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Summary Report

Use of Oral Fluoroquinolones in Canada: A Drug Utilization Study Update

Report Authors

Pierre Ernst, Lisa M. Lix, Greg Carney, Nick Daneman, Matt Dahl, Tayler Dawn Scory, Daniel Dutton, Xue Feng, Donica Janzen, Vicki Ling, Devin Manning, Tarita Miller, Paul Ronksley, Audray St-Jean

Executive Summary

Fluoroquinolones, broad-spectrum antibiotics, have been linked to serious adverse events (undesirable effects of a drug or treatment). In 2017, Health Canada restricted their use due to their potentially persistent and disabling side effects.

The objectives of this Drug Utilization Study were to describe the trends in fluoroquinolone usage from 2008 to 2022 and to evaluate the impact of the risk minimization measures introduced in 2017. Researchers looked at usage patterns in Alberta, British Columbia, Manitoba, Nova Scotia, Ontario, and Saskatchewan overall and for 3 selected conditions: urinary tract infections in women, acute exacerbations of chronic obstructive pulmonary disease in persons aged 66 years and older, and acute bacterial sinusitis.

The use of oral fluoroquinolones in the outpatient setting declined in all provinces between 2008 and 2022. The regulatory actions of 2017 were followed by reductions in the fluoroquinolone dispensation rates and the percentage of fluoroquinolone prescriptions for the 3 conditions, although a decreasing trend was observed before the regulatory actions. The findings suggest that the Health Canada regulatory actions could have affected the prescribing of fluoroquinolones, unmeasured factors may have had an impact on prescribing as well.

Background

Fluoroquinolones, which are broad-spectrum antibiotics, have been linked to serious adverse events. In 2017, Health Canada restricted their use due to their potentially persistent and disabling side effects. Updates to the product labels were also made. In response to a query from Health Canada, observational studies were conducted in 6 provinces using data collected between 2005 and 2015 to assess the appropriate use of fluoroquinolones and to compare their clinical outcomes for specific conditions. It is unclear whether the use patterns of fluoroquinolones have changed since these regulatory actions were taken.

Policy Issue

Health Canada required an update on drug usage patterns to determine the impact of the regulatory actions (the risk communication and label updates) applied in 2017 on fluoroquinolone use in Canada. The requested update is to inform Health Canada about the need for any additional regulatory actions.

Policy Questions

- 1 What are the current trends of fluoroquinolone use in Canada?
- 2 Are fluoroquinolones being prescribed for their intended indications?
- 3 Has drug utilization of fluoroquinolones shifted over time since 2017?
- 4 How have Health Canada's risk mitigation measures (risk communication, updates to the labels) impacted the use of fluoroquinolones in Canada?

Objectives

The objectives of this Drug Utilization Study were to describe the trends in fluoroquinolone usage from 2008 to 2022 and to evaluate the impact of the risk minimization measures introduced in 2017.

Findings

Use

Researchers conducted an updated study to describe the trends in usage for 4 oral fluoroquinolones (ciprofloxacin, levofloxacin, moxifloxacin, and norfloxacin) in the outpatient setting from 2008 to 2022 using administrative health databases in 6 provinces (Alberta, British Columbia, Manitoba, Nova Scotia, Ontario, and Saskatchewan).

Dispensing is the process of preparing and providing a prescription drug to a patient.

Overall dispensation rates of the 4 oral fluoroquinolones decreased by approximately 50% between 2008 and 2022 across provinces, sexes, and age groups (from 107 to 45 dispensations per 1,000 population). Use was highest among females compared to males regardless of age. Fluoroquinolones were rarely prescribed among patients younger than 18 years; as such, the following findings are for adults only.

Ciprofloxacin was the most frequently prescribed fluoroquinolone antibiotic, followed by moxifloxacin and levofloxacin, whereas norfloxacin was prescribed less often.

In all provinces, fluoroquinolones were mostly prescribed by family physicians, with percentages of dispensations ranging from 68.7% (Ontario) to 85.6% (Manitoba) in 2008 and 62.9% (Alberta) to 80.3% (Manitoba) in 2022.

Fluoroquinolone use decreased for the treatment of adults with acute bacterial sinusitis, acute exacerbations of chronic obstructive pulmonary disease (which only included persons older than 66 years), and uncomplicated urinary tract infections (measured in women only).

There were variations in the use of fluoroquinolones across provinces.

Impact Assessment Analysis

Researchers conducted a time-series analysis to determine the impact of the 2017 Health Canada risk communication measures, separating the data into 3 segments:

- **Segment 1:** January 1, 2008, to December 31, 2016 (before the risk minimization period)
- **Segment 2:** January 1, 2017, to February 29, 2020 (after the risk minimization period; pre-COVID-19 pandemic)
- **Segment 3:** March 1, 2020, to December 31, 2022 (after the risk minimization period; during COVID-19 pandemic)

The rate of fluoroquinolone dispensations was reduced by 50% in segment 2 relative to segment 1, and by 62% in segment 3 relative to segment 1.

Similarly, the percentages of antibiotic dispensations for fluoroquinolones decreased for the 3 selected conditions: acute bacterial sinusitis, acute exacerbations of chronic obstructive pulmonary disease (≥ 66 years only), and uncomplicated urinary tract infections (women only).

However, a decreasing trend was observed even before the regulatory actions were taken in 2017. There were variations across the provinces in the scale of the reductions in the rates of fluoroquinolone dispensations and the percentage of antibiotic dispensations that were fluoroquinolones.

Limitations

While this is the first study to review the dispensation of oral fluoroquinolones after the Health Canada 2017 risk minimization measures, the study has important limitations: the data are limited to outpatient pharmacies, event definitions are based on diagnosis codes, exposure is defined as a drug dispensation that may not represent actual consumption by the patient, and there are differences in data availability and coding practices across provinces. The study's findings may not be generalizable to other jurisdictions.

Implications for Policy-Making

Use of oral fluoroquinolones in the outpatient setting declined in all provinces between 2008 and 2022. The 2017 Health Canada regulatory actions were followed by reductions in the rate of fluoroquinolone dispensations and the percentage of antibiotic dispensations that were fluoroquinolones, although a decreasing trend was observed before the regulatory actions. While the findings suggest that the Health Canada regulatory actions could have affected the prescribing of fluoroquinolones, unmeasured factors may have also had an impact on prescribing.

Considerations

Post-Market Drug Evaluation (PMDE) projects aim to produce health policy issue evidence and are not linked to a recommendation.

This work was intended to inform health policy. Clinical questions regarding the use of fluoroquinolones should be directed to a health care professional.

For more information on CoLab and its work visit colab.cda-amc.ca

For the full scientific report, visit:

[Use of Oral Fluoroquinolones in Canada: Drug Utilization Study Update](#)



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