

Medication Safety

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In 2005, the Canadian Council on Health Services Accreditation (CCHSA) developed and released six Patient / Safety Goals and 21 Required Operational Practices (ROPs) related to patient safety which are now part of the accreditation program. The Patient / Safety Goals, and the related ROPs¹, are divided into five patient safety domains; culture, communication, medication use, work life / workforce, and infection control. The CCHSA document entitled *Evaluation of Implementation and Evidence of Compliance*, details how surveyors assess compliance with the Patient / Safety Goals and the ROPs.

The results of the 2005/06 Hospital Pharmacy in Canada survey provide a snapshot of current practices related to medication safety. The survey also helps identify initiatives that hospital pharmacists, in collaboration with health care providers and the leaders of their organizations, will need to implement in order to comply with CCHSA's Patient/Client Safety Goals and medication related ROPs.

Medication Incident Reporting System

CCHSA required organizational practices, that fall under the culture domain of patient safety, include:

- establish a reporting system for actual and potential adverse events, including appropriate follow-up;
 - implement a formal (transparent) policy and process of disclosure of adverse events to patients/families, including support mechanisms for patients, family and care/service providers.
- Ninety-six percent of all respondents reported use of a medication incident reporting system within their facilities (Table G-1).

The presence of reporting systems in organizations will facilitate future reporting to the national database, the *Canadian Medication Incident Reporting and Prevention System (CMIRPS)*, that is currently being developed through a collaborative partnership between the Institute for Safe Medication Practices-Canada (ISMP Canada), the Canadian Institute for Health Information, and Health Canada. The design of CMIRPS is intended to result in a system that embodies the 7 characteristics of successful incident reporting systems, as identified by Leape²: non-punitive, confidential, independent of any authority with power to punish, expert analysis, timely, systems-oriented and responsive.

- Seventy-seven percent of those respondents with a medication incident reporting system reported that strategies have been implemented to increase reporting of medication incidents, compared to 67% in 2003/04. Among the respondents who had implemented strategies, reported initiatives included: in-service to promote reporting (90%, compared to 74% in 2003/04), communication of improvements resulting from reporting to general staff (66%, compared to 57% in 2003/04), incident reports made non-discoverable (36%, compared to 27% in 2003/04), incentives to staff for reporting (33%, compared to 33% in 2003/04), and modified performance appraisal instruments to reward, rather than penalize, incident reporting (7%, compared to 11% in 2003/04). A number of respondents commented on the recent implementation of an on-line incident reporting program at their facility, intended to increase reporting by front line healthcare workers. The upward trend in the percentage of respondents reporting that incident reports were made non-discoverable (36% in 2005/06, compared to 27% in 2003/04 and 7% in 2001/02) suggests that the concept of a just culture, with protection for staff who report medication incidents, is taking root in Canadian health care facilities.
- Forty-six percent of respondents (including those who answered "yes" or "partial") indicated that incidents occurring during prescribing, and detected in pharmacy before dispensing, are reported. This is a notable increase from 28% in 2003/04.

- The percentage of respondents who report incident that occurred in pharmacy but were detected before the medication left the pharmacy has almost doubled since 2003/04 (64% in 2005/06, compared to 34% in 2003/04). Results indicate that reporting of this type of “near-miss” (including those who answered “yes” or “partial”.) was highest in Atlantic Canada (85%, 11/13), followed by the Prairies (80%, 16/20), Ontario (79%, 35/44), BC (53%, 10/19), and Quebec (38%, 15/40). Among the respondents who reported having a formal process for reporting medication incidents that occurred in pharmacy but did not leave the department, more than half (52%) indicated that those incidents were only reported within pharmacy, and were not submitted to the hospital’s incident reporting system. Reporting of “near-misses” provides valuable information that helps to identify and prioritize actions that can be taken to improve the medication-use system.
- Incidents detected on the patient care units, but before administration to the patient, are reported most of the time ($\geq 90\%$) by 75% of respondents, as compared to 66% of respondents in 2003/04. Regional differences are worth noting; in Atlantic Canada 100% of respondents (13/13) reported having a formal process in place for reporting such incidents ($>90\%$), compared to 68% (13/19) in BC and 60% (24/40) in Quebec.
- The percentage of respondents who reported that medication incidents reports can be used during an individual healthcare provider’s performance assessment was 12%, compared to 21% in 2003/04 and 32% in 2001/02. None of the teaching hospital respondents reported that medication incident reports can be used during individual performance assessments. This positive change reflects the adoption of a non-punitive “just culture” that has been strongly encouraged by patient safety organizations and many professional associations.
- Eighty percent of all respondents reported having a policy on the disclosure of incidents to patients and/or their families, compared to 63% in 2003/04. Of the 113 respondents with a disclosure policy, 91% document the disclosure of incidents in the health record. The number of respondents reporting that a disclosure policy existed in their facility was highest in the Prairies (95%, 19/20) followed by Ontario (91%, 41/45), Quebec (86%, 36/42), Atlantic Canada (80%, 12/15) and BC (25%, 5/20).

Table G-1 Reporting Systems for Medication Incidents 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
A medication incident reporting system is in use	136 96%	26 96%	74 95%	36 97%	36 97%	100 95%
Strategies have been implemented, with the goal of increasing the <u>reporting of medication incidents</u>	(136) 105 77%	(26) 19 73%	(74) 54 73%	(36) 32 89%	(36) 32 89%	(100) 73 73%
Incidents that occur during <u>prescribing</u> and are detected in the pharmacy before dispensing are reported						
Yes (>=90%)	27 20%	6 23%	15 20%	6 17%	10 28%	17 17%
Partial (< 90%)	35 26%	4 15%	18 24%	13 36%	10 28%	25 25%
Incidents that occur in <u>pharmacy</u> but are detected prior to the medication leaving the pharmacy are reported						
Yes (>=90%)	48 35%	10 38%	24 32%	14 39%	14 39%	34 34%
Partial (< 90%)	39 29%	8 31%	19 26%	12 33%	11 31%	28 28%
Incidents that occur <u>before medication is administered</u> to patient and are detected in patient care area are reported						
Yes (>=90%)	102 75%	19 73%	57 77%	26 72%	26 72%	76 76%
Partial (< 90%)	23 17%	4 15%	10 14%	9 25%	8 22%	15 15%
Medication incident reports can be used during an individual healthcare provider's <u>performance assessment</u>	(142) 17 12%	(27) 6 22%	(78) 10 13%	(37) 1 3%	(37) 0 0%	(105) 17 16%
Hospital has a policy on the disclosure of incidents to <u>patients and/or their families</u>	113 80%	21 78%	59 76%	33 89%	35 95%	78 74%
Disclosure is <u>documented in the health record</u>	(113) 103 91%	(21) 21 100%	(59) 53 90%	(33) 29 88%	(35) 34 97%	(78) 69 88%

Medication Incident Review

- Eighty percent of all respondents reported having a designated committee responsible for medication incident review (Table G-2), showing no change from 2003/04. The Prairies lead with 95% (19/20), followed by Ontario (87%, 39/45), Quebec (81%, 34/42), Atlantic Canada (80%, 12/15) and BC (50%, 10/20).
- Among the 114 respondents who reported that a designated committee is responsible for medication incident review, the committees named as responsible for this function (Note: more than one committee could be selected) included the Pharmacy and Therapeutics Committee (48%), Medication Safety/Quality Committee (44%), Risk Management Committee (38%), General Quality Committee (37%), Pharmacy & Nursing Committee (32%), Medical Advisory Committee (18%) and other committees (24%). Results indicate a significant increase in the number of respondents (44% in 2005/06 vs. 17% in 2003/04) who have designated a Medication Safety/Quality Committee to oversee the review of medication incidents.

- A Medication Safety Self Assessment tool was reported to have been completed by 71% of all respondents, compared to 51% in 2003/04. Eighty-six percent of teaching hospitals, compared to 66% of non teaching hospitals reported completing a self-assessment tool. The completion of a self-assessment tool was highest in the Prairies (100%, 20/20), followed by Ontario (87%, 39/45), BC (85%, 17/20), Atlantic Canada (60%, 9/15) and Quebec (38%, 16/42). Of the respondents who reported completing a self-assessment, 91% used the ISMP Hospital Medication Safety Self-Assessment™ tool (ISMP MSSA).
- Thirty-seven percent of all respondents reported that they broadly communicate information regarding the institution's medication incidents to hospital staff and physicians. This practice was more commonly reported by teaching hospital respondents (49%) than by non-teaching hospital respondents (32%).
- Nearly half of all respondents (47%) reported that they broadly communicate information regarding published medication incidents to hospital staff and physicians.

Table G-2 Medication Safety Review and Assessment 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
Designated committee responsible for the review of medication incidents	114 80%	23 85%	61 78%	30 81%	33 89%	81 77%
Information regarding the institution's medication incidents is broadly communicated to general staff/ healthcare providers	52 37%	14 52%	28 36%	10 27%	18 49%	34 32%
Information regarding published medication incidents is broadly communicated to general staff/ healthcare providers	67 47%	14 52%	38 49%	15 41%	17 46%	50 48%
A medication safety self assessment has been completed	101 71%	20 74%	56 72%	25 68%	32 86%	69 66%
Type of medication safety self assessment	(101)	(20)	(56)	(25)	(32)	(69)
ISMP	92 91%	19 95%	51 91%	22 88%	30 94%	62 90%
Other	6 6%	0 0%	4 7%	2 8%	2 6%	4 6%

Medication Incident Reduction Strategies - Prescribing, Transcribing and Administration

The Canadian Society of Hospital Pharmacists and the American Society of Health System Pharmacists have both published guidelines on preventing medication errors in hospitals.^{3 4}

CCHSA has also identified required organizational practices related to verification and other checking systems for high risk care/service activities, including medication use. ROPs that fall under the medication use domain of patient safety include:

- Remove concentrated electrolytes (including, but not limited to, potassium chloride, potassium phosphate, sodium chloride > 0.9%) from patient/client care units;
- Standardize and limit the number of drug concentrations available in the organization.

Tables G-3 and G-4 provide data on a number of strategies that are recommended to prevent medication incidents.

- Thirty-eight percent of all respondents, compared to 49% in 2003/04, reported that they do not have a policy requiring checking of two patient identifiers before a medication is administered. This percentage was consistent across hospital status and size.
- Sixty-eight percent of all respondents reported that the patient's allergy status is known in $\geq 90\%$ of cases prior to a medication order being dispensed, compared to 72% in 2003/04.
- Only 75% of all respondents (including "yes" and "partial" responses) reported that verbal and telephone orders are limited to situations in which the patient is at risk for harm and the physician is unable to physically write the order. This is similar to 2003/04 when 76% of respondents reported that this error reduction strategy was in place. To improve communication among caregivers and enhance patient safety, hospitals should clearly establish limitations on the use of verbal or telephone orders.
- Forty-four percent of all respondents reported that most of the time ($\geq 90\%$), medication orders remain conditional until reviewed by a pharmacist. Medication order review by a pharmacist prior to the medication being administered, including the evaluation of the appropriateness of the order against the current medication profile for a specific patient, is a key element of safe medication practices. Fifty-six percent of respondents reported a double check procedure was in place ($\geq 90\%$ of time) to validate medication orders entered into the Pharmacy information system against the paper, fax or electronic physician order. An additional 19% reported that a partial verification system ($<90\%$) was in place.
- Eighty-seven percent of all respondents reported a formal process was in place to review and approve pre-printed medication orders and 77% of all respondents reported having a process to review and approve infusion charts and guidelines. Less than half of the respondents (42%) reported that a formal process was in place to review and approve physician order sets. The implementation of physician order sets requires validation by a formal committee within the organization, to ensure safe practices.
- Establishment of a designated list of dangerous abbreviations that are not accepted in the institution was reported by 58% of all respondents, a notable increase from the 40% reported in 2003/04. The use of nonstandard or ambiguous abbreviations has lead to medication incidents. Hospitals are encouraged to establish a list of abbreviations that should not be used. JCAHO⁵ and ISMP⁶ have published lists of abbreviations that have been associated with incidents, to assist hospitals in establishing their lists.

Table G-3 Medication Safety Strategies - Prescribing, Ordering, Transcribing 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
Policy requiring that <u>two patient identifiers</u> (neither to be the patient's room number) are checked before administering medications						
Yes (>=90%)	57 40%	12 44%	30 38%	15 41%	18 49%	39 37%
Partial (< 90%)	23 16%	5 19%	12 15%	6 16%	4 11%	19 18%
The patient's <u>allergy status</u> is know prior to a medication order being dispensed						
Yes (>=90%)	97 68%	18 67%	57 73%	22 59%	23 62%	74 70%
Partial (< 90%)	39 27%	8 30%	16 21%	15 41%	14 38%	25 24%
<u>Verbal and telephone orders</u> are limited to situations in which the patient is at risk for harm and physician is unable to physically write an order						
Yes (>=90%)	60 42%	15 56%	30 38%	15 41%	15 41%	45 43%
Partial (< 90%)	47 33%	5 19%	28 36%	14 38%	15 41%	32 30%
<u>A medication order remains conditional</u> (i.e. no labels printed or drug dispensed, no update of profile or MARs, or access to automated dispensing units) until reviewed by a pharmacist						
Yes (>=90%)	63 44%	13 48%	33 42%	17 46%	15 41%	48 46%
Partial (< 90%)	43 30%	5 19%	27 35%	11 30%	15 41%	28 27%
<u>When medication orders are entered into the Pharmacy information system (PIS) from a paper, fax or electronic copy, there is a double check to verify the accuracy of the computer order entry</u>						
Yes (>=90%)	80 56%	18 67%	39 50%	23 62%	17 46%	63 60%
Partial (< 90%)	27 19%	3 11%	18 23%	6 16%	10 27%	17 16%
There is a formal process to review and approve						
Pre-printed medication orders	124 87%	25 93%	67 86%	32 86%	35 95%	89 85%
Physician order sets (i.e. for computer order entry)	60 42%	8 30%	36 46%	16 43%	16 43%	44 42%
Infusion dosage charts and guidelines	109 77%	18 67%	61 78%	30 81%	31 84%	78 74%
There is a <u>list of dangerous abbreviations</u> that are <u>not</u> accepted in the institution	83 58%	18 67%	41 53%	24 65%	27 73%	56 53%

- Sixty-one percent of all respondents reported that they have identified a list of high-alert medications, a notable increase over the 38% in 2003/04 who reported that they had such a list. Of the 87 respondents with a list, 80% have developed a policy describing the safety procedures that are to be used within the organization for high-alert medications. High-alert medications are ones that have frequently been associated with medication incidents that result in patient harm. The list of the most commonly reported products by level of harm, extracted from the MEDMARX report: (*A Chartbook of 2000-2004 Findings*⁷) and the ISMP list of high-alert medicines⁸ can assist hospitals in establishing their list of high-alert medications. (Table G-4)

- All respondents in BC and the Prairies have removed concentrated KCl, compared to 93% in Ontario (42/45) and Atlantic Canada (14/15) and 60% (25/42) in Quebec. Sixty-five percent of all respondents reported that they have removed concentrated narcotics from patient care units. This percentage reaches 85% (17/20) in the Prairies and 79% (33/42) in Quebec where incidents leading to narcotic related deaths lead to formal reviews and province-wide implementation of safety strategies intended to prevent the recurrence of similar incidents. ISMP Canada, in collaboration with the Ontario Hospital Association and the Ontario Ministry of Health and Long Term Care, conducted a Medication Safety Initiative that resulted in the publication of a document entitled 'System Safeguards to Prevent Error-Induced Injury with Narcotics (Opioids)⁹. This is a very useful tool for helping organizations to review their processes related to the use of narcotics.
- More than half of the respondents (53%) reported that they have removed all other concentrated electrolytes (e.g., hypertonic saline) from patient care units.
- Seventy-five percent of all respondents reported that they have standardized and limited the number of available heparin infusion concentrations, compared to 81% in 2003/04. Standardization of infusion concentrations for morphine was reported by 57% of all respondents, compared to 47% in 2003/04. For hydromorphone, 53% of all respondents reported standardization of infusion concentrations, compared to 41% in 2003/04. Forty-eight percent of all respondents indicated that they had standardized insulin infusion concentrations, compared to 47% in 2003/04.

Table G-4 Medication Incident Reduction Strategies - Preparing, Dispensing, Administration 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
The hospital has identified a list of <u>high-alert</u> medications	87	17	44	26	29	58
	61%	63%	56%	70%	78%	55%
Policy that describes the safety procedures for specific high-alert medications that are used	(87)	(17)	(44)	(26)	(29)	(58)
Yes	70	14	34	22	27	43
	80%	82%	77%	85%	93%	74%
No	17	3	10	4	2	15
	20%	18%	23%	15%	7%	26%
The hospital has removed one or more of the following concentrated medications from patient care units in at least 90% of cases	(142)	(27)	(78)	(37)	(37)	(105)
KCl	121	26	64	31	35	86
	85%	96%	82%	84%	95%	82%
All other concentrated electrolytes (hypertonic saline)	75	17	41	17	19	56
	53%	63%	53%	46%	51%	53%
Concentrated narcotics	92	16	50	26	22	70
	65%	59%	64%	70%	59%	67%
The hospital has <u>standardized and limited the number of available infusion concentrations</u> for the following high-alert medications, and these standardized concentrations are used in at least 90% of cases for						
Heparin	106	18	60	28	28	78
	75%	67%	77%	76%	76%	74%
Morphine	81	12	46	23	23	58
	57%	44%	59%	62%	62%	55%
Hydromorphone	75	10	45	20	21	54
	53%	37%	58%	54%	57%	51%
Insulin	68	11	40	17	18	50
	48%	41%	51%	46%	49%	48%

Medication Reconciliation

Medication reconciliation is a practice designed to prevent medication errors at transition points in care such as admission to, or discharge from, a hospital. It has been identified as a key component of the seamless care process in the Canadian Society of Hospital Pharmacists/Canadian Pharmacist Association Joint Statement on Seamless Care¹⁰ and is one of the six interventions in the *Safer Healthcare Now!* Campaign that is underway across Canada.

CCHSA has identified two required organizational practices relating to Medication Reconciliation. They are:

- Reconcile the patient's/client's medications upon admission to the organization, with the involvement of the patient/client
- Reconcile medications with the patient/client at referral or transfer, and communicate the patient's/client's medications to the next provider of service at referral or transfer to another setting, service, service provider, or level of care within or outside the organization.

The Institute for Healthcare improvement defines Medication Reconciliation as *"a formal process of obtaining a complete and accurate list of each patient's current home medications – including name, dosage, frequency and route - and comparing the physician's admission, transfer, and/or discharge orders to that list. Discrepancies are brought to the attention of the prescriber and, if appropriate, changes are made to the orders. Any resulting changes in orders are documented."*¹¹.

The Massachusetts Coalition for the Prevention of Medical Errors identified medication reconciliation as a three-step process¹²:

1. Creating the most complete and accurate list possible of all pre-admission medications for each patient;
2. Using that list when writing medication orders, and;
3. Comparing the list against the physician's admission, transfer, and/or discharge orders, identifying and bringing any discrepancies to the attention of the physician and, if appropriate, making changes to the orders.

A *"Getting-started kit: Medication Reconciliation - How-to-Guide"* has been published as part of the Safer Healthcare Now Campaign to support organizations in their implementation of the medication reconciliation process¹³. (www.saferhealthcarenow.ca)

- Nearly half of the respondents (45%) reported conducting a comprehensive medication history of all home medications when a patient visits the Emergency Department (Table G-5). Of the 64 respondents conducting comprehensive medication histories in the ER, 94% reported that nurses conducted medication histories, 80% reported that physicians conducted medication histories, and 47% reported that pharmacists conducted medication histories. The conducting of a comprehensive medication history in the Emergency Department was highest in Quebec (52%, 22/42) followed by Ontario (49%, 22/45), Atlantic Canada (47%, 7/15), the Prairies (40%, 8/20) and BC (25%, 5/20). Among those respondents who reported that a medication history was conducted, the medication history was created using information provided by the patient/family (100%), information contained on prescription containers (98%), information obtained from an electronic database containing records of prescriptions dispensed by retail pharmacies (64%) and information obtained from the patient's primary care physician (52%). All respondents in BC who obtain a medication history in the ER (5/5), reported using the information obtained from an electronic database containing records of prescriptions dispensed by retail pharmacies, followed by Ontario (91%, 20/22), the Prairies (88%, 7/8), Quebec (36%, 8/22) and Atlantic Canada (14%, 1/7).
- Forty-five percent of the respondents who conducted medication histories in the Emergency Department reported reconciling the patient's medication history with medication orders written at the time of the ER visit.

Table G-5 Medication Incident Reduction Strategies - Comprehensive medication history 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
<u>When a patient visits the Emergency Department:</u>						
A comprehensive medication history of all home medications for each patient is conducted	64 45%	11 41%	38 49%	15 41%	18 49%	46 44%
Medication history is carried out by:	(64)	(11)	(38)	(15)	(18)	(46)
Nurse	60 94%	11 100%	36 95%	13 87%	15 83%	45 98%
Physician	51 80%	11 100%	29 76%	11 73%	16 89%	35 76%
Pharmacist	30 47%	5 45%	19 50%	6 40%	8 44%	22 48%
Other	3 5%	0 0%	1 3%	2 13%	1 6%	2 4%
Medication history is created using:						
Information provided by the patient/family	64 100%	11 100%	38 100%	15 100%	18 100%	46 100%
Information contained on prescription containers brought to the ER	63 98%	11 100%	38 100%	14 93%	17 94%	46 100%
Information obtained from an electronic database containing records of prescriptions dispensed by retail pharmacies	41 64%	6 55%	23 61%	12 80%	11 61%	30 65%
Information obtained from the patient's primary care physician	33 52%	7 64%	23 61%	3 20%	9 50%	24 52%
The patient's medication history is reconciled with medication orders written at the time of admission or ER visit	29 45%	4 36%	18 47%	7 47%	10 56%	19 41%

- Almost half of the respondents (42%) who reported that they conducted a comprehensive medication history of all home medications when a patient is admitted to the organization. Atlantic Canada led with 60% (9/15), followed by Ontario (44%, 20/45), the Prairies (40%, 8/20), Quebec (38%, 16/42) and BC (30%, 6/20). Of the 59 respondents conducting a comprehensive medication history when a patient is admitted, 93% reported that medication histories were carried out by nurses, 68% by physicians, and 59% by pharmacists. Physicians (88%) and pharmacists (81%) were more likely to conduct medication histories in teaching hospitals than in non teaching hospitals (physicians 60% and pharmacists 51%). Having a pharmacist complete the medication history has been shown to improve the accuracy of the information. One respondent mentioned the piloting of a program to involve pharmacy technicians in the medication reconciliation process.
- Among the respondents who reported that a medication history was conducted upon admission to the hospital, the medication history was created using information provided by the patient/family (95%), information contained on prescription containers (95%), information obtained from the patient's primary care physician (56%) and information obtained from an electronic database containing records of prescriptions dispensed by retail pharmacies (53%). All respondents in BC (6/6) reported using the information obtained from an electronic database containing records of prescriptions dispensed by retail pharmacies, followed by the Prairies (88%, 7/8), Ontario (65%, 13/20), Atlantic Canada (22%, 2/9) and Quebec (19%, 3/16). Having access to an electronic database providing a complete list of current medications facilitates the reconciling process.

- The patient's medication history was reconciled with medication orders written at the time of admission by 46% of the respondents. This practice was more common in Quebec (63%, 10/15), followed by Ontario (50%, 2/8), Atlantic Canada (44%, 4/9), the Prairies (25%, 2/8) and BC (17%, 1/6). One of the ways in which Medication Reconciliation has been implemented involves using the reconciliation form as an order sheet. This ensures that the prescribing physician has access to the list of medications taken at home while writing the admission order. It also eliminates transcription errors, as well as streamlines the ordering process.

Table G-6 Medication Incident Reduction Strategies - Comprehensive medication history 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
<u>When a patient is admitted to the organization:</u>						
A comprehensive medication history of all home medications for each patient is conducted	59 42%	14 52%	32 41%	13 35%	16 43%	43 41%
Medication history is carried out by:	(59)	(14)	(32)	(13)	(16)	(43)
Nurse	55 93%	14 100%	29 91%	12 92%	15 94%	40 93%
Physician	40 68%	11 79%	17 53%	12 92%	14 88%	26 60%
Pharmacist	35 59%	8 57%	18 56%	9 69%	13 81%	22 51%
Other	6 10%	2 14%	1 3%	3 23%	2 13%	4 9%
Medication history is created using:						
Information provided by the patient/family	56 95%	13 93%	30 94%	13 100%	16 100%	40 93%
Information contained on prescription containers brought to the ER	56 95%	13 93%	30 94%	13 100%	16 100%	40 93%
Information obtained from an electronic database containing records of prescriptions dispensed by retail pharmacies	31 53%	7 50%	15 47%	9 69%	8 50%	23 53%
Information obtained from the patient's primary care physician	33 56%	9 64%	16 50%	8 62%	11 69%	22 51%
The patient's medication history is reconciled with medication orders written at the time of admission or ER visit	27 46%	6 43%	15 47%	6 46%	9 56%	18 42%

- Thirty-eight percent of all respondents reported reconciling the patient's medications and communicating that information to the next provider of care when the patient is transferred between levels of care within the facility. This practice was more commonly reported by non-teaching hospital respondents (40%) than by teaching hospital respondents (32%). Respondents who conduct medication reconciliation when the patient is transferred reported that the pharmacist was the health professional most frequently responsible (39%), followed by the nurse (33%) and the physician (26%). Of the respondents who reported reconciling the patient's medication history when the patient is transferred, 20% had implemented the process throughout the hospital and another 78% had implemented the process for selected patient groups.

Table G-7 Medication Incident Reduction Strategies - Comprehensive medication history 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
When the patient is transferred between levels of care within the facility:						
The facility reconciles the patient's medications and communicates that information to the next provider of care	54 38%	11 41%	28 36%	15 41%	12 32%	42 40%
Health professional most frequently responsible for this medication reconciliation:	(54)	(11)	(28)	(15)	(12)	(42)
Pharmacist	21 39%	2 18%	13 46%	6 40%	6 50%	15 36%
Nurse	18 33%	6 55%	7 25%	5 33%	2 17%	16 38%
Physician	14 26%	3 27%	8 29%	3 20%	3 25%	11 26%
Other	1 2%	0 0%	0 0%	1 7%	1 8%	0 0%
The facility has implemented the process of reconciliation:						
Throughout the hospital	11 20%	3 27%	5 18%	3 20%	1 8%	10 24%
For selected patient groups	42 78%	8 73%	22 79%	12 80%	11 92%	31 74%

- At discharge time, 32% of all respondents reported that they provide a printed, reconciled list of the patient's medications to the next provider, while another 3% of all respondents were providing an electronic copy of the reconciled medication list. When medication reconciliation occurred at discharge time, the service was most frequently provided by a pharmacist (70%, 35/50), followed by a physician (18%, 9/50) and by a nurse (10%, 5/50). Of the 50 respondents who reported communicating a reconciled medication list at discharge time, 90% of the respondents were providing the service for selected patient groups only. It is worth noting that a reconciled medication list was not provided by 54% of all respondents upon transfer between levels of care and by 60% of all respondents at discharge time. When asked what are the most significant barriers to doing so, 43% of all respondents reported implementation of medication reconciliation at the time of transfer/discharge is planned or underway, 34% indicated the facility has examined the desirability and feasibility but additional resources would be required, 22% have not yet examined the desirability and feasibility and 13% have examined the desirability and feasibility but there are not enough other supports to implement it (e.g. access to inpatient and outpatient electronic prescription records).

Participating hospitals in the Massachusetts Reconciling Medications Collaborative identified the following ingredients for success:

- Leadership support
- Multidisciplinary team: strong representation from the leadership of the three key stakeholder groups – physicians, nursing, and pharmacy
- Data feedback to motivate change and to measure whether changes are leading to improvement
- Start small
- Embed into existing workflow
- Don't let perfection be the enemy of the good.

Table G-8 Medication Incident Reduction Strategies - Comprehensive medication history 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
<u>When patient is discharged from the facility:</u>						
The facility communicates a reconciled list of the patient's medications to the next provider with:						
A printed copy of the reconciled medication list	46 32%	7 26%	23 29%	16 43%	19 51%	27 26%
An electronic copy of the reconciled medication list	4 3%	2 7%	1 1%	1 3%	0 0%	4 4%
Health professional most frequently responsible for this medication reconciliation at discharge time:						
Pharmacist	35 70%	5 56%	18 75%	12 71%	14 74%	21 68%
Nurse	5 10%	2 22%	3 13%	0 0%	2 11%	3 10%
Physician	9 18%	2 22%	2 8%	5 29%	3 16%	6 19%
The facility implemented the process of medication reconciliation for:						
All discharged patients	4 8%	2 22%	0 0%	2 12%	1 5%	3 10%
Selected patient groups	45 90%	7 78%	24 100%	14 82%	18 95%	27 87%
Upon transfer between levels of care and/or at the time of discharge, the most significant barriers to provide a reconciled list of the patient's medication are:						
Implementation of medication reconciliation is planned or underway	61 43%	14 52%	29 37%	18 49%	18 49%	43 41%
The facility has examined the desirability and feasibility..., but... additional... resources would be required	48 34%	7 26%	27 35%	14 38%	14 38%	34 32%
The facility has not yet examined the desirability and feasibility...	31 22%	4 15%	21 27%	6 16%	6 16%	25 24%
The facility has examined the desirability and feasibility..., but... there are not enough other supports	19 13%	4 15%	7 9%	8 22%	13 35%	6 6%

Inform and Educate Patients/Clients and or Family

Patients play an important role in patient safety – there is proven value in teaching patients about their medication therapy to allow them to partner with healthcare providers to help improve the safety of the medication-use-system. CCHSA has identified ROPS related to informing and education patients/clients and/or family about their role in patient safety, using both written and verbal communication.

- Thirty percent of all respondents reported providing selected patient groups with a copy of a medication record (e.g. MAR) as part of their patient education program. (Table G-9) Only 1 respondent reported providing this service for all patients. Viewing of the medication record by the patient/patient's family was reported to be allowed by 21% of all respondents for selected patient groups and by 5% of respondents for all patients.
- Counseling pamphlets for each prescribed medication were reported to be provided by 65% of all respondents for selected patients groups and by 1% of respondents for all patients.

- A pharmacist's consultation during the hospital stay was reported to be provided for selected patient groups by 78% of all respondents. Three respondents from Ontario reported providing a pharmacist's consultation for all patients.
- Sixty-two percent of all respondents reported providing selected patient groups with contact information for other available sources of drug information. This practice is more common in teaching hospitals when compared to non teaching hospitals (76% versus 57%).

Table G-9 Medication Incident Reduction Strategies - Patient Education Program 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
<u>Process to facilitate patient teaching with regards to their medication therapy:</u>						
Provide patient with a copy of the MAR or similar medication record						
for selected patient groups only	42 30%	13 48%	18 23%	11 30%	12 32%	30 29%
for all patients	1 1%	0 0%	1 1%	0 0%	0 0%	1 1%
Allow viewing of the MAR by the patient / patient's family						
for selected patient groups only	30 21%	10 37%	13 17%	7 19%	3 8%	27 26%
for all patients	7 5%	0 0%	6 8%	1 3%	2 5%	5 5%
Provide counseling pamphlets for each prescribed medication						
for selected patient groups only	92 65%	19 70%	48 62%	25 68%	26 70%	66 63%
for all patients	2 1%	0 0%	1 1%	1 3%	1 3%	1 1%
Provide a pharmacist's consultation during in hospital stay						
for selected patient groups only	111 78%	21 78%	60 77%	30 81%	32 86%	79 75%
for all patients	3 2%	0 0%	2 3%	1 3%	1 3%	2 2%
Provide contact information for other available sources of drug information						
for selected patient groups only	88 62%	18 67%	43 55%	27 73%	28 76%	60 57%
for all patients	3 2%	0 0%	2 3%	1 3%	2 5%	1 1%

Monitoring

In the Canadian Adverse Events Study, an adverse event (AE) has been defined as *“an unintended injury or complication that results in disability at the time of discharge, death or prolonged hospital stay and that is caused by health care management rather than by the patient’s underlying disease process. Health care management includes the actions of individual hospital staff as well as the broader systems and care processes and includes both acts of omission (failure to diagnose or treat) and acts of commission (incorrect diagnosis or treatment, or poor performance)”*. This study judged 36.9% of AEs to be preventable, and 23.6% of the factors contributing to AEs were drug or fluid related¹⁴. A previous publication by Leape & al, *The Harvard Medical Practice Study*, estimated that 20% of all adverse events were medication related¹⁵. In most studies, adverse drug events (ADEs) are among the most common type of AEs, accounting for 20 to 30% of all AEs.

The Canadian Adverse Drug Reaction Monitoring Program defines an adverse drug reaction (ADR) as *“a harmful and unintended response to a health product. This includes any undesirable patient effect suspected to be associated with health product use. Unintended effect, health product abuse, overdose, interaction (including drug-drug, and drug-food interactions) and unusual lack of therapeutic efficacy are all considered to be reportable ADRs.”*

Definitions of adverse drug events (ADEs) and adverse drug reactions (ADRs) were not provided to the respondents in our survey. In the interpretation of the results, we have assumed that the strategies used to detect, document the occurrence and report ADEs and ADRs did not vary based on the definition.

- Forty-one percent of all respondents reported implementation of strategies to monitor the occurrence of adverse drug events. (Table G-10). Teaching hospital respondents (65%) were more likely than non-teaching respondents (32%) to have implemented strategies to monitor the occurrence of ADEs. Strategies used to monitor the occurrence of ADEs included:
 - 79% reported that they perform chart reviews of patients who experience critical clinical events (mortalities & morbidities)
 - 26% reported that they perform chart reviews of patients with orders for known antidotes
 - 48% reported that they investigate cases where computer rules detect that laboratory abnormalities occurred in the presence of certain drugs (e.g. high serum creatinine in a patient receiving an aminoglycoside)
 - 31% reported that they investigate cases where computer rules detect that there had been an override of a drug-drug interaction alert
 - 29% of respondents reported that they investigate cases where computer rules detect that there had been an override of a drug allergy alert
 - 19% reported that they investigate cases where computer rules detect that there had been an override of a maximum dosage alert
- Implementation of strategies to improve reporting of ADEs was reported by 41% of all respondents. Larger hospitals with 500 or more beds were more likely (57%) to report implementation of strategies to improve internal reporting of ADEs than smaller hospitals, where 30% of respondents from hospitals with 100-200 beds and 37% of respondents from hospitals with 201-500 beds indicated that they had implemented such strategies. The strategies identified by the 58 respondents were: in-service meetings to promote voluntary reporting (78%), development of protocols to facilitate reporting (60%), sharing reports with staff (41%) and providing incentives to staff for reporting (12%). It is worth mentioning that more than half of all respondents (54%) reported that they had not implemented strategies to improve internal reporting of ADE’s.

The internal and external reporting of ADEs has become increasingly important and relevant to organizations in their efforts to improve patient safety.

The survey did not include a question on strategies to improve the external reporting of ADRs. With the increasing number of new drugs being approved, the increased use of Special Access Drugs, and the withdrawal from the market of recently commercialized drugs, Canadian hospitals are strongly encouraged to report ADRs which are unexpected or serious, and ADRs involving recently marketed drugs, to Health Canada. (http://www.hc-sc.gc.ca/dhp-mps/medeff/advers-react-neg/index_e.html)

Table G-10 Medication Safety - Use of Strategies Related to Adverse Drug Events (ADEs) 2005/06

	All	Bed Size			Teaching Status	
		100-200	201-500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
Strategies have been implemented to improve internal reporting of ADEs	58 41%	8 30%	29 37%	21 57%	20 54%	38 36%
Types of strategies implemented	(58)	(8)	(29)	(21)	(20)	(38)
Inservice meetings to promote voluntary reporting	45 78%	5 63%	20 69%	20 95%	17 85%	28 74%
Developing protocol to facilitate reporting	35 60%	5 63%	18 62%	12 57%	12 60%	23 61%
Sharing report rates with staff	24 41%	2 25%	10 34%	12 57%	9 45%	15 39%
Providing incentives to staff	7 12%	1 13%	2 7%	4 19%	3 15%	4 11%
Strategies have been implemented to trace and document the occurrence of adverse drug events (ADEs)	58 41%	8 30%	30 38%	20 54%	24 65%	34 32%
Types of strategies implemented	(58)	(8)	(30)	(20)	(24)	(34)
Critical clinical events (mortality & morbidities)	46 79%	8 100%	22 73%	16 80%	20 83%	26 76%
Laboratory abnormalities occurring in the presence of certain drugs	28 48%	3 38%	16 53%	9 45%	7 29%	21 62%
Override of drug-drug interaction	18 31%	2 25%	9 30%	7 35%	5 21%	13 38%
Override of drug-allergies interaction	17 29%	2 25%	9 30%	6 30%	4 17%	13 38%
Patients with medication orders for known antidotes	15 26%	1 13%	11 37%	3 15%	7 29%	8 24%
Override of drug-maximum dosage alert	11 19%	2 25%	6 20%	3 15%	3 13%	8 24%

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 - 11 The Institute for Healthcare Improvement – Medication Safety Reconciliation Toolkit at <http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Tools/MedicationSafetyReconciliationToolKit.htm> accessed February 4, 2007
 - 12 The Massachusetts Coalition for the Prevention of Medical Errors – Medication Reconciliation at <http://www.macoalition.org/Initiatives/RecMeds/PDSA.doc> - accessed February 4, 2007.
 - 13 Safer Healthcare Now ! Getting Started Kit: Medication Reconciliation – Prevention of Adverse Drug Events, How-to Guide at <http://www.saferhealthcarenow.ca> accessed February 4, 2007
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