Evaluation of Return on Investment for Pharmacy Technicians Performing Best Possible Medication Reconciliation in the Emergency Department

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Background
- Preventable, drug-related hospitalizations in Canada result in more than 1.5 million hospital days at an estimated cost of $2.2 to $5.6 billion annually.¹ ²
- In Canada, 12% of ED visits and 25% of Internal Medicine unit admissions are estimated to occur due to ADEs.³ ⁴
- Communicating effectively about medications is a critical component of delivering safe care.⁵
- BPMH policies and procedures were recently implemented across most VCH and FHA hospitals predominantly utilizing physicians and nurses.
- A $305,000 per year, pilot program investigating the effectiveness of pharmacy technicians performing BPMH began at Lions Gate Hospital (LGH) in 2017.
- The comparative quality of BPMH as performed by physicians, nurses, and pharmacy technicians at LGH is unknown.

Objectives
- To characterize the comparative quality of BPMH as performed by physicians, nurses, and pharmacy technicians at LGH.
- To estimate the return on investment of pharmacy technicians performing BPMH at LGH.

Methods
- Design: Retrospective single-centre chart review at LGH.
- Sample Size: (30 days of baseline data):
  - ISMP MedRec Quality Score
    - Physicians or Nurses (n = 50), BPMH Technicians (n = 50)
  - Discordance between verified medication history and PharmaNet
    - Physicians (n = 60), Nurses (n = 24), BPMH Technicians (n = 56)
- Inclusion Criteria: Adult patients admitted to LGH.
- Exclusion Criteria: Patients taking < 2 prescription medications, except for ASA, prior to admission (PTA). Products for external use, multivitamins, and alternative medications were not considered for therapeutic appropriateness.
- Analysis: Wilcoxon and Kolmogorov-Smirnov tests for non-parametric data.

Primary Outcome:
- ISMP MedRec Quality Audit Tool score comparison between physician/nurse and pharmacy technician – performed BPMH.
- Discordance rate between patients verified medication history and PharmaNet list for medications continued on reconciliation.

Secondary Outcomes:
- Collection of significant clinical near misses and misses resulting from incomplete BPMH.
- Frequency of BPMH and MedRec completion per LGH policy.
- Estimated cost for pharmacy technicians to perform BPMH per patient.

Results

Table 1: Baseline Characteristics: ISMP MedRec Score

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Baseline (n = 50)</th>
<th>BPMH Tech (n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age – mean (± SD)</td>
<td>72 (13.2)</td>
<td>71 (13.2)</td>
</tr>
<tr>
<td>Male – no. (%)</td>
<td>21 (42)</td>
<td>21 (42)</td>
</tr>
<tr>
<td>Avg. Number of Medications</td>
<td>10.3</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Figure 1: ISMP MedRec Quality Score Comparison

Table 2: Baseline Characteristics: Discordance

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Baseline (n = 84)</th>
<th>BPMH Tech (n = 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age – mean (± SD)</td>
<td>61.7 (22.7)</td>
<td>74.1 (16.3)</td>
</tr>
<tr>
<td>Avg. Number of Medications</td>
<td>8.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>

Figure 2: Discordance Data Plot (Richmond Hospital Criteria)

Table 3: Primary and Secondary Outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Physicians</th>
<th>Nurses</th>
<th>Physicians &amp; Nurses</th>
<th>BPMH Tech</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Outcomes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISMP MedRec Quality Score</td>
<td>--</td>
<td>--</td>
<td>2.9 ± 2.4</td>
<td>4.5 ± 1.1</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Discordance (%)</td>
<td>43</td>
<td>13.4</td>
<td>--</td>
<td>33.2</td>
<td>N/A</td>
</tr>
<tr>
<td>Secondary Outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPMH Avg. Completion Rate (%)</td>
<td>3.4</td>
<td>46.3</td>
<td>--</td>
<td>94.9</td>
<td>N/A</td>
</tr>
<tr>
<td>MedRec Avg. Completion Rate (%)</td>
<td>5.9</td>
<td>34.1</td>
<td>--</td>
<td>69.6</td>
<td>N/A</td>
</tr>
<tr>
<td>BPMH Avg. Time to Complete for Technicians (min)</td>
<td>--</td>
<td>--</td>
<td>18.6</td>
<td>(n = 166)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Discussion
- Antiretroviral medications and ASA were the most commonly missed medications.
- The estimated cost for a pharmacy technician to perform BPMH is $9.6 per patient.
- Methods for classifying and predicting potential harms due to poor MedRec have been devised, but none have been validated and thus were not included in this study.
- Limitations:
  - Small sample size.
  - BPMH completion at baseline was highly variable.
  - Discordance is a surrogate marker for good medication history taking.
  - Not feasible to capture all patient outcomes; misses and near-misses were recorded.

Conclusions
- Pharmacist technician – performed BPMH resulted in 50% higher ISMP MedRec Scores (4.5/6 vs. 3/6) with half the standard deviation (1.1 vs. 2.4) compared to baseline.
- Discordance:
  - Pharmacy technicians had a higher discordance rate compared to physicians and nurses and therefore, are more likely to discover differences between PharmaNet and a patient’s true medication regimen.

References
5. Accreditation Canada, CIHI, CPSI/ICSP, ISMP Canada 2012