Ontario's Medication Management System - Transformation Wanted!

White Paper

Completed by Emergis Inc. and Courtyard Group Ltd.
July, 2006

Table of Contents

Executive Summary 3
Introduction and Background 4
Current State of Medication Management 5
Future of Medication Management 7
Expanding the Role of Pharmacists Supports Health System Transformation 10
Information Technology to Promote Change 12
Components of a Medication Management Infrastructure 13
How Have Other Canadian Jurisdictions Done It? 21
Lessons Learned for Ontario 23
Key Questions for Ontario 25
Conclusion 26
Acknowledgements 27

Executive Summary

The medication management system of Canada has been targeted for change in order to achieve better quality of service, improve patient safety, optimize the value for money spent, and integrate along the continuum of care delivery. This means changing the way in which medications are prescribed, dispensed, and reimbursed.

The challenge is to define a new model for medication management that makes the best use of human expertise and leverages emerging information technology. Ontario is moving forward on the development and adoption of new policies that will transform the role of pharmacists through the leadership of the Ontario Ministry of Health and Long-Term Care and the Ontario Pharmacists' Association. However, very little progress has been made in the development of a comprehensive Ontario-wide drug information system even though evidence suggests such a system could save the province billions of dollars over the next 20 years.

This paper describes the components of a medication management system and compares the implementation of provincial Drug Information System (DIS) in five other provinces. To ensure a successful system transformation, this paper highlights lessons learned that can be applied in Ontario and raises key questions to consider in developing and implementing a medication information management strategy for Ontario. It is recommended that Ontario engage professional associations, industry, and government stakeholders in a formal process to develop a provincial strategy that supports a new role for pharmacists and utilizes a comprehensive and integrated medication information management system.

Introduction and Background

How medications are managed in most North American jurisdictions, including Ontario, is no longer acceptable for highly developed economies. The current Ontario system is compartmentalized along government and business interests and represents suboptimal health care delivery, with high risks for patient safety and excessive costs. A more patient-centred approach to medication management is required. An opportunity exists now to create a future state that ensures that patients take the right drug in the right way to ensure optimal health outcomes. This goal can be achieved through an integrated approach that includes better use of pharmacists, the sharing of clinical information between health care team members through technology and communication infrastructure, and redesigning of the medication management processes to ensure a patient-centred approach.

Current State of Medication Management

The current state of medication management is characterized by the following problems:

Quality of medication care is suboptimal

Despite increasing expenditure on drugs, patients' medication regimens are still not being managed optimally, especially in the community setting. Higashi et al.,[1] Wenger et al.[2] and researchers for the Assessing Care of Vulnerable Elders (ACOVE) Project have developed key quality indicators for pharmacologic care. These indicators have been widely applied in evaluating the quality of pharmacologic care in the United States. Research has indicated, for example, that vulnerable older patients receive only about half of the recommended care, and that physicians often fail to prescribe recommended medications for older adults.

Safety of medication management needs to be improved

Medication safety problems are unacceptably frequent, especially among vulnerable patient populations. For example, the frequency of adverse drug reactions in elderly outpatients ranges from 10% to 35%.[3] Another 50% of medications used by older patients are believed to be used inappropriately,[4] and more than half of older patients take at least one "high-risk medication."[5] Overall, drug-related illness is the fourth leading cause of mortality in Canada, behind heart disease, cancer and stroke, but ahead of pneumonia and diabetes.[6]

In addition to endangering patients and adversely affecting the quality of care, medication mismanagement has significant financial implications. For instance, the cost of drug non-adherence for Ontario's Ministry of Health and Long-Term Care is estimated at $1.48 billion annually, or about 5% of total health expenditure.[7] Preventable drug-

[1] Higashi T, Shekelle PG, Solomon DH *et al.* The quality of pharmacologic care for vulnerable older patients. Ann Intern Med. 2004; 140:714-720.
[2] Wenger NS, Solomon DH, Roth CP *et al.* The quality of medical care provided to vulnerable community-dwelling older patients. Ann Intern Med. 2003;139:740-7.
[3] Hanlon JT, Schmader KE, Koronkowski MJ, Weinberger M, Landsman PB, Samsa GP, et al. Adverse drug events in high risk older outpatients. J Am Geriatr Soc. 1997;45:945-8; Schneider JK, Mion LC, Frengley JD. Adverse drug reactions in an elderly outpatient population. Am J Hosp Pharm. 1992;49:90-6; Chrischilles EA, Segar ET, Wallace RB. Self-reported adverse drug reactions and related resource use. A study of community-dwelling persons 65 years of age and older. Ann Intern Med. 1992;117:634-40.
[4] Salzman C. J Clin Psychiatry 1995; 56 Suppl 1: 18-22.
[5] Tamblyn RM, McLeod PJ, Abrahamowicz M, Monette J, Gayton DC, Berkson L, et al. Questionable prescribing for elderly patients in Quebec. CMAJ. 1994;150:1801-9.
[6] Lazarou, J., B.H. Pomeranz and P.N. Corey. 1998. Incidence of Adverse Drug Reactions in Hospitalized Patients: A Meta-analysis of Prospective Studies. JAMA 279: 1200–1205.
[7] Adapted from Western Health Information Collaborative. Pharmaceutical Information Network – Medication Information Strategy White Paper. May 2002.

related illness in Canada in older patients alone is estimated to cost $11 billion per year and to lead to up to 20% of hospital admissions.[8]

Drug expenditures are increasing

Expenditure on drugs is increasing rapidly in Ontario and across Canada. The Canadian Institute for Health Information (CIHI) estimates that total drug expenditure in Canada has grown at an average annual rate of 9.7%, well beyond what can be attributed to economy-wide inflation and growth in the population, and stood at $21.8 billion in 2004. Drug expenditures are the third largest category of health expenditures in Canada, accounting for an estimated 16.7% of total health expenditure in 2004.[9]

The private sector and Canadian households are increasingly bearing the burden of these costs. For example, of the $7.4 billion spent on drugs in Ontario in 2004, $3.4 billion (45%) was financed by the provincial and federal governments, $2.6 billion (35%) by private insurers, and $1.5 billion (20%) by households directly.[10] CIHI data indicate similar patterns in all Canadian provinces.

Coordination and integration in the health care system are poor

Current health care delivery is designed to treat episodic and urgent health problems and is highly fragmented. Patients are often "lost in transition" as they move between institutional and community care, and from one provider to another. Vital health information and evidence-based best practices are seldom available at the point of care. Moreover, current health care delivery models neither support interprofessional collaboration nor empower patients to take more active roles in managing their own health.

[8] Seamless Care. Canadian Pharmacists' Association. Preventable Drug-related Morbidity and Seamless Care.
[9] Canadian Institute for Health Information. Drug Expenditure in Canada 1985 to 2004.
[10] Ontario Ministry of Health and Long-Term Care. 2004/05 Report Card for the Ontario Drug Benefit Program.

Future of Medication Management

Better medication management means that the health system and health professionals are organized to ensure that the most appropriate medications are prescribed and consistently taken by the patient with desired results and fewer adverse reactions. In other words, the right drug is taken the right way to ensure better health outcomes and reduced demand on the health system. The future of medication management will be defined by improvements in quality, safety, costs, and integration in the health care system as described below:

Quality must be improved at each stage in the drug delivery process

Significant improvements in the quality of medication management are possible at every stage in the drug delivery process, especially in prescribing and medication review. Appropriate prescribing practices require that prescribers have:

- comprehensive information about the patient, including lab results, medications, and clinical notes;
- clinical decision support tools at the point of care, such as clinical guidelines and information on drug interactions; and,
- feedback on how patients are being managed according to evidence-based, best practice clinical indicators;

Pharmacists who conduct regular, comprehensive reviews of patients' medications, and share the results of such reviews with the patient and the health care team, are an essential part of pharmacologic care. Numerous studies, including the Romanow Commission, have supported an expanded role for pharmacists in medication and disease management to improve patient outcomes and control health care costs.

Improved safety through greater sharing of information

Research has consistently identified the lack of information-sharing as a major cause of medical and medication errors. Preventable adverse reactions to drugs can be decreased by putting in place mechanisms to collect, analyze, and apply relevant information, such as documenting potential and actual drug-related problems by pharmacists when reviewing patients' medications. Sharing of lab results, visit histories, comprehensive medication profiles, and standardized assessment forms, among others, would enable care providers to make more informed clinical decisions and to recommend appropriate interventions.

Reduced costs through improved adherence, reduced adverse events and better formulary management

In 2003, The Pharmaceutical Information Network (PIN) Task Force published a White Paper[11] that estimated that the implementation of Alberta's PIN system – including ePrescribing, electronic medication profile and history with key clinical data, and clinical decision support functionality – would result in:

- 25% reduction in adverse drug reactions related hospital admissions;
- 25% reduction in hospital admissions related to compliance difficulties;
- 25% reduction in physician visits related to compliance difficulties; and,
- 10% reduction in long-term care admissions related to compliance difficulties.

The White Paper estimated that implementing a system with the above functionality across all western provinces would achieve annual savings of $185 million. This projection recognized the existing, but more limited medication information systems in British Columbia and Manitoba. If such a system were to be implemented in Ontario, annual savings of $238 million may be achieved (assuming Ontario is 29% larger than all four western provinces combined). This might even be a conservative estimate since no pre-existing comprehensive drug information system currently exists in Ontario.

In a more recent study for Infoway, published in March 2005, Booz Allen Hamilton estimated the cost of a Canada-wide EHR system at $10 billon in set-up costs and $32.6 billion in operational costs over 20 years. However, the same study estimated that EHRs would save $82.4 billon in health care costs over those 20 years by:

- reducing adverse drug reactions by 29 million, saving $48.3 billion;
- reducing unnecessary radiological tests, saving $3.6 billion;
- reducing unnecessary laboratory tests, saving $10.5 billion; and,
- allowing the substitution of cheaper alternative medications, saving $20 billion.

Pharmacists and improved medication management are critical to realizing 83% ($68 billion out of the total $82.4 billion) of these estimated benefits.

Thus an Ontario-wide EHR solution would yield an estimated savings of $26 billion (*i.e.* 38% of $68 billion) from improved medication management over 20 years, using a population-based extrapolation.

[11] Pharmaceutical Information Network- Medication Information Strategy Version 4.0; Western Health Information Collaborative; May, 2002.

New care delivery models promote greater integration and collaboration

Improved medication management requires collaborative, proactive interventions by informed care providers. New care delivery models, such as the chronic care management model that targets patients with chronic diseases (*e.g.* diabetes, congestive heart failure, asthma, chronic renal failure, high blood pressure), are based on principles of integration and collaboration by:

- incorporating health promotion, early detection and disease management as everyday elements of care;
- positioning primary care providers to coordinate the spectrum of care provided by specialists, pharmacists, nurses, and other health professionals;
- enabling specialists to provide consultant care, and to act as quality advisors, mentors, and educational resources to primary care providers and other health professionals; and,
- encouraging patients to take a more active role in their own health care and medication management.

The integration of multidisciplinary care providers, including pharmacists, into primary care units such as Family Health Teams, will improve access to care and optimize medication management. Coordinating the medication management workflow between community pharmacists and physicians will help identify and resolve potential and actual drug-related problems. Finally, regional delivery of medication management services, aligned with the priorities of the Local Health Integration Networks (LHINs), makes it possible to meet local medication management service needs.

Expanding the Role of Pharmacists Supports Health System Transformation

The need for high-quality, accessible, affordable, and sustainable health care is a growing international concern. In Ontario, the Ministry of Health and Long-Term Care (MOHLTC) is committed to transforming its health care system to make it more patient-focused, results-driven, integrated, and sustainable. On June 20, 2006, Bill 102 – The Transparent Drug System for Patients Act – was passed by the Ontario government. The Bill was introduced by the Honourable George Smitherman, Minister of MOHLTC and was based on advice from the Drug System Secretariat, which had led a drug system-wide review. Innovative elements of this far reaching bill include reimbursing pharmacists for the delivery of professional services, promoting pharmacists as integral members of primary care teams, and establishing a pharmacy council to advise on future policy development.

The Ontario Pharmacists' Association (OPA) has encouraged the transformation of pharmacy practice by advising the Ministry of Health to develop policies that make the most of the untapped value of pharmacists. They have promoted pharmacists to:

- be a primary source in the health care system for expertise and advice on the safe, effective, and appropriate use of medications;
- improve patient safety and enhance quality of life through chronic disease management and public health services;
- provide cost-effective service and help control health care costs by ensuring appropriate use of medications, increasing adherence to medication regimes, improving individual health outcomes, and decreasing waste; and,
- provide information and education to empower patients to manage their own health.

It has been emphasized that pharmacists' professional services need to be identified, coordinated, delivered using defined protocols, communicated to stakeholders and patients, supported (professional supports), and appropriately reimbursed, in order to ensure success of the above initiatives.

OPA has also developed a four-part approach to policy development and implementation that shows how pharmacists and pharmacy can be integrated into the health care system to improve access to services that improve health outcomes and control health care costs. The approach incorporates the critical components of:

- pharmacists' professional services;
- integration and collaboration;
- information technology; and,
- reimbursement.

With the passing of Bill 102, the foundation has been established to address three of the four parts promoted by OPA. Information technology is the remaining part which requires considerable attention in order for the province to move forward on its transformation agenda for the medication management system.

Information Technology to Promote Change

Ensuring that the right information is available at the right time and the right location, and can be used by the right people to deliver high-quality, safe patient care that improves health outcomes – this is the ultimate goal of information technology deployment in health care.

The federal government established Canada Health Infoway to lead information technology initiatives in Canada's provincial and territorial health systems. Infoway has articulated a vision of a Canada-wide electronic health records (EHR) infrastructure and made significant strides in promoting and coordinating regional efforts.

An EHR is a health care record that is available electronically to authorized health care providers and individual patients anywhere and any time, in support of high-quality care. It can provide Canadians with a secure and private lifetime record of their health history and care within the health system.[12]

Infoway is working in seven areas to improve electronic access to accurate and timely health information to reduce errors, ensure accurate diagnoses, speed up the treatment process, and make the best use of available resources. Medication management information technology is one the identified key areas of an EHR, which include:

- infostructure (that is, IT infrastructure);
- registries (for providers, patients and locations);
- digital imaging systems;
- drug information systems;
- laboratory information systems;
- telehealth; and,
- public health surveillance systems.

[12] Canada Health Infoway. EHR: Electronic Health Record. 2005. Canada Health Infoway. 17 Nov 2005. <http://www.infoway-inforoute.ca/ehr/index.php?lang=en>

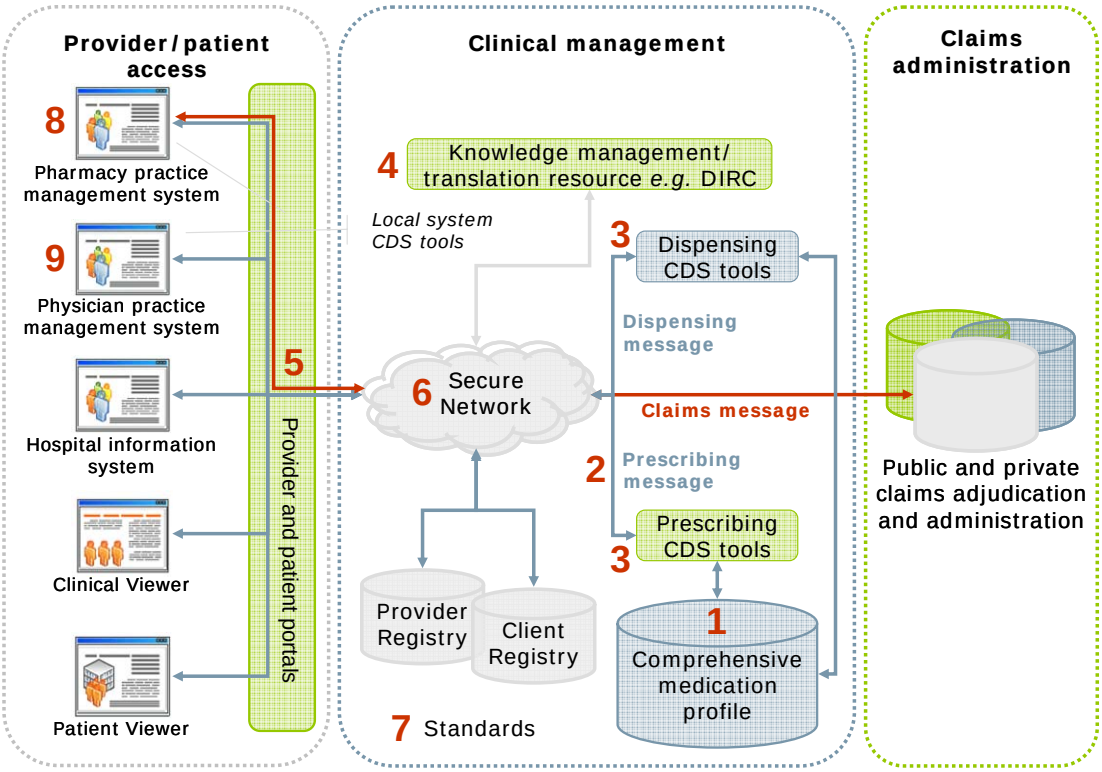
Components of a Medication Management Infrastructure

The IT infrastructure for medication management should support all the clinical and administration services involved and should include the following:

1. a **comprehensive medication profile** for outpatient and inpatient prescription medications and over-the-counter products that includes all drugs for all members of the population;
2. **electronic prescribing** to support electronic ordering of medications and automated alerts to ensure adherence to a medication plan;
3. **clinical decision support tools** to support prescribing decisions and flag potential or actual drug-related problems at the point at which care is provided;
4. **knowledge management and translation** to provide appropriate, round-the-clock clinical and drug information;
5. **provider and patient portals** to give patients and their health care providers ready access to patient information and to ensure greater involvement of patients in their own health care;
6. a **pharmacy network** to ensure integration at the local, regional, and provincial levels;
7. **standards** to ensure that the entire system is integrated and coordinated;
8. **pharmacy management systems** to support dispensing, inventory management, claims processing and adjudication, and compensation; and,
9. **physician practice management systems** to manage the administrative functions of a physician office, such as appointment scheduling and physician billing.

Exhibit 1 illustrates a potential medication management IT infrastructure and shows how these nine components fit together:

Exhibit 1: Potential medication management IT infrastructure



Source: *Adapted from Canada Health Infoway 2004*

The medication management IT infrastructure components are described below along with the state of their implementation in Ontario:

1. Comprehensive, "All Drugs, All People" medication profile

The core component of a medication management infrastructure is a comprehensive medication profile that captures information about all medication transactions for all members of the population, irrespective of the source of finance. More specifically, a comprehensive "All Drugs, All People" medication profile will contain:

- a history of all previous dispensing events – outpatient and inpatient (some, such as the proposed drug information system in Newfoundland & Labrador, include all inpatient medication; others, only medications given to patients upon discharge);
- a history of all non-dispensing events (such as "stop orders");
- an active prescription drug profile;
- information on patient allergies, sensitivities, and past drug interactions;

- a history and active profile of all non-prescription products, including:
  - over-the-counter medications, alternative and herbal medications, vaccines, personal health supplies, drug samples, clinical notes, diagnoses and clinical intents, and indications;
  - the option for pharmacists to add Drug Identification Numbers (DINs) for over-the-counter medications (such as aspirin).

Medication systems that offer information only on "Some Drugs for Some People" may, at best, help care providers identify and prevent some adverse drug effects, but at worst, lead to poor clinical decision-making based on incomplete information. "Some Drugs, Some People" systems should be implemented only as an interim step to an eventual system that provides access to a comprehensive medication profile.

Ontario has implemented a Drug Profile Viewer (DPV) System that will give health care providers in hospital emergency departments real-time access to the Ontario Drug Benefit recipients' prescription drug histories. However, the Ministry of Health and Long-term Care (MOHLTC) has not yet produced a strategy for a provincial "All Drugs, All People" Drug Information System.

2. Electronic prescribing (ePrescribing)

Electronic prescribing systems can reduce medication errors, support appropriate prescribing practices, and streamline medication management interactions between physicians and pharmacists. Most electronic prescribing systems function in the following way:

- The physician sends a prescription to an approved repository, allowing a pharmacy to retrieve the prescription with the patient's authorization.
- Pharmacies retrieve the electronic prescription from the approved repository using a unique identifier, such as a bar code.
- If the physician cannot send the prescription electronically to the pharmacy selected by the patient, the physician prints out a hard copy of the prescription for the patient to take to his or her pharmacy of choice.

Currently, ePrescribing cannot be implemented in Canada because the *Food and Drugs Act (1985)* and the *Controlled Drugs and Substances Act (1992)* stipulate that all prescriptions must be conveyed orally or in writing and that prescribers must sign written prescriptions. Infoway and Health Canada are working jointly to establish electronic equivalents for the signature requirement. They have identified a form of secure electronic signature based on digital certificates as the best way to overcome current

federal regulatory barriers to ePrescribing and made recommendations to ensure the authenticity of electronic prescriptions.[13]

3. Clinical decision support (CDS) *tools*
CDS tools support prescribing decisions and help flag potential and actual drug interactions to clinicians. Most practice management systems provide this service locally. However, only medications prescribed within the local system are included, which usually represents only part of a patient's complete drug profile.

Larger medication management systems often use proprietary drug information databases to power the CDS tools, such as FirstDataBank, Medispan, Micromedex, and SantéXpert. With the exception of a few products, used mostly in Québec, most drug information databases and electronic reference tools are not Canada-specific.

Pharmacy benefits managers (PBMs), such as Emergis, Green Shield, and ESI Canada, provide decision support to pharmacists for medications covered by drug plans that the PBMs adjudicate and administer. Emergis, for example, provides customized formularies for plan sponsors and enables concurrent drug utilization review (DUR). Pharmacists can view and assess DUR checks at the time of adjudication to identify real and potential drug-related problems. However, DUR analyses are performed only in relation to the profile held by a particular adjudicator. While this profile is usually more comprehensive than the profile in local practice management systems, it rarely represents an individual's complete medication profile. Only with a comprehensive medication profile can CDS analysis be based on complete information and provide the best possible value.

4. Knowledge management and translation
Medication management systems are also integrated with contextual knowledge management and translation services, which support care providers by acting as drug information resources. These services answer health care providers' medication-related questions by telephone, fax, or e-mail. For example, the OPA's Drug Information and Research Centre (DIRC) operates a call centre staffed by specially trained and skilled pharmacists who provide drug information to health care providers. DIRC also publishes regular print and online articles and bulletins that synthesize, review, and evaluate drug-related research and information. Finally, DIRC supports the Ontario's Telehealth service, through which health care providers respond to health questions from the public.

[13] Canada Health Infoway, Health Canada. Ensuring the Authenticity of Electronic Prescriptions: Proposed Approach. 30 Sep 2005.

5. Provider and patient portals

Provider portals make it possible for health care providers to get "one-stop" access to information and resources specific to their practice. For example, the OntarioMD.ca portal developed by OMA eServices (an independent subsidiary of the Ontario Medical Association), gives Ontario physicians round-the-clock access to:

- electronic journals;
- health news;
- electronic references (such as MD Consult, Skolar MD and eCPS);
- online continuing medical education;
- links to useful websites;
- clinical practice guidelines; and,
- secure e-mail.

The Ontario Pharmacists' Association is planning a portal for Ontario pharmacists based on a shared platform with OntarioMD.ca.

6. Pharmacy network and technical infrastructure

Advanced medication management systems depend on secure, "always-on" broadband networks integrated with other health infrastructure at the local, regional, and provincial levels. A pharmacy network must comply with standards for connectivity and compatibility (such as the National eClaims Standard Initiative) to support pharmacy claims processing and adjudication by public and private health insurance companies.

However, the value of the pharmacy network in the future will be as a foundation for a drug information system. Thus, integration with the infrastructure provided by Smart Systems for Health Agency (SSHA) is essential for meshing data and workflow with other regional, provincial, and national registries and diagnostic imaging systems, and systems such as the Wait Times Information System and the Ontario Laboratory Information System. Service delivery standards for hardware, help desks, technical support, policies and standards, and privacy and security requirements are needed maintain the infrastructure.

7. Standards to ensure compatibility among systems

Medication management systems require messaging standards to support the exchange of information among users. Two messaging standards are especially relevant for medication management systems: CeRx and NeCST.

- The Canada-wide Electronic Drug (CeRx) Messaging Standards Project at Canada Health Infoway is developing specifications to support the exchange of clinical drug messages between different systems. CeRx messages will enable the preparation of

a comprehensive medication profile and coordinate workflows necessary for electronic prescribing.
- The National eClaims Standard Initiative (NeCST) aims to facilitate and support the development of a national electronic claims messaging standard for exchanging electronic health claims information across Canada, for private- and public-sector payers and health service providers.

National standards would ensure consistency in data capture, provide the foundation for claims information exchange throughout the health care industry, and reduce the cost of managing health billing data for care providers, and processing of health claims and payments by payers.[14] Professional associations are well positioned to develop and implement such standards.

8. Pharmacy practice management systems

Pharmacy practice management systems support dispensing, inventory management, claims processing, and adjudication in pharmacies. Most systems include clinical decision support and interactions-checking capabilities. It is therefore essential to ensure that system vendors upgrade and modify their products to integrate them with medication management software. The benefits to vendors of doing so include:

- opportunities to develop system enhancements for end-users, thereby improving customer relationships;
- expansion of vendors' geographical reach through conformity with the emerging Canada-wide standards; and,
- increased usability of vendors' products through integration into the medication management system.

Supporting vendor upgrades by publishing and sharing a vendor Application Program Interface (API) toolkit can promote the integration process. For example, to help providers make the transition from submitting electronic claims to Ontario's Workplace Safety and Insurance Board (WSIB) through a web browser to sending NeCST messages using practice management systems, Emergis developed an API toolkit for vendors and supported required vendor modifications to accommodate NeCST.

9. Physician practice management systems

Physician practice management systems support not only administrative functions in a physician's office, such as billing and appointment scheduling, but also clinical capabilities, such as ePrescribing. Practice management systems increasingly include

[14] National Electronic Claims Standard Initiative. Infostructure standards. 2005. Canadian Institute for Health Information. 30 Nov 2005. <http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=infostand_eclaims_e>

electronic medical record (EMR) capabilities, which capture and manage complete patient data and make it accessible to health care providers.

Canadian physicians lag behind their colleagues in other countries in their adoption of EMRs. At present only 14 percent of Canadian physicians using EMRs, compared to 59 percent in Britain, 52 percent in New Zealand, 25 percent in Australia, and 17 percent in the United States.[15] Moreover, the Canadian Medication Association (CMA) recently reported that only 3 percent of Canadian physicians use electronic records exclusively, while the majority use a combination of electronic and paper records.[16] Even physicians who do use EMRs do not use the full range of tools, such as electronic prescribing tools, as reported in a recent study by the Center for Studying Health System Change in the United States.[17] The system's value will be fully realized only when all providers adopt compatible systems that communicate with and contribute to a regional medication management system.

Speeding up the adoption of practice management systems by physicians may involve:

- subsidizing the costs of acquisition and implementation of systems;
- working with stakeholders to identify, develop, and communicate transitional arrangements;
- developing and implementing toolkits to support clinical workflows (e.g., workflow aids, chronic disease management templates);
- working with government stakeholders to promote required changes in legislation and policies; and,
- partnering with regulatory colleges and professional associations to review, update, and communicate any changes to standards of practice required to support medication management system implementation.

In Ontario, the Ministry of Health and Long-term Care (MOHLTC) has provided $150 million to the Ontario Medical Association's OMA eServices subsidiary to develop and implement a Physician IT Program.

[15] Harris Interactive 2001.
[16] Canadian Medical Association. 2002 Physician Resource Questionnaire.
[17] Reed MC and Grossman JM. Limited Information Technology for Patient Care in Physician Offices. Center for Studying Health System Change Issue Brief. 2004; 89.

Other infrastructure components

The components highlighted above need to be integrated with well-established IT infrastructure, such as hospital information systems and public and private claims adjudication and administration systems.

Most hospitals in Ontario have hospital information systems, but few have linkages to community-based systems, such as provider and patient portals. Greater integration of hospital information systems with regional and provincial initiatives, such as Enterprise Master Patient Indices (EMPIs), scheduling systems, and medication management systems, will be a growing trend, especially as Ontario moves towards its regionalization model.

Public and private claims adjudication and administration systems are well-established in Ontario and facilitate the electronic, real-time adjudication and reimbursement of medications. In the near-term, such systems may be leveraged to provide interim medication profiles. However, claims adjudication systems do not capture “all drugs for all people” – for example, medications paid for entirely by patients – nor do they capture all the information needed in clinical decision-making. Consequently, claims adjudication systems will be important, but not the sole, components of a medication management infrastructure.

How Have Other Canadian Jurisdictions Done It?

Canada Health Infoway's drug information system (DIS) program is intended to facilitate the adoption of EHR by promoting local or regional drug information systems. Infoway classifies drug information systems into three groups, or generations:

- Generation 1 systems provide dispensing support through Drug Utilization Reviews on drug claims adjudicated by public and private payers.
- Generation 2 systems allow pharmacists access to patients' details electronically and to include this information in patients' longitudinal drug profile. Some versions are "All Drugs, All People" databases; others include only those in provincial drug programs.
- Generation 3 systems have the following additional capabilities:
  - physicians can send patients' prescriptions electronically;
  - any pharmacy can view the orders online, and fill prescriptions; and,
  - messages can be sent electronically to be included in the patient's longitudinal drug profile.

Generation 1 systems are now in place across Canada. Infoway's deployment strategy is to invest in HL7 pan-Canadian standards and user adoption, and support Generation 2 systems as a stepping stone to Generation 3. [18]

Jurisdictions across Canada have taken varying approaches to implementing medication management systems. Exhibit 2 below summarizes the differences in their approaches.

[18] Bishop K. Towards an Electronic Health Record: Investments in Drug Information Systems in Canada. Presentation at "Tools for Advancing Pharmaceuticals Management Conference". Ottawa. Nov. 25, 2004.

Exhibit 2: Comparison of provincial medication management systems

	BC	AB	SK	MB	NL	ON
Comprehensive medication profile	Established	Implementing	Implementing	Established	Planned	None
ePrescribing	Planned	Planned	Planned	Planned	Planned	None
CDS Tools	Established	Established	Implementing	Established	Planned	None
Integration with Knowledge Management & Translation	None	None	None	None	None	None
Provider Portal	Established	Established	None	Viewer implemented in EDs	Planned	ED Access Viewer being implemented
Patient Portal	Planned	Established	None	None	Planned	None
Pharmacy Management Systems	Integrated with DIS	Implementing integration	Integrated with DIS	Integrated with DIS	Planned integration	No integration
Physician Practice Management Systems	Integrated with DIS	Integrated with DIS	Planned integration	Planned integration	Planned integration	No integration
Standards implemented	CPhA v3; NeCST, CeRx planned	CPhA v3; NeCST, CeRx planned	CPhA v3; NeCST, CeRx planned	CPhA v3; NeCST, CeRx planned	CPhA v3; NeCST, CeRx planned	CPhA v3; NeCST, CeRx planned
Pharmacies legislated to send information to DIS	Yes	No	Yes	No	Planned	No
Key lessons learned	Engage and involve pharmacy stakeholders first to provide content and value	Addressing clinician workflow and usability issues is critical for adoption	Leveraging existing infrastructure to build components of DIS is effective	Providing compelling business reasons for pharmacies is effective in encouraging adoption	Robust change management strategy needs to be well-defined up-front	Leveraging and co-ordinating stakeholders to move forward requires leadership from neutral organizations

Lessons Learned for Ontario

Ontario has an opportunity to use the lessons learned in other provinces and leverage existing infrastructure to successfully implement a comprehensive medication management system. Some of these lessons include:

Focus on quality and safety
Users of medication management systems need to generate and share information to inform policy decisions and front-line clinical decision-making in order to improve the quality and safety of pharmacologic care, and ultimately the health outcomes, of all Ontarians.

Respect the workflows of users
When designing and implementing a medication management system, it is essential to respect the workflow of pharmacists and physicians if they are to adopt it. At a minimum, the technology must not reduce their productivity *in the long term*. For example, although it may take a physician longer to create a single prescription electronically compared to one on paper, the time to complete the many subsequent refill authorizations electronically is much shorter.

Ensure alignment with broader initiatives
Medication management systems must be integrated into broader health care reform initiatives such as Family Health Teams or Community Health Centres.

Provide compelling business reasons for adoption
Stakeholders need compelling business reasons and tangible benefits if they are to adopt and to contribute to the medication management system.

Pursue building-block projects, especially at the Local Health Integration Network (LHIN) level
Medication management initiatives may progress faster at the level of Local Health Integration Networks (LHINs), than at the level of the Ministry of Health and Long-Term Care. Building block projects at the LHIN level (such as regional medication management systems, the Enterprise Master Patient Index, or registries) will create infrastructure for an eventual province-wide medication management system.

Use change management strategies

Change management practices can help ensure the adoption of initiatives and new information management infrastructure. The strategies might include:

- conducting benefit studies to measure the value of collaboration;
- communicating the program strategy and benefits;
- developing a quality improvement information infrastructure;
- defining business reasons for pharmacists and other providers to adopt clinical programs and IT infrastructure;
- identifying and supporting key change agents; and,
- engaging influential associations such as the Ontario Medical Association (OMA), the Ontario Pharmacists' Association (OPA), or Research-Based Pharmaceutical Companies (Rx&D).

Define a role for Smart Systems for Health Agency

The role of SSHA in a new information management infrastructure needs to be clearly defined.

Encourage professional associations to lead initiatives

Professional associations, such as the Ontario Pharmacists' Association, are ideally positioned to engage stakeholders and lead medication management initiatives

Implement drug information systems in each province

Drug Information Systems should be implemented in each province to simplify delivery of information to clinicians.

Key Questions for Ontario

The key questions for Ontario as it moves towards better medication management can be grouped into four main categories:

1. Understand the Problems of the Current Situation

- How do we create a sense of urgency about Ontarians who are currently suffering from unnecessary adverse drug reactions and poor medication management?
- How do we gain a comprehensive understanding of the issues and needs of the system stakeholders?
- How can we best use the Canada Health Infoway investments and its model for DIS?

2. Create the Right Vision for the Future

- What basic characteristics of a medication management system would be endorsed by a broad stakeholder group?
- How can Ontario build on concurrent initiatives to improve clinical service delivery and establish multidisciplinary care team models?
- How can Ontario integrate claims management processes with clinical processes?
- What are the measurable clinical, process, and financial goals of an optimal medication management system?

3. Define the Right Transition Plan

- How can Ontario make the transition from its current strategy of “Some Drugs, Some People” available mainly to emergency departments to a more comprehensive system of medication management?
- What reimbursement models, such as cognitive (or consultative) service fees, will promote better medication management and the adoption of community-based drug information systems?

4. Demonstrate Leadership to Drive the Change

- What governance structure will support progress towards a comprehensive medication management system, including decision making, collaboration, IT infrastructure, standards, and policies to sustain change?
- How should the priorities of key stakeholders, such as the SSHA, the eHealth Office, the Ontario Drug Programs Branch, and the Drug Systems Secretariat, be incorporated into the development of the medication management system?
- What is the best way to involve professional associations, research institutes, and health care providers in identifying solutions and demonstrating innovative delivery models?

Conclusion

The current method of prescribing, dispensing, and reimbursing for medications is under tremendous pressure to change. Ontarians are demanding higher standards of care, better patient safety, more value for money spent, and an integrated continuum of care delivery. In the new medication management model, information technology can help achieve these goals. The Ministry of Health and Long-Term Care and the Ontario Pharmacists' Association have taken the lead to develop policies that make better use of pharmacists' professional expertise to increase the health of the population. There is growing evidence that a medication management information technology can improve the quality, safety and costs of health care service delivery. Thus it is time for Ontario to truly transform its medication management system and invest in a comprehensive information technology solution now!

The province needs to initiate the planning for a comprehensive medication management information system that will help pharmacists deliver better value. The experiences of other provinces in implementing drug information systems can help Ontario develop its own solution and approach to implementation. This paper has highlighted key principles for making progress in Ontario, as well key questions to consider in developing and implementing a medication information management strategy for Ontario. The engagement of professional associations, industry, and government stakeholders will be a challenging but necessary process to ensure support for the required transformation.

Acknowledgements

This paper was prepared through the collaboration of Emergis and Courtyard Group Ltd.

Emergis Inc.

Principal Writer: Mike Roszak, Vice-President, Business Development

Emergis has co-written and funded this White Paper to share its knowledge with the industry and demonstrate its commitment to improving the health of Canadians through its eHealth solutions. A key focus of Emergis' efforts is to build and integrate electronic systems that help pharmacists manage medication claims and clinical information for their clients. The following Emergis initiatives can help facilitate change in Ontario's medication management system:

- *Developing a provincial Drug Information System*: Emergis has recently begun implementing a province-wide Drug Information System with the Newfoundland and Labrador Centre for Health Information and Canada Health Infoway.
- *Using change management techniques to engage pharmacists*: Emergis' change management approach for WSIB and planned approach for the Newfoundland and Labrador DIS project is multi-faceted and tailored to different stakeholders at different points in the change process. Depending on the input received at various points in the process, Emergis modifies the messages, communication plan, and level and type of engagement to support specific stakeholder requirements.
- *Implementing the HL7 v3*[19] *messaging standard*: In 2002, Emergis led a major project for WSIB to improve the approval process for providers' bills. Working closely with government, care providers, software vendors, and national agencies, including Infoway and the CIHI, Emergis pioneered the development and initial North American implementation of the HL7 v3 messaging standard to accept NeCST messages from practice management systems.
- *Supporting user adoption by providing "quick wins":* Emergis implemented a simple portal through which providers could get used to submitting claims electronically, before helping them make the transition to exchanging HL7 v3 messages through practice management software.
- *Providing clinical decision support through electronic adjudication of claims*: Concurrent Drug Utilization Review (DUR) is a standard component of Emergis' Pharmacy Benefit Management services. DUR promotes patient safety and the appropriate use of drugs through checks performed at the time of, and in addition to, adjudication, allowing pharmacists to make any necessary adjustments to

[19] An acronym for Health Level 7, it is the interface standard for communication between various systems employed in the medical community.

medications being dispensed. DUR checks compare the drug claim to other drug claims incurred by the same person within the last 100 days.

- *Publishing and sharing vendor API toolkits to support vendor upgrades*: API toolkits facilitate the integration process. For example, to help health care providers make the transition from submitting electronic claims to WSIB through a web-based application to submitting NeCST messages using practice management software, Emergis developed an API toolkit for vendors and supported vendor modifications to accommodate NeCST.

Recognizing the interdependencies and complexities of managing medications in the Ontario, Emergis is collaborating with stakeholders to promote the changes required to develop a more cost-effective system.

Courtyard Group Ltd

Principal Writers:
Nicholas E. Zamora, BScPhm, MBA, CHE – Clinical Informatics Specialist
Vincent Ng, BScPhm, MBA – Consultant

Document Reviewers:
Matthew Morgan MD MSc FRCP(C) and Steve Rome

The Courtyard Group has co-written this paper to share its expertise with the industry and support Ontario's journey to transform its health care system. Developing innovative health care service deliver models, IT deployment and adoption strategies to support better medication management is central to Courtyard's work.

About Courtyard Group – www.courtyard-group.com

Courtyard Group has developed a proven track record of transforming the health system. We bring together a wide range of experience and multidisciplinary knowledge to address the complex challenges facing our health system. Built on the hundreds of years of collective experience of the partners and principals, we have grown to almost 100 consultants operating from offices in Toronto, New York City, Edmonton and now the UK.

The Courtyard team provides strategy, advisory, project management, change leadership and clinical informatics services to a variety of clients, with the goal of driving significant improvements in the quality and productivity of the health care system.

Courtyard's client base includes health service delivery organizations, governments and policy makers, professional associations and suppliers to the health sector.