Foreword

D. Terrance McCool

Eli Lilly Canada is pleased to present the results of the 15th *Hospital Pharmacy in Canada Survey* available at www.lillyhospitalsurvey.ca.

Patient safety continues to be a major issue for health professionals, health administrators and policy makers in Canada. This issue was again highlighted with the creation of the Canadian Patient Safety Institute and the release of the Canadian Adverse Events Study. This report provides valuable information on medication safety, incident reporting and error reduction strategies and focuses on the role of Pharmacy leaders in creating a safer environment for patients.

Thanks to all the hospital pharmacists across the country who completed the survey, which resulted in a 77% response rate.

This year's data was compiled by Paul Oeltjen Consulting. The report was edited by Bonnie Salsman.

Also, thank you to this year's Editorial Board who interpreted the data and authored the report - Jean François Bussières, Kevin Hall, Janet Harding, Neil Johnson, Patricia Lefebvre, Patricia Macgregor, Ron McKerrow and Nancy Roberts.

Management information can be a valuable tool in both decision-making and planning in pharmacy and administration. It is our hope that the information in this year's *Hospital Pharmacy in Canada Survey* Annual Report assists you in making effective decisions.

Yours truly,

Terry McCool
Vice President, Corporate Affairs
Eli Lilly Canada Inc.

The Editorial Board's comments are based on an analysis of this data.
The views expressed in the text do not necessarily represent those of Eli Lilly Canada Inc.

Acknowledgements - Support Staff

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Special Thanks

The Editorial Board would like to thank Ian Sheppard, Assistant Director, Pharmacy, Children's & Women's Health Centre of British Columbia for his assistance in enhancing the survey response rate by personally contacting hospital pharmacists.

Data Collection Methodology

Paul Oeltjen

- An initial list of hospital pharmacies was prepared, based on respondents to previous surveys, hospital pharmacies on the mailing list of the Hospital Pharmacy in Canada Annual Report website and hospital pharmacies suggested by the members of the Editorial Board of the Hospital Pharmacy in Canada Annual Report. A telephone survey of these hospitals was conducted in order to obtain the names and e-mail addresses of the current Directors of Pharmacy and hospital Chief Executive Officers and to determine each hospital's eligibility based on an estimate of the number of acute beds (>=50) and the total number of beds (>=100). Some Directors requested the addition of other hospital pharmacies. A final list of 195 hospitals was then prepared based on the information collected.

- The Hospital Pharmacy in Canada survey was announced during the period of May 4 - May 13, 2004, in e-mails to Directors of Pharmacy and CEOs of hospitals.

- A second e-mail letter was sent only to the Directors of Pharmacy on May 31, 2004. This letter contained the respondent identification and the password required to log on to the survey web site.

- Respondents who had not completed the on-line survey received weekly reminders starting on June 15, 2004.

- The respondent identification (user ID) and the password enabled a respondent to log on to the survey website at any time and to complete any part of the questionnaire. The first page a respondent was presented with was a page with instructions for completing the survey. The survey questions were distributed over 19 web pages. From any page a respondent was able to move to any other page of the on-line survey. A respondent was also able to change the language of the questionnaire and respond to questions in English or French. .

- On-line survey completion was interactive: if an answer required that questions be skipped, the on-line program presented a modified version of the questionnaire without these non-applicable questions. The program also warned respondents if they had entered numbers that were too high or too low, or if they had entered non-numeric information in fields that required numeric answers.

- Questionnaires were included in the analyses if more than 25% of key questions had been answered by August 13, 2004 and if teaching status and bed size of the hospital was known. Using these criteria, data from 144 hospital pharmacies could be analyzed. Nine hospital pharmacies did not qualify because they did not meet the bed size requirements or they did not qualify due to organizational considerations. The response rate calculated based on the remaining 186 hospitals was then 77%. The actual response rate may be higher because it is not known if there are more non-qualifying hospitals among the non-respondents.

Introduction – Focus on Medication Safety

Ron McKerrow

The Canadian healthcare system continues to undergo significant change as it tries to cope with increasing demand and cost in an environment of limited financial resources. Every part of the system has to do more with less, look a different ways of doing things, eliminate non-value-added interventions, increase efficiency and find new ways to reduce costs. With the limited supply of health professionals expected to become more acute over the next few years, it is expected that salary expectations will continue to rise, putting additional strain on the system. Advances in technology may improve efficiency and safety, but could require a reduction in operating dollars to support the additional capital expenditures required. The new federal funds expected to flow into the provincial health systems will likely be focused on underserved populations and access issues, including wait times. Although the Canadian public continues to regard healthcare as a key priority, confidence in the current system is eroded by reports of cancelled surgeries and serious medical errors.

Patient safety is a topic of increased focus to practitioners in the Canadian healthcare system. The landmark 'Canadian Adverse Events Study' by Baker and Norton published in May 2004 highlighted the need to improve the safety of our patient care systems. [(1)] The overall adverse events rate of 7.5 per 100 hospital admissions, with 37% of these events potentially preventable, challenges all health leaders to invest more resources and attention in systems that will reduce patient harm. The fact that drug or fluid related events were the second leading cause of adverse events in Canadian hospitals highlights the need for pharmacists to expand their traditional role and work with other health professionals to improve safety.

This year's Report focuses on medication safety and the role of pharmacy leaders in creating a safer environment for patients. A specific chapter addresses medication safety and strategies related to adverse drug events; however safety issues and challenges are identified within various sections of the Report. For more than 30 years pharmacists have been advocates for improvements in systems that improve safety. With the enhanced focus on patient safety, it is expected that pharmacy leaders will play an increasingly important role.

Patricia Lefebvre's review of medication safety issues highlights the changes in incident reporting and medication incident reduction strategies. Two-thirds of respondents indicated that strategies have been implemented to increase the reporting of medication incidents, while 77% of teaching hospitals have implemented strategies to monitor the occurrence of adverse drug events. Patricia outlines the leadership role of pharmacists in error reduction and the need for continued research in patient safety.

Effective drug distribution systems can reduce the rate of occurrence of medication errors. Janet Harding reviews these systems and notes that patient safety can be severely compromised if flaws in the design of drug distribution systems create opportunities for increased error. She argues that "it is fundamental that pharmacists advocate for and ultimately deliver drug distribution systems that are the least prone to error." Despite the evidence, respondents reported that comprehensive unit dose systems are in place at only 31% of institutions and that complete intravenous admixture services are in use at 56% of facilities.

Neil Johnson's review of human resources highlights the effect that pharmacist shortages have on practice. Respondents reported more than 330 vacant positions and approximately two thirds of respondents indicated that services have been curtailed in the past year due to staff shortages. Pharmacist salaries have been impacted by the demand – the average of reported maximum salary for the category "Pharmacist (B. Sc.)" increased by more than 14% since the last survey. Based on information collected this year and in previous reports, the skill shortage is unlikely to dissipate in the near future, further compromising the ability of hospital pharmacies to deliver comprehensive, high quality, patient-oriented pharmacy services.

Patricia Macgregor reports on the application of technological innovations, noting that "judicious application of new technologies is reported as one of the strategies to optimize patient care and improve outcomes, communication and efficiency." Only 22% of respondents to the survey indicated that bar coding is used in their medication systems, and use of computerized physician order entry systems was reported by only 5% of respondents. Efforts to improve patient safety must include appropriate investments in technology to be effective.

Jean-Francois Bussieres profiles clinical pharmacy services in 2003/04 with respect to human resources, documentation of clinical activities, practice models, evaluation of services, the right to prescribe and the priority and service level of clinical pharmacy services. Significant changes in clinical practice are described, including pharmacist prescribing.

Nancy Roberts has reviewed a number of topics – drug utilization review, drug purchasing and inventory control, education and research. Drug costs have increased by more than 19%, a rate that clearly exceeds growth in other areas of health care.

As in previous Reports, Kevin Hall has developed benchmark indicators for Pharmacy departments in Canada. He has analyzed data from large acute and specialty hospitals and used subset analyses to allow for inter-facility comparison. This year Kevin includes an informative review of pediatric facilities in Canada.

The Editorial Board has made a number of changes in this Report based on reader input. A completed set of tables and figures are included, but the written section has been modified by using a bullet format to highlight changes and provide commentary.

I would like to take this opportunity to thank a number of individuals who have contributed to the success of this survey and Report. The support of Eli Lilly Canada and the contributions of Ken Forsyth, Donna Hammill, Anne Hiltz and other members of the Eli Lilly Canada team, have made this publication possible over the past 15 years. The Editorial Board members continue to meet on a regular basis to identify trends, share information and analyze changes in practice - their continued support for this project is appreciated by all practitioners. Paul Oeltjen collects and analyzes the data for the editors, Marjorie Robertson provides structure and George Horne electronically publishes the results – without their contributions the Report would not be possible. Lastly Bonnie Salsman provided not only editorial support but provided leadership and direction when it was needed over the past year. This team assures the quality of the Hospital Pharmacy in Canada Annual Report and Millcroft, the Symposium.

References

1. Baker G.R. Norton P.G and al. The Canadian Adverse Events Study: the incidence of adverse events among hospitalized patients in Canada. CMAJ. 2004;170 (11): 1678-86.

Demographics

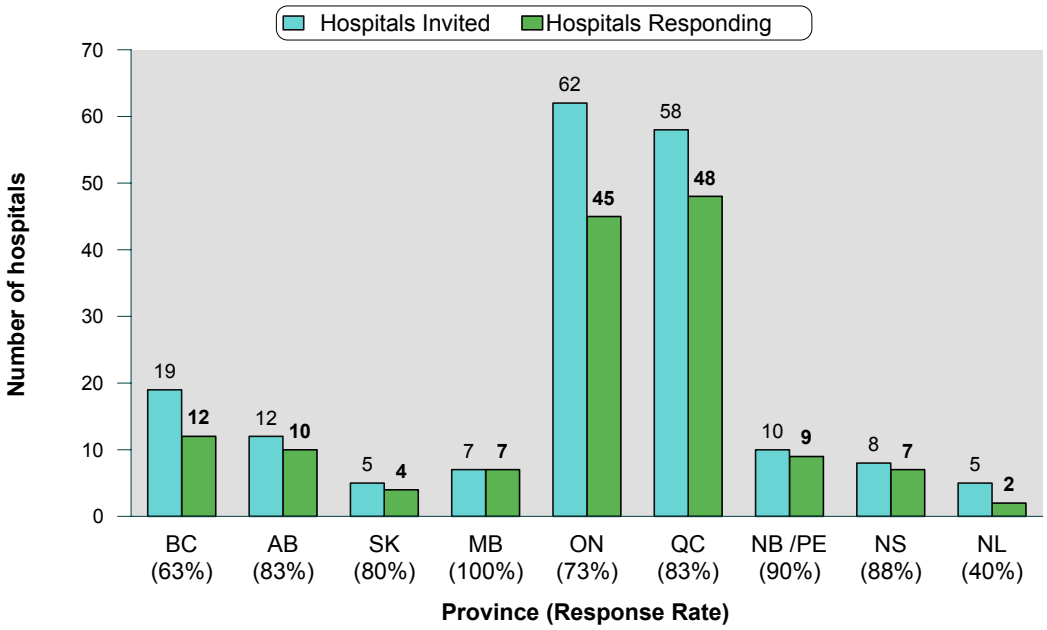
Ron McKerrow

- The 2003/04 response rate was much higher than previous surveys at 77% (144/186). When compared to the previous survey, the number of respondents increased from 123 to 144 while the number of surveys sent fell from 217 to 186, likely due to increased consolidation of health organizations.

- The mix of facilities changed slightly compared to the previous survey, with 61% of respondents from non-teaching facilities compared to 58% in 2001/02, and 39% from teaching organizations compared to 42% in 2001/02.

- Fifty-nine percent of respondents indicated they were part of a multi-site health organization (MSHO), similar to the percentage reported in the last survey (60%). The percentage of respondents reporting MSHOs was higher in British Columbia, the Prairies and Atlantic Canada. Among respondents reporting that their facility was part of a MSHO, the average of reported number of sites managed as a collective unit was six, the same as the previous survey.

Figure A-1. Response to the Survey by Province 2003/04



- Hospital demographic information presented in Table A-1 represents the average of reported data from hospitals with a total of 100 beds and at least 50 acute care beds.

- Demographic data has remained consistent with the previous year, with only a slight increase in admissions and patient days.

Table A-1. Hospital Demographic Data 2003/04

Hospitals (n=)	Acute Care		
	All (144)	Teaching (56)	Non-teaching (88)
Number of beds	311	469	211
Annual admissions	13,996	19,809	10,073
Occupancy rate	86%	86%	87%
Patient days	101,471	149,394	70,292
Length of stay (days)	7.2	7.4	7.1
Clinic/Medical Day Unit Visits	120,753	218,773	58,376
Emergency Department Visits	52,591	62,001	46,877
Operating Room Case Load	7,667	10,864	5,779
Surgical/Day Unit Case Load	8,894	10,638	7,829

Hospitals (n=)	Non-acute Care		
	All (107)	Teaching (36)	Non-teaching (71)
Number of beds	147	194	123
Annual admissions	499	581	456
Occupancy rate	90%	93%	88%
Patient days	43,191	46,458	41,635
Length of stay (days)	180	164	188

- Pharmacy Department information is presented in Table A-2. The data is remarkably consistent with the last survey. The average of reported number of hours the Pharmacy is open fell from 82 to 79 hours per week.

- Forty-four percent of respondents indicated that Programme Management had been implemented in their hospitals, either totally or partially. The majority of respondents from these facilities indicated that the pharmacists reported to Pharmacy (73%), with an additional 24% reporting that pharmacists' reporting responsibility was shared. Seventy-five percent of respondents from facilities with Programme Management reported that the pharmacists' salaries were paid by Pharmacy.

Table A-2. Pharmacy Department Data 2003/04

Hospitals (n=)	All (144)	Bed Size			Teaching Status	
		100-200 (38)	201-500 (68)	> 500 (38)	Yes (56)	No (88)
Pharmacy hours of operation	79	64	81	91	92	71
Program Management						
Yes – Total	42 29%	8 21%	24 35%	10 26%	19 34%	23 26%
Yes – Partial	21 15%	4 11%	11 16%	6 16%	12 21%	9 10%
Pharmacists' salary paid by (n=63)						
Pharmacy	47 75%	10 83%	29 83%	8 50%	20 65%	27 84%
Program	5 8%	1 8%	1 3%	3 19%	4 13%	1 3%
Shared	11 17%	1 8%	5 14%	5 31%	7 23%	4 13%
Pharmacists' reporting responsibility (n= 63)						
Pharmacy	46 73%	10 83%	29 83%	7 44%	19 61%	27 84%
Program	2 3%	-	1 3%	1 6%	1 3%	1 3%
Shared	15 24%	2 17%	5 14%	8 50%	11 35%	4 13%

Clinical Pharmacy Services

Jean-François Bussières

Introduction

Pharmacists react strongly to those film clips intended to illustrate the practice of pharmacy, featuring a close-up of a hand counting out pills. After all, the emphasis in pharmacy shifted to the patient so very long ago! Clinical pharmacy services form one of the five major components of pharmaceutical practice, together with drug distribution services – or dispensing – education, research and management. While it is true that distributing medication continues to be an important component of the practice of pharmacy, it is disappointing that depicting the clinical role of the pharmacist remains a more difficult feat.

The importance of clinical pharmacy is no longer questioned. A number of studies, albeit mostly descriptive, have assessed the nature, variety, complexity, relevance and impact of clinical pharmacy services. Since our last report, Schumock et al.[1] have published their evaluation of economic studies from 1996 to 2000 on the impact of clinical pharmacy on both hospital and ambulatory care. In particular, they report a positive benefit/cost ratio (ranging from 1.7:1 to 17:1, with a mean of 4.68:1). An assessment by the same authors of studies published from 1988 to 1995 yielded similar results. [2]

It is worthwhile recalling some positions that have contributed to the promotion of clinical pharmacy. In 2000, the American College of Clinical Pharmacy (ACCP) published its white paper on the role of the pharmacist in the health care system. [3] In 2003, the American Society of Health-System Pharmacists (ASHP) published its strategic plan entitled *ASHP 2015 initiative*. [4] The six main goals and 31 associated objectives are designed in particular to enable pharmacists to help achieve the best use of medications through the safe use of evidence-based methods and available technology, not only in their own healthcare facilities but throughout the health-care network. Legislative amendments are also under consideration in the US that will extend Medicare coverage to clinical pharmacists' services. [5] In Canada, the Canadian Society of Hospital Pharmacists has published professional standards [6] for hospital pharmacists practising in health-care facilities, which will help point the way for the development of clinical pharmacy.

This section of the report accordingly profiles clinical pharmacy services in 2003/04 with respect to human resources, documentation of clinical activities, practice models, evaluation of services, the right to prescribe and the priority and service level of clinical pharmacy services.

Staffing for clinical pharmacy

For more than a decade, we have been asking pharmacists to assess what proportion of their time is devoted to each of the components of pharmaceutical practice. Despite the substantial increase in the average number of full-time equivalents (FTEs) of pharmacy staff in healthcare facilities, increasing automation and the development of distribution systems, there has been little change in the proportion of pharmacists' time devoted to clinical services. In 2003/04, respondents reported this proportion to be 38%, compared with 39% in 2001/02 and 38% in 1999/2000. Moreover, these figures are close to those reported in similar surveys conducted in the US. [7] [8] However, data presented in this report illustrate the evolution of clinical pharmacy services throughout the years in terms of areas of practice and specialization, intensity, documentation, seamless care and prescribing rights.

Bond et al. evaluated the possible link between pharmacists' practices and medication errors. [9] A key finding was that the number of medication errors per occupied bed per year was 3.15 in facilities in which the pharmacist is "centralized" – works mainly in the pharmacy – compared with 1.93 when the pharmacist is centralized but makes occasional floor visits, and 1.74 when the pharmacist is decentralized and is generally on the floor. In other words, decentralizing pharmacists can help reduce errors by 45%. Improving medication safety is a topical issue to which we have devoted a chapter of this year's report.

- In the 2003/04 survey, 71% of respondents reported FTEs for outpatient clinical services, (Table B1) compared to 76% in 2001/02. The average number of services for which FTEs were reported was 3.9 in 2003/04, compared with 4.0 in 2001/02. This slight drop may be attributable to an increase in the response rate, and the inclusion of a greater number of smaller facilities.

- While 102 of the 144 respondents identified pharmacist FTEs for outpatient clinical services in general or by medical discipline, we based our analysis on 65 of the 102 respondents. The remaining responses were excluded due to inconsistencies in responses to different questions in the survey.

- Among respondents who reported FTE's for outpatient clinical services, the average of reported number of FTEs was 2.73 in 2003/04, and 2.32 in 2001/02. The reported number of FTEs varied with the size of the healthcare facility and teaching status. There were also regional variations: the average of reported FTEs was 3.4 in British Columbia, 1.9 on the Prairies, 2.3 in Ontario, 3.9 in Quebec and 1.5 in the Atlantic Provinces.

- There was generally little change in the average number of FTE's reported for each type of clinic compared with 2001/02. Table B-1 shows the average number of pharmacist FTEs and, in brackets, the absolute number of respondents reporting FTEs for clinical pharmacy services to each category of client. The 14 outpatient sectors for which data was collected are shown in descending order of the average of reported number of pharmacist FTEs per area.

- This year, for the second time, we calculated the ratio of the number of pharmacist FTEs per 10,000 outpatient visits for each clinic for which we had quantitative data on patient visits and FTEs. This type of ratio can be helpful in planning for the number of pharmacists required for a given patient volume. The results show a wide variation, possibly attributable to a number of factors that were discussed in the previous report. The median ratio of pharmacist FTEs per 10,000 patient visits for all outpatient clinics was 0.14 in 2003/04, compared with 0.11 in 2001/02. The median ratios, in descending order, for 2003/04 versus 2001/02, are as follows: DVT/anticoagulants (2.02 vs. 7.19), infectious disease/AIDS (2.00 vs. 3.40) cardiovascular/lipid (1.67 vs. 3.29), diabetes (1.16 vs. 0.38) hematology/oncology (1.06 vs. 1.21), asthma/allergies (0.84 vs. 1.39), geriatric day care (0.61 vs. 1.22), transplants (0.40 vs. 0.39), mental health (0.04 vs. 1.28) and the ER (0.01 vs. 0.03).

Table B-1. Number of Outpatient Clinical Pharmacy Services and Resources Allocated (FTE) 2003/04

Hospitals (n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)
Respondents reporting FTE for Outpt Clinical Services	102 71%	19 50%	51 75%	32 84%	46 82%	56 64%
Total FTE (n=65)	2.73 (65)	0.86 (10)	1.89 (33)	4.83 (22)	4.23 (30)	1.44 (35)
Average # Diff Services (n=65)	3.9	2.6	3.5	5.0	4.7	3.2
Min	1	1	1	1	1	1
Max	10	6	7	10	10	6
Emergency room	0.65 (30)	0.20 (5)	0.54 (16)	1.10 (9)	1.02 (12)	0.41 (18)
Clinics (by frequency):						
Infectious Disease/AIDS	1.10 (21)	0.53 (2)	0.67 (5)	1.33 (14)	1.12 (19)	0.90 (2)
Haematology - oncology	1.07 (39)	0.55 (3)	0.82 (25)	1.79 (11)	1.57 (18)	0.65 (21)
Renal / dialysis	0.94 (30)	- -	0.71 (14)	1.14 (16)	0.82 (18)	1.11 (12)
DVT / anticoagulant	0.82 (23)	0.97 (3)	0.51 (11)	1.16 (9)	1.20 (12)	0.42 (11)
Transplantation	0.65 (6)	- -	0.20 (1)	0.74 (5)	0.65 (6)	- -
Geriatric Day Care	0.41 (7)	0.05 (1)	0.43 (2)	0.50 (4)	0.50 (4)	0.30 (3)
Cardiovascular / lipid	0.38 (15)	0.22 (3)	0.13 (3)	0.52 (9)	0.66 (7)	0.14 (8)
Diabetes	0.34 (26)	0.18 (3)	0.22 (14)	0.59 (9)	0.52 (12)	0.19 (14)
Neurology	0.30 (2)	- -	- -	0.30 (2)	0.30 (2)	- -
Asthma/Allergy	0.23 (6)	0.10 (1)	- -	0.25 (5)	0.25 (5)	0.10 (1)
Pain/Palliative Care	0.20 (10)	0.10 (1)	0.24 (6)	0.13 (3)	0.22 (5)	0.17 (5)
Mental Health	0.13 (13)	0.06 (3)	0.13 (6)	0.20 (4)	0.13 (4)	0.14 (9)
Other	0.66 (19)	0.40 (1)	0.61 (12)	0.78 (6)	0.90 (11)	0.33 (8)

0.00 = average number of FTE's dedicated to clinical services in that sector, consistent responses only

( ) = Number of respondents reporting FTE for clinical services in that sector

- Sixty-nine per cent of respondents reported FTEs for inpatient clinical services (Table B2) compared with 73% in 2001/02. The average number of services for which FTE's were reported was 5.9 in 2003/04 compared with 5.7 in 2001/02.

- While 100 of the 144 respondents identified pharmacist FTEs for inpatient clinical services in general or by medical discipline, we based our analysis on 70 of the 100 respondents. The remaining responses were excluded due to inconsistencies in responses to different questions in the survey.

- The average of reported number of pharmacist FTEs devoted to inpatient clinical services was 8.3 in 2003/04, and 6.6 in 2001/02. Thus, although a lower percentage of respondents reported FTE's for inpatient and outpatient clinical services compared to 2001/02, the average number of reported FTE's was greater both for inpatients and outpatients, with the greatest increase observed in the inpatient area. The number of FTEs varies with the size of the healthcare facility and its teaching status. There are also regional variations: an average of 7.2 FTEs in British Columbia, 9.1 on the Prairies, 10.9 in Ontario, 6.9 in Quebec and 2.4 in the Atlantic Provinces.

- The increase in the average number of pharmacist FTEs varied depending on the type of clientele. Table B-2 shows the average number of pharmacist FTEs and, in brackets, the absolute number of respondents reporting FTEs for clinical pharmacy services to each category of client. The sixteen inpatient sectors for which we collected data are shown in descending order of the number of pharmacist FTEs per care unit (adult and pediatric).

- This year, for the second time, we calculated the ratio of the number of pharmacist FTEs per 10,000 patient days for each department for which we had quantitative data on patient-days and FTEs. This type of ratio can be helpful in planning for the number of pharmacists required for a given patient volume. The results show a wide variation, possibly attributable to a number of factors that were discussed in the previous report. The median ratio of pharmacist FTEs per 10,000 patient-days was 0.53 in 2003/04, compared with 0.49 in 2001/02, for all hospital patients. The median ratios in descending order, for 2003/04 versus 2001/02, are as follows: pediatric haematology/oncology (2.35 vs. 2.56), pediatric intensive care (1.82 vs. 2.93), adult intensive care (1.53 vs. 1.57), pediatric general medical (1.27 vs. 0.83), adult hematology/oncology (1.24 vs. 1.29), pediatric surgical (0.96 vs. 1.4), pediatric mental health (0.81 vs. 0.99) adult general medical (0.65 vs. 0.53), adult rehabilitation (0.55 vs. 0.48), adult surgical (0.51 vs. 0.45), adult mental health (0.47 vs. 0.52), obstetrics/gynecology (0.42 vs. 0.25), and geriatrics/LTC (0.36 vs. 0.26).

Table B-2. Number of Inpatient Clinical Pharmacy Services and Resources Allocated (FTE) 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Respondents reporting FTE for Inpt Clinical Services	100 69%	18 47%	49 72%	33 87%	49 87%	51 58%
Total FTE (n=70)	8.3	1.8	5.4	15.8	12.7	3.9
Average # Diff Services (n=70)	5.9	3.8	5.7	7.3	6.2	5.6
Min	1	2	1	3	1	1
Max	14	8	12	14	14	12
Adult Acute Care						
Adult General Medical units	3.2 (56)	0.8 (10)	1.9 (25)	5.8 (21)	5.0 (26)	1.6 (30)
Adult Surgical units	1.9 (50)	0.4 (7)	1.2 (23)	3.1 (20)	2.8 (26)	0.9 (24)
Adult Intensive Care units	1.4 (50)	0.3 (5)	0.6 (24)	2.5 (21)	2.0 (28)	0.6 (22)
Adult Haem-Oncology units	1.2 (22)	0.3 (1)	0.5 (9)	1.8 (12)	1.5 (14)	0.6 (8)
Adult Mental Health units	0.7 (46)	0.4 (6)	0.5 (22)	1.0 (18)	0.8 (24)	0.5 (22)
Obstetrics/ Gynaecology	0.4 (26)	0.1 (3)	0.5 (13)	0.4 (10)	0.6 (11)	0.3 (15)
Other Acute Care	2.4 (33)	0.6 (3)	1.5 (17)	4.0 (13)	3.9 (17)	0.9 (16)
Pediatrics						
Paediatric General Medical	0.8 (21)	0.4 (3)	1.1 (10)	0.5 (8)	1.3 (11)	0.2 (10)
Paediatric Surgical units	0.4 (7)	- -	0.3 (2)	0.4 (5)	0.5 (5)	0.2 (2)
Paediatric Intensive Care	1.1 (14)	1.1 (1)	1.5 (5)	0.8 (8)	1.2 (12)	0.2 (2)
Paediatric Haem-Oncology	1.1 (8)	0.9 (1)	1.7 (3)	0.8 (4)	1.3 (7)	0.3 (1)
Paediatric Mental Health	0.2 (5)	- -	0.2 (3)	0.4 (2)	0.4 (2)	0.1 (3)
Non-Acute Care						
Adult Rehabilitation units	0.5 (24)	0.2 (3)	0.5 (11)	0.7 (10)	0.8 (7)	0.4 (17)
Geriatrics / LTC units	0.6 (34)	0.2 (2)	0.5 (18)	0.8 (14)	0.6 (15)	0.5 (19)
Paediatric Rehabilitation	0.2 (2)	- -	0.2 (2)	- -	0.2 (2)	- -
Other Non Acute Care	0.5 (11)	- -	0.4 (7)	0.6 (4)	0.6 (6)	0.3 (5)

0.0 = average number of FTE's dedicated to clinical services in that sector, consistent responses only

( ) = Number of respondents reporting FTE for clinical services in that sector

In 2002, the National Association of Pharmacy Regulatory Authorities (NAPRA) published a bulletin stating that it supported the recognition of specialties in pharmacy. In at least three provinces – British Columbia, Alberta and Quebec – working groups have been set up by the professional associations to consider the advisability of recognizing specialties in pharmacy, in particular to assist in the exercise of the right to prescribe, and in the more efficient organization of health care. Recognition of pharmaceutical specialization will doubtless promote optimum use of pharmacists' services.

Documentation of clinical activities

In 1993, the Canadian Society of Hospital Pharmacists proposed guidelines for the documentation of pharmacists' activities. [10]

- Most respondents (79% in 2003/04 compared with 80% in 2001/02) reported that pharmaceutical interventions were documented and recorded (Table B-3). There was little difference in the percentage reporting documentation, regardless of the size of the healthcare facility or its teaching status.

- Surprisingly, almost 20% of respondents who document interventions still do not document their activities in the patient record, which no doubt impairs continuity of care and the multidisciplinary approach.

- Respondents reported an average of 10,815 pharmacokinetic and therapeutic interventions in 2003/04. These have been on the rise for several years: the reported average was 4,195 in 1997/98, 7,505 in 2000/01 and 8,973 in 2001/02. The average number of interventions is greatly affected by the size of the healthcare facility and its teaching status.

- While mergers increased the size of facilities, and thus potentially the total number of interventions per respondent, two ratios dependent on the volume of activity and of pharmaceutical resources also progressed. The number of interventions per admission rose from 0.19 in 1993/94 to 0.64 in 2003/04, while the number of interventions per pharmacist FTE rose from 418 in 1999/00 to 645 in 2003/04.

- Regional differences were also found: an average of 0.51 interventions was reported per admission in British Columbia, 0.61 on the Prairies, 0.81 in Ontario, 0.52 in Quebec and 0.42 in the Atlantic Provinces. The ratio of the reported number of interventions/pharmacist FTE also varies: an average of 356 in British Columbia, 669 on the Prairies, 817 in Ontario, 664 in Quebec and 346 in the Atlantic Provinces. The Society's guidelines notwithstanding, there is no common yardstick recognized by the provincial bodies for measuring pharmacists' clinical activities, and this is true of all the provinces. Despite the absence of such standards, the quantity and quality of descriptive data on the clinical practices of pharmacists in Canada are remarkable.

Table B-3. Clinical Pharmacy Activities - Documentation 2003/04

Hospitals (n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)
Interventions						
Documented Interventions	114	30	52	32	45	69
	79%	79%	76%	84%	80%	78%
By % of those who document interventions In Manual Pharmacy records	57	13	26	18	31	26
	50%	43%	50%	56%	69%	38%
In Computerized Pharmacy records	66	18	29	19	27	39
	58%	60%	56%	59%	60%	57%
Document in Medical Record	90	22	43	25	38	52
	79%	73%	83%	78%	84%	75%
Total Interventions						
# Therapeutic and Pharmacokinetic Interventions Made/ Year (n=67)	10,815	2,747	9,672	21,102	17,147	6,800
Ratios						
# Interventions per Admission (n=58)	0.64	0.44	0.69	0.73	0.82	0.51
# Interventions per Pharmacist FTE (n=63)	645	726	719	439	569	695

Clinical practice models

Most pharmacy departments have a range of distribution systems and clinical practice models. "Pharmaceutical care" means the organized delivery of pharmacotherapeutic services to achieve well-defined therapeutic results. In particular, it means designing, applying and managing a therapeutic care plan of monitoring, prevention and solution of pharmacotherapeutic problems, potential or real. "Traditional clinical pharmacy services" can refer to a range of services based on a medication or a particular pharmaceutical function designed to optimize a given result for the patient; for example pharmacokinetic services, total parenteral nutrition (TPN) monitoring services and so on.

- Seventy per cent of respondents, compared with 66% in 2001/02, reported that pharmacists utilized a pharmaceutical care model within their organization; the average reported percentage of inpatient beds serviced was 30 (Table B-4).

- Eighty eight per cent of respondents, compared with 89% in 2001/02, reported that pharmacists utilized a traditional clinical pharmacy services model within their organization; 53% of inpatient beds were serviced.

- A source of concern is the fact that 81% of respondents, compared with 83% in 2001/02, reported that clinical pharmacy services were not offered to some inpatient clienteles; this affected 33% of inpatient beds. Bond et al. have identified key factors in implementing evidence-based clinical pharmacy services. Their model indicates a need to plan a net addition of 14,508 FTEs in the US market, on the current basis of 17,235 FTEs devoted to clinical pharmacy activities, in order to be able by 2020 to offer the five clinical pharmacy services that have the most impact to 100% of inpatients. [(11) (12)] In other words, the clinical services workforce must be more than doubled in order to reduce to zero the proportion of inpatients with no access to clinical pharmacy services.

- It appears that continuity of care, or "seamless care", has lost ground since our last report, with only 28% of respondents reporting an established policy on seamless care, compared to 32% in 2001/02. However, among respondents who reported an established policy for seamless care, the average reported proportion of patients whose information was forwarded to healthcare workers in the community rose from 15% in 2001/02 to 21% in 2003/04. The descriptive data on types of information and types of healthcare providers to which information is provided were not collected in the same way in the last two reports, and thus are not comparable.

Table B-4. Clinical Practice Models and Seamless Care 2003/04

Hospitals (n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)
Clinical Practice Model						
Pharmaceutical care	101	21	47	33	50	51
	70%	55%	69%	87%	89%	58%
% of beds serviced (n=101)	30%	30%	27%	33%	35%	24%
Traditional clinical services	126	31	60	35	48	78
	88%	82%	88%	92%	86%	89%
% of beds serviced (n= 126)	53%	56%	55%	46%	49%	55%
Some patients do not receive any clinical services	117	31	53	33	48	69
	81%	82%	78%	87%	86%	78%
% of beds not serviced (n=117)	33%	35%	36%	26%	28%	36%
Seamless Care						
Established Policy for Seamless Care	41	13	13	15	22	19
	28%	34%	19%	39%	39%	22%
% of patients with information transferred to community (n= 41)	21%	31%	18%	14%	16%	26%
Information is provided to (n= 41)						
• community pharmacists	93%	92%	92%	93%	100%	84%
• family physicians	73%	85%	69%	67%	68%	79%
• care centres	39%	15%	62%	40%	50%	26%
• home care providers	54%	69%	54%	40%	45%	63%
• others	15%	8%	23%	13%	18%	11%
Information includes (n=41)						
• medications at discharge	95%	92%	100%	93%	100%	89%
• medications discontinued during stay	68%	77%	54%	73%	86%	47%
• care plan information	56%	54%	69%	47%	55%	58%
• relevant drug / monitoring parameter and lab values	59%	54%	54%	67%	68%	47%
• diagnosis	46%	46%	38%	53%	55%	37%
• other	15%	15%	8%	20%	18%	11%

Evaluation of clinical services

Plan, organize, direct and monitor: traditional schools of management still teach these four key aspects of management. However, given the limited administrative resources in pharmacy – 1.9 FTEs in management, or about 5% of all the FTEs reported – many organizations hesitate or fail to put in place a recurrent, structured, collegial process for evaluating pharmaceutical practice.

- Only 17% of respondents, compared with 20% in 2001/02, reported that pharmacy's direct patient care services were evaluated by auditing a sample of clinical activities (Table B-5). This proportion is affected by the size of the healthcare facility and its teaching status: a higher percentage of larger facilities and teaching hospitals report that evaluation is done. There were also regional variations; the percentage reporting that evaluation was done was higher in Ontario (24%) and the West (17-19%) than in the East (11-13%).

- Note that respondents reporting that evaluation was conducted indicated that evaluation is most commonly conducted by peers, and is more often retrospective (64%) than prospective (direct observation – 48%, self-evaluation of pharmacists – 36%), with little change from the 2001/02 data.

- Among respondents reporting that evaluation was conducted within their pharmacy departments, we find that the average reported proportion of pharmacists evaluated is 42% in 2003/04, compared with 41% in 2001/02.

A key element of professionalism is the capacity for periodic evaluation of the skills and abilities of the professionals, and the quality and risks of the actions they take. Given the rapid evolution of pharmaceutical practice, it seems necessary to invest in the short term in the evaluation of its various components. In 2003, the Canadian Society of Hospital Pharmacists published its *Professional Standards for Hospital Pharmacy Practice*. [13] In the Society's view, its standards are established to describe a suitable and desirable level of quality in the practice of pharmacy and in the services provided in a health care facility. The Standards are applicable to any pharmaceutical department that contributes to the efficient, safe and cost-effective delivery of care, and the monitoring of the use of medications. Standards should reflect the professional consensus on what constitutes satisfactory quality in a given department or practice environment. The standards specify in particular the level of quality expected with respect to competence, quality of pharmaceutical services, and evaluation.

Table B-5. Evaluation of Clinical Pharmacy Services 2003/04

		Bed Size			Teaching Status	
	All	100-200	201-500	>500	Yes	No
Hospitals (n=)	**(144)**	**(38)**	**(68)**	**(38)**	**(56)**	**(88)**
Evaluation of direct care services by auditing sample of clinical activities	25	4	9	12	17	8
	17%	11%	13%	32%	30%	9%
• peers, e.g., other pharmacists	18	3	6	9	13	5
	72%	75%	67%	75%	76%	63%
• physicians	1	-	-	1	1	-
	4%			8%	6%	
• others	8	1	3	4	4	4
	32%	25%	33%	33%	24%	50%
Method for evaluation (n=25)						
• chart review - retrospective	16	4	5	7	12	4
	64%	100%	56%	58%	71%	50%
• direct observation	12	3	2	7	9	3
	48%	75%	22%	58%	53%	38%
• self-evaluation by pharmacists	9	2	-	7	8	1
	36%	50%		58%	47%	13%
• other	8	1	3	4	3	5
	32%	25%	33%	33%	18%	63%
Evaluated aspects of clinical practice (n=25)						
• patient assessment	15	3	5	7	10	5
	60%	75%	56%	58%	59%	63%
• implementation of objectives and monitoring plan	15	1	6	8	12	3
	60%	25%	67%	67%	71%	38%
• patient counselling and understanding	8	2	1	5	7	1
	32%	50%	11%	42%	41%	13%
• documentation	20	4	4	12	15	5
	80%	100%	44%	100%	88%	63%
• other	2	-	1	1	1	1
	8%		11%	8%	6%	13%
Proportion of pharmacists evaluated (n= 25)	42%	68%	36%	38%	39%	48%

The right to prescribe

It is no longer surprising to hear Canadian hospital pharmacists claiming the right to prescribe medication, either in collaboration with the physician (dependent – with a collaboration agreement and protocol) or independently (in which case the pharmacist is solely responsible in law for the results experienced by the patient). Among the reasons for this interest and the desire to contribute more proactively to pharmacotherapy, we note the following: the dynamics of the drug market (with approximately twenty new active drug substances approved each year in Canada), increasing costs (medication now ranks second among health care costs, after hospital costs), the need to make evidence-based choices, the training required in order to practise pharmacy in a healthcare facility (generally, a 4-year bachelor's degree plus a hospital residency or a master's degree), and the specialization of most pharmacists working in healthcare facilities (whereby many pharmacists who work in facilities choose one or more sectors on which to focus their continuing education and their day-to-day practice).

A number of papers addressing the right to prescribe have appeared since the publication of our last report. In 2003, the American College of Clinical Pharmacy published an updated position statement which provides information on the recognition profile for collaborative drug therapy management in the US context, where the pharmacist's contribution is now widely recognized. [(14)] The American Society of Health-System Pharmacists published a similar tract in 2004. [(15)] Kuo et al. published an interesting discussion of the application of collaborative agreements between physicians and pharmacists in group family practices. [(16)] In Canada, the Canadian Society of Hospital Pharmacists published an information paper [(17)] and a statement [(18)] in 2001 on prescribing by pharmacists in healthcare facilities. These publications make it clear that a growing number of pharmacists have access to a dependent or independent right to prescribe.

- Sixty-seven per cent of respondents reported that professionals other than physicians and dentists were authorized to prescribe medication within their organizations, an increase from 57% in 2001/02. (Table B-6). In contrast to the previous report, the percentage varies little with facility size or teaching status. There were wide regional variations: 75% in British Columbia, 81% on the Prairies, 87% in Ontario, 42% in Quebec and 61% in the Atlantic provinces.

- Respondents who indicated that professionals other than physicians and dentists are authorized to prescribe reported that these included pharmacists (66% – an absolute increase from 42 to 63 respondents since the last report), nurse practitioners (47%), midwives (45%) and other professionals (20%). There were also regional variations, doubtless related to the legislation in force in each area. Since professional practice is a provincial jurisdiction, regional differences are to be expected. It should be understood, moreover, that the pharmacy act in a given province does not necessarily apply to pharmacy practised in a hospital setting, which may explain disparities in the right to prescribe within specific regions.

- Lastly, of the respondents who reported the granting of the right to prescribe to professionals other than physicians and dentists, a small proportion (5%) reported that pharmacists were given an independent right to prescribe, but a much larger proportion reported a dependent right (from 13% to 46%, depending on the type of prescription). There was little change reported for most types of prescribing by pharmacists in these healthcare facilities between 2001/02 and 2003/04: dependent, for new therapy (reduced from 20% to 13%); dependent, for dosage adjustments (reduced from 56% to 46%); independent, for new therapy (reduced from 6% to 5%); independent, for dosage adjustments (increased from 15% to 23%); and independent, for lab tests (increased from 20% to 21%). Developments in pharmacists' right to prescribe depend on developments in the regulatory framework, the shortage of pharmacists in the healthcare network, and multiple pressures within organizations.

Table B-6. Prescribing Privileges 2003/04

Hospitals (n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)
Other professionals prescribe drugs (besides physicians and dentists)	96 67%	23 61%	45 66%	28 74%	41 73%	55 63%
Prescribing rights of other professionals (n=96)						
• Nurse practitioners	45 47%	8 38%	19 42%	18 62%	22 52%	23 43%
• Midwives	43 45%	5 22%	22 49%	16 57%	16 39%	27 49%
• Pharmacists	63 66%	17 74%	27 60%	19 68%	30 73%	33 60%
• Other	19 20%	4 17%	10 22%	5 18%	8 20%	11 20%
Prescribing rights approved for pharmacists (n=96)						
• Independent, for lab tests	20 21%	6 26%	9 20%	5 18%	10 24%	10 18%
• Independent, for dosage adjustments	22 23%	6 26%	8 18%	8 29%	13 32%	9 16%
• Independent, for new therapy	5 5%	1 4%	3 7%	1 4%	3 7%	2 4%
• Dependent, for dosage adjustments	44 46%	12 52%	17 38%	15 54%	19 46%	25 45%
• Dependent, for new therapy	12 13%	3 13%	5 11%	4 14%	6 15%	6 11%

Priority and service level of clinical services

Given limited resources, most pharmacy departments cannot offer the full range of clinical pharmacy services. Since this report first appeared, we have been asking respondents to identify the clinical pharmacy services available within their organizations. There has been remarkable progress in some clinical services- for example: the reporting of drug histories upon admission increased, from 6% in 1985/86 to 64% in 2001/02, and the reporting of pharmacist participation in medical rounds increased from 25% in 1985/86 to 61% in 2001/02. There has been limited progress in other areas- for example, reporting of a program of adverse drug reaction (ADR) monitoring increased from 74% in 1985/86 to 84% in 2001/02. In the absence of recognized definitions for such activities and uniform data collection tools, we have never asked respondents for quantitative data on which to assess the scope of individual categories of clinical activities.

In order to get a more accurate picture of the scope of services available, this year we asked respondents to characterize activities by the extent to which they are offered. A service may be offered systematically (meaning a comprehensive service provided uniformly to all patients who require it), in a targeted way (meaning a service that is targeted to those who need it most), in a limited way (meaning a limited service provided as time and resources allow), or not at all. We took the opportunity to add some services, and restate some others in clearer terms. Respondents were asked to identify the level of service offered for a selection of 21 clinical activities, 10 centrally-delivered and 11 patient-specific. We also asked respondents to rank in descending order (1 for the service with the highest priority and 10 for the one with the lowest) the 10 clinical pharmacy services to which they attach the most importance.

Bond et al. [19] assessed the possible links between pharmaceutical activities and the results achieved by a healthcare facility, based on a sample of 1,016 hospitals. They found that six clinical pharmacy services were associated with a lower total cost of care: drug use evaluation, drug information, adverse drug reaction monitoring, drug protocol management, medical rounds participation and admission drug histories. According to the abstract, "The results of this study suggest that increased staffing levels of clinical pharmacists and pharmacy administrators, as well as some clinical pharmacy services, were associated with reduced total cost of care in United States hospitals." Other publications by this author reviewed effects on error rates, impact on mortality and costs. [20] [21]

- Respondents chose among their 10 priority clinical services: drug therapy monitoring and evaluation (possible including management by protocol – 68%), medical rounds participation (49%), admission drug histories (46%), drug use evaluation programs (33%), drug information (30%) and drug monitoring (3%). These results may suggest that pharmacists should be reviewing their priorities.

- Interestingly, of the six clinical services identified by Bond et. al. as having a positive effect on results (such as a reduced error rate, reduced mortality, reduction in the cost of medication, reduced overall costs per care event or reduced length of stay), none was reported by more than 70% of respondents as being among the top 10 priorities (Table B-7).

- We have indicated the average ranking assigned to each service; however, this value should be interpreted in conjunction with the number (n) of respondents that attached a priority to the service in question. For example, drug information was ranked at 5.8, but was ranked within the top 10 priorities by only 35 respondents, compared with medication incident reporting and prevention, which had an average ranking of 5.6, but was among the top 10 priorities for 73 respondents.

- The only service reported to be offered comprehensively by at least 50% of respondents was participation in the pharmacy and therapeutics committee (82%). The only targeted service reported to be offered in a proportion of at least 50% was participation in medication counselling (51%). Lastly, two limited services were reported as offered in a proportion of at least 50%: inservice education for other professionals, and ADR monitoring.

Readers interested in comparing the Canadian situation with the prevalence of clinical activities in the US. may be interested in referring to additional publications by Pedersen, Schneider et. al. [22] and Bond et.al. [23]

Table B-7. Priority and Service Level of Clinical Pharmacy Services 2003/04

Service Description	Service Level				Service Priority		
	Not offered	Compre-hensive	Targeted	Limited	Rank	n*	% in top ten (n=116)
Centrally Delivered							
Clinical Research	60 %	3%	10%	27%	9.1	8	9%
Drug Information	52 %	18%	14%	16%	5.8	35	30%
Drug Use Evaluation	32 %	8%	24%	36%	7.4	37	33%
Formulary Compliance	28 %	14%	22%	36%	7.3	37	34%
Inservice education	10 %	4%	35%	51%	7.9	43	43%
Med Incident reporting/prevention	7 %	34%	25%	34%	5.6	73	69%
P&T participation	2 %	82%	12%	4%	5.9	89	88%
Ethics Review Ctee participation	34 %	46%	7%	13%	8.2	18	20%
Infection Control Ctee participation	23 %	24%	24%	29%	7.8	24	24%
Clinical Trials support	20 %	38%	21%	21%	8.0	38	36%
Patient Specific							
Admission drug histories	71 %	6%	29%	36%	5.0	50	47%
ADR monitoring	10 %	7%	25%	58%	6.5	44	46%
CPR team	85 %	3%	2%	10%	8.3	4	3%
Drug Interaction assessment	2 %	48%	34%	16%	3.8	86	84%
Drug therapy monitoring/evaluation	23 %	17%	42%	18%	2.6	85	76%
Medication Counselling	15 %	6%	51%	28%	4.9	74	68%
Medication rounds	30 %	15%	39%	16%	4.5	64	57%
Patient Education	13 %	6%	48%	33%	6.0	50	49%
Pharmacokinetic monitoring	4 %	32%	49%	15%	4.0	87	83%
Seamless Care	48 %	1%	27%	34%	6.5	32	28%
TPN team participation	36 %	24%	21%	19%	6.3	42	42%
	Base: Respondents who provided rating of service level (n=137 to 141)						

*n= number of respondents who ranked 10 services and included this one

Conclusion

On the whole, the 2003/04 data in this report confirm the continuing development of clinical pharmacy in Canada with respect to staffing, for both inpatients and outpatients. By comparison with the 2001/02 data, we see less change with respect to the documentation of activities, practice models, evaluation of services, and the right to prescribe. Lastly, we took a different approach to describing clinical activities this year, in order to document the relative importance assigned to such activities by our respondents.

References

1. Schumock GT, Butler MG, Meek PD, Vermeulen LC, Arondekar BV, Bauman LS, Bauman JL. 2002 Task Force on Economic Evaluation of Clinical Pharmacy Services of the American College of Clinical Pharmacy. Pharmacotherapy 2003; 23 (1):113–132.
2. Schumock GT, Meek PD, Ploetz PA, Vermeulen LC. Economic evaluations of clinical pharmacy services--1988-1995. The Publications Committee of the American College of Clinical Pharmacy. Pharmacotherapy 1996; 16(6):1188-208
3. ACCP White Paper. A vision of pharmacy's future roles, responsibilities and manpower needs in the US. Pharmacotherapy 2000; 20 (8): 991-1020.
4. ASHP 2015 Initiative - http://www.ashp.org/2015/, checked on October 26, 2004.

5. ACCP Legislative Update – H.R. 4724 - The Medicare Clinical Pharmacist Practitioner Services Coverage Act of 2004
6. Canadian Society of Hospital Pharmacists. Professional Standards for Hospital Pharmacy Practice. 2003 - *http://www.cshp.ca/dms/dmsView/1_01-Professional-Standards.pdf* checked on October 28, 2004
7. Bond, CA, Raehl CL, Patry RP. The feasibility of implementing an evidence-based core set of clinical pharmacy services in 2020: manpower, marketplace factors and pharmacy leadership. Pharmacotherapy. 2004; 24 (4): 441-52.
8. Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: Monitoring and patient education—2003. Am J Health-Syst Pharm. 2004; 64: 457-71.
9. Bond CA, Raehl CL, Franke T. Clinical pharmacy services, hospital pharmacy staffing, and medication errors in United States hospitals. Pharmacotherapy. 2002 22(2):134-47.
10. Canadian Society of Hospital Pharmacists – Guidelines for Documentation of Pharmacists' Activities in the Patient's Health Record. 1993. http://www.cshp.ca/dms/dmsView/1_Lignes-10.pdf, checked on October 26, 2004
11. Bond CA, Raehl CL, Patry RP. The feasibility of implementing an evidence-based core set of clinical pharmacy services in 2020: manpower, marketplace factors and pharmacy leadership. Pharmacotherapy. 2004; 24 (4): 441-52.
12. Bond CA, Raehl CL, Patry RP. Evidence-based core clinical pharmacy services in U.S. hospitals in 2020: services and staffing. Pharmacotherapy. 2004; 24 (4): 427-40.
13. Canadian Society of Hospital Pharmacists – Professional Standards for Hospital Pharmacy Practice. 2003. *http://www.cshp.ca/dms/dmsView/1_01-Professional-Standards.pdf*, checked on October 28, 2004
14. Hammond RW, Schwartz AH, Campbell MJ, Remington TL, Chuck S, Blair MM, Vassey AM, Rospond RM, Herner SJ, Webb CE; American College of Clinical Pharmacy. ACCP Position Statement- Collaborative drug therapy management by pharmacists--2003. Pharmacotherapy. 2003 Sep;23(9):1210-25.
15. Anonymous. Status of collaborative drug therapy management in the United States, March 2004. Am J Health Syst Pharm. 2004;61(15):1609-10.
16. Kuo GM, Buckley TE, Fitzsimmons DS, Steinbauer JR. Collaborative drug therapy management services and reimbursement in a family medicine clinic. Am J Health Syst Pharm. 2004; 61(4):343-54.
17. Pearson G., Yuksel N, Card D. et coll. CSHP – Information paper on pharmacist prescribing within a healthcare facility. CSHP Official Publications 2003/2004: 199-204. http://www.cshp.ca/dms/dmsView/1_37-Info-Pharm.ist-prescribi.pdf visité le 1er novembre 2004.
18. CSHP – Statement on pharmacist prescribing. 2001. http://www.cshp.ca/dms/dmsView/1_25-Pharmacist-Prescribing.pdf visité le 1er novembre 2004
19. Bond CA, Raehl CL, Franke T. Clinical pharmacy services, pharmacy staffing, and the total cost of care in United States hospitals. Pharmacotherapy. 2000; 20 (6) :609-21.
20. Bond CA, Raehl CL, Franke T. Interrelationships among mortality rates, drug costs, total cost of care, and length of stay in United States hospitals: summary and recommendations for clinical pharmacy services and staffing. Pharmacotherapy. 2001;21(2):129-41.
21. Bond CA, Raehl CL, Franke T. Medication errors in United States hospitals. Pharmacotherapy. 2001;21(9):1023-36.
22. Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: Monitoring and patient education—2003. Am J Health-Syst Pharm 2004; 64: 457-71.
23. Bond CA, Raehl CL, Patry RP. Evidence-based core clinical pharmacy services in U.S. hospitals in 2020: services and staffing. Pharmacotherapy. 2004; 24 (4): 427-40.

Drug Information and Drug Use Evaluation

Nancy Roberts

- The percentage of respondents reporting dedicated staff for drug information and drug use evaluation services in 2003/04 was 30%, similar to the 31% reported in 2001/02 (Table C-1).

Table C-1. Drug Information and Drug Use Evaluation Services 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Drug information / drug use evaluation services have dedicated staff	43 30%	3 8%	15 22%	25 66%	31 55%	12 14%
Drug information services						
FTE pharmacists (n=32)	1.3	0.5	0.9	1.6	1.5	0.4
FTE support staff (n=18)	0.4	.	0.3	0.5	0.5	0.1
Drug use evaluation services						
FTE pharmacists (n=33)	0.7	0.6	0.7	0.8	0.8	0.6
FTE support staff (n=10)	0.5	.	0.5	0.4	0.5	.

- The average of reported staffing for drug information for respondents who reported staffing of greater than 0 FTE in each category was 1.3 FTE for pharmacists (32 respondents) and 0.4 support staff (18 respondents).

- The average of reported staffing for drug use evaluation for respondents who reported staffing of greater than 0 FTE in each category was 0.7 FTE for pharmacists (33 respondents) and 0.5 support staff (10 respondents).

- It should be noted that the manner in which data was collected and analyzed in the 2003/04 survey differed from the 2001/02 survey, therefore the comparison of results between these two surveys is not included this year. However, future surveys will provide for more accurate comparison and trending in this area.

Drug Distribution Systems

Janet Harding

Oral Medication Systems

The system by which drugs move from the pharmacy to the patient involves a number of different health care workers and multiple steps. At each of these steps, the opportunity for misadventure and patient harm exists. It is fundamental that pharmacists advocate for and ultimately deliver drug distribution systems that are the least prone to error. The Canadian Society of Hospital Pharmacists endorses the Unit-Dose/Intravenous Admixture system as the drug distribution system of choice in organized health care settings. (1)

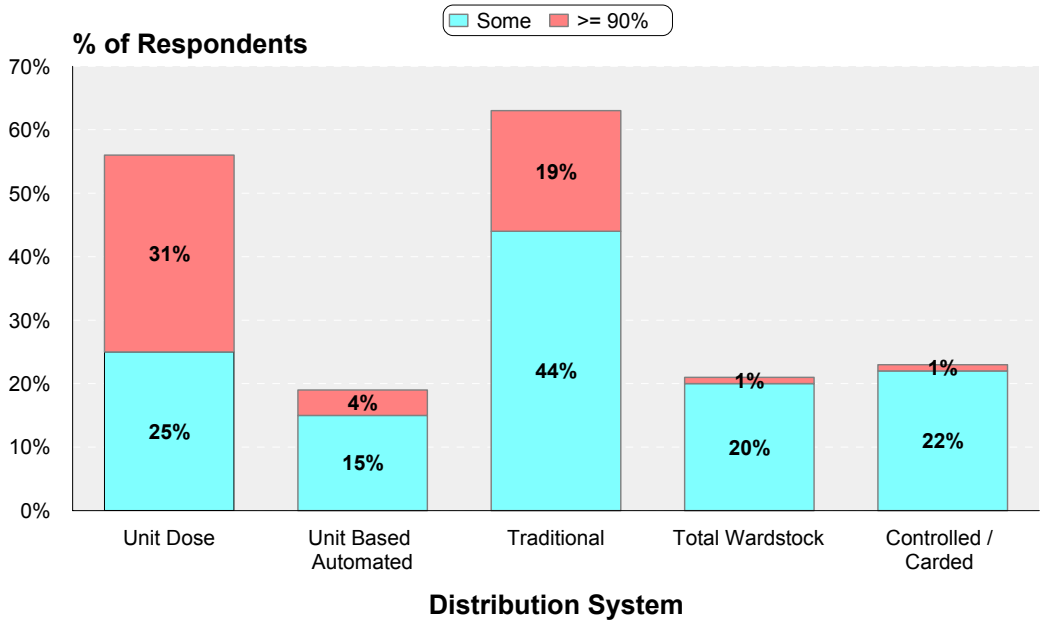
- There has been a slow but steady increase in the number of respondents reporting use of unit dose systems over the past years, indicating progress toward use of safer drug distribution systems within Canadian hospitals. In spite of this modest progress, traditional and total wardstock systems were reported to be used for a least some beds in 63% and 21% of responding hospitals respectively (Table D1). Traditional and total wardstock systems are associated with a higher risk of medication misadventure than unit dose, controlled dose or unit based automated systems.

Table D-1. Drug Distribution Systems 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Unit dose						
some beds	81	14	39	28	41	40
	56%	37%	57%	74%	73%	45%
≥90% of beds	45	6	27	12	24	21
	31%	16%	40%	32%	43%	24%
Unit based automated dispensing system						
some beds	27	3	11	13	15	12
	19%	8%	16%	34%	27%	14%
≥90% of beds	6	1	4	1	2	4
	4%	3%	6%	3%	4%	5%
Traditional						
some beds	91	29	34	28	31	60
	63%	76%	50%	74%	55%	68%
≥90% of beds	28	12	11	5	9	19
	19%	32%	16%	13%	16%	22%
Total wardstock						
some beds	30	10	16	4	9	21
	21%	26%	24%	11%	16%	24%
≥90% of beds	1		1			1
	1%	-	1%	-	-	1%
Controlled/ carded dose						
some beds	33	11	14	8	7	26
	23%	29%	21%	21%	13%	30%
≥90% of beds	1	1	-	-	-	1
	1%	3%				1%
One system for oral medication for ≥90% of beds	81	20	43	18	35	46
	56%	53%	63%	47%	63%	52%

- Unit dose systems that provide service to ≥90% of beds within an institution were reported by 31% of respondents, up from 24% in 2001/02. These comprehensive unit dose systems were reported by 43% of teaching hospitals, compared to 24% of non-teaching hospitals and 40% of respondents with 201-500 beds, versus 16% of respondents with 100-200 beds and 32% in the >500 bed category (Figure D-1).

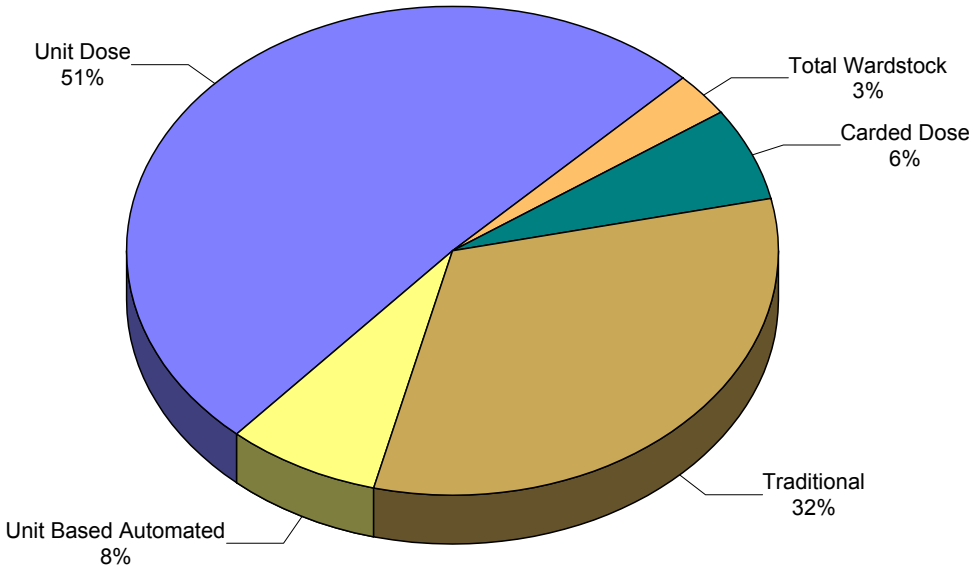
Figure D-1. Drug Distribution Systems 2003/04



Base: All respondents (144)

- Combined responses from all survey participants indicated that 65% of beds overall were serviced by the safer systems of unit dose, unit-based automated systems or controlled/carded dose, while 35% of beds were provided with traditional or total wardstock drug distribution systems (Figure D-2).

Figure D-2. Proportion of Beds Serviced by Drug Distribution System 2003/04



Base: All respondents (144)

- Among respondents who reported unit dose drug distribution, 63% (51/81) reported using a centralized automated dispensing system. Of these, 82% (42/51) use a canister type system and 18% (9/51) use a robotic system (six respondents in Quebec, two in Ontario and one in Atlantic Canada).

- The reported use of unit based automated dispensing systems increased slightly from 22 respondents (18%) in 2001/02 to 29 respondents (20%) in this year's survey. Among respondents reporting the use of unit based automated dispensing systems, the number used in Emergency Departments increased substantially, from 10/22 (45%) in 2001/02 to 23/29 (79%) in 2003/04. Drug distribution systems to Emergency Departments often rely on nurses choosing doses from extensive floorstock supplies, with the attendant risk of errors. Automated dispensing systems can be used to minimize vulnerability to medication misadventure, improve security controls, and increase the safety consciousness of staff members in these typically busy patient care areas. [(2)]

The contribution of safe, accurate, well-designed and efficient drug distribution systems to patient care cannot be underestimated. Patient safety can be severely compromised if flaws in the design of the drug distribution system create increased opportunities for error. The leadership role of the pharmacist in developing, implementing and managing improved drug distribution systems that demonstrate an ability to enhance patient safety is one that clearly needs to be embraced.

Medication Order Entry

- Pharmacists and technicians continue to be reported as the categories of personnel who most frequently perform medication order entry (Table D-2), with almost identical percentages of respondents reporting order entry by pharmacists (79%) as technicians (78%). Pharmacy technician order entry has remained relatively stable over the past number of years, with 73% of respondents reporting that technicians entered orders in 2001/02 and 77% in 1999/2000.

- The reported percentage of pharmacist verification of medication order entry increased from 2001/02, regardless of the category of personnel entering the medication order. The importance of pharmacist review of medication orders for therapeutic appropriateness is well documented as a safe medication use practice and can occur either prior to or after actual medication order entry. Verification of medication order entry itself can provide a check in the medication use system to ensure not only therapeutic appropriateness when order entry is completed by other than pharmacists, but also transcription accuracy.

- There has been a notable increase in the percentage of respondents reporting that orders entered by pharmacists are verified by pharmacists; 41% of respondents who reported pharmacists perform order entry also reported that pharmacist order entry is verified by a pharmacist, compared to 27% in 2001/02. The survey did not address the number of respondents who may have a technician check for computer order entry or transcription accuracy.

Table D-2. Medication Order Entry 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Personnel who perform and check order entry						
Pharmacists	114	31	52	31	43	71
	79%	82%	76%	82%	77%	81%
Verified by pharmacist (n=114)	47	11	27	9	14	33
	41%	35%	52%	29%	33%	46%
Technicians	113	28	52	33	46	67
	78%	74%	76%	87%	82%	76%
Verified by pharmacist (n=113)	98	24	46	28	40	58
	87%	86%	88%	85%	87%	87%
Nurses	7	3	1	3	3	4
	5%	8%	1%	8%	5%	5%
Verified by pharmacist (n=7)	6	3	-	3	3	3
	86%	100%		100%	100%	75%
Physicians	6	1	2	3	4	2
	3%	3%	3%	4%	6%	1%
Verified by pharmacist (n=6)	5	1	1	3	4	1
	83%	100%	50%	100%	100%	50%
Others	5	2	1	2	4	1
	3%	5%	1%	5%	7%	1%
Verified by pharmacist (n=5)	5	2	1	2	4	1
	100%	100%	100%	100%	100%	100%

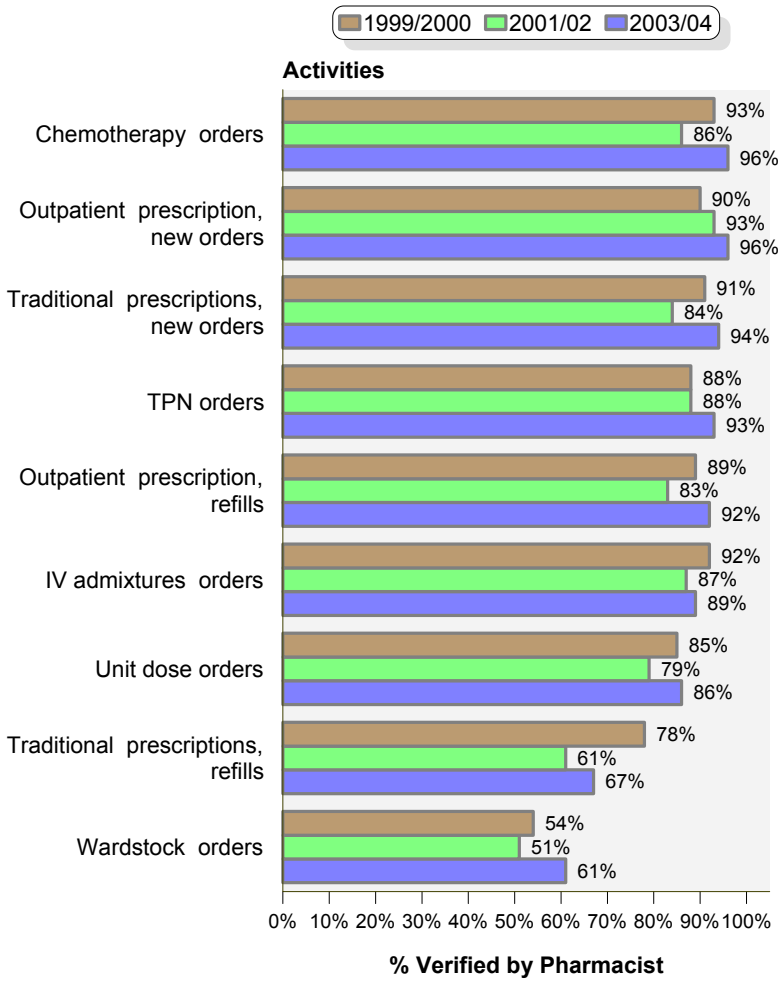
- There has been minimal change in the medication order types reported as entered by technicians since the previous Annual Report, with the exception of unit dose orders. The percentage of respondents reporting technician unit dose order entry has increased from 35% in 2001/02 to 49% in 2003/04 (Table D-3). This change is reflective of the expanding role of technicians within the distribution system as institutions strive to maintain and advance pharmacy services, both distributive and clinical, while continuing to deal with pharmacist shortages.

Table D-3. Medication Order Entry by Technicians 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
No order entry by technicians	25 17%	6 16%	15 22%	4 11%	9 16%	16 18%
Some Order Entry by technicians						
Wardstock orders	102 71%	29 76%	45 66%	28 74%	38 68%	64 73%
• Verified by pharmacist (n=102)	62 61%	14 48%	30 67%	18 64%	24 63%	38 59%
Traditional prescriptions, new orders	93 65%	28 74%	40 59%	25 66%	32 57%	61 69%
• Verified by pharmacist (n=93)	87 94%	25 89%	39 98%	23 92%	30 94%	57 93%
Traditional prescriptions, refills	100 69%	30 79%	44 65%	26 68%	35 63%	65 74%
• Verified by pharmacist (n=100)	67 67%	18 60%	33 75%	16 62%	26 74%	41 63%
Unit dose orders	70 49%	16 42%	35 51%	19 50%	29 52%	41 47%
• Verified by pharmacist (n=70)	60 86%	14 88%	31 89%	15 79%	23 79%	37 90%
IV admixture orders	85 59%	22 58%	39 57%	24 63%	32 57%	53 60%
• Verified by pharmacist (n=85)	76 89%	19 86%	37 95%	20 83%	29 91%	47 89%
TPN Orders	70 49%	17 45%	34 50%	19 50%	25 45%	45 51%
• Verified by pharmacist (n=70)	65 93%	17 100%	32 94%	16 84%	24 96%	41 91%
Chemotherapy orders	54 38%	16 42%	23 34%	15 39%	19 34%	35 40%
• Verified by pharmacist (n=54)	52 96%	14 88%	23 100%	15 100%	19 100%	33 94%
Outpatient prescriptions, new orders	78 54%	16 42%	39 57%	23 61%	36 64%	42 48%
• Verified by pharmacist (n=78)	75 96%	16 100%	39 100%	20 87%	34 94%	41 98%
Outpatient prescriptions, refills	79 55%	15 39%	40 59%	24 63%	38 68%	41 47%
• Verified by pharmacist (n=79)	73 92%	13 87%	39 98%	21 88%	34 89%	39 95%

- Pharmacist verification of technician order entry increased for all categories of orders from 2001/02 to 2003/04 (Figure D-3), perhaps indicating renewed awareness of patient safety.

Figure D-3. Pharmacist Verification of Technician Order Entry 2003/04



Base: Respondents reporting that technicians enter orders for individual categories

- Pharmacy medication profiles were reported to include all medications (scheduled, once only, stat and floorstock) prescribed for a patient by 87% of respondents (Table D-4). Complete medication profiles are fundamental to patient safety, facilitating timely identification of potential drug related problems such as drug interactions, inappropriate dosages, therapeutic duplications and contraindications to therapy.

Table D-4. Medication Tickets, Medication Profiles and Medication Administration Records 2003/04

		Bed Size			Teaching Status	
	All	100-200	201-500	>500	Yes	No
Hospitals (n=)	(144)	(38)	(68)	(38)	(56)	(88)
Manually prepared medication "tickets" or "cards" used						
Yes (≥90%)	10%	11%	9%	13%	9%	11%
Partial	12%	11%	12%	13%	14%	10%
Pharmacy's Medication profiles include all prescribed meds						
Yes (≥90%)	87%	95%	87%	79%	80%	91%
Partial	10%	3%	9%	18%	18%	5%
Medication Administration Records						
Are Manually prepared	44%	50%	40%	45%	36%	49%
Hard copy generated through PIS, manual documentation	56%	53%	54%	61%	50%	59%
Electronic, share a common database with PIS and documentation is on-line	10%	5%	12%	13%	14%	8%
Allergy status visible on each page of MAR	56%	47%	56%	63%	57%	55%
Patient provided with copy of MAR or similar ongoing record	3%	-	6%	3%	4%	3%

Medication Administration Records (MARs) support critical functions in the medication use system. They give the health care worker basic directions on the drug, dose, route and time for medication administration, act as a document to indicate when actual administration of medication has occurred and provide a comprehensive summary of a patient's medication regimen for prescribers and other caregivers. MARs generated through the pharmacy information system, either in hard copy or electronically, used with independent checks against original medication orders on the patient care area, provide for safer drug administration by avoiding errors that can occur through manual transcription as well as misinterpretation of handwriting.

- Manual preparation of MARs was reported by 44% of respondents.

- Fifty-six percent of respondents reported that MARs are generated in hard copy through the pharmacy information system and manually documented.

- Fifteen respondents (10%) reported that MARs are generated electronically, share a common database with the pharmacy information system and documentation is on-line. This was more commonly reported in teaching facilities (14%, 8/56) and in those with >500 beds (13%, 5/38) and was least commonly reported by respondents in non-teaching facilities (8%, 7/88) and those with 100-200 beds (5%, 2/38). Twelve of the 15 respondents reporting use of electronically generated MARs were from Quebec, with one from each of the Prairies, Ontario and Atlantic Canada.

- Approximately half (56%) of all respondents reported a patient's allergy status is visible on each page of the MAR. Ensuring that allergy status is clearly available and consistently reinforced may prevent untoward events ranging from minor allergic responses to anaphylaxis.

- Only 3% (5/144) of all respondents provided the patient with a copy of the MAR or a similar ongoing medication record. This is similar to the less than 4% reported in American hospitals.[3] Providing patients with a copy of the MAR indicates a willingness to involve the patient in their own care, which in turn can enhance patient safety.

The use of manually prepared medication "cards" or "tickets" during the medication administration process is clearly outmoded in today's era of computer technology. The manual production of these tickets introduces additional opportunities for transcription errors, and the quantity and small size of medication tickets can lead to administration errors, as the tickets are easily lost or misplaced.

- In spite of these well known pitfalls, manually prepared medication tickets or cards were reported in use to ≥90% of areas by 10% (15/144) of all respondents and <90% of areas by an additional 12% of respondents. Use of "cards' or "tickets" was reported by 25% of facilities with ≥90% traditional systems compared to 4% of respondents providing ≥90% unit dose systems. Regional variation was evident, with use of cards reported by 22% of respondents from Atlantic Canada and 19% of respondents from Quebec, compared to only 4% from Ontario, and none from the Prairies or British Columbia.

Technicians Checking Technicians

- Eighty-seven percent (125/144) of respondents reported technicians check the work of other technicians.

- Table D-5 outlines activities performed by technicians and the percentage of respondents reporting that "tech check tech" processes are in place, as well as those that report established certification procedures (See also Figures D-4 and D-5).

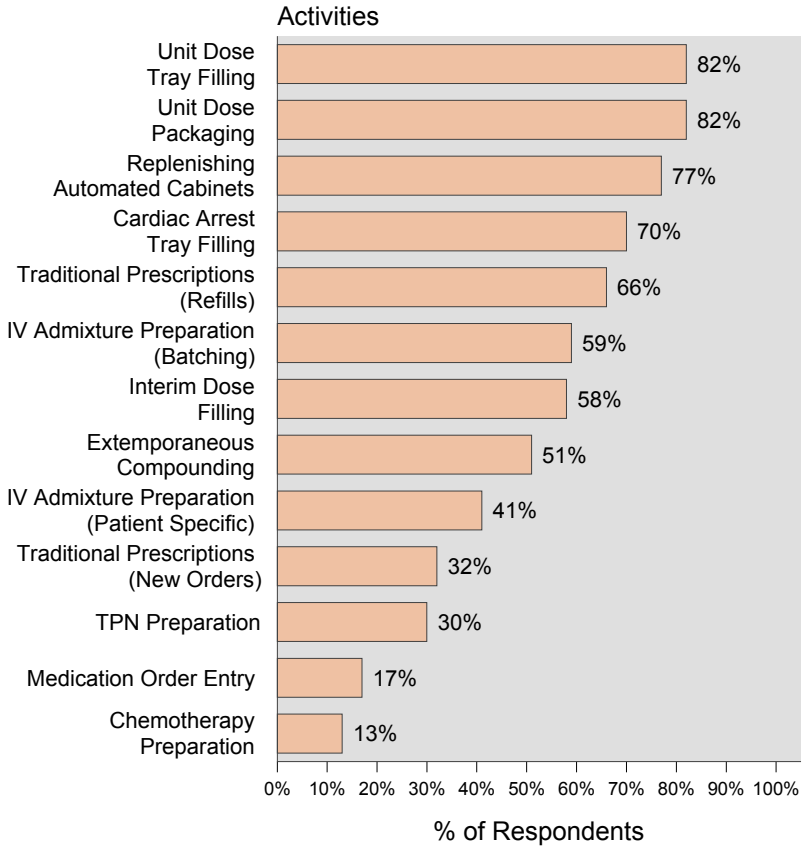
Table D-5. Technician Activities Checked by Other Technicians and Certification Required 2003/04

Hospitals (n=144)	Function Performed	Tech Check Tech Total	Certification Required (Where Function checked by Technicians) Yes	No
IV Admixture Preparation (Batching)	88	52	43	9
	61%	59%	83%	17%
IV Admixture Preparation (Patient Specific)	88	36	31	5
	61%	41%	86%	14%
TPN preparation	87	26	20	6
	60%	30%	77%	23%
Chemotherapy Preparation	83	11	9	2
	58%	13%	82%	18%
Unit Dose Packaging	99	81	44	37
	69%	82%	54%	46%
Unit Dose Tray Filling	73	60	43	17
	51%	82%	72%	28%
Interim Dose Filling	72	42	32	10
	50%	58%	76%	24%
Replenishing Automated Cabinets	47	36	11	25
	33%	77%	31%	69%
Traditional Prescriptions (Refills)	79	52	39	13
	55%	66%	75%	25%
Traditional Prescriptions (New Orders)	66	21	17	4
	46%	32%	81%	19%
Medication Order Entry	71	12	8	4
	49%	17%	67%	33%
Cardiac Arrest Tray Filling	92	64	25	39
	64%	70%	39%	61%
Extemporaneous Compounding	96	49	20	29
	67%	51%	41%	59%

Note- *The method used to analyse the data for technician check technician programs has been modified since the 2001/02 Annual Report. In the 2003/04 report, the number of respondents indicating that the activity was performed by technicians is the base on which the percentage of Tech Check Tech is calculated. This differs from previous reports, in which the base was the total number of respondents, therefore the results presented in Table D-5 are not directly comparable to tables from reports of previous years. Additionally, the per cent of responses indicating if certification was required for technician check technician activities is based on the number of respondents reporting technician check technician for the specific activity rather than the total number of respondents as in the 2001/02 Annual Report.*

- The delegation of certain checking functions to technicians is clearly well established practice for some work, yet is far less common in areas such as chemotherapy preparation, medication order entry and TPN preparation. The accreditation of pharmacy technician schools and the legislative recognition of pharmacy technicians can be expected to influence delegation of functions in the future.

Figure D-4. Technician Activities Checked by other Technicians 2003/04

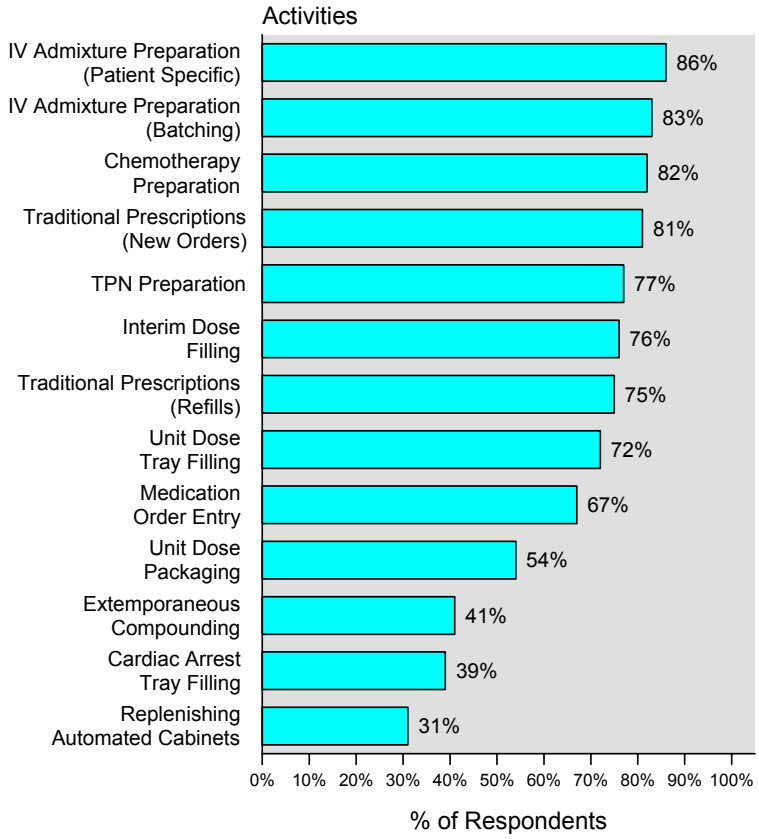


Base: Respondents reporting that function is performed

CSHP recommends and encourages implementation of a certification process, specific to activities delegated to technicians, to ensure technicians are appropriately trained and qualified.[4] Certification supports the technician in the checking role and advances a safety process within the medication use system.

- More than 80% of the respondents that have technicians check technicians for traditional prescriptions (new orders), chemotherapy preparation and IV admixture preparation (batching and patient specific) require certification.

Figure D-5. Certification Required 2003/04



Base: Respondents using technician check technician

- Technician certification was reported by 71% (102/144) respondents. A consistently applied process for re-certification was reported to be partially in place by 45% (46/102) of these respondents and fully implemented (≥90%) by 35% (36/102).

Pharmacy technicians have demonstrated they can accurately and efficiently prepare and deliver drug products. It is the responsibility of the pharmacist to ensure procedures are in place to ensure technicians can safely perform these activities. As the shortage of pharmacists continues, the scope of technician tasks within the medication use system can allow pharmacists to continue to provide and expand direct patient care activities.

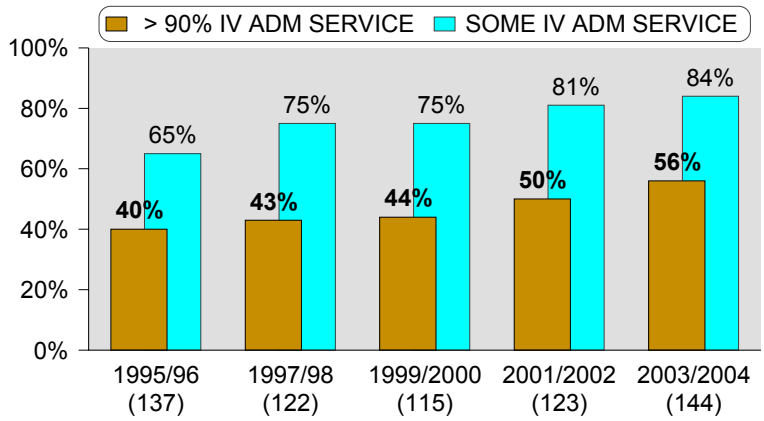
Intravenous Admixture Services

When doses are not available in a ready to administer form from the manufacturer, central preparation of intravenous medication unit doses within the pharmacy department is the ideal way to ensure that these sterile products are therapeutically appropriate, free from microbial, pyrogenic and particulate contaminants, prepared correctly and properly labeled, stored and distributed.[5]

- The percentage of respondents reporting the provision of IV admixture has steadily increased from 75% of all respondents in 1999/2000 to 81% in 2001/02 and 84% in 2003/04 (Figure D-6). These services were more commonly reported by teaching facilities (95%) as compared to non-teaching (77%) and by those facilities with >500 beds (100%) compared to those with 100-200 beds (71%) and 201-500 beds (82%).

- This movement is also apparent for IV admixture services offered to ≥90% of patients or patient care areas; with 56% of respondents reporting these complete services in 2003/04, compared to 50% in 2001/02 and 44% in 1999/2000.

Figure D-6. Percentage of IV Admixture Service Providers 1995/96 to 2003/04



Base: All respondents ( )

- Respondents providing IV admixture estimated that 47% of total IV doses administered in their facilities are prepared through the service. IV doses include a range of possible preparation from those administered in an undiluted form to those requiring dilution in a small volume in a syringe, minibag or buretrol to those requiring dilution in a large volume for continuous infusion. A definition of IV dose was not provided to respondents; therefore interpretation of this question may have varied between respondents (Table D-6).

- Within the 121 facilities where respondents reported the provision of IV admixture services, patient care areas receiving service included the OR (40%), ER (55%), Other Outpatients (74%), Critical Care (81%) and Other Inpatients (96%).

- The inclusion of antibiotics in the admixture service was reported by 92% of respondents with IV admixture programs, H2 Blockers by 64%, large volume parenterals by 56%, and inotropes by 20%. Other products (e.g. narcotics, epidurals and corticosteroids) were identified by 63% of respondents.

Table D-6. IV Admixture Services and Averages of Reported Annual Productions 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Provision of Some IV Admixture Services	121 84%	27 71%	56 82%	38 100%	53 95%	68 77%
Extent of areas covered by service						
≥90% of patient care areas	80 56%	11 29%	39 57%	30 79%	41 73%	39 44%
If partial, % of patient care areas (n=35)	35%	35%	33%	39%	38%	34%
Estimated percentage of doses administered in institution prepared through IV admixture program (n= 121)	47%	35%	47%	54%	53%	42%
Annual production of IV Admixtures						
Total	107,234 (97)	32,973 (19)	85,268 (47)	186,053 (31)	174,411 (45)	49,101 (52)
Inpatients	99,665 (51)	12,026 (8)	86,502 (28)	170,976 (15)	164,801 (24)	41,765 (27)
Outpatients	6,515 (30)	383 (3)	5,134 (16)	10,195 (11)	9,522 (14)	3,883 (16)
Home patients	5,660 (19)	807 (4)	6,641 (10)	7,579 (5)	8,167 (9)	3,403 (10)
Ratio IV production per acute patient day						
≥90% of patient care areas	1.07 (65)	1.43 (7)	1.00 (34)	1.07 (24)	1.37 (34)	0.74 (31)

Base: Pharmacy departments providing complete data ( )

- The reported average production of IV admixtures by respondents providing service to ≥90% of patients was 1.07 admixtures per acute patient day, down from the reported average of 1.19 reported in 2001/02 and 1.09 reported in 1999/2000. This change could be related to a shift in survey demographics, but the increasing use of medications that require less frequent dosing may also be a contributing factor.

- The primary method of administering intermittent IV doses has not changed appreciably since the 1997/98 Annual Report; minibag use was reported by 60% (86/144) of respondents, syringe infusors by 28% (41/144) buretrol/burette by 6% (9/144) while 3% (5/144) report other methods (e.g. direct IV push). Minibag use was reported more often in Ontario (84%, 38/45), B.C. (75%, 9/12), Atlantic Canada (72%, 13/18) and the Prairies (57%, 12/21), while syringe infusors are used more often in Quebec (58%, 28/48) and to a lesser extent in the Prairies (33%, 7/12).

Chemotherapy

- Ninety-two percent of all respondents report that IV chemotherapy is prepared and administered in their facilities. Preparation in the pharmacy department was reported by 95% (127/133) of these respondents.

- The average of reported number of chemotherapy doses in hospitals reporting that parenteral chemotherapy doses were prepared by Pharmacy was 8,351 (Table D-7).

Table D-7. Averages of Reported Annual Productions of IV Chemotherapy 2003/04

		Bed Size			Teaching Status	
	All	100-200	201-500	>500	Yes	No
Hospitals (n=)	(144)	(38)	(68)	(38)	(56)	(88)
Annual production of IV Chemotherapy						
Total	8,351	1,555	8,306	13,911	12,421	5,534
	(110)	(25)	(54)	(31)	(45)	(65)
Inpatients	2,882	891	2,209	4,296	3,976	1,579
	(46)	(5)	(23)	(18)	(25)	(21)
Outpatients	8,629	1,214	8,627	13,576	13,029	5,879
	(52)	(10)	(27)	(15)	(20)	(32)
Home patients	629	12	963	245	1014	53
	(5)	(1)	(3)	(1)	(3)	(2)

Base: Pharmacy departments providing complete data ( )

- The provision of home chemotherapy services was reported by five Quebec respondents.

- Among respondents reporting the preparation of IV chemotherapy, 95% have written policies and procedures to ensure the health and safety of employees preparing, transporting, administering and disposing cytotoxic drugs (Table D-8).

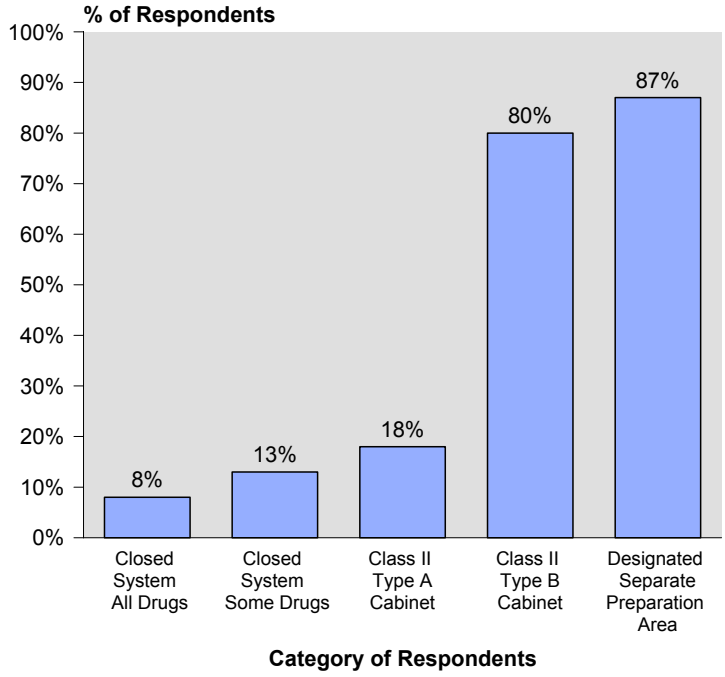
Table D-8. Cytotoxic Drugs- Safety Practices 2003/04

		Bed Size			Teaching Status	
	All	100-200	201-500	>500	Yes	No
Hospitals (n=)	(144)	(38)	(68)	(38)	(56)	(88)
IV chemotherapy prepared and administered by hospital	92%	87%	94%	95%	95%	91%
Pharmacy prepared parenteral chemo doses (n=133)	95%	94%	95%	97%	94%	96%
Written policies and procedures to ensure employee health and safety (n= 127)	95%	97%	93%	97%	100%	92%
Cytotoxic drugs prepared using a closed system (n=127)						
Some drugs	13%	16%	10%	14%	14%	12%
All drugs	8%	6%	7%	11%	6%	9%
Cytotoxic drugs prepared in approved biological safety cabinet (n=127)						
Class II Type A	18%	23%	18%	14%	18%	18%
Class II Type B	80%	77%	80%	83%	82%	79%
Other	1%	-	-	3%	-	1%
	(1)			(1)		(1)
Cytotoxic drugs prepared in a separate designated area (n=127)	87%	84%	90%	83%	84%	88%

- Use of a designated separate chemotherapy preparation area was reported by 87% of respondents who indicated that Pharmacy prepared parenteral chemotherapy doses (Figure D-7).

- Among facilities reporting that Pharmacy prepared parenteral chemotherapy doses, 80% reported use of a Class II Type B Cabinet and 18% use of a Class II Type A Cabinet.

Figure D-7. Chemotherapy Preparation Systems 2003/04



Base: Pharmacy departments where parenteral chemotherapy doses were prepared (127)

Recommendations on the use of biological safety cabinets differ based on provincial Occupational Health and Safety regulations as well as provincial cancer agencies. Class II Type B Cabinets or better, which do not exhaust any cabinet air into the room, are preferred. Class II Type A Cabinets are approved in some provinces if they are used with a hood that captures released air and exhausts it out of the building and if there are means to ensure the HEPA filter is functioning before each use.

An alert issued by the National Institute for Occupational Safety and Health in the United States in March, 2004, warned of the dangers associated with cytotoxic drugs and suggested appropriate measures to protect workers. Among those measures discussed was a closed system drug transfer device that prevents the entry of particulate matter into the work environment.[6] Ten respondents reported using a closed system to prepare all cytotoxic drugs (6 from Quebec, 2 from Ontario, and 1 from each of the Prairie and Atlantic Regions.)

It is probable that in the future, increasing focus will be placed on occupational health and patient safety issues surrounding the preparation and administration of chemotherapy. Hospital pharmacists should be familiar with the issues and ensure appropriate procedures are developed in their workplace.

Ambulatory Pharmacy Services

- Twenty-four percent of respondents reported that a separate dispensary for ambulatory pharmacy services was operated at their facilities, equal to the 24% reported in the 1999/2000 survey (Table D-9). Reporting of separate ambulatory pharmacies was more prevalent in those facilities with >500 beds (47%) versus those with 100-200 beds (8%) and in teaching facilities (41%) versus non-teaching facilities (14%). Operation of separate ambulatory pharmacies was also reported more often by respondents from Ontario (44%) and the Prairies (38%) as compared to British Columbia (17%), Quebec (8%) and Atlantic Canada (6%).

- The majority of these respondents (71%, 25/35) reported the pharmacy operated the separate ambulatory dispensary, a decrease from the 82% reported in the 1999/2000 survey. Fourteen per cent (5/35) reported that they contracted out the service and 11% (4/35) indicated other means of operation (e.g. funded by outside sources but responsible for operations). Non-teaching facilities were more likely to report contracting out (25%) versus teaching facilities (9%) and teaching facilities were more likely to report that they operated the ambulatory dispensary themselves (78%) versus non-teaching facilities (58%).

Table D-9. Ambulatory Pharmacy Services 2003/04

		Bed Size			Teaching Status	
	All	100-200	201-500	>500	Yes	No
Hospitals (n=)	(144)	(38)	(68)	(38)	(56)	(88)
Separate dispensary for ambulatory Pharmacy services operated at your facility	24%	8%	21%	47%	41%	14%
Ambulatory pharmacy was (n=35)						
Operated by Pharmacy	71%	100%	50%	83%	78%	58%
Contracted out	14%	-	21%	11%	9%	25%

References

1. Canadian Society of Hospital Pharmacists Background Paper: Impact of Hospital Pharmacists on Patient Safety. Ottawa, Ontario, December 2003, available at http://www.cshp.ca .
2. American Society of Health-System Pharmacists. ASHP Guidelines on the Safe Use of Automated Medication Storage and Distribution Devices. Am J Health-Syst Pharm. 1998;55:1403-7.
3. Pedersen CA, Schneider PJ , Scheckelhoff DJ. ASHP National Survey of Pharmacy Practice in Hospital Settings: Dispensing and Administration – 2002. Am J Health-Syst Pharm, 2003;60:52-68.
4. Statement on the Role of the Pharmacy Technician, Canadian Society of Hospital Pharmacists, Ottawa, Ontario, 2001.
5. American Society of Hospital Pharmacists. ASHP Technical Assistance Bulletin on Hospital Drug Distribution and Control. Am J Hosp Pharm. 1980;37:1097-103.
6. Antineoplastics Declared Occupational Hazard, May 15, 2004, AJHP News http://www.ashp.org/news

Drug Purchasing and Inventory Control

Nancy Roberts

Drug Costs

The Patented Medicine Prices Review Board (PMPRB) reported that total sales of all drugs for human use in 2003 increased 14.5% from 2002, and that sales of patented drugs increased by 14.8% for the same period [(1)]. Growth in drug expenditures clearly exceeds growth in other areas of health care- the Canadian Institute for Health Information (CIHI) reported that pharmaceutical expenditures accounted for 16.2% of overall health care expenditures in Canada in 2003, up from 15.2 % in 2001 (accounting for the second largest share, after hospitals). In comparison, the share of drugs in total health expenditures was 9.5% in 1985. [(2)]

- This year's survey supports these findings- reported annual drug costs for respondents' hospitals in 2003/04 (Table E-1) have increased by almost 1.28 million (19%) since the 2001/02 Annual Report, to an average of $7,963,681.

- Increases are noted for all hospital sizes, and for teaching and non-teaching hospitals, with the most significant increase (48%) seen in non teaching hospitals and the smallest increase (2.7%) in >500 bed hospitals. However, significant changes in sample size in these two hospital categories, since the 2001/02 survey, may account for this shift. This shift may also be affected by a change in the definition for clinic/medical day drug costs in the 2003/04 survey, since respondents were directed to include drug costs for provincially funded programs (i.e. oncology, nephrology, etc) for the first time.

- Acute care inpatients drug costs per day were reported to have increased by only 26 cents per day since 2001/02.

- Emergency room drug costs continue the pattern of increase from survey to survey, from $4.31 in 1997/98 to $8.01 in 2003/04. The percentage increase since 2001/02 was 24% ($6.48 to $8.01).

- Clinic/Medical Day Unit drug cost per clinic/day unit visit in 2003/04 cannot be compared to previous surveys, due to the change in definition noted above. This definition change/clarification will allow for more comparable results per visit across the country in future surveys. .

Table E-1. Inventory and Drug Costs 2003/04

Hospitals (n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)
Inventory						
Total Value at Year End	$697,514	$308,660	$515,023	$1,357,451	$1,152,857	$422,060
Inventory Turns per Year	10.3	7.0	10.8	12.3	12.5	8.9
Drug Costs by Area						
Total	$7,963,681 (134)	$2,078,951 (32)	$5,337,963 (64)	$17,341,506 (38)	$14,735,596 (52)	$3,669,296 (82)
Acute Care Inpatient	$3,596,002 (81)	$1,164,765 (18)	$2,545,432 (40)	$7,325,787 (23)	$5,962,616 (34)	$1,883,983 (47)
Non-Acute Care Inpatient	$381,056 (50)	$102,360 (8)	$223,470 (27)	$813,348 (15)	$606,083 (16)	$275,161 (34)
Clinical/Medical Day Unit	$2,056,431 (76)	$412,058 (15)	$1,515,196 (38)	$4,023,064 (23)	$3,423,584 (34)	$949,689 (42)
Emergency Room	$414,204 (69)	$236,932 (15)	$339,735 (36)	$710,869 (18)	$535,972 (29)	$325,922 (40)
Ambulatory (Take home)	$3,068,454 (17)	$17,932 (2)	$709,616 (8)	$6,635,847 (7)	$3,993,358 (13)	$62,516 (4)
Ambulatory (Retail)	$8,327,712 (6)	. -	$4,864,615 (2)	$10,059,261 (4)	$8,327,712 (6)	. -
Acute Care Inpatient Costs						
Drug Costs/ Acute Pt Day (n=79)	$31.25	$27.70	$28.53	$38.51	$40.35	$24.72
Drug Costs/ Acute Admission (n=78)	$230	$173	$213	$301	$313	$169
NonAcute Care						
Inpatient Costs						
Drug Costs/ Non Acute Patient Day (n=42)	$9.30	$6.78	$10.07	$9.57	$9.04	$9.41
Drug Costs/ Non Acute Admission (n=40)	$1,251	$889	$1,615	$885	$1,318	$1,222
Other Areas						
Clinic, Medical Day Unit Costs/ Clinic, Day Unit Visit (n=69)	$53.83	$11.89	$76.87	$42.99	$20.16	$81.29
Emergency Room (ER) Costs / ER visit (n=67)	$8.01	$8.39	$7.54	$8.65	$9.42	$7.06

Base: Pharmacy departments providing complete data

Inventory

- The average of reported total inventory value at year end for 2003/04 has increased by 10.6% when compared to 2001/02 ($631,105).

- The most significant increases for total inventory value in 2003/04, when compared to 2001/02, were reported in 100-200 bed hospitals (46%) and non-teaching hospitals (22%). This might be attributed to the efforts of larger, teaching hospitals to transfer patients back to the community hospitals for secondary care (recovery) to decrease lengths of stay and address long surgical waiting lists. The increase may also reflect the fact that these facilities may be geographically located in areas where the lead time for ordering stock is greater, or perhaps less emphasis is placed on inventory management due to resource limitations.

- Inventory turns increased for all sizes/types of hospitals except for the 100-200 bed sites. The reduction in inventory turns in the 100-200 bed sites is consistent with the 46% increase in inventory value also reported by respondents in these smaller facilities.

Changes in Drug Costs

- The number of respondents (n=7) reporting a decrease in total drug costs in 2003/04 was the same as reported in 2001/02 (Table E-2); however the percentage decrease reported was significantly higher at 10.1% in 2003/04, as compared to 3.8% in 2001/02. It is noteworthy that 73 (51%) of respondents did not answer this question in the 2003/04 survey.

- For respondents who provided information on the magnitude of the increase, the average reported percentage increase in total drug costs in 2003/04 was 12.9%, similar to 2001/02 (13.4%). The reported percentage increases were higher in all areas compared to 2001/02, except for acute care inpatient areas, where the reported increase was 11.8% versus 12.7% in 2001/02. This result correlates with the very small increase (26 cents) reported under Table E1 for drug costs per acute patient day for 2003/04, when compared to 2001/02.

- The reported percentage decrease in non-acute care inpatient costs was substantially less in 2003/04 (12%) than in 2001/02 (24.2%).

Table E-2. Changes in Drug Expenses by Patient Care Area - Magnitude of Change and Number of Respondents 2003/04

		Bed Size			Teaching Status	
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Acute Care Inpatient						
% Decrease in drug costs	7.4%	0.6%	6.8%	12.0%	9.5%	2.0%
	(7)	(1)	(4)	(2)	(5)	(2)
% Increase in drug costs	11.8%	14.8%	12.8%	6.5%	12.7%	11.2%
	(59)	(14)	(31)	(14)	(23)	(36)
Non-Acute Care Inpatient						
% Decrease in drug costs	12.0%	4.0%	16.8%	17.0%	17.0%	11.3%
	(8)	(3)	(4)	(1)	(1)	(7)
% Increase in drug costs	16.3%	15.5%	21.1%	6.2%	24.3%	12.3%
	(27)	(2)	(17)	(8)	(9)	(18)
Clinic/ Medical Day Unit						
% Decrease in drug costs	20.1%	40.0%	23.3%	8.0%	13.9%	26.3%
	(14)	(1)	(9)	(4)	(7)	(7)
% Increase in drug costs	20.6%	24.4%	19.4%	20.0%	20.5%	20.7%
	(44)	(9)	(24)	(11)	(19)	(25)
Emergency Room						
% Decrease in drug costs	10.6%	16.0%	11.8%	4.0%	6.4%	15.5%
	(13)	(2)	(8)	(3)	(7)	(6)
% Increase in drug costs	15.7%	16.6%	17.9%	9.3%	15.8%	15.7%
	(35)	(6)	(21)	(8)	(13)	(22)
Ambulatory (Take Home)						
% Decrease in drug costs	18.0%	.	18.0%	.	5.0%	31.0%
	(2)		(2)		(1)	(1)
% Increase in drug costs	67.4%	13.0%	134.8%	27.0%	66.7%	69.7%
	(13)	(1)	(5)	(7)	(10)	(3)
Ambulatory Retail						
% Decrease in drug costs	8.0%	.	8.0%	.	8.0%	.
	(1)	-	(1)	-	(1)	-
% Increase in drug costs	17.0%	.	5.0%	20.0%	17.0%	.
	(5)	-	(1)	(4)	(5)	-
Total Drug Costs						
% Decrease in Drug Costs	10.1%	9.5%	15.4%	7.0%	7.2%	14.0%
	(7)	(2)	(2)	(3)	(4)	(3)
% Increase in Drug Costs	12.9%	14.3%	13.3%	10.7%	11.6%	13.5%
	(59)	(15)	(28)	(16)	(20)	(39)

Base: Pharmacy departments providing complete data

Drug Expenses

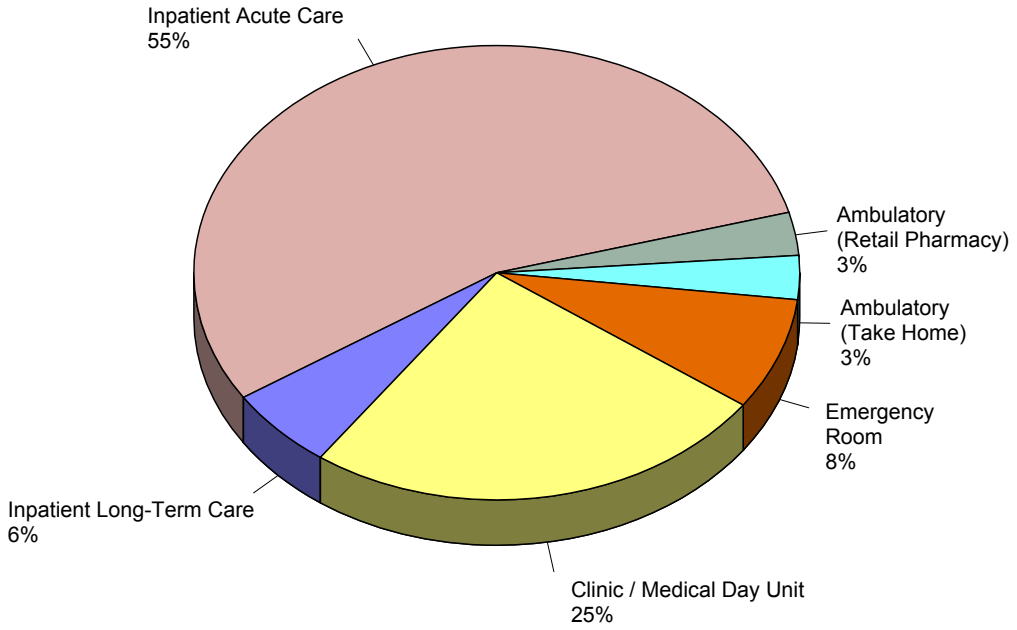
- The percentage of drug expenses for acute care inpatient (Figure E-1, Table E-3) has undergone a distinct shift over a 6 year period, from 67% of total drug expenses, as reported in 1997/98, to 55% in 2003/04. The percentage of drug expenses for acute care inpatient reported in the 2001/02 survey was 58.7%.

- Clinic/Medical Day Unit drug expenses percentage shifted from 14% of total drug expenses in 1997/98 up to 25% in 2003/04. This shift may be attributed to the increase emphasis for more procedures to be carried out in the clinic setting versus OR/Day Surgery setting, as well as an increase in the number oncology treatments delivered in an outpatient versus inpatient basis. It also should be noted that provincial financing for some clinic/medical day unit drugs (i.e. oncology, nephrology, etc) varies across provinces and in the 2003/04 survey respondents were directed to ensure these drug costs were included, to enable more accurate comparison across the country for clinical/medical day unit drug expenses.

- No significant change was reported in the percentages of drug expenses for emergency and long-term care areas over the last 6 years.

- The percentage of drug expenses for Ambulatory (take home) decreased from 6% to 2 %, when comparing 1997/98 to 2003/04. Ambulatory (retail) drug expenses were reported separately for the first time in the 2003/04 survey, which most likely accounts for the majority of the decrease for Ambulatory (take home). Future surveys will provide more accurate trending information in these areas.

Figure E-1. Percentage of Drug Expenses by Patient Care Area 2003/04



Base: Respondents who provided relevant drug cost information (82)

Table E-3. Percentage of Drug Expenses by Patient Care Area 2003/04

Hospitals (n=)	All (144)	Bed Size			Teaching Status	
		100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)
Acute Care Inpatient	55.2%	63.8%	53.6%	51.5%	50.9%	58.5%
Non-Acute Care Inpatient	5.7%	4.8%	5.5%	6.5%	3.1%	7.5%
Clinic/Medical Day Unit	25.1%	19.4%	27.0%	26.3%	28.6%	22.5%
Emergency Room	7.6%	12.0%	7.4%	4.7%	4.4%	10.1%
Ambulatory (Take home)	2.4%	0.1%	1.5%	5.6%	5.3%	0.2%
Ambulatory (Retail)	2.7%	-	2.5%	5.1%	6.3%	-

Base: Pharmacy departments providing complete data

References

1. Patented Medicine Prices Review Board, Annual Report 2003, Ottawa, Ontario. Communiqué Page 1
2. Canadian Institute for Health Information, Drug Expenditures in Canada 1985 to 2003. Ottawa, Ontario. Executive Summary Page i

Human Resources

Neil Johnson

Human resource shortages currently affect a number of health professions. Over the past few years, these shortages have affected pharmacy, and particularly hospital pharmacy, in a dramatic fashion. The scope of this problem is believed to be widespread and its impact has caused reductions in patient oriented pharmacy services.

Staffing

- Overall, the average of reported pharmacy staff paid hours per acute care patient day (excluding residents) remained unchanged from the 2001/02 Annual Report, at 0.74 (Table F-1). Prior to this report, there had been consistent upward movement of this average, with an overall increase of 29.8% since 1997/98, when this value was 0.57 paid hours per acute patient day.

- Comparisons at the provincial level showed that the average of reported paid hours per acute care patient day increased the most in New Brunswick and Prince Edward Island (15.5%), Newfoundland and Labrador (12.1%) and Saskatchewan (5.6%) and decreased the most in Nova Scotia (15.5%). In other provinces the change in the reported average was less than 5%. The average of reported paid hours per acute patient day decreased by 5.5% for hospitals with greater than 500 beds. In hospitals with complete unit dose and IV admixture systems the average decreased by 9.9% (Table F-2). This appears to be drive primarily by hospitals with complete unit dose systems, where the decrease was 11.4%. These changes may be the result of changes in demographics of respondents. For example, teaching hospital respondents represented 42.2% of the total in the 2001/02 survey, while this number decreased to 38.8% in this year's survey. This small change across the entire survey base may not contribute to large changes; however, it may lead to more dramatic changes within provincial data sets.

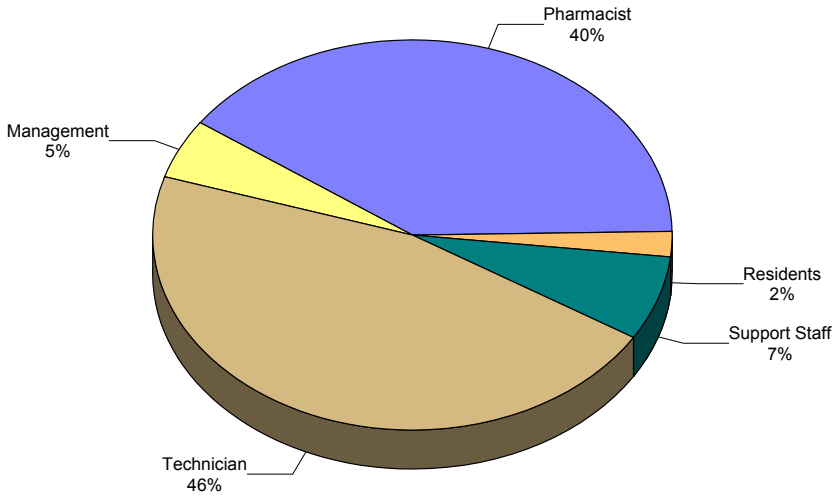
Table F-1. Average Budgeted Pharmacy Staffing and Net Percent Change in Staffing 2003/04

		Province								
Hospitals (n=)	**CANADA (144)**	**BC (12)**	**AB (10)**	**SK (4)**	**MN (7)**	**ON (45)**	**QC (48)**	**NB/PE (9)**	**NS (7)**	**NL (2)**
Pharmacist	16.1	13.3	21.7	20.3	19.3	18.0	14.8	10.2	13.7	8.0
Management	1.9	2.4	3.0	3.0	1.4	2.3	1.1	1.8	2.1	1.0
Technician	18.4	16.3	21.8	20.6	18.1	22.7	15.2	14.3	18.6	7.2
Support Staff	2.8	1.8	10.0	1.6	1.9	2.1	2.9	1.3	1.3	1.5
Residents	0.7	0.6	0.4	1.0	-	0.5	1.1	0.3	0.4	-
Total FTE	39.9	34.3	56.9	46.4	40.7	45.6	35.1	27.9	36.1	17.7
Total beds	420	575	501	462	360	424	388	299	409	492
Paid hours/ Acute Patient Day (n=140) (excluding residents)	0.74	0.71	0.83	0.75	0.72	0.84	0.66	0.67	0.71	0.74
Overall staffing change										
Net increase	38%	8%	70%	25%	71%	40%	27%	56%	57%	50%
Net decrease	21%	17%	-	-	14%	13%	40%	-	29%	-
No change	38%	75%	30%	75%	14%	44%	29%	33%	14%	50%

Table F-2. Average Budgeted Pharmacy Staffing by Drug Distribution System 2003/04

Hospitals(n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)	>= 90% Unit Dose (45)	>= 90% Trad (28)	>= 90% CIVA (81)	>= 90% CIVA & UD (35)	>= 90% CIVA & Trad (8)
Pharmacist	16.1	4.9	12.6	34.3	27.7	8.8	17.3	13.3	20.5	20.0	15.3
Management	1.9	0.8	1.5	3.7	2.9	1.2	2.1	1.0	2.3	2.5	0.9
Technician	18.4	5.9	14.3	38.9	29.6	11.4	20.0	12.6	23.3	23.0	13.8
Support Staff	2.8	0.6	1.7	7.0	5.7	1.0	3.3	2.4	3.8	4.0	3.1
Residents	0.7	0.1	0.3	1.9	1.7	-	0.7	1.0	0.8	0.9	0.8
Total FTE	39.9	12.3	30.4	85.8	67.7	22.4	43.4	30.2	50.8	50.3	33.8
Total beds	420	150	328	857	594	310	430	307	493	467	340
Paid hours/ Acute Patient Day (excluding residents) (Base=140)	**0.74**	**0.66**	**0.72**	**0.86**	**0.89**	**0.64**	**0.78**	**0.66**	**0.82**	**0.82**	**0.68**

Figure F-1. Staff Composition of Average Hospital Pharmacy Department

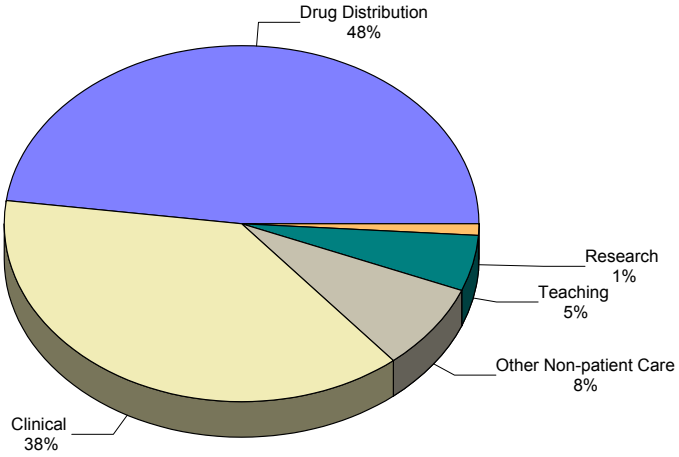


Base: All respondents (144)

- The overall staff composition of the average pharmacy department (Figure F-1) changed slightly from the 2001/02 report, with the percentage of pharmacists dropping to 40% from 44%, percentage of technicians increasing to 46% from 43%, and percentage of support staff increasing to 7% from 6%. This reflects the evolving and expanding role of pharmacy technicians in supporting pharmacy operations.

- In contrast to the 2001/02 report, where 50% of respondents reported an increase in staff positions, only 38% (55/144) reported an increase this year. In addition, 21% (30/144) reported a net decrease in staffing, which is up from 6% in 2001/02. This finding supports the observation that staff complements have remained stable since the 2001/02 Annual Report. The cause for this could be multi-factorial. Financial challenges faced by many hospitals, the lack of pharmacist staff and rapid growth of salaries might be contributory factors to the lack of staff growth in hospital pharmacies.

Figure F-2. Proportion of Time Spent by Pharmacists in Each Category 2003/04



Base: All respondents (144)

- Respondents reported that pharmacists spent approximately 38% of their time in clinical activities (Figure F-2, Table F3), which was essentially unchanged from the 2001/02 Annual Report (39%). The time reported as spent in clinical activities was lowest in Atlantic Canada (29%) and highest in the Prairies (46%). The reported percentage of time spent in distribution activities increased slightly to 48%, from 46% in the previous report. The reported time spent in distribution activities in non-teaching hospitals increased from 49% in the 2001/02 Annual Report to 54% this year. In contrast, this value decreased from 41% to 38% for teaching hospitals. Distribution time was highest in the Atlantic Provinces (60%) and British Columbia (57%) and lowest in Ontario (43%).

Table F-3. Proportion of Time Spent by Pharmacists in each Category 1997/98 - 2003/04

		Bed Size			Teaching Status		Previous Surveys		
Hospitals (n=)	All (144)	100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)	2001/02 (123)	1999/00 (115)	1997/98 (122)
Drug distribution (including investigational drugs)	48%	53%	49%	41%	38%	54%	46%	49%	51%
Clinical activities	38%	32%	38%	44%	45%	34%	39%	38%	33%
Teaching	5%	5%	4%	6%	5%	4%	6%	6%	7%
Pharmacy research	1%	2%	1%	2%	2%	1%	2%	1%	N/A
Other non-patient care activities	8%	8%	8%	7%	10%	7%	7%	6%	9%

Salaries

- The salaries reported in the 2003/04 Annual Report (Table F-4) are reflective of those paid up to March 31, 2004. Salaries continue to be dynamic given the current labour shortages, so these figures may not reflect current salary figures as of the date of publication of this report. Clearly the approach in many areas of health care in Canada is toward a marked increase in compensation to health care workers. The average of reported expenditure per full time equivalent pharmacy staff position increased to $54,959. from $49,298 reported in the 2001/02 Annual Report. This increase is well above the increase in cost of living for the period; however this could, in part, be due to changes in the mix of respondents from various provinces. Prior to the 1999/2000 Annual Report, annual increases in salary per FTE had been in the 2% range. From the 1999/2000 Annual Report through to this report the average annual salary per FTE increase has been 5.6%.

- The definition of staff classifications in the 2003/04 Annual Report has changed somewhat from previous reports, making some comparisons with past reports difficult. In the 2003/04 Annual Report, respondents reported that salaries for pharmacists increased substantially over the 2001/02 Annual Report. Increases in average maximum salaries for pharmacy leadership and staff positions (both baccalaureate and advanced practice) increased by between 9.0% (4.4% annual) and 14.0% (6.7% annual) with the largest increase reported in the staff pharmacist classification. Teaching hospitals and hospitals larger than 500 beds reported larger increases in staff pharmacist salaries than non-teaching hospitals and hospital with 500 or fewer beds. The Prairie region reported the highest increase in maximum staff pharmacist salary (27.1%). Average maximum reported salaries for technicians increased by 5.3% (annual 2.6%). These increases were less than increases reported in the 2001/02 Annual Report.

Table F-4. Average Annual Salary by Position 2003/04

Hospitals (n=)	Canada (144)	Province								
		BC (12)	AB (10)	SK (4)	MN (7)	ON (45)	QC (48)	NB/PE (9)	NS (7)	NL (2)
Manager										
Start Salary (n=84)	$68,649	$74,427	$73,105	$73,148	$92,304	$72,131	$60,299	$65,602	$59,314	-
Max. Salary (n=99)	$84,681	$89,464	$89,848	$85,923	$100,038	$84,807	$83,552	$76,536	$71,232	-
Leader/ Supervisor/ Coordinator										
Start Salary (n=62)	$67,074	$71,265	$74,051	$69,706	$86,933	$70,023	$57,513	$62,100	$56,949	$61,549
Max. Salary (n=69)	$79,696	$85,482	$83,140	$74,129	$86,933	$82,511	$77,097	$70,811	$62,468	-
Pharmacist (B.Sc.)										
Start Salary (n=119)	$60,674	$59,684	$62,297	$63,300	$81,244	$64,596	$51,877	$58,723	$54,123	$59,138
Max. Salary (n=120)	$73,818	$70,090	$80,711	$70,258	$83,508	$77,200	$72,159	$65,985	$61,809	-
Pharmacist (Pharm.D. / M.Sc.)										
Start Salary (n=53)	$62,694	$65,681	$75,123	$77,252	$93,588	$70,069	$52,099	$67,210	$64,042	-
Max. Salary (n=55)	$77,059	$78,905	$88,477	$82,027	$93,588	$81,961	$71,273	$68,562	$76,800	-
Technician, Senior										
Start Salary (n=80)	$33,160	$41,245	$46,490	$36,028	$34,133	$40,525	$27,092	$30,081	$30,462	-
Max. Salary (n=82)	$38,291	$42,814	$59,143	$38,181	$37,485	$47,213	$32,795	$32,858	$35,661	-
Technician										
Start Salary (n=105)	$33,299	$39,853	$41,000	$30,658	$28,659	$36,532	$26,716	$27,207	$28,724	$27,825
Max. Salary (n=104)	$38,179	$41,482	$49,772	$33,106	$34,831	$42,863	$30,331	$28,619	$33,547	-
Residency Stipend Average (n=31)	$26,643	$47,057	$29,229	$37,700	-	$25,161	$22,737	$31,773	$30,200	-
Overall Average Salary $/ FTE (n=130) (without residents)	$54,959	$62,763	$66,563	$56,095	$59,630	$58,617	$49,802	$48,177	$44,452	$51,323

- Respondents indicated that 82% of pharmacy directors earned over $80,000 per year, compared to 56% as reported in the 2001/02 Annual Report (Table F-5). Seventeen percent of directors were reported to earn over $100,000 per year, compared with 6% in the previous report. Directors of Pharmacy in larger facilities and teaching hospitals tended to be compensated at higher levels.

Table F-5. Distribution of Director Salary Ranges 2003/04

Hospitals (n=)	Canada (144)	Bed Size			Province								
		100-200 (38)	201-500 (68)	>500 (38)	BC (12)	AB (10)	SK (4)	MN (7)	ON (45)	QC (48)	NB/PE (9)	NS (7)	NL (2)
Under $70,000	2%	5%	-	3%	8%	--	--	-	-	-	-	14%	50%
$70,000- $79,999	15%	32%	10%	5%	-	-	25%	-	4%	17%	78%	43%	-
$80,000- $89,999	36%	34%	46%	21%	50%	-	25%	-	31%	58%	22%	14%	-
$90,000- $99,999	25%	11%	29%	32%	25%	50%	50%	86%	33%	8%	-	14%	-
$100,000- $109,999	10%	5%	7%	21%	17%	40%	-	-	18%	2%	-	-	-
$110,000- $119,999	3%	-	4%	5%	-	-	-	14%	2%	6%	-	-	-
$120,000+	2%	-	-	8%	-	-	-	-	7%	-	-	-	-
no answer/no Director	6%	13%	3%	5%	-	10%	-	-	4%	8%	-	14%	50%

Human Resource Shortages

- Sixty-three percent (89/142) of respondents reported having pharmacist position vacancies at March 31, 2004, which was somewhat greater than the rate reported in 2001/02 (60%).

- Overall, respondents reported a total of 331 pharmacist position vacancies across Canada on March 31, 2004, which substantially exceeds the number reported in 2001/02 (228). The absolute number of reported vacancies will clearly underestimate the true pharmacist human resource gap across Canada, given the response rate to this survey. The increase in reported paid hours vacant is concerning in light of the service delivery needs. Budgeted staff increases show that pharmacists' services are in demand, however effective service provision is constrained by a lack of human resources. The situation could be worsening, as the reported positional vacancy rate as of March 31, 2004 (Table F-6) exceeds the reported paid hour vacancy rate for the fiscal year (Table F-7).

- Positional vacancy rates for residents this year rose from 7.4% in the 2001/02 Annual Report to 13.8% this year. This substantial rise in unfilled residency positions illustrates what could be a troubling trend as fewer students seek to engage in post-graduate hospital based education. Increases in tuition, student debt load and private sector wage rates for entry- level pharmacists are likely contributory factors. Should this trend continue, the availability of skilled practitioners able to practice in and provide leadership within complex hospital environments will be reduced.

- The most challenging labour market situation in the country appears to be in Nova Scotia. The overall positional vacancy rate for all staff in Nova Scotia was the highest reported in the country and the province led in pharmacist, management and technician paid hour vacancies.

Table F-6. Vacancy Rates – Percent Positions Vacant as of March 31, 2004 (Weighted Averages)**

Hospitals(=)	All (144)	Bed Size			Teaching Status		Province								
		100-200 (38)	201-500 (68)	>500 (38)	Yes (56)	No (88)	BC (12)	AB (10)	SK (4)	MN (7)	ON (45)	QC (48)	NB/PE (9)	NS (7)	NL (2)
Pharmacists (n=132)	12.9%	17.9%	14.1%	11.3%	10.6%	17.4%	9.6%	11.5%	4.9%	8.9%	13.6%	15.2%	12.7%	14.6%	-
Management (n=121)	6.9%	15.0%	4.7%	6.9%	4.6%	10.5%	3.8%	6.6%	8.3%	-	7.8%	2.1%	15.4%	20.0%	-
Technicians (n=132)	0.9%	1.0%	1.3%	0.7%	1.0%	0.8%	-	0.9%	2.4%	0.8%	1.0%	0.9%	-	1.5%	-
Support Staff (n=106)	1.2%	-	0.9%	1.4%	1.5%	-	-	1.0%	-	15.0%	1.1%	-	-	-	-
Residents (n=31)	13.8%	50.0%	17.4%	11.6%	14.0%	-	-	25.0%	25.0%	.	16.7%	10.0%	50.0%	33.3%	
All positions (n=133)	6.3%	9.0%	6.9%	5.6%	5.5%	7.9%	4.0%	5.4%	4.3%	5.3%	6.5%	7.4%	6.0%	7.9%	-

Table F-7. Vacancy Rates – Percent Paid Hours Vacant during Fiscal 2003/04

Hospitals (=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)	Province BC (12)	Province AB (10)	Province SK (4)	Province MN (7)	Province ON (45)	Province QC (48)	Province NB/PE (9)	Province NS (7)	Province NL (2)
Pharmacists (n=113)	12.3%	16.6%	12.2%	8.1%	6.3%	16.6%	9.1%	12.1%	2.9%	8.0%	15.3%	10.1%	15.6%	20.6%	4.8%
Management (n=105)	4.4%	1.6%	3.1%	8.6%	4.8%	4.0%	0.5%	10.4%	5.0%	0.4%	6.7%	0.6%	4.9%	11.6%	0.9%
Technicians (n=113)	0.9%	1.7%	0.7%	0.4%	0.9%	0.8%	-	-	2.4%	0.7%	1.3%	0.5%	-	3.4%	-
Support Staff (n=93)	0.7%	-	0.6%	1.1%	0.9%	0.4%	-	1.1%	-	2.6%	0.6%	0.3%	-	-	3.8%
Residents(n=28)	13.1%	37.1%	12.0%	10.7%	13.1%	-	-	74.2%*	-	-	11.5%	8.7%	30.7%	33.3%	-

Note- vacancy rates for percent paid hours vacant are derived only from those respondents who reported a number of paid hours vacant, therefore this information does not support interpretation as a provincial trend.

Pharmacists

- In this annual report, vacancy rates are reported on a weighted basis, which may cause some variations in reporting from the 2001/02 Annual Report. The average percent of vacant paid hours for pharmacists reported was 12.3%, with a positional vacancy rate at March 31, 2004 of 12.9%. The paid hour vacancy rate increased slightly from the 2001/02 Annual Report (10.3%) while the positional vacancy rate rose substantially from the previous report (7%).

- Nova Scotia respondents reported the highest pharmacist paid hour vacancy rate (20.6%) with Quebec respondents reporting the highest positional vacancy rate (15.2%)**.** Teaching hospitals (6.3%) and large hospitals > 500 beds (8.1%) reported the lowest paid hour vacancy rates. While the data does not offer clear reasons for these results, issues of geography may play a role to some degree, and small hospitals in rural communities may have particular challenges in recruiting pharmacists to hospitals.

Technicians

- By contrast, only 12% (17/144) of respondents reported having technician vacancies at March 31, 2004. The reported vacancy rate for technicians (based on both vacant hours and positions) was reported to be less than 1%. The highest paid hour vacancy rate was reported in Nova Scotia (3.4%).

Management

- Management vacancy rates were reported as 4.4% of paid hours and 6.9% of positions. The greatest position vacancy rates were reported in Nova Scotia (20%) and Quebec (15.4%).

- The average of reported durations of pharmacist vacancies rose slightly from 210 days in the 2001/02 Annual Report to 222 days in this report. The growth rate of the duration of vacancies appears to be stabilizing now. The average duration reported by respondents from hospitals with greater than 500 beds was 267 days (compared to 258 days in 2001/02), and the average for non-teaching hospitals was 245 days (compared to 177 days in 2001/02). The teaching hospital vacancy duration has shrunk to 193 days from 257 days in the 2001/02 Annual Report. This data may support the hypothesis that hospitals offering fewer services have a harder time recruiting new staff. British Columbia reported the greatest duration of the provincial breakdown at 310 days. Average management vacancy durations were reported as 46 days.

Impact on Patient Care Services

- Sixty-seven percent of respondents noted that services have been curtailed in the past year due to staff shortages (Table F-8). This percentage was consistent across all provinces, hospital size and hospital classifications. All service reductions remained consistent with the 2001/02 Annual Report except reduced service hours (38% vs. 27%) and curtailed inpatient drug distribution (26% vs. 19%) which both grew. This suggests that growing human resource shortages are now limiting core pharmacy service provision to a larger extent.

- The continued curtailment of teaching services is of concern given the move by academic institutions toward increased enrolment and entry-level Pharm D programs. The increased demand for clinical practicum training in hospitals will be greatly limited by the current and continuing labour shortages. The increase in curtailment of distribution services and hours of operation show that labour shortages are affecting core service delivery. Faced with the reality of core service limitations, hospital leaders may be forced to further limit teaching services at a time when academic institutions are seeking enhanced services.

Table F-8. Impact of Staff Vacancies on Pharmacy Services Delivered 2003/04

	2003/04	2001/02
Hospitals (n=)	**(144)**	**(123)**
Pharmacies reporting that they had to curtail service due to staff vacancies	96 67%	74 60%
Impact of staff shortages: (n=74)		
curtailed direct patient care / clinical services	85%	80%
delayed implementation of an approved service	56%	59%
reduced teaching	52%	49%
reduced service hours	38%	27%
curtailed inpatient drug distribution	26%	19%
curtailed outpatient drug distribution	15%	16%
curtailed contract drug distribution	5%	12%
other	22%	14%

Summary

This year's Annual Report illustrates the growing problem of human resource shortages in Canadian hospital pharmacy. Based on trends from previous reports, this skill shortage is unlikely to dissipate in the near future, further compromising the ability of hospital pharmacies to deliver comprehensive quality patient oriented pharmacy services.

Medication Safety

Patricia Lefebvre

"The Canadian Adverse Events Study" was published in the *Canadian Medical Association Journal* on May 25, 2004. [(1)] This landmark patient safety study, conducted by lead investigators Dr. Ross Baker and Dr. Peter Norton, provides the first national estimate of the incidence of adverse events among hospitalized patients in Canada. The overall adverse events rate was 7.5 per 100 hospital admissions. The investigators estimated that close to 37 % of adverse events in the study were potentially preventable. Of 360 procedures to which adverse events were attributed, 85 (23.6%) were drug or fluid related.

The fact that drug or fluid-related events were the second leading cause of adverse events strengthens the leadership role of the hospital pharmacist in enhancing the safety of patient care. Hospital pharmacists, in collaboration with health care providers and organizations' leaders, have already undertaken initiatives to address the prevention and review of medication-related adverse events. The Canadian Society of Hospital Pharmacists' background paper, "Impact of Hospital Pharmacists on Patient Safety", highlights examples of progressive services and programs already implemented in Canadian hospitals to improve medication use systems. [(2)]

Medication Incident Reporting System

- **All respondents** (100%) reported use of a medication incident reporting system within their facilities, compared to 93% in 2001/02 (Table G-1). The widespread implementation of reporting systems will facilitate future voluntary reporting to the national database - The Canadian Medication Incident Reporting and Prevention System (CMIRPS) - 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. In the Business plan, it was proposed that CMIRPS provide a secure database to collect reported incident data submitted by healthcare professionals, institutions and patients. Services provided by CMIRPS may include reports addressing national issues, information bulletins, education programs, risk assessment and recommendations to prevent medication incidents.

- Two thirds of all respondents (67%) indicated strategies have been implemented to increase reporting of medication incidents, showing no change since 2001/02. Among these respondents, reported strategies included inservices to promote reporting (74%, 71/96), communication of improvements resulting from reporting (57%, 55/96) incentives to staff for reporting (33%, 32/96), medication incidents reports made non-discoverable (27%, 26/96) and modification of appraisal instruments (11%, 11/96). It is also worth noting that 18% of all respondents reported that medication incident reports had been made non-discoverable, compared to 7% in 2001/02. This positive change to confidential reporting of incidents may partly explain the increase in the number of respondents reporting that medication incidents are reported during each stage of the medication-use process.

- A number of institutions noted that they have implemented the ISMP on-line reporting program specifically designed for hospitals, Analyze-ERR. Analyze-ERR is an internet-accessible, anonymous, error reporting software. The program has two components: 1) reporting of medication incidents to gather uniform and comparable data and 2) analysis of the incidents to generate meaningful information and root causes.

On-line reporting is one example of a strategy facilitating reporting of medication incidents by front line professionals. Another example is a "Nonpunitive Voice-Mail-Based Medication Incident Reporting System." [3] This technology allows clinicians to call to report incidents or potential incidents, therefore eliminating paperwork. A Medication Safety Coordinator screens the voice mails and enters pertinent information into the database of the reporting program. This system has been reported to result in a significant increase in reporting at Summa Health System in Akron, Ohio and several process improvements had been implemented following the analysis of those reports.

- Indicators such as the number of near misses reported, the total number of medication incidents reported or the number of medication incidents reported by the health care provider involved in the medication incident, can reflect a culture of safety. Twenty-eight percent of respondents (including those who answered "yes" or "partial") indicated that incidents occurring during prescribing and detected in pharmacy are reported, up from 21% in 2001/02. The percentage of respondents indicating that incidents occurring in pharmacy and detected during final check are reported increased by 7% (34% of respondents in 2003/04 vs. 27% in 2001/02). Results indicate that reporting of this type of "near-miss" is more common in teaching institutions when compared to non-teaching hospitals (45% versus 27%, including those who answered "yes" or "partial").

- The percentage of respondents reporting that incidents detected on the patient care units before administration to the patient are reported most of the time (≥90%) increased by 16% - from 50% in 2001/02 to 66% in 2003/04.

The analysis from USP's MEDMARX database of medication errors for 2002 (192,477 records) reports that 34,650 errors originated in the prescribing mode, of which 82% were intercepted before reaching the patient. [4] Almost half of the dispensing errors (16,853/35,016) were intercepted in the pharmacy. As you get closer to the patient, less than 10% of errors (7.13%, 3,820/ 53,612) are detected before the administration to the patient. These data clearly demonstrate the importance of reporting medication incidents detected in pharmacy or prior to administration to the patient. Reporting of "near-misses" is critical to capture valuable information to guide and prioritize improvements of the medication-use system designed to prevent medication incidents.

- Sixty-three percent of all respondents reported having a policy on the disclosure of incidents to patients and/or their families. Of the 91 respondents with a disclosure policy, 81% reported that disclosure of incidents was documented in the health record. The adoption of a disclosure policy was more commonly reported by teaching hospital respondents (75%) than by non-teaching hospital respondents (56%). The reporting of a disclosure policy was highest in Quebec (73%, 35/48) followed by Ontario (69%, 31/45) and the Prairies (62%, 13/21) and lowest in British Columbia (17%, 2/12).

Table G-1. Reporting Systems for Medication Incidents 2003/04

Hospitals (n=)	All (144)	Bed Size 100-200 (38)	Bed Size 201-500 (68)	Bed Size >500 (38)	Teaching Status Yes (56)	Teaching Status No (88)
A medication incident reporting system is in use	144 100%	38 100%	68 100%	38 100%	56 100%	88 100%
Strategies have been implemented, with the goal of increasing the **reporting of incidents**	96 67%	18 47%	51 75%	27 71%	40 71%	56 64%
Incidents that occur during **prescribing** and are detected in the pharmacy before dispensing are reported						
Yes (≥90%)	11 8%	4 11%	4 6%	3 8%	5 9%	6 7%
Partial (<90%)	29 20%	9 24%	10 15%	10 26%	15 27%	14 16%
Incidents that occur in **pharmacy** and are detected during the **final check** prior to the medication leaving pharmacy are reported						
Yes (≥90%)	19 13%	2 5%	11 16%	6 16%	11 20%	8 9%
Partial (<90%)	30 21%	9 24%	10 15%	11 29%	14 25%	16 18%
Incidents that occur **before medication is administered** to patient and are detected in patient care area are reported						
Yes (≥90%)	95 66%	20 53%	49 72%	26 68%	36 64%	59 67%
Partial (<90%)	45 31%	16 42%	17 25%	12 32%	20 36%	25 28%
Hospital has a policy on disclosure of incidents to **patients and/or their families**	91 63%	20 53%	44 65%	27 71%	42 75%	49 56%
Disclosure is **documented in the health record (n=91)**	74 81%	18 90%	34 77%	22 81%	36 86%	38 78%

Medication Incident Review

- Eighty percent of respondents reported having a designated committee responsible for medication incident review (Table G-2) showing a 10% increase from 2001/02. Ontario led with 93% (42/45), followed by the Prairies (81%, 17/21), Quebec (73%, 35/48), Atlantic (72%, 13/18) and British Columbia (67%, 8/12). Teaching hospitals (91%) and hospitals with greater than 500 beds (87%) were more likely to report a designated committee.

- Among those respondents who reported that a designated committee was responsible for medication incident review, the committees named as responsible for this function included Pharmacy and Therapeutics (60%, 69/115), Risk Management (44%, 51/115), Pharmacy & Nursing (30%, 34/115), General Quality (26%, 30/115), Medical Advisory (20%, 23/115) Medication Quality (17%, 19/115) and other committees (22%, 25/115). Hospitals are encouraged to favor interdisciplinary membership with expertise in medication safety, as the medication-use process involves all professional disciplines.

- A Medication Safety Self Assessment tool was reported to have been completed by half of the respondents (51%). Sixty-one percent of teaching hospitals compared to 45% of non-teaching hospitals reported completing a self-assessment tool. The completion of the self-assessment tool was highest in Ontario (82%, 37/45) and British Columbia (75%, 9/12) and lowest in Quebec (19%, 9/48).

- Of the respondents who reported completing a self-assessment, 95% used the ISMP Hospital Medication Safety Self-Assessment™ tool (ISMP SAT). The ISMP SAT is a comprehensive tool that can help hospitals evaluate the strengths and weaknesses of their medication use processes and identify opportunities for improvement. Most importantly, this tool facilitates the development of a plan to improve medication safety within your institution. This proactive approach permits the identification of actions required to ensure the safety of medication practices. The Canadian Council on Health Services Accreditation will recognize the value of completion of the ISMP SAT in their 2005 standards.

- The percentage of respondents who reported that medication incidents reports can be used during an individual healthcare provider's performance assessment was 21%, an 11% decrease from 2001/02. Teaching hospital respondents (14%) were less likely than non-teaching hospital respondents (25%) to report the use of medication incident reports during individual performance assessments. This positive change is in keeping with the just culture and non-punitive approach strongly encouraged by professional associations.

Table G-2. Medication Safety Review and Assessment 2003/04

		Bed Size			Teaching Status	
	All	100-200	201-500	>500	Yes	No
Hospitals (n=)	(144)	(38)	(68)	(38)	(56)	(88)
Designated committee responsible for medication incident review	115 80%	29 76%	53 78%	33 87%	51 91%	64 73%
Information regarding **the institution's medication incidents** is broadly communicated to general staff/ healthcare providers	58 40%	16 42%	22 32%	20 53%	27 48%	31 35%
Information regarding **published medication incidents** is broadly communicated to general staff/ healthcare providers	67 47%	17 45%	33 49%	17 45%	28 50%	39 44%
A **medication safety self assessment** has been completed	74 51%	18 47%	33 49%	23 61%	34 61%	40 45%
Type of medication safety self assessment (n= 74)						
ISMP	70 95%	18 100%	32 97%	20 87%	31 91%	39 98%
Other	4 5%	0 -	1 3%	3 13%	3 9%	1 3%
Medication incident reports can be used during an individual healthcare providers' **performance assessment**	30 21%	11 29%	12 18%	7 18%	8 14%	22 25%

Medication Incident Reduction Strategies

Since January 1, 2003, health care organizations in the United States have been required to comply with National Patient Safety Goals (NPSGs) to obtain or maintain accreditation. The United States Joint Commission on Accreditation of Healthcare Organizations (JCAHO) issued seven NPSGs for 2004. An expert panel of 23 professionals have identified goals and recommendations based on expert opinion or evidence for each action to improve patient safety. (5) In the near future, Canadian hospitals can expect similar patient safety goals will be adopted by the Canadian Council on Health Services Accreditation. The Canadian Society of Hospital Pharmacists and the American Society of Health System Pharmacists have published guidelines on preventing medication errors in hospitals. (6) (7)

Tables G-3 and G-4 outline strategies to prevent medication incidents. The acronym *NPSG(#)* identifies medication safety initiatives associated with a NPSG.