Handbook for a Pilot Study to Reduce Potential Hospitalizations due to Preventable Drug-Drug Interactions

Atsushi Kawano, BSc, MSc, BScPhm; Certina Ho, RPh, BScPhm, MIST, MEd

Table 1 Drug-drug interactions leading to potential hospitalizations identified from primary literature

<table>
<thead>
<tr>
<th>Drug Interaction Pairs</th>
<th>Chronic Medication</th>
<th>Added Antibiotic</th>
<th>Patient Information</th>
<th>Adverse Outcomes</th>
<th>Number of cases identified from Ontario Drug Benefit database</th>
<th>Adjusted odds ratio based on hospitalization rate over the prior week of exposure to evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin / Trimethoprim-sulfamethoxazole (TMP-SMX)</td>
<td>Older than 65 years treated with Digoxin</td>
<td>Trimethoprim-sulfamethoxazole (TMP-SMX)</td>
<td>Hyperkalemia</td>
<td>2151</td>
<td>9.7</td>
<td></td>
</tr>
<tr>
<td>Digoxin / Antihypertensives</td>
<td>Older than 65 years treated with Digoxin</td>
<td>Antihypertensives</td>
<td>Hyperkalemia</td>
<td>1851</td>
<td>9.2</td>
<td></td>
</tr>
<tr>
<td>Digoxin / Antihypertensives (Non-DHP blockers)</td>
<td>Older than 65 years treated with Digoxin</td>
<td>Antihypertensives (Non-DHP blockers)</td>
<td>Hyperkalemia</td>
<td>1355</td>
<td>3.3</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 Drug-drug interactions leading to potential hospitalizations identified from primary literature

Background

- Hospital reports on medication incidents suggest 37-51% of reported adverse drug events may have been prevented with appropriate interventions.1,2
- Community pharmacists are in a unique position to monitor and prevent adverse drug reactions, including drug-drug interactions.
- By identifying and offering recommendations to prescribers, community pharmacists can be reimbursed through the Pharmaceutical Opinion Program offered by the Ontario Ministry of Health and Long-Term Care (MOHLTC).
- The Institute of Clinical Evaluative Sciences (ICES) conducted population-based studies examining the association between specific drug-drug interactions and hospitalizations (Table 1).2,3

Objective

- To compile a list of evidence-based drug-drug interactions with association to an increased risk of hospitalizations (Table 1).
- To develop a Treatment Algorithm Handbook that helps community pharmacists identify and communicate therapeutic alternatives to prescribers in situations involving evidence-based drug-drug interactions (Table 1).
- To implement a pilot study in community pharmacies that applies medication safety principles to integrate cognitive services and reimbursement of professional services.

Methodology

Identification of evidence-based drug-drug interactions

- A literature search was conducted using MEDLINE, and EMBASE. Medical subject heading (MeSH) terms used to search the database included "drug interaction", "elderly patients", "nursed-case control", "population-based", "pharmacoeconomics", and "patient safety". Publications were also found by reviewing references contained within articles.
- Eighty-six articles were selected based on relevant evidence-based drug-drug interactions associated with increased risk of hospitalization that could be easily screened by community pharmacies.

Development of treatment algorithms to resolve evidence-based drug-drug interactions

- Treatment algorithms were created to suggest alternative antibiotics for three community infections: Group A β-hemolytic Streptococcus pharyngitis, outpatient community-acquired pneumonia, and uncomplicated acute cystitis.
- Published literature was searched using MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, and through bibliographic review.
- Articles were selected based on appropriate trial design (including use of clinical and bacteriological outcomes), comparators, and inclusion of adult patients older than 65 years of age.

Results

- Evidence-based drug-drug interactions in Table 1 included either a macrolide or trimethoprim-sulfamethoxazole (TMP-SMX). In all cases, the evidence supports an alternative to either antibiotic for selected community infections (Figure 1).
- Older persons are underrepresented in trials evaluating antibiotic therapy for community infections. Selecting an appropriate antibiotic requires applying data derived primarily from children and adults.

A Treatment Algorithm Handbook was created for community pharmacies to resolve evidence-based drug-drug interactions.

Conclusion / Next Steps

- The list of evidence-based drug-drug interactions with association to an increased risk of hospitalizations (Table 1) was made available to community pharmacists via ISMP Canada Community Pharmacy Incident Reporting Newsletter and Ontario College of Pharmacists quarterly publication, Pharmacy Connection.1
- Community pharmacists will have the option of using the Treatment Algorithm Handbook to help resolve evidence-based drug-drug interactions (Table 1).
- Treatment Algorithm Handbook content will be converted in difficult multimedia formats to increase accessibility to information by community pharmacists.
- Community pharmacies can participate in this pilot study to proactively initiate clinical interventions to prevent drug-drug interactions. More specifically, the information from this pilot study can be used as a catalyst to initiate cognitive services to support a financially sustainable business model.

References


Acknowledgements

This project is supported by the Innovation Fund Grant from the Canadian Foundation for Pharmacy.