall, it was found that:

- 57.2% of antibiotic-related medication events occurred during the order entry stage, compared with 39.5% of overall medication events.
- 18.7% of antibiotic-related medication events occurred during the dispensing stage, compared with 33.6% of medication events overall.
- 75.8% of antibiotic-related medication events occurred in the early phases of the process (order entry and dispensing combined), compared with 73.1% of medication events overall.
- There were no differences in the top three most common medication event types when comparing antibiotic-related events (incorrect drug [16.5%], incorrect quantity [15.7%], and incorrect concentration [15.2%]) and overall medication events (incorrect drug [19.5%], incorrect concentration [17.2%], and incorrect quantity [14.5%]).



According to the literature, errors in prescribing decisions contribute to antibiotic resistance, reducing drug efficacy in the future.<sup>8</sup> Numerous factors, such as pharmacy staff involvement, physical surroundings, tools and technology, and organizational culture, can compromise safe dispensing practices.<sup>9</sup> Among pediatric prescriptions, 3 of 4 errors occurred at the order entry step.<sup>10</sup>

## Recommendations for Practice

Antibiotics are a high-volume medication in community pharmacies and this high rate of use can lead to medication errors and potential patient harm. Pharmacy teams should create a personalized approach to antibiotic clinical assessments and dispensing workflows. Several other potential practice improvements include the following:

- Gather and consider information about the patient's current allergies, age, and weight before finalizing the drug and dosage. Greater attention may be required for older adults (65+ y), given the higher rate of antibiotic-related errors in this age group and potential for drug–drug interactions.
- Make every effort to confirm the indication for the medication before finalizing the drug and dosage. Double-checking drug names both during the prescription-entry and prescription-filling stages is crucial, given the potential for similarities among antibiotic names. This will help to prevent the most commonly observed antibiotic-related event of the incorrect drug being dispensed to patients.
- Designate specific individuals for prescription entry/filling and prescription checking/verification into the workflow to enhance safety measures, given that over half of all antibiotic-related events occurred during the order entry stage.
- Make use of medication event reporting (including actual incidents and good catches), along with process and workflow analysis, to identify areas for improvement in antibiotic prescribing or dispensing. This will help you develop resources and strategies to help prevent future errors.
- Familiarize yourself with local antibiotic resistance and susceptibility patterns and current guidance related to antimicrobial stewardship.
- Take special care with antibiotics that are dosed by weight, adjusted for renal function, or dispensed as suspensions, as errors in dose calculation and measurement can occur. Provide patients who are receiving antibiotic suspensions with a measuring device and demonstrate measurement during counselling.<sup>11</sup>

Information regarding patient metrics and medication indication can be obtained through various means, such as actively engaging with the patient, caregiver, or prescriber, querying electronic information repositories, such as clinical viewers, or reviewing previous clinical notes.

## Conclusion

Pharmacies can actively work toward preventing antibiotic-related medication incidents and enhancing the overall safety of antibiotic prescriptions. This includes conducting thorough therapeutic assessments that address the use, indications, and safety of these medications. With the expanding scope of pharmacist prescribing, it is vital to modify the antibiotic prescribing process as necessary to effectively avert errors associated with antibiotic prescriptions.

Further information and resources on quality improvement methods can be found on the

[OCP website](#).

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