



Report on

Medication System Safety

Review of Three Ontario

Homes

To:

MOHLTC Task Force on Medication Management

Submitted by:

ISMP Canada

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*A Key Partner in the Canadian Medication Incident Reporting and Prevention System
Un partenaire clé du Système canadien de déclaration et de prévention des incidents médicamenteux*

The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent, national, not-for-profit agency committed to the advancement of medication safety in all health care settings. ISMP Canada works collaboratively with the health care community, regulatory agencies and policy makers, provincial, national and international patient safety organizations, the pharmaceutical industry and the public to promote safe medication practices.

ISMP Canada's mandate includes collection, review and analysis of medication incident and near-miss reports, identifying contributing factors and causes and making recommendations for the prevention of harmful medication incidents. Information on safe medication practices for knowledge translation is published and disseminated.

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Report to the Ontario MOHLTC Task Force on Medication Management on the Results of the Medication System Safety Reviews of Three Ontario Homes

Executive Summary

Research evidence demonstrating the frequency and consequences of adverse drug events, combined with heightened awareness of patient safety issues in all health care environments, have generated increased interest in enhancing the safety of medication use systems to reduce the likelihood of preventable harm from medications. Much of the early work in patient safety was completed in acute care settings; however research in the long-term care (LTC) setting has provided evidence of similar concerns in this sector.^{1,2,3,4,5}

In the Ontario LTC sector, the release of the 2007 Annual Report of the Office of the Auditor General of Ontario⁶ highlighted the area of medication management in LTC homes. Areas of concern identified in the Auditor General's report included: informed consent for new medications, lack of a standard definition of a medication error for LTC homes, use of medications known to be potentially harmful in the elderly, lack of processes for increased monitoring of residents receiving 12 or more regularly scheduled medications, high level of over-riding of computerized alerts of drug interactions in pharmacies dispensing medications for LTC residents (91%), discrepancies in controlled drug records, monitoring and management of expiry dates of medications in emergency boxes and government stock, and inappropriate medication disposal practices.

In response to the report of the provincial auditor, the MOHLTC created a Task Force on Medication Management to collectively develop strategies to address the identified issues and medication safety. To inform the work of the task force, the MOHLTC provided funding for ISMP Canada to conduct medication system safety reviews in three LTC homes and the pharmacies providing pharmacy services to the identified three homes,

¹ Gurwitz JH et al. The incidence of adverse drug events in two large academic long-term care facilities. *AMJ* 2005; 118: 251-258.

² Aspinall S, Sevick MA, Donohue J, Maher R, Hanlon JT. Medication Errors in Older Adults: A Review of Recent Publications. *Am J Ger Pharmacol* 2007; 5(1): 75-84.

³ Gurwitz JH, Field TS, Avorn J et al. Incidence and Preventability of Adverse Drug Events in Nursing Homes. *AMJ* 2000; 109(2): 87-94.

⁴ Budnitz DS, Shehab N, Kegler SR, Richards CL. Medication Use Leading to Emergency Department Visits for Adverse Drug Events in Older Adults. *Ann Intern Med* 2007; 147: 755-765.

⁵ IOM (Institute of Medicine) 2007. Preventing Medication Error: Quality Chasm Series. Washington, DC: National Academy Press. http://www.nap.edu/catalog.php?record_id=11623 Accessed December 22, 2008

⁶ Office of the Auditor General of Ontario. Long-term-care Homes – Medication Management, in 2007 Annual Report. Cited 29Sept2008 Available from: http://www.auditor.on.ca/en/reports_en/en07/310en07.pdf

and provide a de-identified summary report to the task force. Homes volunteered to participate and the following criteria were used to select the LTC homes for review: location (rural/urban), MDS implementation status, use of technology, age of facility and availability of medical staff. The 3 reviews took place between the beginning of September and the end of November 2008. ISMP Canada's review team was comprised of two pharmacists, a registered nurse and a human factors engineer.

The medication system is complex and composed of multiple processes involving many different members of the interdisciplinary team. The medication use system consists of five stages: ordering (prescribing), order processing and transcription, dispensing, administration and monitoring. It has become well recognized that the root causes of most medication errors lie within the supporting systems. A well-designed medication use system incorporates effective safeguards to prevent errors or to mitigate harm.

The focus of this review of 3 homes was on the systems used to support medication practices. The findings are based on practices that were observed or described to the reviewers and are compiled in this report.

The following Key Areas for Improvement were identified:

- ❖ Enhancement of medication incident detection, reporting and analysis processes;
- ❖ Building capacity in Root Cause Analysis, and Failure Modes and Effects Analysis through widespread training and implementation of these tools;
- ❖ Creation of orientation guides or toolkits containing information regarding a process for, and materials to assist with, assessing competency in medication administration. Incorporate learning from incidents known to have occurred, and safeguards put in place in response to incidents; include guidance for functional assessment, and a checklist guide to ensure consistency and completeness of training;
- ❖ Centralization of development of protocols or creation of checklist(s) for the required content of protocols for high alert drugs (e.g. anticoagulants) that address issues such as prescribing, administration, monitoring and storage, as well as audit tools to identify that protocols are being used as intended. This will assist homes to enhance system safeguards and reduce duplication of effort;
- ❖ Development of strategies to regularly review medication use for individual residents to ensure therapeutic goals are being met. Assess the number of medications required as well as the frequency of medication administration times in order to reduce the time spent on medication administration without negatively impacting resident clinical status;
- ❖ Use of error-prone abbreviations. Undertake an abbreviations initiative to reduce the risk of miscommunication in all medication-related activities;
- ❖ Use of generic drug names as the primary identifier for medication packaging and labelling and for electronic prescribing systems and medication administration records when available;

- ❖ Provision of allergy information in a prominent location on all forms e.g. physician order forms, MAR, pharmacy records;
- ❖ Definition of high alert medications for LTC that would assist homes to ensure appropriate safeguards are in place for these medications;
- ❖ Creation of or dissemination of standardized definitions for medical directives, standing orders, preprinted orders, protocols; there appears to be confusion around the use of these terms and how to apply them;
- ❖ Implementation of medication reconciliation; availability of complete medication (and medical) history on admission was identified as a challenge.
- ❖ Resident / family education around safety; development of public messaging around resident and family role in medication safety for residents in LTC; role in medication reconciliation, avoidance of interruptions during medication administration, reporting of changes in resident's condition that could signal a medication-related issue, resident (and family) knowledge of own medications; possible creation of a pamphlet that facilities could use at the time of admission;
- ❖ Enhancement of the role of the Professional Advisory Committee to include review of internal and external medication incidents, root cause analysis, development of improved system safeguards, review of drug utilization reports to assess appropriateness of current practices;
- ❖ Assessment of alternative methods of resident identification; this is a challenge in LTC as armbands are not usually used and residents are often cognitively impaired. Finding new methods of positive resident identification is beyond the capability of individual homes;
- ❖ Centralized development of audit tools to support facilities in implementing an ongoing periodic review process to assess the functionality of different aspects of the medication use system. Audit tools are needed to assess how specific medication processes are working e.g., medication reconciliation, communication of allergy information, etc.;
- ❖ Development of and/or use of a strategic, systematic approach to documentation and monitoring of treatment effects. Nursing staff have limited specific knowledge related to drug use in the elderly and the types of adverse effects to monitor for and manage if they occur. Increased education is needed about the use of drugs that should be used with care in the elderly e.g. Beer's list, drugs identified in LTC Coroner's reports, research literature, etc.
- ❖ Consideration of shifting the role of the consultant pharmacist, from the current focus on supporting MOHLTC compliance requirements during the limited time of the usual monthly visit, toward more clinical activities to support the care team.
- ❖ Support the implementation of new technology to improve accuracy and efficiency in the system through:
 - Centralized technology assessments (functionality, user interface, use of abbreviations, etc.) of medication-related software, and related

communication devices, bar-coding that may support prescribing, administering and monitoring

- Guidance for selection and implementation of technology through the centralized development of a tool such as a checklist or framework for homes to use when exploring technology options (e.g., for eMAR, CPOE, point-of-care barcoding) to support their medication use systems.
- ❖ Development of effective systems for sharing information about serious medication incidents occurring in LTC and what was learned from them. Networking opportunities to share leading practices, lessons learned from new technology implementation, practice issues etc. – possibly through electronic means – are also needed.

The medication system is complex and supportive system design is crucial to prevent medication incidents and related harm to residents. The three homes and pharmacies visited by the ISMP Canada review team demonstrated a strong commitment to the residents under their care. The controlled medication distribution system and related infrastructure provided by the contract pharmacies provide an important safeguard in that medications are individually packaged and labelled until they reach the patient. The adoption of new technologies such as eMAR and CPOE present additional benefits for the long-term care setting but require careful planning and implementation processes to ensure that new opportunities for error are not introduced. Opportunity exists to optimize medication management in long-term care residents through improved utilization of clinical pharmacist knowledge and skills. An increased focus on medication incident reporting and analysis processes with widespread sharing of lessons learned will help to promote a culture of safety in long-term care.

Report to the Ontario MOHLTC Task Force on Medication Management on the Results of the Medication System Safety Reviews of Three Ontario Homes

1. *Background and Understanding of Project*

Research evidence demonstrating the frequency and consequences of adverse drug events, combined with heightened awareness of patient safety issues in all health care environments, have generated increased interest in opportunities to enhance the safety of medication use systems to reduce the likelihood of preventable harm from medications. In the Ontario LTC sector, the release of the 2007 Annual Report of the Office of the Auditor General of Ontario⁷ highlighted the area of medication management in LTC homes. Areas noted for improvement in the Auditor General's report included: informed consent for new medications, lack of a standard definition of a medication error for LTC homes, use of medications known to be potentially harmful in the elderly, lack of processes for increased monitoring of residents receiving 12 or more regularly scheduled medications, high level of over-riding of computerized alerts of drug interactions in pharmacies dispensing medications for LTC residents (91%), discrepancies in controlled drug records, monitoring and management of expiry dates of medications in emergency boxes and government stock, and inappropriate medication disposal practices.

In response to the report of the provincial auditor, the Ontario Ministry of Health and Long-term Care (MOHLTC) created a Task Force on Medication Management that includes Ministry representatives, LTC representatives (Associations and homes), academic researcher and ISMP Canada to collaboratively develop strategies to address the identified issues.

To inform the work of the task force, the MOHLTC provided funding for ISMP Canada to conduct medication system safety reviews in three LTC facilities and the pharmacies supplying the three homes, and provide a de-identified summary report to the task force. The Task Force identified criteria to guide the selection of homes. The individual homes and pharmacies that volunteered to participate in the review were provided with individual reports of their own review findings. All volunteered for this project; this was not a random selection process.

The three homes selected had the following characteristics:

- One home was in a rural location experiencing challenges in attracting physician coverage and nursing staff; 90 beds; some technology in use

⁷ Office of the Auditor General of Ontario. Long-term-care Homes – Medication Management, in 2007 Annual Report. Cited 29Sept2008 Available from: http://www.auditor.on.ca/en/reports_en/en07/310en07.pdf

(electronic prescribing in early stages of implementation); early adopter of MDS pilot; older facility (1950's); and high turnover of residents due to geographic location.

- One home was located on the outskirts of a small city; 160 beds; manual medication system (i.e., handwritten physician orders and paper MARs; non-MDS implementation; good physician coverage; and newly constructed building.
- One home was in an urban location; 128 beds; using innovative technology (eMAR) and electronic order transmission via the *ePen*; good physician coverage; and newly renovated building.

Three pharmacy providers, one associated with each home, were similarly reviewed.

It is well-recognized that the root causes of most medication errors lie in the systems used within facilities. The home and pharmacy reviews therefore focused on systems in place to manage medications, using the ISMP Canada Medication Safety Self-Assessment® for Long Term Care⁸, the Accreditation Canada Managing Medications standards⁹, and current standards and criteria for pharmacy services for LTC facilities as guiding documents.

2. Objectives and Scope

The identified objectives for this project were to:

- (i) Review the current processes within the medication system at the three homes;
- (ii) Identify areas of strength or leading practice that others may benefit from;
- (iii) Identify risks/opportunities for enhancement with respect to the safety of the current system;
- (iv) Develop recommendations for preferred practices and/or modification of processes to improve the safety of medication systems in homes in Ontario;
- (v) Compare the findings from the ISMP Canada home reviews and the findings reported by the Office of the Auditor General of Ontario in 2007.

The findings from the 3 homes reviews were incorporated into an aggregate report prepared for the MOHLTC Task Force on Medication Management.

⁸ Institute for Safe Medication Practices Canada. Medication Safety Self-Assessment® for Long-Term Care, Canadian Version. Toronto, Canada, 2007.

⁹ Accreditation Canada. Managing Medications Standards 2008. Available from Accreditation Canada (membership required).

3. Methodology

The review was conducted by a multidisciplinary team:

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Julie Greenall, RPh, BScPhm, MHSc, FISMPC, Project Leader ISMP Canada

Laura Lin Gosbee, MAsc, Human Factors Engineer, Consultant to ISMP Canada

Catherine Lacombe RN, BScN, GNC(c), Consultant to ISMP Canada

Oversight of the project was provided by ISMP Canada's executive team.

3.1. Off-site Preparation

Prior to the site visit, the ISMP Canada team worked with staff from each home's head office to plan the site visit. An off-site review of background material pertaining to the project was conducted, including review of Professional Advisory Committee (PAC) minutes, incident report summaries, and medication policies and procedures.

3.2. On-site Medication System Review

The on-site visits for the three homes were conducted between September 9th, 2008 and November 11, 2008.

One day was spent at the home and about half a day at the pharmacy provider dispensing site on the following day.

Activities included the following:

- ❖ Observation of medication administration by two registered staff for the morning medication pass. (The ISMP Canada review team worked in sub-teams of two for this observation.)
- ❖ Tour of the home, specifically including medication storage areas
- ❖ Interview with medical director and evening shift nurse
- ❖ Review of randomly selected resident charts, protocols and forms
- ❖ Brief overview of the computer systems (*ClearScribe*, *PointClickCare*) in use in the home related to medication processes where applicable
- ❖ Focus group meetings with nursing staff and home administration staff

A brief synopsis of findings was provided to the home on the morning following the on-site review.

The site visit to the Pharmacy included:

- ❖ Tour of facility
- ❖ Observation of processes
- ❖ Meeting with pharmacists, pharmacy technicians and administration.

3.3. Off-site Analysis

The reviewers assessed current practices at each home against generally accepted best practices for medication safety (framed by the ISMP Canada Medication Safety Self-Assessment® for Long-term Care¹⁰, the ISMP Canada Medication Safety Self-Assessment® for Community/Ambulatory Pharmacy¹¹, Ontario College of Pharmacists Standards for Pharmacists Providing Pharmacy Services to Licensed Long Term Care Facilities¹²) and Accreditation Canada Managing Medications standards¹³). Documentation provided by the home, observations of the medication pass processes, medication storage areas, dispensing processes, and information provided during interviews were analyzed. Further review and analysis of the team's observations was completed to identify key opportunities for improvement and associated recommendations.

3.4. Report Preparation

Key themes and the following generalized description were extracted from the individual reports to create this report for the Task Force on Medication Management.

4. Overview of the Medication Systems Observed

Medical oversight is provided by a medical director for each home. This physician may be supported by other physicians in the community on a regular or ad hoc basis (including vacation coverage) depending on the home. There is daily

¹⁰ Institute for Safe Medication Practices Canada. Medication Safety Self-Assessment® for Long-Term Care, Canadian Version. Toronto, Canada, 2007.

¹¹ Institute for Safe Medication Practices Canada. Medication Safety Self-Assessment® for Community/Ambulatory Pharmacy, 2006.

¹² Ontario College of Pharmacists. Standards for Pharmacists Providing Pharmacy Services to Licensed Long Term Care Facilities. Cited 6Jan2009. Available from: [http://www.ocpinfo.com/client/ocp/OCPHome.nsf/object/SP+for+Long_Term_Care/\\$file/LTC_SP.pdf](http://www.ocpinfo.com/client/ocp/OCPHome.nsf/object/SP+for+Long_Term_Care/$file/LTC_SP.pdf)

¹³ Accreditation Canada. Managing Medications Standards 2008. Available from Accreditation Canada (membership required).

contact with physicians and the frequency of on-site visits vary depending on the home's location and the physician. All homes had at least a weekly visit from a physician.

Medications are administered by both Registered Nurses (RNs) and Registered Practical Nurses (RPNs); currently only RNs administer intravenous (IV) and intramuscular (IM) medications.

Pharmacy services are provided by contract as negotiated by each home. There is one provider per home. The three homes reviewed were each supported by a different pharmacy provider. For two of the homes the pharmacy is located quite distant to the home (at least an hour's drive) and for one the pharmacy was located within the same building. All three homes received daily delivery (Monday to Friday)¹⁴ of new orders and refills of topical medications, as well as weekly delivery of all regularly scheduled oral medications. Additional back-up for supplies were available through formal arrangements with a pharmacy local to each home, as well as an on-site emergency supply "Stat" box (Figure 2).



Figure 2. Sample stat box for after hours supply

The after hours supplies provided in the Stat box were packaged either in traditional prescription vials or carded blister packs. All homes had access to a pharmacist on-call. A consultant pharmacist visits the home at least once per month. The consultant pharmacist visits often are scheduled to coincide with the Professional Advisory Committee (PAC) meeting. During the site visit the pharmacist also conducts Medication Administration Record (MAR) audits, medication storage audits for outdated products, checks the Stat box for supply availability and product dating, verifies medications for destruction and often provides in-service education for the staff.

The pharmacies provide quarterly medication lists for each home which are reviewed by physicians for continued treatment and orders adjusted as appropriate. The consultant pharmacists may submit medication management suggestions to physicians in writing as part of the quarterly medication review process and periodically make recommendations about medication therapy;

¹⁴ One pharmacy was open on Saturday to handle new orders as well.

these comments are most commonly associated with new medication orders for residents.

All pharmacies provide a similar multi-pak unit dose distribution system with MARs generated from the pharmacy medication profile (two homes use paper-based cMARs; the third home uses an eMAR system). In all the homes visited, an average medication pass takes 1.5 to 2 hours. The complexity of the medication administration process is increased by the fact that nurses may be managing 5 different systems, all of which are in different locations on the medication cart:

- ❖ Oral solid meds in multi-paks in resident labelled bins;
- ❖ Oral liquids in bulk bottles located in a storage bin on the cart;
- ❖ Narcotics and “as needed” medications on blister-cards located in another separately located area of the cart;
- ❖ Antibiotics in standard prescription vials, which may be located in the resident’s bin or elsewhere on the cart, depending on space; and
- ❖ Inhalers/eyedrops/topicals in baggies located in various drawers on the medication cart.

In addition, medications may be stored in the refrigerator and those medications used under medical directive in the “floorstock” cupboard and the handling of emergency supplies from the “Stat” box as well as the back-up pharmacy (usually a local community pharmacy).

It was noted that the level of care required by residents in the homes has become increasingly complex; severe behavioural problems were identified as a particular challenge as well as managing the swallowing difficulties of many residents. These factors increase the challenges of medication administration.

Pharmacy

The pharmacies had staff assigned to specific homes to better support customer relationships.

New medication orders are triaged by a pharmacy technician and placed in a designated location for processing by staff in the associated dispensing area. Any discrepancies or questions are immediately brought to the attention of the dispensing pharmacist responsible for the home, or communicated to the home directly by the triage technician (e.g., missing information on the order).

In all three pharmacies, medication order entry into the pharmacy computer system is completed by a pharmacy technician and verified by a pharmacist, who performs clinical order review on new orders relative to the resident’s existing medication profile. All pharmacies had processes in place to calculate and monitor creatinine clearance based on semi-annual creatinine levels. Access to other laboratory test information is available to consultant pharmacists when on-

site, or the dispensing pharmacist can call the home to access this information if needed. A process for identifying drugs that require dose adjustment due to renal or liver impairment and incorporating this into the pharmacy computer system is in development by some of the pharmacies and integrated into the dispensing software by another. If allergy information has not been provided, pharmacy staff call the home to confirm that there are no known allergies prior to processing medication orders.

Medication Distribution in the Homes

All three homes had similar medication distribution systems. Most of the medications for residents are stored in a cart. When not in use, the cart is stored in a medication room on the unit. All medication storage areas were observed to be locked when unattended. Medication carts were used by nurses to carry their supplies during medication administration rounds and similarly were locked when unattended. There was good separation of clean and used supplies observed on the carts.

There was a medication cart for each unit. (Sample in Figure 3) Manufacturers of the cart may vary but the use and functionality were similar. Some had more working space on the top of the cart, flexibility to accommodate height of different staff, better separation for clean and dirty (used) supplies, site for garbage and sharps etc.



Figure 3: Medication Cart

The carts were set up with a medication bin for each resident. Some homes had different information on bins such as resident photos for ease in identification, preferred method of medication administration (e.g., crushed in applesauce) and any medication allergies (Figure 4).



Figure 4: Sample of bin layout and Individual medication bins with resident identification and cues

In two homes medication administration is documented using a paper-based computer-generated monthly medication administration record (cMAR) provided by the contract pharmacy. The third home uses an electronic Medication Administration Record (eMAR) system.

Regularly scheduled oral medications are dispensed in multi-paks (Figure 4), for 7 days at a time and delivered to the home weekly by pharmacy. Each pak is labelled with the resident's name and the name and description of each medication (Figure 5). One home had an additional positive feature on the multi-pak label: a final line of text on each pak indicating "Breakfast" or "Lunch", a useful redundant cue.



Figure 5: Individual multi-pak showing medication description

Generally there is one multi-pak for each administration time; however, if there are more than 5 medications per administration time, additional paks are dispensed. Unit-of-use medications such as inhalers, eyedrops and topical preparations are dispensed separately as needed for new orders and reorders.

Each home had a slightly different process for managing additional medications for each resident, such as eyedrops and other items. One home placed the items in plastic bags labelled with the resident's first initial and last name and stored them in a different drawer from the scheduled medications; the other homes

placed these items in the front of the medication bins or in adjacent bins (Figure 6).



Figure 6: Resident-specific items in labelled plastic bags or adjacent bin

Floorstock

Some non-prescription items are stored in the medication rooms in the resident areas as well as a back up storage area. Floorstock in medication rooms appeared to be well-organized, labelled and available in reasonable quantities. (Figure 7).



Figure7: Floorstock in medication room

New regulations which permit the contract pharmacy to order Ontario Government Pharmacy stock directly and include in multi-pak strips have reduced the amount of floorstock individual homes need to order and maintain. One home appeared to have an excessive amount of Ontario Government Pharmacy stock on hand and a recommendation was made to order smaller quantities more frequently.

Narcotics and Controlled Drugs

Narcotics and controlled drugs are dispensed for individual residents in a blister carded system and stored in a locked compartment in the bottom drawer of the

medication cart. The narcotic storage compartment was observed to be kept locked and opened only when required. Inventory counts are completed at each shift change by nursing staff.

5. Findings

The medication use system is complex and composed of multiple processes involving different members of the interdisciplinary team. The medication use system is general considered to include five stages: ordering (prescribing); order processing and transcription; dispensing; administration and monitoring. This framework has been used to describe the review findings.

The findings in this section of the report are based on practices that were observed or described to the reviewers and may not fully or accurately represent all current practices. Comments in this report are limited to issues related to patient safety associated with the medication use process.

Each home had its own unique positive attributes, some of which will be noted in this report. The primary focus of this report to the Task Force is to identify vulnerabilities and opportunities for improvement. The recommendations noted in the report are intended to provide enhanced safeguards for the medication system.

A comparison of findings with those in the Ontario Auditor General's report¹⁵ is provided in **Appendix 1**.

5.1. Medication Orders

At the time of the site visits, medication orders were handwritten by physicians when on-site (using a usual pen or an electronic pen) or received verbally by telephone or by fax from physicians who were off-site. Nurses stated that they routinely "read-back" telephone orders to physicians, with requests for spelling if unsure. The manually written orders are then faxed to pharmacy for dispensing.

One site was in the process of implementing an e-prescribing application with the use of *Palm@* devices as the transmission instrument for physicians in addition to desktop computers for physicians and nurses. Nursing staff directly enter any telephone orders into the system; orders are not transcribed by hand and then entered into the system. A hard copy of the order prints out at the home and the

¹⁵ ¹⁵ Office of the Auditor General of Ontario. Long-term-care Homes – Medication Management, in 2007 Annual Report. Cited 29Sept2008 Available from: http://www.auditor.on.ca/en/reports_en/en07/310en07.pdf

electronic order is directly transmitted to the pharmacy. The hard copy is placed on the resident's chart and counter-signed by the physician on his next visit to the home. The software application, as observed by the reviewers, did not appear to provide any clinical decision support, although the product website indicates that physicians can use the system to check for drug interactions.¹⁶ On a follow-up call with the home, reviewers were advised that the system is now interfaced with the pharmacy information system allowing physicians to review the resident's medication profile when prescribing.

One home uses the *ePen* to electronically transmit hand-written orders to the pharmacy. The third home faxes handwritten orders to the pharmacy.

Competent residents are informed of medication changes; when residents are not competent, the family or substitute decision-maker is informed. The date and time of this notification was noted to be consistently documented on medication orders.

Non-urgent concerns by staff were typically noted in a physician communication book and addressed on the physician's next visit to the home.

For new residents admitted to the facility, the physician attempts to access full records from the referring physician; however one physician acknowledged that full information is typically only available about 50% of the time. A complete physical is conducted upon admission and when new medical needs are identified it is sometimes difficult to determine if this has been a problem in the past and how it was managed.

The use of dangerous abbreviations, symbols and dose designations¹⁷ in a variety of medication-related communications including the eMAR was observed and no home had a specific policy to limit this practice. One home did have an approved list which was very long (i.e., multiple pages) and not referred to by staff.

Computerized prescriber order entry (CPOE), with clinical decision support, and access to resident clinical information (e.g. allergies, laboratory results) eliminates legibility issues, as well as the need for transcription of orders, a known error-prone process. However it should be recognized that systems must be designed to optimize the human/computer interface, to reduce the potential for introducing new errors with implementation of technology.¹⁸ Incorrect product selection during order entry, as well as dosing errors, can still occur. In an electronic ordering system, the onus rests with the prescriber to identify any

¹⁶ ClearScribe Communicate with Clarity. Cited 8Nov2008. Available from:

<http://www.clearscribe.com/ClearScribe2008/PhysicianInfo.aspx>

¹⁷ ISMP Canada Do Not Use Dangerous Abbreviations, Symbols and Dose Designations. Cited 15Dec2008. Available from: <http://www.ismp-canada.org/download/ISMPCanadaListOfDangerousAbbreviations.pdf>

¹⁸ Schneiderman B. Designing the user interface: strategies for effective human-computer interaction, 3rd ed. Addison-Wesley Publishing, 1998, Reading MA.

discrepancies between the intended order and the order actually generated. Pharmacists and nurses must also recognize the potential for these types of errors and confirm any orders that do not seem appropriate for the resident based on the previous history. A review of five pilot projects where electronic prescribing was implemented in long-term care was published by Spiro in January 2008 and may be of interest to readers.¹⁹

The introduction of technology into the medication use system can lead to significant changes in how processes are carried out. While technology can reduce practitioner workload and errors in some areas, it can also introduce a new set of work demands that lead to errors of a different nature. These can be identified through proactive risk assessment (e.g., FMEA) and application of human factors methods and principles. The ability to proactively assess the impact of new technology could provide the homes with the leverage and confidence to work with vendors developing the technology to improve design, or create necessary countermeasures, *before* the product is rolled out (e.g., special training aids, tools etc.). With the large financial investments and human resource demands required to implement such technology, it will be important for homes to be able to identify products/tools that are well-designed from a human factors standpoint and which in turn would lead to fewer user errors, greater efficiency, lighter training burden, and assist in ensuring “fit” to home’s current processes and work environment.

Use of Pre-printed Orders/Care Pathways/Medical Directives

Some homes did have pre-printed order forms and protocols to guide various aspects of care. Copies of the following were provided for review:

- ❖ “Medical directives” for:
 - acute, minor, self-limiting conditions for which residents would commonly self-medicate in their own homes; and
 - immediate actions to be taken for suspected urinary tract infections, eye infections, low blood sugar, angina and shortness of breath.
 - Coumadin-INR - for immediate management of INRs outside the target range (one dose only)
 - MRSA/VRE - describes action to be taken to screen for MRSA/VRE and to manage positive swab results
- ❖ Admission Standing Orders, including:
 - standard orders e.g., TB test, annual flu shot (with consent), pneumovax (with consent), chest x-ray, ECG, urine testing and blood work, drug levels, INR if applicable, MRSA/VRE swab, etc
 - routine orders for Fosavance 40 mg weekly and Vitamin D 400 units daily
 - “fill in the blank” orders for diet, alcohol, restraint use
- ❖ Readmission Standing Orders:
 - Similar to Admission Standing Orders, but excluding blood work and urinalysis

¹⁹ Spiro R. Electronic Prescribing in Long-Term Care. *The Consultant Pharmacist* 2008; 23 (10): 14-26).

- Include order to “Resume Medical Directives”

All medical directives are ordered individually for each resident, with appropriateness determined by the attending physician, and reordered every 3 months.

There appeared to be confusion around the definitions of standing orders, medical directives and pre-printed orders/protocols. Both the College of Nurses of Ontario^{20,21} and the College of Physicians and Surgeons of Ontario²² have definitions that should be used to guide the development and use of these standardized order sets by homes.

Observations of medical directives documentation noted a number of concerns:

- ❖ criteria for use were not well-defined (clinical situation);
- ❖ terminology for medications were inconsistent (preferably the generic drug name followed by sample brand name in brackets);
- ❖ full directions were missing (duration of use or number of doses);
- ❖ clinical limitations were missing;
- ❖ physician signature were missing;
- ❖ required order of completion of procedures were be well-organized or may be incomplete;
- ❖ error-prone abbreviations, symbols and dose designations were used;
- ❖ some directives included medications as routine orders;
- ❖ lack of standardization (e.g., different INR protocols for different physicians in the same home.

Pre-printed protocols can guide staff in fulfilling their responsibilities and ensuring clarity of expectations by all care team members. Pre-printed order forms can guide and expedite the prescribing process and assist homes to prepare for CPOE.

Opportunities for Improvement Action:

1. Homes to adopt and implement the ISMP Canada “Do Not Use” list of dangerous abbreviations, symbols and dose designations for all medication-related communications²³ This action can be facilitated by

²⁰ College of Nurses of Ontario. Practice Guideline: Authorizing Mechanisms, 2008. Cited 16Dec2008.

Available from: http://www.cno.org/docs/prac/41075_AuthorizingMech.pdf

²¹ College of Nurses of Ontario. Practice Guideline: Directives, 2008. Cited 16Dec 2008. Available from:

http://www.cno.org/docs/prac/41019_MedicalDirectives.pdf

²² College of Physicians and Surgeons of Ontario. Policy on Delegation of Controlled Acts. Cited 8Jan2009.

Available from: <http://www.cpsso.on.ca/policies/policies/default.aspx?ID=1554>

²³ ISMP Canada Do Not Use Dangerous Abbreviations, Symbols and Dose Designations. Cited

8Nov2008. Available from: <http://www.ismp-canada.org/download/ISMPCanadaListOfDangerousAbbreviations.pdf>

developing a province-wide campaign similar to one currently being rolled out in Alberta²⁴; that assists with communicating the hazards of certain abbreviations among all healthcare practitioners, students and vendors. Abbreviations are commonly used in medication orders, clinical notes, drug labels, Medication Administration Records, as well as information system software to support prescribing, dispensing and administration. To fully eliminate the use of dangerous abbreviations, symbols and dose designation, the support of educational institutions, regulatory bodies, professional associations, and suppliers of medical equipment is required.

2. Encourage and support the implementation of new technology to all homes to improve accuracy and efficiency in the system through:
 - ❖ Centralized technology assessments (functionality, user interface, use of abbreviations, etc.) of medication-related software, and related communication devices, bar-coding that may support prescribing, administering and monitoring
 - ❖ Guidance for selection and implementation of technology through the centralized development of a tool such as a checklist or framework for homes to use when exploring technology options (e.g., for eMAR, CPOE, point-of-care barcoding) to support their medication use systems.
3. Centralize the development of a checklist or template to guide the development by homes of their drug protocols/ medical directives/ pre-printed orders for high alert drugs (e.g. anticoagulants). Protocols to include items related to prescribing, administration, monitoring and storage to ensure clarity of responsibilities of each clinical team member when using selected high risk drugs. In addition, audit (Quality Assurance) tools for the homes to identify that protocols are being used as intended would also be helpful.
4. Homes to review medical directives to confirm that the requirements as set out by the College of Physicians and Surgeons and/or College of Nurses are met.

²⁴ Health Quality Council of Alberta Prohibited Abbreviations Initiative. Cited 3Apr2009. Available from: <http://www.hqca.ca/index.php?id=100>.

5.2. Medication Order Processing and Transcription

Medication orders, which are written by physicians on a medication order record in the resident's chart, are then processed by writing or entering the order onto a Medication Administration Record (MAR) (called transcribing) by nursing staff. The next processing step is to inform pharmacy of the new order. Pharmacy would in turn process the order leading to dispensing and delivery of the medication(s) to the home (which is described in 5.3).

A Medication Administration Record (MAR), which is a list of all drugs prescribed for administration to a resident, guides nurses during medication administration. (Figure 8). Two sites use a paper-based MAR system that is generated from the pharmacy's computerized medication profile on a monthly basis. These MAR sheets are checked for accuracy by both pharmacy staff and nurses prior to use. New medication orders received during the month are transcribed onto the paper MAR by one nurse and checked by a second nurse. One physician's order sheet was noted to include space for Nurse #1 and Nurse #2 to document, which acts as a cue for double-checking of the order transcription.



Figure 8: Paper MAR generated from pharmacy medication profile (cMAR)

One home was observed to place all new orders on a clipboard at the nursing station until all transcription steps have been completed, providing a visual alert. When complete, the orders are filed in the resident's medical chart. Another home transcribes all new orders into a "Drug Record Book" which is faxed to the pharmacy and acts as a double check for both the home and the pharmacy to ensure that the pharmacy has received all new orders and that dispensed medications have been received at the home.

As mentioned, one site uses an electronic MAR (eMAR). At this site, medication orders are handwritten by physicians and transmitted to the pharmacy using the *ePen*. Nurses enter orders into the computer manually to allow immediate administration of medications. This order entry generates a paper copy in the pharmacy, which is verified against the *ePen* transmission. Observers noted some nurses struggling with entering new orders. Additional concerns identified

with the current eMAR system include: lack of allergy and drug interaction warnings to nursing staff during the order entry process, need for frequent training and availability of resource staff, orders with complex dosing regimens may require supplementary paper-based information which can be overlooked, rework requirements if an error was made during the entry process.

Practices for Consideration by all Homes:

- ❖ Homes are encouraged to work towards the development of an eMAR system that would provide nursing staff with real-time data for medication administration. If combined with CPOE and linked to the pharmacy system, the need for local transcription of medication orders can be eliminated. In planning for conversion to eMARs, ensure attention is paid to availability and prominence of critical information.²⁵

Opportunities for Improvement Action:

1. Homes to conduct field testing when implementing change in forms or technology. Small groups of nurses act to assess usability of design changes e.g. cMARs and eMARs, prior to full implementation, to ensure optimum functionality from a nursing perspective.²⁶ Ideally, this assessment should include simulated use, to allow nurses to step through all aspects of usage in realistic and typical scenarios.
2. Homes/pharmacies to use generic medication names as the primary identifier for medication labels and MARs, with brand name or manufacturer added to meet legal dispensing requirements. The label and MAR should also include a cross-reference to the name used by the prescriber. The use of prefix brand names such as “Novo-“ or “Apo-“ is not optimal from a differentiation perspective.
3. Homes/pharmacies to encourage more direct pharmacist-physician communication about medication-related concerns.

²⁵ Schneiderman B. Designing the user interface: strategies for effective human-computer interaction, 3rd ed. Addison-Wesley Publishing, 1998, Reading MA.

²⁶ Borycki E, Kushniruk A. Identifying and Preventing Technology-Induced Error Using Simulations: Application of Usability Engineering Techniques. Healthcare Quarterly 2005; 8(Sp): 99-105.

5.3. Medication Dispensing and Delivery

At all pharmacies, new medication orders are entered into the pharmacy information system by a pharmacy technician. The order entry is verified by a pharmacist when checking the filled prescription. New orders are given priority for processing to allow sufficient time for pharmacists to follow up on any identified concerns. Drug interactions and other clinical alerts are immediately brought to the attention of a pharmacist for new orders and flagged for review for medications the resident has been taking previously. A hard copy of the interaction or other alert is typically printed and attached to the medication order for review by the pharmacist.

Orders requiring clarification result in calls to the home by either a technician or a pharmacist depending on the problem. All the pharmacies had set up systems to ensure these orders are not forgotten. Less urgent clinical concerns may be passed on to the clinical consultant pharmacist. Pharmacists will often relay their clinical concerns to the nursing staff at the home to follow up with the physician; direct follow up with physicians by pharmacists does not appear to be a standard practice. Some homes have set up a procedure to facilitate communication of telephone orders from physicians to pharmacists to the home staff.

Regularly scheduled medications are dispensed in multi-paks prepared via an automated dispensing system (PacMed®, Automed®) (Figures 9 and 10). The automated dispensing system machine houses about 300 medications; additional medications can be added on special trays as needed. Antibiotics and cytotoxic agents are not packaged in the machine. The machine is typically restocked twice weekly. Various processes are in place for ensuring correct stocking of the machine; all pharmacies ensure a pharmacist check. Barcode verification was used by one pharmacy.



Figure 9: PacMed® automated packaging machine



Figure 10: Automed® Packaging Machine

Items that cannot be packaged in the automated dispensing system, and are small enough to fit into the strip, may be manually inserted into the pak by a pharmacy technician or provided in a prescription vial. If the pharmacy alters the strip, an auxiliary label *“This bag was altered by the pharmacy”* is affixed to any pak that has been modified. Some pharmacies use other auxiliary labels as well, for example:

- ❖ “Attention – New med strip – replace previous strip”
- ❖ “Potential Drug-Warfarin Interaction – Monitor INR”
- ❖ “Take with FULL GLASS OF WATER at least 30 MINUTES PRIOR to first meal, beverage, medication of the day. Stay fully upright for at least 30 minutes.”

Multi-paks labelling is not consistent among the pharmacies. Some use the generic name as the primary identifier, some use the brand name; all include a physical description. Multi-paks are transparent or translucent; transparent packaging facilitates product identification by nursing staff. In all cases, medications were observed to be listed on the multi-pak label in the same order as they appear on the MAR and using consistent terminology from one to the other.

Each multi-pak dispensed by the automated delivery system is manually examined by a pharmacy staff member to verify that it contains the correct number of tablets. All prescriptions, including multi-pak strips are double checked by a pharmacist, per legislative requirements.

Heat-sealed blister cards are prepared for medications that are ordered on an “as needed” basis. The heat sealer is shown in Figure 11 and medications being filled into blisters are shown in Figure 12.



Figure 11: Heat sealer for blister cards



Figure 12: Medication preparation in blister cards for heat sealing

Commonly used medications are prepared in bulk, i.e., a number of cards are prepared at once and stored for future use.

For resident specific unit-of-use items (e.g., inhalers, eyedrops, etc), the dispensing technician and checking pharmacist typically check and initial the drug identification number (DIN) on the hard copy of the prescription. Nurses must order replenishment of used supplies and systems have been developed to support this function. To simplify this process, one pharmacy uses “peel-able” labels. The top copy is removed by the nurse, placed on a reorder form and faxed to the pharmacy. A concern was identified in that the bottom copy very quickly becomes illegible.

Floorstock

Items available in floorstock/unit stock were found to meet the criteria of low risk items. The majority of floorstock items are obtained by the home from the Ontario

Government Pharmacy. The use of items obtained from Government Pharmacy has declined dramatically since a regulatory change now allows contract pharmacies to package these items as part of the multi-paks for regularly scheduled medications. Medication expiry dates of the stock areas are checked by nursing staff at the home and also by the consultant pharmacist.

Stat Medication Box

A “stat” medication box is available for newly ordered items that may be required urgently, including oral antibiotics, warfarin, salbutamol inhalers, eye drops, and some injectables (e.g., epinephrine, furosemide, diphenhydramine, haloperidol, diazepam, antiemetics). Not all staff were aware that a list of medications in the stat box was available. It was unclear what the criteria were for deciding which medications should be included in the Stat box and whether the list and utilization are reviewed at regular intervals by a multidisciplinary committee such as the Professional Advisory Committee (PAC).

Medication Disposal

The process for disposal of medications appears to be very inefficient. The consultant pharmacist is expected to ensure that every unusable dose is documented. This process was described as taking anywhere from 1 - 5 hours, depending on the number of medications to be destroyed and how much of the documentation has been completed by the nursing staff prior to the arrival of the consultant pharmacist. The Ontario standards and criteria for pharmacy services to LTC facilities state that “A system of records for receipt and disposition of all drugs received by the facility shall be maintained in sufficient detail to enable accurate tracking, reconciliation and auditing”.²⁷ The limited time of pharmacists could be better allocated to providing more clinical support to the care team instead of participating in the destruction of every medication dose.

Practices for Consideration by all Homes:

- ❖ Homes to ensure that all unit-of-use items e.g. eye drops, liquids are labeled for patients by the home staff and include full first and last names for accurate identification (as well as date opened)
- ❖ Homes to investigate the ability to purchase bin dividers and/or larger bins to allow storage of unit-of-use items (e.g., eyedrops) in the same bin or an adjacent bin to the one used for regularly scheduled oral medications. (Note that for residents known to have infections, it may be prudent to isolate medications used for personal care to avoid transmission of infection between residents.)

²⁷ Standards and Criteria for Provision of Pharmaceutical Services in Long-term Care Facilities in Ontario

- ❖ Homes to maintain a maximum 3-month supply of Ontario Government Pharmacy items in main store rooms.
- ❖ Homes to develop a simple, systematic checking process for inventory and expiry date management that is less labour dependent than what is currently in place for the homes visited and minimizes the use of professional staff. The involvement of non-professional staff in this function needs to be supported in the OLTC Act regulations. For example:
 - ❖ Develop minimum and maximum stock levels to assist in ordering and maintaining reasonable inventory quantities and reduce reliance on one individual to order based on memory.
 - ❖ Assign one person to do expiry date checking on a monthly basis, in the medication storeroom and in care areas. This can be facilitated by keeping an expiry date logbook (paper or electronic), where items are entered when received by month and year of expiry. Staff then only have to check the list each month to determine which items are expiring, rather than complete a full inventory.

Opportunities for Improvement Action:

1. Home PAC's to review the list of medications contained in the Stat box, as well as utilization of items, at regular intervals (e.g., annually). Consider adding antidotes such as naloxone to Stat box stock if opioid narcotics are in use.
2. Homes/pharmacies to post the list of Stat box contents in easily retrievable locations on the units to avoid unnecessary travel by staff to check the contents of the box and attach the list to the exterior of box for quick reference.
3. MOHLTC to review compliance regulations to simplify the medication disposal standard so that it is less labour intensive without losing the intent of having the safety checks and balances in the medication system

5.4. Medication Administration and Documentation

Medication administration is a challenging process in LTC homes due to the characteristics of this population and staffing levels. A nurse is responsible for administering medications to 32 - 45 residents, each of whom takes an average of 10 medications, many of which are administered multiple times per day. In addition, many elderly residents have difficulty swallowing and cannot take their medications quickly. Steps to prepare medication for administration (e.g. finely crush, mix in food) and waiting for/assisting resident to swallow to ensure their safety results in medication passes taking 2 hours or longer.

One home had been working to consolidate medication administration times i.e. changing from full medication passes four times daily to two main medication passes daily with the help of the medical director and consultant pharmacist.

An RPN or RN is responsible for administering medications during the usual four daily medication passes; the morning medication pass is the heaviest, typically taking at least 2 hours. Unlike acute care settings, in LTC, medications are not administered in a room-by-room fashion. Residents may be early- or late-risers and nurses must keep track of who has received medications and who has not. With a paper-based MAR system, it is difficult to develop a system for identifying missed doses that is consistently used, thus doses may be forgotten. Non-standard medication dosing times present a particular challenge. Different systems have been implemented by homes (e.g. slide tabs on bins, paper clips, own notes) but all require manual action and remembering to do so, which creates a high risk for omission. In addition, practices are inconsistent among staff members (i.e., each person has their own system). The eMAR solves this in part through a colour coding highlight mechanism on a resident's MAR page. Medication administration is a task that requires sustained attention and vigilance and the level of distraction in the LTC environment is high.

Nurses were observed to take medications in the multi-pak for the appropriate administration time from the resident specific bin, check the medication multi-paks against the MAR prior to administration of medications (see Figure 13), crush the multi-pak if needed for the resident or place tablets in a medication cup, carry to the resident for administration, observe the resident swallowing the medications, and return to the cart for signing on the MAR indicating that administration is complete. Some nurses were observed to sign off medication administration prior to travelling to resident; this requires changing documentation if resident refuses medication; however it is a logical process step as medications are checked against the MAR. Medications may be given in the resident room, in the hallway, at the nursing station, or in the dining area.

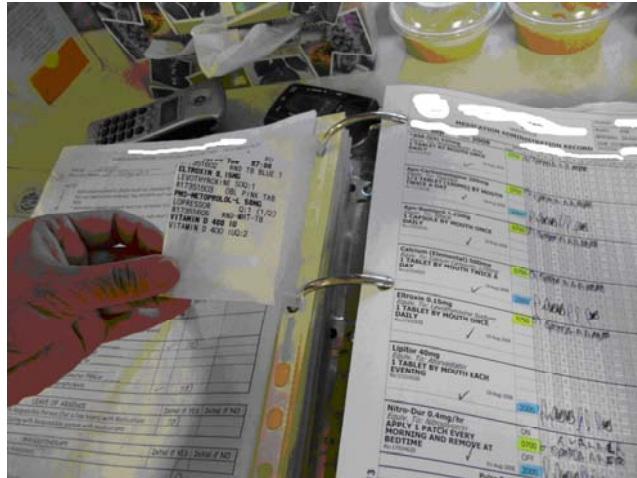


Figure 13: Comparison of multi-pak label and MAR

Staff were observed to occasionally handle medication directly with their fingers, specifically, blister packed items and oral floorstock items. Although nurses were observed to regularly use hand sanitizer gel between residents, skin contact with medications should be avoided for infection control reasons and for staff safety when administering cytotoxic medications.

There are no policies related to independent double checks in any of the homes for any medication calculations or administration of selected medications (e.g., high alert drugs^{28,29}) by nursing staff, although some staff indicated they would occasionally ask a co-worker to double-check a medication with them. This highlights the need to identify medications used in long-term care that might be appropriate for such a check and how it should be done.

If dosing calculations are required for new orders (e.g., morphine injection), nursing staff determine the volume to be administered for first doses, with no independent double check. For subsequent doses, the pharmacy includes the volume to be administered on the prescription label. This is of particular concern with morphine, as errors have been reported to ISMP Canada that were related to the availability of morphine for LTC homes in only a 15 mg/mL concentration, despite common use of 1-2 mg doses.³⁰

Implementation of requirements for independent double checks also has implications for home staffing levels as it is common for the nurse administering medications to be the only registered staff member on the unit. The pharmacy staff for some of the homes indicated that they would be willing to accept the role of providing an independent double check for calculations for high alert

²⁸ High-alert medications are those that bear a heightened risk of causing significant patient harm when they are used in error.

²⁹ ISMP's List of High-Alert Medications. Cited 8Jan2009. Available from: www.ismp.org/Tools/highalertmedications.pdf.

³⁰ Top Ten Drugs Reported as Causing Harm through Error. ISMP Canada Safety Bulletin 2006; 6(1). Cited 8Nov2008. Available from: <http://www.ismp-canada.org/download/ISMPCSB2006-01Top10.pdf>

medications (e.g., morphine) prior to pharmacy dispensing the product (e.g., via the pharmacist-on-call).

Several situations were identified where nursing staff must identify and remove medications from multi-paks:

- ❖ Medications that *cannot* be crushed are commonly included in multi-paks with medications that *can be* crushed;
- ❖ Digoxin is included in multi-paks, but requires assessment of the resident's heart rate prior to administration and thus may need to be held; and
- ❖ Two of the pharmacies issue replacement medication strips as soon as possible when medications are changed or discontinued, but in the intervening period, staff must remove the discontinued item(s) from the pak and alert others to the change (Figure 14). One of the pharmacies does not issue replacement strips for new orders, thus nursing staff may need to identify and remove discontinued items for several days. It is not clear how staff differentiate between medications with similar appearances in these situations.

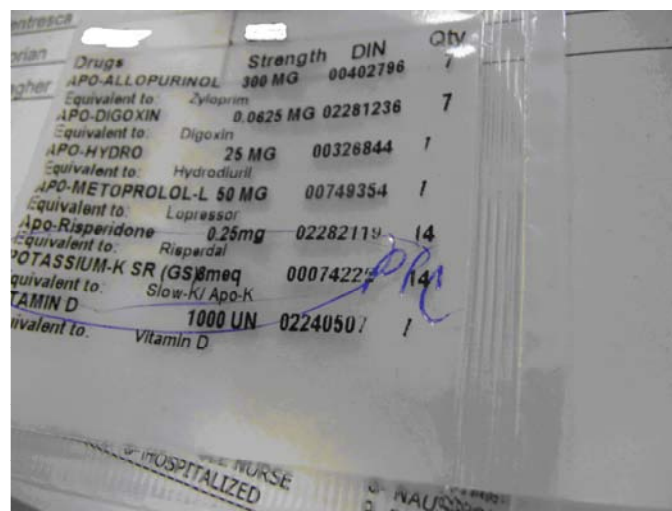


Figure 14: Multi-pak with discontinued item circled

It was noted that documentation of location of application of medication patches (e.g., nitroglycerin, fentanyl) is not completed consistently. Also, not all nursing staff were aware of appropriate disposal procedures for patches; some described discarding in the regular garbage. As there is a substantial amount of medication remaining in the patch after use, it is very important that these items be discarded in a way that prevents inadvertent skin contact by others e.g., into the sharps container.

A few residents self-administer medications; observations were that the medications were stored on the medication cart until required and then handed by nurses to the resident. The resident was observed to take the medication

(usually an inhaler or insulin injection) and the dose was then documented by the nurse onto the MAR.

Resident Identification

It is not common for LTC residents to wear identification armbands as this is a “home” environment; however armbands provide a helpful secondary identification check and are an important part of a bar-coding system. Photographs are provided in the MAR book (and in one home were included on medication bins). The updating of photos was not always systematic. Staff who know residents rely on their knowledge of resident identity; however, it is recognized by the home administration that this can be difficult for new staff and agency staff.

Resident Status

Communication from the home to the pharmacy regarding resident discharges, deaths, and transfers can be delayed, resulting in drug wastage, time of staff to handle drugs, and financial impact on pharmacy.

Allergy Information

The MAR sheets observed during the review typically provided resident allergy information in the bottom left hand corner of the MAR, which is not a prominent location for critical information (Figure 15).

The image shows a Medication Administration Record (MAR) sheet. A red box highlights the 'Allergies' section, which contains the text 'No Known Allergies'. To the right of the 'Allergies' section, there are sections for 'Pulse Rate', 'Blood Pressure', and 'ALLERGIES'. The 'ALLERGIES' section contains the text 'No Known Allergies' with a checkmark next to it. The 'Pulse Rate' and 'Blood Pressure' sections are empty. The 'ALLERGIES' section is bolded and larger than the other sections. The 'Allergies' section is also bolded and larger than the other sections. The 'Allergies' section is also bolded and larger than the other sections.

Figure 15: Allergy information on MAR

Increasing the font size relevant to other information on the page, bold font, and reconsideration of location on MAR page would increase the likelihood that staff will routinely check this information when administering medications.

Other Resident Information

A variety of methods and cognitive aids are used to communicate information about how residents prefer or require medications to be administered (Figure 16).

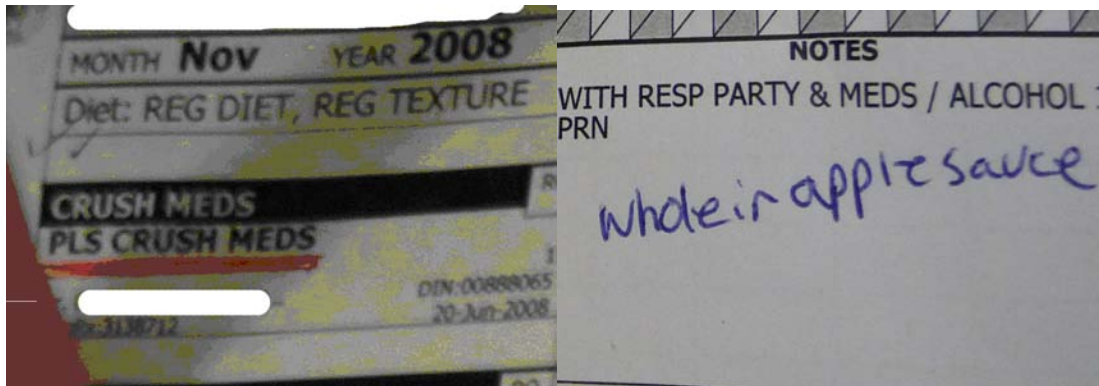


Figure 16: Communication about how medications are to be given

This information is sometimes included on the MAR face sheet, sometimes as a separate entry on the MAR and sometimes in the Notes section on the MAR. In addition, some nurses have created “reminder cue sheets” to include this type of reminder. Nursing staff noted that knowing how each resident likes to receive their medications is an important issue in terms of staff credibility with residents. Pharmacy staff indicated they would include this information in the MAR if made aware.

Drug Information

Drug information for nurses was provided from the contract pharmacy, selected texts (e.g. CPS), selected electronic resources (e.g. e-CPS). Not all nursing staff were comfortable accessing electronic resources and in some cases were continuing to use outdated hard-copy CPS’s. Electronic resources are encouraged as the version available is always the most current; however unless there is a computer on the medication cart, nurses do not have ready access to information at the point of care.

Inservices and courses were noted to be offered regularly by the home and by the contract pharmacy for home staff.

Pharmacies followed the Ontario College of Pharmacists Required Reference Guide for Pharmacies in Ontario.³¹

³¹ Ontario College of Pharmacists Required Reference Guide for Pharmacies in Ontario. Cited 18Dec2008. Available from: [http://www.ocpinfo.com/client/ocp/OCPHome.nsf/object/Library+Guide/\\$file/Library+Guide.pdf](http://www.ocpinfo.com/client/ocp/OCPHome.nsf/object/Library+Guide/$file/Library+Guide.pdf)

Medical Devices

Insulin Pens

There is opportunity to standardize devices and practices related to insulin administration. Homes often are using two or more different insulin pens and some nurses preferentially administer insulin using vials and syringes. This sets the stage for potential error. One home had a very well-organized system of individually labelled insulin pen cases (Figure 17).



Figure 17: Insulin pen case, labelled for an individual resident

Blood Glucose Meters

Blood glucose meters are another device in use in homes. Again, one of the homes had these well organized on the cart and individually labelled (Figure 18). Standardizing practices and location for storage in carts enhance safe use of these devices.



Figure 18: Blood glucose meters, labelled for individual residents

Miscellaneous

Use of safety needles by homes is commended. This should be considered for insulin pen needles, as well, as a new product is now available (Autocover®).

All the homes visited used the Silent Knight® pill crusher; however nurses in one locked unit identified that it does not crush the medications finely enough for some residents. Where medications that cannot be crushed are dispensed in the same multi-pak with medications that can be crushed it is necessary for nurses to identify and remove the non-crushable items before using the Silent Knight®, which is awkward. The review team also observed nurses “saving” empty pouches from other residents to use to crush medications. Concerns about this practice include the potential for medication mis-identification and also for allergic reactions to medication residue remaining in an empty package.

Vaccines are typically stored in a single refrigerator and the temperature is monitored and recorded daily per Public Health standards. Refrigerators on units were also monitored for temperature but not as consistently.

Practice for Consideration by all Pharmacies:

- ❖ Replace medication multi-pak strips as soon as possible whenever medication orders change, rather than waiting until the next scheduled dispensing day.

Opportunities for Improvement Action:

1. Home staff to verify the administration volume for injectable and oral liquid medications with the pharmacist on-call whenever calculations are required to administer first doses of new medication orders (e.g., medications retrieved from the Stat box or dispensed without volume directions such as morphine injection, amantadine and phenytoin oral liquids, etc.).
2. Pharmacies to add auxiliary labels to medications in the Stat box that may require dose calculations e.g., “Call pharmacist to verify dose/volume to be administered”.
3. MOHLTC is asked to reconsider the decision to provide reimbursement for only morphine 15/mL and 50 mg/mL injectable concentrations as part of the Ontario Drug Benefit Formulary, as these concentrations do not meet the needs of many elderly patients and calculation errors can result in substantial harm.

4. Pharmacies are asked to assess the feasibility of packaging medications that require specific monitoring prior to administration to avoid selection errors in removing a drug not needed (e.g. digoxin).
5. MOHLTC to work to assist the LTC sector to develop processes that will provide two unique identifiers for resident identification, possibly including biometric identification in the future.
6. Homes/ pharmacies to provide labels indicating “discontinued item” for nursing staff to apply as highly visible alerts on medication strips that contain discontinued medications for the interim period before new medication strips can be provided.
7. Homes to review the use of dangerous abbreviations, symbols and dose designations³² currently in use on MARs and work with the software vendor to eliminate these.
8. Homes to record site of administration on MAR for medications that require rotation on body. A separate sheet depicting the human body may be helpful for documentation of medications such as fentanyl and nitroglycerin patches and insulin injections.
9. Homes to require that all medication patches be safely and securely disposed of e.g. folded to cover the medication area and discarded in the sharps container to prevent inadvertent skin contact by others (as could occur if discarded in the regular garbage).
10. Homes to ensure policies and procedures related to the handling medications for residents who self-administer their medications exist and are used.
11. Homes, with the consultant pharmacist and physicians, identify high alert medications in use and implement additional safeguards that may be needed with these medications, such as independent double checks. (Items for consideration may be first doses of high alert medications from the Stat box).
12. MOHLTC work with LTC stakeholders to develop a high alert medication list specific to the LTC sector.
13. MOHLTC work with stakeholders to identify a reasonable independent double check process for the LTC setting.
14. For homes with current manual resident tracking systems, add pharmacy to the distribution list when completing daily or weekly census reports.
15. When evaluating new facility information systems, homes to consider the ability to easily update admission, discharge and transfer information and automatically produce resident census reports that can be transmitted to key internal and external providers.

³² ISMP Canada Do Not Use Dangerous Abbreviations, Symbols and Dose Designations. Cited 15Dec2008. Available from: <http://www.ismp-canada.org/download/ISMPCanadaListOfDangerousAbbreviations.pdf>

16. MOHLTC to require all homes to provide the resident census to the pharmacy at least weekly, as a back-up to ongoing verbal communication about admissions, transfers, discharges and deaths
17. Homes and pharmacies to develop a standardized communication process to inform pharmacy of how medications need to be administered to a resident, to allow for inclusion on the MAR, and a standard location for this information (e.g., in the Notes section on each page of the MAR).
18. Homes to verify that all staff know how to access electronic references and can demonstrate proficiency.
19. Homes to remove all outdated CPS's and other references.
20. Homes to standardize medication cart set-up and labelling.
21. Homes/ pharmacies can enhance the functionality of medication carts by providing:
 - a. a cup dispenser
 - b. a non-slip surface (items were noted to almost slide off the top of the cart when moved around corners)
 - c. providing a place to dispose of cups so they don't fall off the cart.
 - d. garbage holder

For future medication cart purchases, consider:

 - e. availability of biometric identification and automatic locking functions
 - f. ease for staff to manoeuvre the cart
 - g. option for height of the cart adjustment to accommodate staff of varying heights
22. Homes to keep medication supplies together as much as possible (i.e., oral tablets/capsules, topicals (e.g., eye drops/eardrops) and inhalers) for each resident.
23. Homes to standardize medication delivery devices i.e. insulin pens, glucometers etc.
24. Homes to train and assess the competency of all staff in using the selected medication delivery devices.
25. Homes to conduct usability testing when purchasing equipment and devices for the medication delivery, to ensure deficiencies are identified e.g., infusion devices, Palm@ devices for electronic medication ordering.
26. Homes to develop "super-users" for infusion pumps and other devices to ensure expertise is readily available.

5.5. Medication Monitoring

Resident Monitoring

Nursing staff were not generally aware of the Beer's list of medications that should be used with caution in the elderly³³ or drugs noted in Ontario LTC Coroners' reports or other pharmacologic considerations in the elderly. While there was monitoring and documentation of individual "prn" medication doses administered and effects, it was not clear that there is an overall systematic monitoring process to assess the effectiveness of and problems with medication therapy in relation to treatment goals.

Care aides have a role to play in medication monitoring as they are primarily responsible for hands-on care of residents (e.g., activities of daily living: bathing, dressing, feeding). There is opportunity to increase their awareness of symptoms that may be indicative of adverse drug reactions as well as therapeutic goals (particularly with drug or dose changes) that should be reported to registered staff. The LTC sector has raised the topic of care aids administering medications in the future.

On the pharmacy side, the dispensing pharmacist provides pharmacotherapy monitoring for all new orders at the time of dispensing. More complex monitoring concerns are referred to the consultant pharmacist for follow-up with the home and/or physician. If changes in orders are needed, the pharmacist often "works through a nurse" at the home. The pharmacist may contact the physician directly and accept the order change by telephone but this does not appear to be a standard practice. Direct contact between the pharmacist and prescriber is strongly supported by the review team; however there may be opportunity to streamline the order receipt process for the home and physicians.

Creatinine levels are generally well-monitored by the homes; creatinine is usually measured on admission and intervals thereafter depending on the home's practice. Results are reviewed by the consultant pharmacist as well as nurses and the physician. One pharmacy system calculated creatinine clearance and 50 drugs have been flagged in the system for alerts related to kidney function. If the creatinine clearance is below the recommended limit, a form is completed by the pharmacist and faxed to the physician with suggested alternatives. Other lab results were available to the pharmacist on request. No electronic link to view lab results from their own practice sites by either physicians or pharmacists were described.

The consultant pharmacist generally reviews the resident's medication profile on admission and annually, but is not involved to any great extent in the quarterly

³³ Potentially Inappropriate Medications for the Elderly According to the Revised Beers Criteria. Cited 13Nov2008. Available from: <http://www.dcri.duke.edu/ccge/curtis/beers/html>

medication review process. Different levels of participation by pharmacists regarding medication reconciliation on admission were noted. Consultant pharmacist time is typically approximately one day per month per home. Activities during the on-site time include attendance at Professional Advisory Committee (PAC) meetings as well as compliance-related activities, significantly limiting the time available for medication-review activities.

There is opportunity to enhance and expand the clinical role of the pharmacist in LTC homes. Medication reviews are particularly important for new residents, and should include medication reconciliation to ensure the home begins with the best possible medication history and medications are assessed for appropriateness. Research by Lane et al³⁴ and Bond and Raehl³⁵ highlight the value of pharmacist clinical services in achieving positive pharmaceutical outcomes; one important facet of this is a pharmacist-obtained medication history and medication reconciliation on admission. Pharmacists also can assist the home to better identify potential adverse drug reactions.³⁶

The reviewers identified that many of the functions completed by the pharmacist during the on-site visit do not require the skills of a pharmacist. The pharmacist involvement in medication monitoring should be encouraged, for example:

- ❖ More direct interaction with physician(s) regarding medication order issues.
- ❖ Pharmaceutical care assessment for individual residents, in addition to the one medication at a time review occurring at the time of processing of new orders. Medication reviews are particularly important for residents on admission/readmission and should include medication reconciliation to ensure the home begins with the best possible medication history and medications are assessed for appropriateness and discrepancies. Research by Lane et al³⁷ and Bond and Raehl³⁸ highlight the value of pharmacist clinical services in achieving positive outcomes; one important facet of this is a pharmacist-obtained medication history on admission.

It is noted that the current funding model for pharmacy services in LTC facilities limits the pharmacist's role in providing pharmaceutical care for residents.

The medical director in one home had reviewed laboratory tests currently ordered for all residents with the view of reducing non-essential lab work. Standard protocols have been developed by some homes (e.g., HbA1c q3months for

³⁴ Lane CJ, Bronskill SE, Sykora K, Dhalla IA et al. Potentially Inappropriate Prescribing in Ontario Community-Dwelling Older Adults and Nursing Home Residents. *J Am Geriatr Soc* 2004; 52: 861-866.

³⁵ Bond CA, Raehl CL. Clinical Pharmacy Services, Pharmacy Staffing and Adverse Drug Reactions in United States Hospitals. *Pharmacotherapy* 2006; 26(6): 735-747.

³⁶ Handler SM, Hanlon JT, Perera S, Roumani YF et al. Consensus List of Signs to Detect Potential Adverse Drug Reactions in Nursing Homes. *J Am Geriatr Soc* 2008; 26(5): 808-815.

³⁷ Lane CJ, Bronskill SE, Sykora K, Dhalla IA et al. Potentially Inappropriate Prescribing in Ontario Community-Dwelling Older Adults and Nursing Home Residents. *J Am Geriatr Soc* 2004; 52:861-866.

³⁸ Bond CA Raehl CL. Clinical Pharmacy Services, Pharmacy Staffing and Adverse Drug Reactions in United States Hospitals. *Pharmacotherapy* 2006; 26(6): 735-747.

diabetic residents). Nursing staff document when lab results are received, who was notified and when and any action taken. Reviewers did not observe a system for tracking routine blood work orders to ensure that needed lab tests are not omitted. (ISMP Canada is aware of an incident that occurred in an LTC facility where a resident did not have an INR done for 3 months and experienced harm.) Reminder systems will assist homes to decrease the risk of omitting lab test for high alert medications that require ongoing monitoring.

A specific focus on enhanced pain management was described by two of the homes. An external specialist nurse provides assistance with specific patient management assessment as well as training of staff in one home. In another home, the PAC reviews drug utilization reports prepared by the pharmacy indicating the number and type of drugs utilized for pain management as well as other drug categories. How this information is used to make system improvements in the care of residents was not described. Of interest, a study of over 47,000 residents of Ontario LTC facilities identified substantial variation in prescribing rates for antipsychotic medications.³⁹

Opportunities for Improvement Action:

1. Homes to consider incorporating a comparison with the Beer's list⁴⁰ and other drugs flagged in the Ontario coroners' Geriatric and Long Term Care reports⁴¹ as part of the admission, quarterly, and annual medication review process (as a quality check – use of these items may not necessarily be inappropriate depending on individual requirements).
2. If not already in place, homes to work to develop a standardized reminder system to ensure that routine lab work required for medication monitoring is not inadvertently omitted.
3. For selected medications, such as warfarin, homes to develop pre-printed standardized orders/protocols to support the 5 stages of medication processes.
4. Homes to assist in educating nurses to better identify potential adverse drug reactions.⁴²
5. MOHLTC to review the current regulations related to the pharmacist role to facilitate a shift of focus from compliance audits to clinical services.
6. MOHLTC to reassess the current funding model for pharmacist clinical services to LTC residents to enhance pharmacist provision of pharmaceutical care.

³⁹Rochon PA, Stukel TA, Bronskill SE, Gomes T et al. Variation in Nursing Home Antipsychotic Prescribing Rates. Arch Intern Med 2007; 167: 676-683.

⁴¹ http://www.ontca.ca/index.php?option=com_content&task=view&id=16&Itemid=30

⁴² Handler SM, Hanlon JT, Perera S, Roumani YF et al. Consensus List of Signals to Detect Potential Adverse Drug Reactions in Nursing Homes. J Am Geriatr Soc 2008; 56(5): 808-815.

5.6 Supporting System Elements

Resident/Family Education

Education programs for residents and families around drug and disease were described which include the active involvement of the consultant pharmacist.

In general, families are encouraged to contact the home anytime by phone or e-mail with any concerns.

Processes are in place to keep family members informed about medication changes on an ongoing basis.

There is opportunity to involve residents and family members more directly in the medication use process. For example, the reviewers did not observe any nurses saying to residents “here is your heart pill, etc”.

Gaining family and resident support for medication safety can begin at the time of admission. Residents cognitively aware and familiar with their medications can act as a safeguard for themselves.^{43,44} Staff need to be sensitive to expressions of concern about differences in medication appearance and complete a second check to verify accuracy. Families too can support safety by minimizing interruptions via phone calls during medication pass times.⁴⁵

Physical Environment

Nursing staff administering medications must cope with a high level of distractions and interruptions. Medications are administered in narrow hallways with people constantly coming and going in wheelchairs and walkers, and “hanging around” the carts; staff are frequently interrupted while pouring medications and documenting medication administration by staff, residents, phone calls, and resident call bells.

The use of portable phones and walkie-talkies are useful communication links. However, the phones also create the potential for interruptions; calls are commonly answered by nurses while administering medications.

Staff Orientation

A buddy / mentorship system is commonly used for orientation. New staff observe another nurse for a defined time then are themselves observed completing medication passes. All homes had a flexible policy around the

⁴³ Davis NM. Patient counselling can detect 83% of medication errors. *American Pharmacy* 1994 (NS34):22-23.

⁴⁴ Cohen MR (editor). *Medication Errors*. 2nd edition APhA Washington DC 2007 p.308.

duration of the orientation period. There appeared to be reliance on prior knowledge and experience rather than actual assessment of skill level and competence with medication-related tasks as required by the home.

Comprehensive checklists of items to cover during orientation with respect to the medication system were not seen; further there were no defined performance standards or audit processes built in. All had comprehensive Pharmacy Policy and Procedure Manuals and one home also had a good pharmacy orientation binder which showed photographs and computer system screen shots. It was not clear how these binders were worked into the orientation program and how or whether new staff were assessed on their knowledge of the binders content. None of the orientation programs included safety information relating to past medication incidents and the resultant system safeguards introduced to prevent recurrence.

Staff Education

There is substantial support for staff education at all the homes either through on-site inservice presentations, often involving the pharmacist in providing information (e.g. administration of IV medications, hypodermoclysis, use of pain pumps for palliative residents and pharmacy-provided sessions e.g. Antibiotic Use; Parkinson's Disease; Pain; Depression; Wound Care; Influenza.) or external programs.

An education gap was identified by reviewers in that staff interviewed were not familiar with drugs that should be used with caution or avoided in the elderly (e.g., the Beer's list⁴⁶) or medications that have been considered as a risk when used in the elderly by the Office of the Chief Coroner of Ontario. Increasing staff knowledge related to medication use in the elderly and relating this to monitoring the effects of medications on residents would be helpful.

Some homes posted ISMP safety bulletins and newsletters and discussed relevant issues at nursing staff meetings and/or PAC meetings. These bulletins provide education about specific medication safety issues; a key value is in highlighting medication system issues and strategies to enhance safety that are applicable in more than one setting.

⁴⁶ Potentially Inappropriate Medications for the Elderly According to the Revised Beers Criteria. Cited 13Nov2008. Available from: <http://www.dcri.duke.edu/ccge/curtis/beers.html>

Quality Processes and Risk Management Medication Safety Self-Assessment®

Many homes have completed the Medication Safety Self-Assessment for Long-term Care supported by the MOHLTC in 2008/09. This program offers insights into risk areas of the medication system in homes.

Medication Incident Reporting

All three homes report medication incidents on a paper incident report form. Reports are reviewed by the discipline associated with the error; pharmacy if a dispensing error and nursing if an administration error. No reports of prescribing errors were described. For administration errors, the director of care or assistant director of care usually meets with the nurse to review how the staff member thinks the error happened. Policies and procedures are reviewed and a plan of action is developed with the staff member. There is currently no interdisciplinary review of individual medication incidents although one home did discuss reports (de-identified) at nursing staff meetings. Summary reports are tabled at PAC meetings but how the information could be used to enhance systems would be challenging for the Committee without details of contributing factors. A home was in the process of changing its incident reports to try to capture potential contributing factors to support moving to a more system-based focus. More knowledge around incorporating human factors principles would be helpful to home management and staff. Some of the homes' management teams and staff have participated in Root Cause Analysis and/or Failure Mode and Analysis workshops which are helpful in understanding the principles of a just culture, responding to incident reports with a system approach, and improving processes using more effective solutions. Examining incident reports in a systematic manner assists in improving understanding of root causes and creating improvement strategies that will help to prevent recurrence.

One Pharmacy also worked hard at developing improvements as a result of errors and near misses by implementing a surveillance program and discussing with the staff involved and then sharing in a de-identified way with all staff during weekly meetings, using the format of "What happened, how it happened, and what has been done to rectify the situation".

There is potential to increase detection of medication incidents through clear definition of "reportable incidents"^{47,48,49,50} for staff and by monitoring "trigger"

⁴⁷ Aspinall S, Sevick MA, Donohue J, Maher R, Hanlon JT. Medication Errors in Older Adults: A Review of Recent Publications. *Am J Ger Pharmacol* 2007; 5(1): 75-84.

⁴⁸ Flynn EK, Barker KN, Pepper GA, Bates DW and Mikeal RL. Comparison of Methods for detecting medication errors in 36 hospitals and skilled nursing facilities. *Am J Health Syst Pharm* 2002; 59(5)

⁴⁹ Grissinger M. Medication Errors in Long-Term Care: Part 1. *The Consultant Pharmacist* 2007; 22(7):544-561.

⁵⁰ Grissinger M. Medication Errors in Long-Term Care: Part 2. *The Consultant Pharmacist* 2007; 22(8):646-658.

orders (e.g., an order for vitamin K may indicate an incorrect dose of warfarin or omission of a lab test).

Professional Advisory Committee (PAC)

The PAC, a multidisciplinary committee, is a useful venue to assist in enhancing the medication use system. Some PACs participated in standardizing medication policies and procedures throughout the home, reviewing drug utilization reports provided by pharmacy, reviewing summary reports of medication incidents, and reviewing external safety bulletins (e.g. ISMP Canada's). As a result of its oversight and multidisciplinary capacity, increasing the PAC role in improving medication system safety would be beneficial to the care of its residents. Some specific recommendations related to the PAC are summarized below.

One opportunity for the PAC is to identify areas that would benefit from standard protocols and work to develop these either locally or collaboratively at the corporate level as appropriate. Confusion around terms (e.g., medical directives, standing orders) also appeared to exist for which guidance is available from both the College of Nurses or College of Physicians and Surgeons.^{51,52}

Practices for Consideration for All Homes and Pharmacies:

- ❖ Addition of a registered nurse to the pharmacy team by one contract pharmacy provider has helped with orientation processes for new nursing staff, particularly in terms of consistent messaging related to expectations for medication-related tasks.
- ❖ Discuss safety bulletins and incident reports at staff meetings and PAC meetings.
- ❖ One home had developed an interesting educational approach. A “Spot the Hazard” display in the home’s lobby (Figure 19) assists in alerting nursing staff about general safety issues and this public focus works to support the development of a culture of safety by all.

⁵¹ College of Nurses of Ontario. Practice Guideline: Authorizing Mechanisms, 2008. Cited 16Dec2008. Available from: http://www.cno.org/docs/prac/41075_AuthorizingMech.pdf

⁵² College of Nurses of Ontario. Practice Guideline: Directives, 2008. Cited 16Dec 2008. Available from: http://www.cno.org/docs/prac/41019_MedicalDirectives.pdf



Figure 19: “Spot the Hazard” lobby display

Opportunities for Improvement Action:

1. Homes to introduce the concept of resident safety at admission:
 - a. Encourage residents who are cognitively aware to actively participate in the medication process through, e.g., through ongoing discussions about medications they are receiving
 - b. Advise family members of medication pass times and request that they refrain from calling the care unit during those times.
2. As part of orientation training, homes to include a review incidents and adverse events that have occurred in the home/pharmacy and other organizations as background for discussions about the types of things that can go wrong and how they can be prevented.
3. Homes to consider incorporating a functional assessment component into the medication system orientation process by developing objective criteria to indicate that new staff members are ready to work independently.
4. Homes to assess the ability to have portable phones go to voicemail during medication pass times with an option for callers to be transferred to another individual for urgent issues.
5. Homes to obtain and distribute the ISMP Canada Safety Bulletin and ISMP (US) newsletters (e.g., NurseAdviseERR and Community/Ambulatory Care Medication Safety Alert!) to staff as appropriate. Review of these newsletters may also help to identify topics requiring action by the PAC.
6. Homes to make available inservice sessions on medication use in the elderly and why certain drugs should be avoided; for example, referencing drugs noted in coroner’s reports⁵³, etc.
7. Homes to clearly define “medication incidents” and ensure staff understand when they should report an incident. The MOHLTC Task

⁵³ http://www.ontca.ca/index.php?option=com_content&task=view&id=16&Itemid=30

- Force on Medication Management has selected the Ontario College of Nurses definition of medication incidents as an example.⁵⁴
8. Homes to use incident reports as opportunities to identify system deficiencies and share learning widely with all staff, not just the staff member involved in the incident.
 9. Homes can enhance medication incident detection through the use of “trigger” monitoring by the Pharmacy and/or the Medical Director or Director of Care; e.g., vitamin K and naloxone orders should trigger further investigation. A trigger tool for measuring adverse drug events is available from the Institute for Healthcare Improvement.⁵⁵
 10. Homes to make “Medication Safety” a standing agenda item for PAC and staff meetings. Review incidents that have occurred describing “what happened; how it happened; and actions taken to reduce the likelihood of recurrence”.
 11. Homes to consider revising incident report forms to:
 - a. Request information in the order that individuals would be expected to process the information; e.g., capture the incident description before asking the staff to think about the type of incident;
 - b. Add notification of substitute decision maker/power of attorney (name, date, time);
 - c. Include whether this was a patient involved incident or a good catch/near miss; and
 - d. Include contributing factors.
 12. Homes to pursue training and education in Root Cause Analysis and Failure Mode and Effects Analysis to enhance understanding of the impact of process design and environment on error potential and apply when examining incident reports.
 13. Homes to develop standard pre-printed orders and protocols, particularly for high alert medications, to enhance standardization.
 14. Home PAC’s to annually review the list of medications available in the Stat box, along with statistics on the utilization of individual items.
 15. Review annual reports from the Office of the Chief Coroner of Ontario (Geriatric and Long Term Care Review Committee) regarding use of drugs in the elderly. Reports available online
http://www.ontca.ca/index.php?option=com_content&task=view&id=16&Itemid=30

⁵⁴ College of Nurses of Ontario Practice Standard: *Medication, Revised 2008* 7
http://www.cno.org/docs/prac/41007_Medication.pdf accessed April 7, 2009

⁵⁵ Institute for Healthcare Improvement. Trigger Tool for Measuring Adverse Drug Events. Cited 22Dec2008. Available from:
[http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Tools/Trigger%20Tool%20for%20Measuring%20Adverse%20Drug%20Events%20\(IHI%20Tool\)](http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Tools/Trigger%20Tool%20for%20Measuring%20Adverse%20Drug%20Events%20(IHI%20Tool))

16. Homes to review their results of the ISMP Canada's Medication Safety Self-Assessment for Long-term Care and with the PAC decide on improvement actions and monitor progress

7. Summary

This report highlights the themes identified during an ISMP Canada expert review of three Ontario LTC homes and contract pharmacy providers. A number of positive practices were identified, some of which present opportunities for spread throughout the LTC sector. Areas for improvement were also identified.

This report is presented to the Task Force on Medication Management in Long-term Care for review and suggestions for next steps (e.g. prioritization and classification into short, medium, long term goals).

ISMP Canada acknowledges the support and efforts of the Ministry of Health and Long-term Care in taking steps to enhance the safety of the medication use process in Ontario LTC homes. As well, ISMP Canada appreciates the cooperation of the staff in all the homes and pharmacies who participated in the review.

Appendix 1: Comparison of Findings to the Auditor General Recommendations

Auditor General Recommendations	Observation during Home Visit
informed consent for new medications	Some excellent processes in place to ensure resident and family informed of treatment changes; not practice in all
lack of a standard definition of a medication error for LTC homes	No standard definition seen in use; staff appear to report when it is recognized that a resident has received an incorrect scheduled drug or dose particularly if there is concern of harm
use of medications known to be potentially harmful in the elderly	Nurses unaware of drugs to be used cautiously in the elderly e.g. Beer's list, or drugs noted in coroners reports re LTC, literature; not sure if they were aware of differences in the way the elderly metabolize and sometimes show the effects of drugs; no described systematic process to assess this
lack of processes for increased monitoring of residents receiving 12 or more regularly scheduled medications	No systemized monitoring of drug effects seen or described except for prn use
high level of over-riding of computerized alerts of drug interactions in pharmacies dispensing medications for LTC residents (91%),	Not assessed
discrepancies in controlled drug records	Not assessed although a shift change count was observed that was completed appropriately
monitoring and management of expiry dates of medications in emergency boxes and government stock	Homes reviewed had extensive audits in place to ensure no outdated drugs are stocked; audits completed by nursing and pharmacy at frequent intervals (weekly and monthly); much time was spent by home staff on this activity (in the opinion of reviewers, more time than required)
inappropriate medication disposal practices	Systems were in place for disposal of discontinued or outdated drugs that appeared secure and well documented; there was lack of knowledge by some nurses as to how to dispose of used topicals e.g. fentanyl patches

Appendix 2: Summary of Opportunities for Action

Stage of Medication Use Process	Opportunity
5.1 Medication Ordering / Prescribing	<ol style="list-style-type: none"> 1. Homes to adopt and implement the ISMP Canada “Do Not Use” list of dangerous abbreviations, symbols and dose designations for all medication-related communications ⁵⁶ This can be facilitated by developing a province-wide campaign. 2. Support the implementation of new technology to improve accuracy and efficiency in the system through: <ol style="list-style-type: none"> a. Centralized technology assessments (functionality, user interface, use of abbreviations, etc.) of medication-related software, and related communication devices, bar-coding that may support prescribing, administering and monitoring b. Guidance for selection and implementation of technology through the centralized development of a tool such as a checklist or framework for homes to use when exploring technology options (e.g., for eMAR, CPOE, point-of-care barcoding) to support their medication use systems. 3. Homes to review medical directives to confirm that the requirements as set out by the College of Physicians and Surgeons and/or College of Nurses are met. 4. Centralize the development of protocols and/or create checklists/templates outlining reasonable contents for protocols and order sets for high alert drugs (e.g. anticoagulants) to address issues related to prescribing, administration, monitoring and storage. to assist homes to enhance system safeguards and reduce duplication of effort. In addition, audit tools to identify that protocols are being used as intended would also be helpful.
5.2 Medication Order Processing and Transcription	<ol style="list-style-type: none"> 1. Homes to conduct field testing when implementing change in forms or technology. Small groups of nurses act to assess usability of design changes e.g. cMARs and eMARs, prior to full implementation, to ensure optimum functionality from a nursing perspective.⁵⁷ Ideally, this assessment should include simulated

⁵⁶ ISMP Canada Do Not Use Dangerous Abbreviations, Symbols and Dose Designations. Cited 8Nov2008. Available from: <http://www.ismp-canada.org/download/ISMPCanadaListOfDangerousAbbreviations.pdf>

⁵⁷ Borycki E, Kushniruk A. Identifying and Preventing Technology-Induced Error Using Simulations: Application of Usability Engineering Techniques. Healthcare Quarterly 2005; 8(Sp): 99-105.

Stage of Medication Use Process	Opportunity
	<p>use, to allow nurses to step through all aspects of usage in realistic and typical scenarios.</p> <ol style="list-style-type: none"> 2. Homes/pharmacies to use generic medication names as the primary identifier for medication labels and MARs, with brand name or manufacturer added to meet legal dispensing requirements. The label and MAR should also include a cross-reference to the name used by the prescriber. The use of prefix brand names such as “Novo-“ or “Apo-“ is not optimal from a differentiation perspective. 3. Encourage more direct pharmacist-physician communication about medication-related concerns..
5.3 Medication Dispensing and Delivery	<ol style="list-style-type: none"> 1. Home PAC’s to review the list of medications contained in the Stat box, as well as utilization of items, at regular intervals (e.g., annually). Consider adding antidotes such as naloxone to Stat box stock if opioid narcotics are in use. 2. Homes/pharmacies to post the list of Stat box contents in easily retrievable locations on the units to avoid unnecessary travel by staff to check the contents of the box and attach the list to the exterior of box for quick reference. 3. MOHLTC to review compliance regulations to simplify the medication disposal standard so that it is less labour intensive without losing the intent of having the safety checks and balances in the medication system
5.4 Medication Administration and Documentation	<ol style="list-style-type: none"> 1. Home staff to verify the administration volume for injectable and oral liquid medications with the pharmacist on-call whenever calculations are required to administer first doses of new medication orders (e.g., medications retrieved from the Stat box or dispensed without volume directions such as morphine injection, amantadine and phenytoin oral liquids, etc.). 2. Pharmacies to add auxiliary labels to medications in the Stat box that may require dose calculations e.g., “Call pharmacist to verify dose/volume to be administered”. 3. MOHLTC is asked to reconsider the decision to provide reimbursement for only morphine 15/mL and 50 mg/mL injectable concentrations as part of the Ontario Drug Benefit Formulary, as these concentrations do not meet the needs of many elderly patients and calculation errors can result in substantial harm. 4. Pharmacies are asked to assess the feasibility of packaging

Stage of Medication Use Process	Opportunity
	<p>medications that require specific monitoring prior to administration to avoid selection errors in removing a drug not needed (e.g. digoxin).</p> <ol style="list-style-type: none"> 5. MOHLTC to work to assist the LTC sector to develop processes that will provide two unique identifiers for resident identification, possibly including biometric identification in the future. 6. Homes/ pharmacies to provide labels indicating “discontinued item” for nursing staff to apply as highly visible alerts on medication strips that contain discontinued medications for the interim period before new medication strips can be provided. 7. Homes to review the use of dangerous abbreviations, symbols and dose designations⁵⁸ currently in use on MARs and work with the software vendor to eliminate these. 8. Homes to record site of administration on MAR for medications that require rotation on body. A separate sheet depicting the human body may be helpful for documentation of medications such as fentanyl and nitroglycerin patches and insulin injections. 9. Homes to require that all medication patches be safely and securely disposed of e.g. folded to cover the medication area and discarded in the sharps container to prevent inadvertent skin contact by others (as could occur if discarded in the regular garbage). 10. Homes to ensure policies and procedures related to the handling medications for residents who self-administer their medications exist and are used. 11. Homes, with the consultant pharmacist and physicians, identify high alert medications in use and implement additional safeguards that may be needed with these medications, such as independent double checks. (Items for consideration may be first doses of high alert medications from the Stat box). 12. MOHLTC work with LTC stakeholders to develop a high alert medication list specific to the LTC sector. 13. MOHLTC work with stakeholders to identify a reasonable independent double check process for the LTC setting. 14. For homes with current manual resident tracking systems, add

⁵⁸ ISMP Canada Do Not Use Dangerous Abbreviations, Symbols and Dose Designations. Cited 15Dec2008. Available from: <http://www.ismp-canada.org/download/ISMPCanadaListOfDangerousAbbreviations.pdf>

Stage of Medication Use Process	Opportunity
	<p>pharmacy to the distribution list when completing daily or weekly census reports.</p> <ol style="list-style-type: none"> 15. When evaluating new facility information systems, Homes to consider the ability to easily update admission, discharge and transfer information and automatically produce resident census reports that can be transmitted to key internal and external providers. 16. MOHLTC to require all homes to provide the resident census to the pharmacy at least weekly, as a back-up to ongoing verbal communication about admissions, transfers, discharges and deaths 17. Homes and pharmacies to develop a standardized communication process to inform pharmacy of how medications need to be administered to a resident, to allow for inclusion on the MAR, and a standard location for this information (e.g., in the Notes section on each page of the MAR). 18. Homes to verify that all staff know how to access electronic references and can demonstrate proficiency. 19. Homes to remove all outdated CPS's and other references. 20. Homes to standardize medication cart set-up and labelling. 21. Homes/ pharmacies can enhance the functionality of medication carts by providing: <ol style="list-style-type: none"> a. a cup dispenser b. a non-slip surface (items were noted to almost slide off the top of the cart when moved around corners) c. providing a place to dispose of cups so they don't fall off the cart. d. garbage holder <p>For future medication cart purchases, consider:</p> <ol style="list-style-type: none"> e. availability of biometric identification and automatic locking functions f. ease for staff to manoeuvre the cart g. option for height of the cart adjustment to accommodate staff of varying heights 22. Homes to keep medication supplies together as much as possible (i.e., oral tablets/capsules, topicals (e.g., eye drops/eardrops) and inhalers) for each resident. 23. Homes to standardize medication delivery devices i.e. insulin

Stage of Medication Use Process	Opportunity
	<p>pens, glucometers etc.</p> <ol style="list-style-type: none"> 24. Homes to train and assess competency of all staff in using the selected medication delivery devices. 25. Homes to conduct usability testing when purchasing equipment and devices for the medication delivery, to ensure deficiencies are identified e.g., infusion devices, Palm® devices for electronic medication ordering. 26. Homes to develop “super-users” for infusion pumps and other devices to ensure expertise is readily available.
5.5 Medication Monitoring	<ol style="list-style-type: none"> 1. Homes to consider incorporating a comparison with the Beer’s list⁵⁹ and other drugs flagged in the Ontario coroners’ Geriatric and Long Term Care reports⁶⁰ as part of the admission, quarterly, and annual medication review process (as a quality check – use of these items may not necessarily be inappropriate depending on individual requirements). 2. If not already in place, homes to work to develop a standardized reminder system to ensure that routine lab work required for medication monitoring is not inadvertently omitted. 3. For selected medications, such as warfarin, homes to develop pre-printed standardized orders/protocols to support the 5 stages of medication processes. 4. Homes to assist in educating nurses to better identify potential adverse drug reactions.⁶¹ 5. MOHLTC to review the current regulations related to the pharmacist role to facilitate a shift of focus from compliance audits to clinical services. 6. MOHLTC to reassess the current funding model for pharmacist clinical services to LTC residents to enhance pharmacist provision of pharmaceutical care.
5.6 Supporting System Elements	<ol style="list-style-type: none"> 1. Homes to introduce the concept of resident safety at admission: <ol style="list-style-type: none"> a. Encourage residents who are cognitively aware to actively participate in the medication process through, e.g., through ongoing discussions about medications

⁶⁰ http://www.ontca.ca/index.php?option=com_content&task=view&id=16&Itemid=30

⁶¹ Handler SM, Hanlon JT, Perera S, Roumani YF et al. Consensus List of Signals to Detect Potential Adverse Drug Reactions in Nursing Homes. J Am Geriatr Soc 2008; 56(5): 808-815.

Stage of Medication Use Process	Opportunity
	<p>they are receiving</p> <p>b. Advise family members of medication pass times and request that they refrain from calling the care unit during those times.</p> <ol style="list-style-type: none"> 2. As part of orientation training, homes to include a review incidents and adverse events that have occurred in the home/pharmacy and other organizations as background for discussions about the types of things that can go wrong and how they can be prevented. 3. Homes to consider incorporating a functional assessment component into the medication system orientation process by developing objective criteria to indicate that new staff members are ready to work independently. 4. Homes to assess the ability to have portable phones go to voicemail during medication pass times with an option for callers to be transferred to another individual for urgent issues. 5. Homes to obtain and distribute the ISMP Canada Safety Bulletin and ISMP (US) newsletters (e.g., NurseAdviseERR and Community/Ambulatory Care Medication Safety Alert!) to staff as appropriate. Review of these newsletters may also help to identify topics requiring action by the PAC. 6. Homes to make available inservice sessions on medication use in the elderly and why certain drugs should be avoided; for example, referencing drugs noted in coroner's reports⁶², etc. 7. Homes to clearly define "medication incidents" and ensure staff understand when they should report an incident. The MOHLTC Task Force on Medication Management has selected the Ontario College of Nurses definition of medication incidents as an example.⁶³ 8. Homes to use incident reports as opportunities to identify system deficiencies and share learning widely with all staff, not just the staff member involved in the incident. 9. Homes can enhance medication incident detection through the

⁶² http://www.ontca.ca/index.php?option=com_content&task=view&id=16&Itemid=30

⁶³ College of Nurses of Ontario Practice Standard: *Medication, Revised 2008* 7

http://www.cno.org/docs/prac/41007_Medication.pdf accessed April 7, 2009

⁶⁴ Institute for Healthcare Improvement. Trigger Tool for Measuring Adverse Drug Events. Cited 22Dec2008. Available from:

[http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Tools/Trigger%20Tool%20for%20Measuring%20Adverse%20Drug%20Events%20\(IHI%20Tool\)](http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Tools/Trigger%20Tool%20for%20Measuring%20Adverse%20Drug%20Events%20(IHI%20Tool))

Stage of Medication Use Process	Opportunity
	<p>use of “trigger” monitoring by the Pharmacy and/or the Medical Director or Director of Care; e.g., vitamin K and naloxone orders should trigger further investigation. A trigger tool for measuring adverse drug events is available from the Institute for Healthcare Improvement.⁶⁴</p> <p>10. Homes to make “Medication Safety” a standing agenda item for PAC and staff meetings. Review incidents that have occurred describing “what happened; how it happened; and actions taken to reduce the likelihood of recurrence”.</p> <p>11. Homes to consider revising incident report forms to:</p> <ol style="list-style-type: none"> a. Request information in the order that individuals would be expected to process the information; e.g., capture the incident description before asking the staff to think about the type of incident; b. Add notification of substitute decision maker/power of attorney (name, date, time); c. Include whether this was a patient involved incident or a good catch/near miss; and d. Include contributing factors. <p>12. Homes to pursue training and education in Root Cause Analysis and Failure Mode and Effects Analysis to enhance understanding of the impact of process design and environment on error potential and apply when examining incident reports.</p> <p>13. Homes to develop standard pre-printed orders and protocols, particularly for high alert medications, to enhance standardization.</p> <p>14. Home PAC’s to annually review the list of medications available in the Stat box, along with statistics on the utilization of individual items.</p> <p>15. Homes to review annual reports from the Office of the Chief Coroner of Ontario (Geriatric and Long Term Care Review Committee) regarding use of drugs in the elderly. Reports available online http://www.ontca.ca/index.php?option=com_content&task=view&id=16&Itemid=30</p> <p>16. Homes to review their results of the ISMP Canada’s Medication Safety Self-Assessment for Long-term Care and with the PAC decide on improvement actions and monitor progress</p>

Appendix 3: Summary of Strengths Identified in Homes Reviewed

- ❖ A controlled drug system is in place that is fairly similar in all three homes and pharmacies. The pharmacies have provided extensive infrastructure to support nursing staff medication-related functions resulting in less time spent on medication-related functions, minimizing of medication wastage, and enhanced safety of residents. The system is built around 7 day supply cycles with individually labelled drug packages (multi-paks) for each administration time for each resident.

- ❖ Examples of specific positive attributes observed in one or more locations included:
 - Consistent following of appropriate steps in preparing and administering medications by nursing staff;
 - Patient identification through use of armbands and colour photographs in the Medication Administration Record (MAR) binder;
 - Placement of resident photographs on a face sheet located in the MAR book, on the MAR itself, the medication storage bin and the medication profile used by the pharmacy staff; multiple locations provide redundant cues;
 - Implementation of electronic medication administration records (eMAR) at one site and a computerized prescriber order entry (CPOE) system (completed after site visit at another site) are examples of the use of technology to provide increased safeguards in the medication system;
 - Chart room separate from nursing station and medication room; useful for quiet area to write orders or complete computer order entry;
 - System for notification of resident's family of new orders; new order placed on clipboard and hung in nursing station as cue for action; once contact is made the nurse documents this on the order sheet with the date and time of the notification and files the order sheet;
 - Intuitive use of human factors engineering principles in pharmacy dispensing processes; e.g., process flow, colour coding, use of reminders at appropriate points in the process;
 - A system of dispensing areas within a pharmacy that each look after a specific group of homes. The associated staff members work consistently in an area; this supports pharmacy staff familiarity with the home's staff and practices which in turn enhances

communication between both the home and pharmacy, assists with customer service and reduces the risk of error;

- Use of a consultant nurse in addition to a consultant pharmacist by one pharmacy to assist with medication system orientation and training needs for nursing staff;
- Use of redundant cues on medication multi-pak labels such as “Breakfast”, “Lunch”, etc (see Figure 1 above);
- Next day replacement of revised multi-pak medication strips for residents when a medication order has changed rather than waiting until the next scheduled dispensing date;
- Ability of on-call pharmacists to view electronic images of faxed prescriptions allowing for review with resident profile and resolution of clinical issues after hours prior to referral to satellite pharmacy for dispensing or on-site retrieval of Stat box items;
- Medication review completed by pharmacist for each new admission;
- Collaborative efforts between the home and pharmacy to consolidate medication administration times through reduced frequency of medication administration where appropriate;
- Regular corporate level monthly meetings between pharmacy and home staff to identify needs and create standardized solutions relating to the medication system.

Appendix 4: Summary of Key Improvement Opportunities

- ❖ Enhancement of medication incident detection, reporting and analysis processes;
- ❖ Building capacity in Root Cause Analysis, and Failure Modes and Effects Analysis through widespread training and implementation of these tools;
- ❖ Creation of orientation guides or toolkits containing information regarding a process for, and materials to assist with, assessing competency in medication administration. Incorporate learning from incidents known to have occurred, and safeguards put in place in response to incidents; include guidance for functional assessment, and a checklist guide to ensure consistency and completeness of training;
- ❖ Centralization of development of protocols or creation of checklist(s) for the required content of protocols for high alert drugs (e.g. anticoagulants) that address issues such as prescribing, administration, monitoring and storage, as well as audit tools to identify that protocols are being used as intended.
- ❖ Development of strategies to regularly review medication use for individual residents to ensure therapeutic goals are being met. Assess the number of medications required as well as the frequency of medication administration times in order to reduce the time spent on medication administration without negatively impacting resident clinical status;
- ❖ Use of error-prone abbreviations. Undertake an abbreviations initiative to reduce the risk of miscommunication in all medication-related activities;
- ❖ Use of generic drug names as the primary identifier for medication packaging and labelling and for electronic prescribing systems and medication administration records when available;
- ❖ Provision of allergy information in a prominent location on all forms e.g. physician order forms, MAR, pharmacy records;
- ❖ Definition of high alert medications for LTC that would assist homes to ensure appropriate safeguards are in place for these medications;
- ❖ Creation of or dissemination of standardized definitions for medical directives, standing orders, preprinted orders, protocols; there appears to be confusion around the use of these terms and how to apply them;
- ❖ Implementation of medication reconciliation; availability of complete medication (and medical) history on admission was identified as a challenge.
- ❖ Resident / family education around safety; development of public messaging around resident and family role in medication safety for residents in LTC; role in medication reconciliation, avoidance of interruptions during medication administration, reporting of changes in resident's condition that could signal a medication-related issue, resident (and family) knowledge of own

medications; possible creation of a pamphlet that facilities could use at the time of admission;

- ❖ Enhancement of the role of the Professional Advisory Committee to include review of internal and external medication incidents, root cause analysis, development of improved system safeguards, review of drug utilization reports to assess appropriateness of current practices;
- ❖ Assessment of alternative methods of resident identification; this is a challenge in LTC as armbands are not usually used and residents are often cognitively impaired. Finding new methods of positive resident identification is beyond the capability of individual homes;
- ❖ Centralized development of audit tools to support facilities in implementing an ongoing periodic review process to assess the functionality of different aspects of the medication use system. Audit tools are needed to assess how specific medication processes are working e.g., medication reconciliation, communication of allergy information, etc.;
- ❖ Development of and/or use of a strategic, systematic approach to documentation and monitoring of treatment effects. Nursing staff have limited specific knowledge related to drug use in the elderly and the types of adverse effects to monitor for and manage if they occur. Increased education is needed about the use of drugs that should be used with care in the elderly e.g. Beer's list, drugs identified in LTC Coroner's reports, research literature, etc.
- ❖ Consideration of shifting the role of the consultant pharmacist, from the current focus on supporting MOHLTC compliance requirements during the limited time of the usual monthly visit, toward more clinical activities to support the care team.
- ❖ Support the implementation of new technology to improve accuracy and efficiency in the system through:
 - Centralized technology assessments (functionality, user interface, use of abbreviations, etc.) of medication-related software, and related communication devices, bar-coding that may support prescribing, administering and monitoring
 - Guidance for selection and implementation of technology through the centralized development of a tool such as a checklist or framework for homes to use when exploring technology options (e.g., for eMAR, CPOE, point-of-care barcoding) to support their medication use systems.
- ❖ Development of effective systems for sharing information about serious medication incidents occurring in LTC and what was learned from them. Networking opportunities to share leading practices, lessons learned from new technology implementation, practice issues etc. – possibly through electronic means – are also needed.