Medication Reconciliation Business Case

Executive Summary

In November of 2005, ___________, CEO of the _______________, officially enrolled the Region in the Canadian Safer Healthcare Now! (SHN!) campaign. The SHN! was initiated to enlist Canadian healthcare organizations in implementing six targeted patient safety intervention:

1. Improve care for myocardial infarction
2. Prevent central line-associated infections
3. Prevent adverse drug events by implementing medication reconciliation
4. Prevent deaths by implementing rapid response teams
5. Prevent surgical site infections
6. Prevent ventilator-associated pneumonia

The collection of accurate, complete home medication information from patients upon admission is a significant patient safety issue. Our current process is cumbersome, disorganized and insufficient. Roles and responsibility for the steps of the process are ambiguous. The lack of a high quality, consistent process repeatedly results in medication errors and adverse drug events.

Medication Reconciliation is defined as: “a formal process of obtaining a complete and accurate list of each patient’s current home medications, including name, dose, frequency, and route and comparing the physician’s admission, transfer and/or discharge orders to that list.”¹,² This complete and accurate list supports each physician’s ability to order medications based on the patient’s current medication therapy.

The Canadian Council on Health Services Accreditation (CCHSA) recognizes this and has embedded medication reconciliation as a key Patient Safety Goal and Required Organizational Practice (ROP) to be addressed during the Region’s 2008 accreditation survey. The CCHSA requirements include:

- a demonstrated, formal process to reconcile patient medications upon admission
- generation of a single, documented comprehensive best possible medication history list (BPMH) of the most accurate and current medications that the patient has been taking prior to admission
- a timely process to review the BPMH with all new medications ordered
- documentation that discrepancies between the BPMH and medication orders are resolved appropriately
- involvement of patients/clients, nurses, physicians and pharmacists as appropriate
- an implementation plan for the spread of the medication reconciliation process across the organization before the next accreditation survey

A Patient Safety Story of Incorrect Medication Doses on Admission to Hospital: Mr Q, a kidney transplant recipient on immunosuppression medication had incorrect doses of his prednisone and sirolimus ordered on admission resulting in too few doses which could increase the possibility of organ rejection.
How to Conduct Medication Reconciliation

The following details the key steps from the SHN! Getting Started Kit for medication reconciliation initiatives:

1. Secure leadership commitment (clear goals, Executive Sponsor, removal of barriers, adequate dedicated resources)
2. Form a team
3. Collect baseline data
4. Set Aims (Goals and Objectives)
5. Start with a pilot project and begin to learn how to reconcile medications
6. Continue to implement medication reconciliation, test results and spread
7. Evaluate (ongoing monitoring and evaluation)

Resource Requirements for Pilot Project

The estimated costs to implement a medication reconciliation process on one pilot unit (based on involvement of a nurse-pharmacist combined project leads and a physician champion over the pilot project period) are estimated at approximately $49,000.

The estimated costs to spread the new medication reconciliation process to all admissions settings at the ____________ Hospital and __________ Hospital are estimated at approximately $35,000. Additional resources would be required to ensure process implementation at all regional sites.

Benefits to the Region

The Institute of Medicine (IOM) and others have established that patients admitted to a healthcare organization will experience, on average, 1.5 discrepancies in their medication regimen which will lead to approximately one percent of these patients experiencing harm. The literature has estimated that the cost of addressing an adverse event is approximately $4,800 U.S. ($5,650 CDN) per incident although some have calculated this to be higher. It is estimated that an effective medication reconciliation process could avert 85% of these adverse events.

Extrapolating this research to the Region’s patient population, approximately 320 (1% of 32,000 annual admissions to the __________ Hospital and __________ Hospital) will experience an adverse drug event. It is estimated that a high quality medication reconciliation process can prevent 272 of these injuries (85%), a potential savings of a minimum of $1,500,000 CDN each year.

This document is the business case for the SHN Medication Reconciliation initiative. The document will provide an overview of the initiative including the Region’s current state, cost/benefit analysis and the methodology.

Project Sponsor: ______________, Executive Director, Medical Care & Pharmacy

Business Case Authors: _____________ & _______________
Medication Reconciliation Business Case

I. Introduction

On April 12, 2005, the Safer Healthcare Now! (SHN) campaign was initiated to enlist Canadian healthcare organizations in implementing six targeted interventions in patient care. Supported by the Institute for Healthcare Improvement (IHI) and using the 100K Lives campaign as a model, individuals and organizations across Canada came together to develop this Canadian campaign to promote improvements in patient safety.

In November of 2005, _________________, CEO of the ________________________, officially enrolled the region in the Campaign. The Quality Improvement Unit has been tasked with developing a business case for each of the six initiatives outlined in the campaign.

A. Current Situation

Obtaining an accurate and complete list of home medications from a patient upon admission to our hospitals is the first step to ensuring that physicians have complete and accurate information on which to base their admissions medication orders. Without a clear understanding of the medications the patient was taking prior to admission, medication errors and omissions occur, potentially resulting in significant adverse drug-related events (ADE).

Currently in the Region’s acute care facilities, a patient admitted to hospital is questioned about their home medications at several points in their care. This information, gathered by various healthcare professionals, is documented on a variety of forms and placed in various locations in the patient chart. The variation in methodology includes:

- The triage nurse in the Emergency Department uses an outpatient registration form, (the “pink sheet”), to record a brief medication history, which often omits the dose or frequency and may have the drug spelled incorrectly.
- The ER physician writes orders for the medication they wish the patient to receive while in the ER.
- If the patient is admitted to an inpatient unit, the nurse “re-checks” the medication history from both the “pink sheet” and the physician’s orders, as well as from the physician’s medical history (if available).
- This list of medications is written onto the nurses’ patient database. The list may contain omissions and discrepancies from the ER list, such as the omission of non-prescription medications (e.g. ASA for prevention of an MI, or the antihistamine purchased over the counter, or herbs such as St. John’s Wort used for their depression.)
- When a pharmacist receives the medication orders, they may need to interview the patient to clarify the order. The pharmacist’s list is generally written in the patient’s progress record.

An Patient Safety Story of Incorrect Medication Doses on Admission to Hospital: Mr Q, a kidney transplant recipient on immunosuppression medication had incorrect doses of his prednisone and sirolimus ordered on admission resulting in too few doses which could increase the possibility of organ rejection.
Alternatively, patients who are first seen in the Pre-Admission Clinic have a medication history recorded by a nurse on yet another nursing patient database for inclusion in the patient’s chart.

This additional database may be used by the internist and/or anaesthesiologist who completes the pre-op assessment and who may change, stop or add more medications in the Physician’s Orders of the chart.

This process results in documentation of home medications in a minimum of three different places in the patient’s chart, if they are documented at all. At times information from patients is vague leading to omissions or errors (e.g. “I take one blue pill for nerves, a white pill for my heart and ½ of a yellow “water” pill”).

At this time, an effective process for medication reconciliation* upon admission does not exist in the Region, and confusion regarding roles and responsibilities only compounds the situation.

B. Project objective and scope

The objective of this project is to improve patient safety by reducing adverse drug events through the development of an effective medication reconciliation process.

Medication Reconciliation* is defined as: “a formal process of obtaining a complete and accurate list of each patient’s current home medications, including name, dose, frequency, and route and comparing the physician’s admission, transfer and/or discharge orders to that list.” ¹, ² This complete and accurate list supports each physician’s ability to order medications based on the patient’s current medication therapy.

Specifically, the implementation of medication reconciliation strives to:

• Identify Documented Intentional Discrepancies, defined as one in which the physician has made an intentional choice to add, change or discontinue a medication and that choice is clearly documented, as appropriate practice, and separate from unintentional discrepancies and undocumented intentional discrepancies.
• Reduce the number of Unintentional Discrepancies defined as one in which the physician unintentionally changed, added or omitted a medication the patient was taking prior to admission.
• Reduce the number of Undocumented Intentional Discrepancies defined as one in which the physician has made an intentional choice to add, change or discontinue a medication but this choice is not clearly documented.

A well designed medication reconciliation process includes three key steps:

1. Nursing staff interview the patient and/or family upon admission, as well as utilize other available information (such as the Pharmaceutical Information Program - “PIP”) to document the most complete and accurate list possible of pre-admission medications for each patient.
2. Physicians utilize this list as a medication order form upon admission, transfer or discharge, documenting deletions or changes directly on the form.
3. A referral is placed to the pharmacist when a concern exists that a patient may be at risk for an ADE. The pharmacist compares this list against the physician’s admission orders, as well as reviews the compatibility and appropriateness of the patient’s current medications and consults with the physician regarding recommendations.

The initial scope of this pilot project will be limited in size to include patients admitted under the care of one physician on one unit. The patients will be interviewed upon admission by nurses involved in the pilot project. Patients meeting the screening criteria will then be seen by the pilot project pharmacist. (For screening criteria see Appendix A)

Once an effective admission medication reconciliation process has been developed, a staged roll out through the two acute care sites in ________ will occur. The region must demonstrate a concerted effort to implement medication reconciliation at point of admission in order to meet CCHSA’s 2008 accreditation standards. The medication reconciliation process will need to be utilized at each point of admission/transfer/discharge across the region by the 2011 accreditation survey.

C. Literature review
The Canadian Adverse Events Study (2004) identified that an estimated 9,000 to 24,000 patients die each year in hospital due to unnecessary adverse events. This same study reported that drug and fluid related events were the second most common type of adverse event, with ADEs making up approximately 24% of adverse events. Communication between settings of care has been identified as one of the leading factors in ADEs. A study utilizing chart reviews identified that over half of all hospital medication errors occur at the interfaces of care, or, as patients are admitted to a facility, transferred within the facility, or discharged from the facility. One study looking at hospital admissions identified that in 53.3% of admissions, there was at least one unintended medication discrepancy upon admission. Of these discrepancies, 38.6% were judged to have the potential to cause moderate to severe discomfort or clinical deterioration. Most of the ADEs (46.4%) consisted of the omission of a regularly used medication. An effective medication reconciliation process contributes to the “five rights of medication safety” as described by the Institute for Safe Medication Practices: the right patient receives the right medication, at the right time, in the right dose, via the right route.

D. Methodology
The Canadian Patient Safety Institute (CPSI) has developed a “Medication Reconciliation: Getting Started Kit”. The kit outlines the methodology and metrics for implementing and sustaining an effective medication reconciliation process. The CPSI recommends an initial focus on admission to acute care, followed by discharge home or transfer to an alternative site.

In order to implement a pilot project the following steps will be taken:
- Identification of a Senior Leadership Project Sponsor and Physician Champion
- Identification of a project manager and core pilot project team
- Completion of base line data collection
- Creation of a current state process map of our process to collect home medication information and reconcile discrepancies.
- Develop a project charter, measures, goals and pilot implementation methodology
- Develop a communication/education strategy and action plan to address all stakeholder groups throughout the pilot project
- Implement pilot project (April 2007 – October 2007)
- Evaluate results and spread improved process across the region

### II. External Assessment

#### A. The 100,000 Lives Campaign

In 2004, the Institute for Healthcare Improvement (IHI) launched the 100K Lives Campaign, aimed at preventing 100,000 unnecessary hospital-related deaths, in response to the startling findings in the Institute of Medicine’s two reports, *To Err is Human* (1999) and *Crossing the Quality Chasm* (2001). In these studies the IOM estimated that tens of thousands of Americans die each year from errors in their care, and hundreds of thousands suffer or barely escape from nonfatal injuries that a truly high-quality care system would largely prevent.

The campaign includes six initiatives:
- Improve care for myocardial infarction
- Prevent central line-associated infections
- Prevent adverse drug events by implementing medication reconciliation
- Prevent deaths by implementing rapid response teams
- Prevent surgical site infections
- Prevent ventilator-associated pneumonia

#### B. The Safer healthcare Now! Campaign

The Canadian Patient Safety Institute (CPSI) has adopted the 100K Lives Campaign, creating a Canadian version known as the Safer Healthcare Now (SHN) Campaign. Medication reconciliation is one of six key initiatives embedded in the campaign, to significantly improve patient safety in participating facilities.

Currently 176 healthcare organizations in Canada have deployed 583 teams to work on SHN initiatives. 200 of these teams (34%) are implementing medication reconciliation.

#### C. CCHSA Required Organizational Practices

The Canadian Council on Health Services Accreditation (CCHSA) has recently released Patient Safety Goals and Required Organizational Practices (ROPs) which organizations are now responsible for implementing. The Communication ROP requires organizations to
demonstrate how they are addressing medication reconciliation as a significant patient safety initiative.

Organizations will demonstrate:
- a demonstrated, formal process to reconcile patient medications upon admission
- generation of a single, documented comprehensive best possible medication history list (BPMH) of the most accurate and current medications that the patient has been taking prior to admission
- a timely process to review the BPMH with all new medications ordered
- documentation that discrepancies between the BPMH and medication orders are resolved appropriately
- involvement of patients/clients, nurses, physicians and pharmacists as appropriate
- an implementation plan for the spread of the medication reconciliation process across the organization before the next accreditation survey

D. Other Healthcare Organizations
A survey of 24 individuals throughout Canada who are working on improvement teams to implement medication reconciliation identified that front-line nursing staff are most frequently responsible for collecting best possible medication histories (BPMH) upon admission. Nursing staff in B.C. utilize the provincial pharmacy database, PharmNet, during interviews with patients. The physicians, in turn, utilize the BPMH list to order medications for use during the patient’s in-hospital stay. In 2 – 10% of cases, a pharmacist is consulted to review a patient’s medications and make recommendations to physicians about changes.

Provincial Health has implemented the Pharmaceutical Information Program (PIP). This program links the provinces pharmacies through one database, in order to provide a summary of each patient’s current medication utilization. Although the PIP only lists medications that have recently been filled by a pharmacist, and does not include the route, dosage or frequency, a PIP print off can be utilized as an effective resource during an interview with a patient or family member.

, Medication Safety Officer, explains, “Our process in ER is largely driven by nurses and physicians. Pharmacists are consulted to see approximately three percent of cases. The triage nurse determines which each patient require a BPMH as a potential admission based on CTAS (Canadian Triage and Acuity Scale) score. The Triage Nurse currently spends three to five minutes with patients, and begins to compile the medication history but it is completed and/or verified by the bedside nurse, who has access to a PharmaNet profile for confirmation.”

, Manager of Pediatrics, shared, “We began medication reconciliation in three areas: Pediatrics, Medicine and Emerg. We hold weekly team meetings which are crucial for team momentum and success. Weekly meetings facilitate the use of numerous PDSA cycles. Our overall project sponsor is our VP of Nursing, and co facilitators for the project are the Chief of Pharmacy Practice as well as the Chief of Nursing Practice. The three teams consist of the clinical pharmacist, the nurse manager, the nurse educator and one front line or charge nurse. The Specialist for Organizational Effectiveness and Patient Safety functions as a consultant to the teams.”
__________ Health Region has been working on implementation since Fall 2005. They are now experiencing the benefits of the new process:

A quote from a ________ patient advocate - "My dear family friend, an 87 year old gentleman we are caring for, is just recovering from congestive heart failure that may have been the result of mistakenly stopping his regular medications in hospital. Medication Reconciliation is an excellent process to go through so please do not stop!"

A quote from a ________ RN - "The form is straight forward, you just fill in the blanks and it is done- all on one page. It is really quite nice!" "The process is working. You can't mix up patient orders if a patient is off serviced. The doctors do not have to rewrite anything therefore saves time. We are all more conscious of accuracy and details now." "It will be easier once everyone is using the same form/process."

__________ healthcare:

“Reduced paperwork, improved workflow, efficiency, communication, and physician confidence - based on feedback from staff on the units”

**A Patient Safety Story re: Need for Hospital Admission: Mr. D arrived in Emergency with bradycardia (very low heart rate causing significant dizziness and possibly blackouts) requiring hospital admission just 3 days after his discharge from hospital. A review of his history identified that prior to his 1st hospital admission he was taking verapamil for ventricular rate control for atrial fibrillation, however, it had been changed to diltiazem, another calcium channel blocker with rate control properties, as it had lesser side effects (e.g. constipation). However, when Mr. D went home after his 1st hospitalization, due to lack of communication he not only took his new prescription for diltiazem, but restarted his “old one” of verapamil that he had had at home. This resulted in his significant bradycardia and led to his need to return to the ER on an urgent basis.**

III. Internal Assessment:

**A. Implications & risks for the Region**
The lack of an efficient, effective medication reconciliation process results in increased workload and re-work for nurses, physicians and pharmacists as they contend with incomplete and disorganized information regarding home medication use. An effective process can reduce work and re-work associated with the management of medication orders. In one study, after implementation, nursing time at admission was reduced by over 20 minutes per patient. The amount of time pharmacists were involved in discharge was reduced by over 40 minutes per patient. Additional significant risks to the region include potential patient morbidity and mortality, litigation and cost associated with adverse drug events. 6,7
Implementation of a new process will likely meet with initial barriers. A Pan-Canadian Survey of healthcare organization teams implementing medication reconciliation identified these five barriers and challenges:

- Lack of time/resources for data collection - 86.2%
- Lack of staff engagement - 41.5%
- Lack of internal QI knowledge and technical skill to submit measurement forms - 30.8%
- Other (e.g. insufficient population base, ongoing resource challenges) - 29.8%
- Insufficient senior management/clinical leadership support - 21.2%

B. Resource Requirements

The three groups directly impacted by this project will be Nurses, Physicians and Pharmacists. These professional groups must engage both front line and managerial staff in implementation and adoption of a new process to ensure program success.

The estimated costs based on assignment of 1FTE as the Pilot Project Lead (two co-leads at 0.5 FTE each) and involvement a physician champion over the pilot project period include:

<table>
<thead>
<tr>
<th>Pilot Project</th>
<th>Estimated cost</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse &amp; Pharmacist pilot project co-leads (training and mentoring staff on pilot unit (1:1); monthly audits on pilot unit; testing changes and coordination of work, etc) @ 0.5 FTE each</td>
<td>40 hrs/wk x 24 weeks @ $50/hr</td>
<td>$48,000</td>
</tr>
<tr>
<td>Monthly hourly meetings with Physician Champion</td>
<td>Meetings @ $170.00/hr x 6 months</td>
<td>$1,020</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>$49,020</td>
</tr>
</tbody>
</table>

* ______ Guide to Uninsured Services

The estimated costs to spread the new medication reconciliation process include:

<table>
<thead>
<tr>
<th>Spread Phase</th>
<th>Estimated cost</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse &amp; Pharmacist training and mentoring staff on each unit (1:1)</td>
<td>20 hrs/wk x 32 weeks @ 50.00/hr</td>
<td>$32,000</td>
</tr>
<tr>
<td>Physician Champion function as process expert for his/her colleagues</td>
<td>1 hour monthly x 8 months @ 170.00/hr*</td>
<td>$1,360</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>$33,360</td>
</tr>
</tbody>
</table>

* ______ Guide to Uninsured Services

C. The Role of Quality Improvement & Patient Safety

The Quality Improvement Consultant will contribute to the project in the following ways:

- Function as the co-project manager
• Assist team to implement each step of the methodology contained in the SHN Getting Started Kit
  o Assist to secure leadership commitment – present information about the project with potential Project Sponsor and Senior Management Team
  o Assist with formation of a team – assist Team Lead in identifying appropriate team composition and approaching prospective team members
  o Assist with the collection of baseline data – assist team auditor to collect and report on baseline data
  o Assist to set project aims (goals and objectives) – assist team to develop the current state map and complete a Team Project Charter by applying basic project management methodology to project
  o Start with a pilot project and begin to learn how to reconcile medications more effectively – Assist team to put Team Charter into action – support team to conduct numerous PDSA cycles to facilitate rapid process improvement
  o Continue to implement medication reconciliation, test results via spread methodology
  o Evaluate project and report outcomes to project team and stakeholders.
• Act as a Liaison between the Western Node of the SHN Campaign and the Region, submitting data and reports as required by campaign.

D. Gap Analysis (Current State versus Ideal State)
The initial stage of the project includes a Gap Analysis based on comparison of the baseline data to current clinical best practice. Baseline data collection on 15 randomly-selected patients upon admission reflects an average of seven medications upon admission, 13 (87%) experienced an undocumented intentional discrepancy (type 2) or an unintentional discrepancy (type 3). (Appendix B). Involvement in the Safer Healthcare Now! Campaign requires regular submission of audit information based on random sampling of 20 patient admission charts (Appendix C).

In total, of the 109 home medications recorded for these 15 patients, 48% of the medications were either intentionally changed upon admission but not documented, or were inadvertently not ordered correctly. These discrepancies occur when appropriate documentation is not a standardized process, or when complete information is not available for physicians upon admission. In order to “close the gap” between our current state and where the campaign would like us to be, SHN! recommends we reduce type 2 and type 3 discrepancies by 75%, will improving our overall Medication Reconciliation Success Index by 75% (Appendix C).

Baseline data is captured through the following steps:
• Patient is admitted through the usual admitting process
• A Pharmacist interviews the patient to obtain a BPMH list (which includes all medications and herals with the correct dosages, times, etc) and compares this list to the admission orders.
• Any identified discrepancies are clarified with the physician to determine type (intentional discrepancies, unintentional discrepancies, undocumented intentional discrepancies).
• The discrepancies are recorded on an audit sheet.
E. Benefits to the Region

The literature reflects a significant reduction in patient morbidity and mortality and resulting cost savings secondary to implementation of effective medication reconciliation.

The Institute of Medicine (IOM) and others have established that patients admitted to a healthcare organization will experience, on average, 1.5 discrepancies in their medication regimen which will lead to approximately one percent of these patients experiencing harm.

The U.S. literature sets the cost of an adverse drug event (ADE) at $4,800 per incident although some have calculated this to be higher. With an effective medication reconciliation process 85% could be averted.\(^{(13)}\)

According to Regional statistics, approximately 32,000 patients were admitted to the ___ and ____ between Apr 05 and Mar 06. Based on the above research, it can be estimated that 320 patients will experience medication related harm due to lack of medication reconciliation.

320 patients harmed x 0.85 (85% injuries prevented through reconciliation) = 272 injuries prevented

272 injuries prevented x $5,650 CDN ($4,800 US)/injury = $1,536,800 saved annually

Summary of Cost/ Benefit:

<table>
<thead>
<tr>
<th></th>
<th>Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Project</td>
<td>$49,020</td>
<td>$750,000 saved* in 6 months</td>
</tr>
<tr>
<td>Spread Costs</td>
<td>estimated @ $33,360</td>
<td>$1,000,000 saved* in 8 months</td>
</tr>
<tr>
<td>Ongoing and Annualized</td>
<td>Monthly Audits = $6,000</td>
<td>$1,500,000 saved*</td>
</tr>
</tbody>
</table>

*The estimated $1,500,000 saved annually based on extrapolation from U.S. Institute of Medicine research on potential prevention of ADEs: 2005

A Patient Safety Story of Medication Duplication & Omission: Mrs. P was discharged from hospital with an order to “Continue meds as prior to admission”. During her hospital stay, however, numerous medication changes had been made. Additionally, her cardiologist told her to “Reduce amlodipine, a blood pressure medication, to half her usual dose”, but this was not documented in the chart. There were also medications initiated in hospital, but no prescription provided on discharge. This resulted in her taking both, vitamin D and alphacalcidiol, a pro-vitamin of vitamin D, as well as two ACE inhibitors, fosinopril and lisinopril which could have resulted in significant hypotension and possibly hyperkalemia.

Recommendations to move forward:

To reduce the number of medication errors and ADEs that result in harm to patients of the Region, it is recommended a Medication Reconciliation Program be implemented as above.

Next Steps and Timelines
As described under methodology, the next steps, beginning January 2007 include:

<table>
<thead>
<tr>
<th>Region Medication Reconciliation Pilot Project Time Line</th>
</tr>
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<tbody>
<tr>
<td>2007 - 2008</td>
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<tr>
<td>J</td>
</tr>
<tr>
<td>Identification of a Senior Leader Project Sponsor</td>
</tr>
<tr>
<td>Identification of a core pilot project team</td>
</tr>
<tr>
<td>Completion of business case and collection of base line data</td>
</tr>
<tr>
<td>Presentation of Business Case to SMT</td>
</tr>
<tr>
<td>Presentation of Business Case to MAC</td>
</tr>
<tr>
<td>Background Development and implementation of Pilot Project</td>
</tr>
<tr>
<td>Evaluate results and spread improved region process (12 - 18 months)*</td>
</tr>
</tbody>
</table>

* Not fully reflected in timelines chart.
References:
2. Canadian Patient Safety Institute: Safer healthcare Now Campaign: Medication Reconciliation
7. Rozich JD, Howard RJ, Justeson JM, et al; Standardization as a mechanism to improve safety in health care: impact of sliding scale insulin protocol and reconciliation of medications initiative; Jt Comm J Qual Saf; 2004; 30(1); 5 – 14.
8. The Five Rights; ISMP Medication Safety Alert; Institute for Safe Medication Practices; April 7, 1999
13. Source: presented by S.B. Meisel, Pharm D. at the JCAHO/ISMP Medication Reconciliation Conference November 2005
### Appendix A: Screening Criteria to identify referrals to Pharmacist

<table>
<thead>
<tr>
<th>Medication Reconciliation Screening Inclusion Criteria</th>
<th>0 – 64 years</th>
<th>65 – 80 years</th>
<th>&gt; 80 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Number of Medications Prior to Admission</strong></td>
<td>0 – 1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 – 4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 – 7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 +</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>High Risk Medications Prior to Admission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antiseizure</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticoagulant</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 2 cardiovascular meds</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>diabetic medications (oral +/- insulin)</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>Drug Related Admission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td></td>
<td></td>
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</tbody>
</table>

*Source: Modified from the Calgary Health Region’s Best Possible Medication History Hospitalist Program Medication Reconciliation form (05/2006)*

A total score of ≥ 10 results in a referral to a pharmacist.
### Appendix B: Project Baseline Data Collection

#### Med Rec Pilot Project - Random Baseline Sampling (n=15)

<table>
<thead>
<tr>
<th>Patient</th>
<th>Number of Home Medications</th>
<th>Type 0: Number of &quot;no discrepancy&quot; meds</th>
<th>Type 1: Number of &quot;intentional discrepancy&quot; meds</th>
<th>Type 2: Number of &quot;undocumented intentional discrepancy&quot; meds</th>
<th>Type 3: Number of &quot;unintentional discrepancy&quot; meds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1926</td>
<td>13</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>1927</td>
<td>14</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1922</td>
<td>10</td>
<td>4</td>
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<td>3</td>
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<tr>
<td>J1926</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1955</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1948</td>
<td>7</td>
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<td>6</td>
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<td><strong>3</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
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**Definitions:**

**Type 0: No Discrepancy**

**Type 1: Documented Intentional Discrepancy**, defined as one in which the physician has made an intentional choice to add, change or discontinue a medication and that choice is clearly documented, as appropriate practice, and separate from unintentional discrepancies and undocumented intentional discrepancies.

**Type 2: Undocumented Intentional Discrepancy** defined as one in which the physician has made an intentional choice to add, change or discontinue a medication but this choice is not clearly documented.

**Type 3: Unintentional Discrepancy** defined as one in which the physician unintentionally changed, added or omitted a medication the patient was taking prior to admission.
Appendix C: Safer healthcare Now!
Computational Framework

Prevention of Adverse Drug Events Through Medication Reconciliation

Mar-07

Baseline Data Collection (n = 15)

<table>
<thead>
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<th>1.1</th>
<th>Total Number of Patients</th>
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<tr>
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Mean # Undocumented intentional discrepancies
Goal: reduce baseline in pilot area by 75%

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Mean # unintentional discrepancies
Goal: reduce baseline in pilot area by 75%

<table>
<thead>
<tr>
<th>3.1</th>
<th>Total number of BPMH discrepancies (type 0+1+2+3)</th>
<th>109</th>
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<tr>
<td>3.2</td>
<td>Type 0 BPMH Discrepancies</td>
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<tr>
<td>3.3</td>
<td>Type 1 BPMH Discrepancies</td>
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<td>3.4</td>
<td>3.2 + 3.3</td>
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<td>3.5</td>
<td>(3.4/3.1) X 100</td>
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Total number of all discrepancies (Type 1+2+3) 60

Medication Reconciliation Success Index 52.29%
Goal: increase baseline in pilot area by 75%

Project Indicators and Outcome Measurements:
1. Reduction in the Mean number of Type 3 Undocumented Discrepancies (Documentation Accuracy)
2. Reduction in the Mean number of Type 2 Unintentional Discrepancies (Rate of Error)
3. Calculate the Medication Reconciliation Success Index (Improvement over Time)
Appendix D: Example Process Map

Medication Reconciliation

Nurses: Collect BPMH info on the Med Rec Order Form

Physicians: Admission Medication Orders on Med Rec Order Form

Physicians: Admission Medication Orders on Med Rec Order Form

Nurses: Collect BPMH info on the Med Rec Order Form

Discrepancies Identified?

Potential consult to Pharmacy (as per screening criteria)

Yes

Intentional Discrepancy: Documented?

No

No further action required at admission

Yes

No further action required at admission

Intentional, but Undocumented Discrepancy: Document

Improve with standardized admission/transfer/discharge medication documentation process

Unintentional Discrepancy: Reconcile (correct)

Improve with training of staff and patients regarding provision of concise, accurate list of current medication intake

Ask prescriber if intentional?

No

No further action required at admission

(Ensure reconciliation on transfer and discharge)