Hospital Pharmacy in Canada
2013 / 2014 Report

Published by the Hospital Pharmacy in Canada Editorial Board

New chapter

Future Trends in Hospital Pharmacy Practice

Lilly

Hospital Pharmacy in Canada 2013 / 2014 Report

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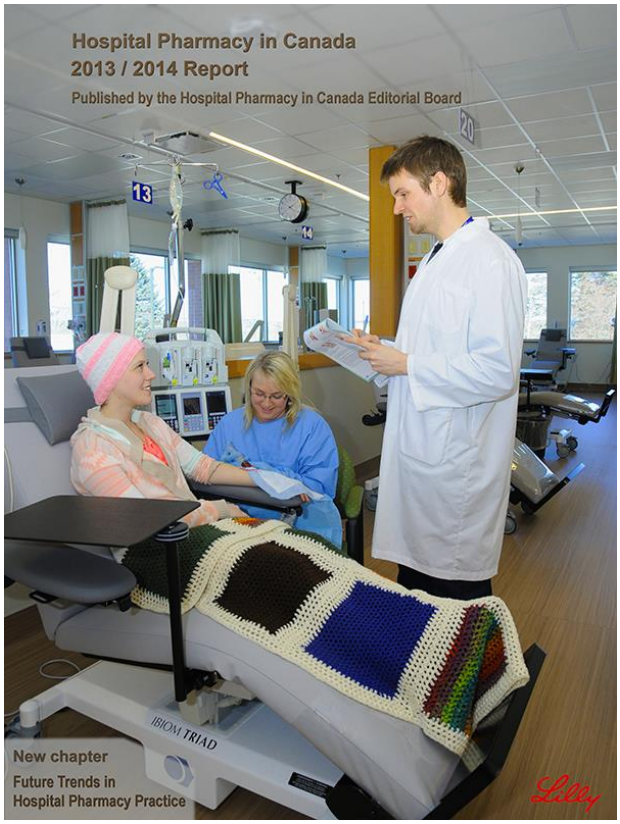

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The Editorial Board wishes to acknowledge and thank the support team of the 2013/14 Hospital Pharmacy in Canada Report.

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Special thanks

The Editorial Board would like to thank Eli Lilly Canada Inc, and its representatives Harold Just and Andrew Merrick, for their ongoing support of the Hospital Pharmacy in Canada Report.

The Editorial Board would also like to thank the staff of hospital pharmacy departments across Canada who assembled data from their respective institutions and committed the time to complete the survey.

The Editorial Board thanks the Canadian Society of Hospital Pharmacists, its Board and staff for their support for this survey.

Editorial Board

Foreword

Lauren Fischer

Eli Lilly Canada is pleased to support the 20th ***Hospital Pharmacy in Canada Report*** available at www.lillyhospitalsurvey.ca.

Thanks to all the hospital pharmacists across the country who completed the survey, there was an impressive 78% response rate. We are pleased that there were 170 organizations that responded to the survey, which collectively represent 71,686 inpatient beds across Canada. The information contained in this survey report continues to be a reliable reference due to the high participation rate by hospital pharmacy managers in all parts of the country.

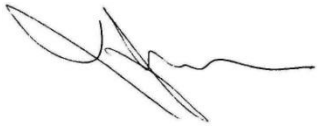
This is the last year to contain a special section measuring hospital pharmacy's progress towards the goals of the Canadian Society of Hospital Pharmacists 2015 Initiative. Carolyn Bornstein, CSHP 2015 Project Coordinator, is our guest editor for this chapter. A new chapter in this year's report focuses on future trends looking at the domains of leadership, pharmacy practice model, ambulatory care, pharmacy operations, informatics and the pharmaceutical marketplace.

This year's data were compiled by Paul Oeltjen Consulting. The report was edited by Chuck Wilgosh and Kevin Hall. Administrative support was provided by Marjorie Robertson. Copy-editing was provided by Peggy Robinson.

Also, thank you to this year's Editorial Board who interpreted the data and authored the report – André Bonnici, Jean-François Bussières, Douglas Doucette, Richard Jones, Patricia Macgregor, Kyle MacNair and Emily Musing.

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

Yours truly,



Lauren Fischer
Vice President, Corporate Affairs
Eli Lilly Canada Inc.

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

Introduction

Emily Musing

This publication marks the 20th edition of the Hospital Pharmacy in Canada Report. Milestones such as this are good opportunities for reflection. What major changes have impacted hospital pharmacy practice since 1985/86? What progress have we made as a profession in expanding our role to its full potential? How have we improved our services with respect to efficiency and safety? Have we met the challenges and embraced the opportunities inherent in the ever-changing landscape of healthcare?

In the Foreword of the first Hospital Pharmacy in Canada Report, Ken Forsyth, Manager, Business Relations for Eli Lilly Canada Inc., expressed a simple goal, that the survey would "assist all hospital pharmacy directors in the analysis of their departments' operations and their formulation of future plans". The inaugural edition, the first national survey of hospital pharmacy practice in Canada, focused on issues related to personnel shortages, economic pressures, professional growth and technology.

As for previous editions, this year's Hospital Pharmacy in Canada Report is based on data gathered by means of a survey of institutional directors of pharmacy across Canada. The report summarizes many important aspects of hospital pharmacy practice in the 170 participating organizations, which collectively represent 71,686 inpatient beds across Canada, and includes data from Newfoundland and Labrador (absent since the 2003/04 survey) and, for the first time, the Yukon (see Chapter A for characteristics of the respondent institutions). For the purposes of this report, data from Newfoundland and Labrador are combined with data from Nova Scotia, and data from the Yukon are combined with data from British Columbia. Similarly, as in the 2011/12 report, data from the Northwest Territories are combined with data from Alberta, and data from Prince Edward Island are combined with data from New Brunswick. Where data are presented on a regional basis, "BC" should be understood to include the Yukon, "Prairies" (sometimes shortened to "Prai") to include the Northwest Territories, and "Atlantic" (sometimes shortened to "Atl") to include New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador. The current report maintains the chapter highlights that were initiated in the 2009/10 report, to emphasize new and emerging trends. Notably, the chapters incorporate analyses of data from survey responses that may not always be represented in the accompanying tables and graphs. For data that are presented in the text as percentages, the raw data are also provided, as number of respondents with a particular answer divided by the total number who replied to that question, e.g., "32% (49/153)."

In the chapter on pharmacy practice (Chapter B), Jean-François Bussières and Richard Jones provide a thoughtful and comprehensive overview of clinical pharmacy activities, noting the continued evolution of the role of hospital pharmacists toward patient-centred responsibilities and accountabilities. This chapter provides data on the types of inpatient and outpatient clinical pharmacy services being offered in Canadian hospitals, as well as the evolving pharmacy practice models being used to deliver those services. This chapter also highlights the evolving role of the pharmacist as it relates to prescribing rights.

In his review of drug distribution systems (see Chapter C), Douglas Doucette documents the continued replacement of traditional drug distribution and total wardstock systems with unit-dose systems and a doubling of the use of automated dispensing cabinets since the 2007/08 report, most often in emergency departments, adult critical care units and adult medical–surgical units. The section on parenteral admixture services returned to the survey after being absent in 2011/12. This chapter also highlights an increasing concern about medication shortages, which have reportedly increased drug costs and drug-related adverse events, caused delays or cancellations of surgery, and increased lengths of stay and preventable mortality.

André Bonnici and Chuck Wilgosh profile the changing face of hospital pharmacy human resources across Canada (see Chapter D), noting an increased supply of pharmacists in most regions of the country, which has correspondingly decreased the vacancy rate for hospital pharmacist positions. Conversely, we are beginning to see evidence of an emerging shortage of pharmacy technicians in some provinces. In this chapter, the sections on staffing ratios, salaries and structured training programs for students provide useful information for pharmacy managers.

Carolyn Bornstein, the CSHP 2015 Project Coordinator, provides an insightful synopsis on the progress that Canadian hospitals have made toward achieving the CSHP 2015 targets (see Chapter E), relative to the baseline data presented in the 2007/08 report and the follow-up data in the two subsequent reports (2009/10 and 2011/12). Of note, some of the objectives within this quality initiative have been revised since its inception, and such shifts must

be considered when these data are interpreted. Carolyn's thoughtful analysis summarizes areas of strength and also highlights the further improvement needed to attain the vision set forth by the Canadian Society of Hospital Pharmacists for pharmacy practice in hospitals and other collaborative healthcare settings by the year 2015.

In the pharmacy technician chapter (Chapter F), Kyle MacNair reports on the evolving role of this important sector of hospital pharmacy human resources. Although there continues to be regional variation, respondents reported an increasing role for pharmacy technicians in directly supporting clinical pharmacy services through activities such as acquisition of preadmission medication histories and participation in medication reconciliation. This expanding scope of practice is supported by the trend toward provincial legislation to regulate pharmacy technicians, with an increasing proportion of technicians receiving certification through the Pharmacy Examining Board of Canada.

This year's report contains a new chapter on the topic of future trends (Chapter G). Respondents were presented with a number of statements concerning what the future might look like for hospital pharmacy under the domains of leadership, pharmacy practice model, ambulatory care, pharmacy operations, informatics and the pharmaceutical marketplace. They were then asked to indicate their thoughts on the probability of these potential futures. In summarizing these results, Kevin Hall and Jean-François Bussières help us to understand the potential environment in which hospital pharmacy may find itself by 2019.

Richard Jones and Chuck Wilgosh provide a snapshot of current practices related to the evaluation of pharmacy services in Canadian hospitals (see Chapter H). These include auditing a sample of clinical activities to evaluate pharmacists' provision of direct patient care services, with several of the evaluated aspects reflecting the national clinical pharmacy key performance indicators. Respondents continue to report slow progress in implementing quality assurance practices for ensuring the safety of compounded sterile products. As we try to define the place of pharmacists in the care team of the future, departments will be challenged to identify the metrics required to advance knowledge of the benefit to patient care outcomes.

Data from the seven stand-alone pediatric hospitals have been excluded from the general analysis to allow for their analysis as a distinct group. Jean-François Bussières, Kevin Hall and Patricia Macgregor review this specialty practice within the pediatrics chapter (Chapter I).

The 2013/14 survey again incorporated two supplemental surveys to capture the perspectives of front-line pharmacists and pharmacy technicians. In Chapter J, Kevin Hall and Jean-François Bussières discuss the responses of 718 front-line pharmacists to questions designed to capture their perspectives on some of the same issues addressed in the main directors' survey, as well as some of the specific practice issues faced by staff pharmacists. These issues include the respective roles and responsibilities of pharmacists and pharmacy technicians, student training programs and future trends in hospital pharmacy practice. In Chapter K, Kyle MacNair analyzes the responses of 511 hospital pharmacy technicians to questions focused on their roles and responsibilities, their knowledge and skills, and the status of technician certification and regulation in their home provinces. The Editorial Board appreciates the time taken both by the pharmacy directors who forwarded these survey questions to their staff and by the front-line staff who generously shared their insights. The data collected from these supplemental surveys will be further analyzed for a future journal publication to complement the information provided within this report.

As Executive Editor, I would like to take this opportunity to thank a number of individuals who have contributed to the success of this survey and its ensuing report. The support of Eli Lilly Canada Inc. and the contributions of Harold Just and Andrew Merrick have made this publication possible. The members of the Editorial Board continue to meet regularly to identify trends, share information and analyze changes in practice. Their insight and dedication to this project are appreciated by all hospital practitioners. Paul Oeltjen collects and analyzes the data for the editors, Marjorie Robertson provides administrative support and designs the final layout of the chapters, and George Horne electronically publishes the results. Without their contributions, the report would not be possible. As we enter our next cycle, we will be losing two long-term members of our Board. Patricia Macgregor brought a wealth of experience to this endeavour, having held leadership positions in both adult and pediatric centres. We have benefited from her insights at our editorial table. Kevin Hall joined the Board for the 1995/96 report and assumed the role of managing editor beginning with the 2005/06 report. Over the years, his attention to detail and his capable oversight have been invaluable to both the survey process and development of the report, and we will very much miss his leadership.

Now, on behalf of the Editorial Board, I present to you this latest report on the state of hospital pharmacy practice in Canada. Many years may have passed since the first edition of this report, but its goal remains steadfast and is best expressed by quoting Carly Fiorina, former CEO of Hewlett-Packard Co.: "To transform data into information and information into insight." I trust that the data contained herein will support our profession's continued self-assessment and thus inform further improvement.

Data Collection Methodology

Paul Oeltjen

An initial list of hospital pharmacies was prepared, based on respondents to previous surveys, hospital pharmacies identified by members of the Editorial Board of the Hospital Pharmacy in Canada Report, hospital pharmacies on the mailing list of the Hospital Pharmacy in Canada Report and the membership list of the Association of Canadian Academic Healthcare Organizations (ACAHO; now part of HealthCare*CAN*). The Editors (listed on page iii of this report) were responsible for verifying the current name and email address of the director of pharmacy and the chief executive officer (CEO) for each facility in the province(s) that they represented. At that point, the Editors also attempted to confirm each hospital's eligibility to participate in the survey, according to the qualifying criteria of 50 or more acute care beds.

Based on the information collected and after deletion of duplicate records, the list consisted of 221 hospitals. It was later learned that four of these hospitals had fewer than 50 acute care beds and therefore did not qualify to participate. The resulting 217 potentially qualified hospitals included 47 teaching hospitals that were members of the ACAHO, of which 7 were pediatric hospitals.

The Hospital Pharmacy in Canada Survey was announced in email messages sent to directors of pharmacy and CEOs of the initial selection of hospitals on May 7 and May 18, 2014, respectively. A second email message was sent only to the directors of pharmacy during the period from May 23 to May 27, 2014. This message contained a hospital-specific identification code and password required to log on to the survey website. Because some of the data required to complete the survey had to be obtained from other departments within each facility, a third email message was sent to the directors of pharmacy containing a summary of the data elements that the pharmacy department would likely need to obtain from other departments within the organization.

During the subsequent weeks, the Editors followed up with potential respondents to ensure that the identification codes and passwords had been received and to encourage participation in the 2013/14 survey. On June 10, June 23, July 6 and July 12, reminder notices were sent by email to directors of pharmacy who had not yet completed the online survey, asking them to participate. In addition, in early July, the Editors personally contacted hospital pharmacies that had not yet responded, to explain the importance of participation in this national survey.

The identification code and password enabled the respondent representing each facility to log on to the survey website at any time and to complete any part of the questionnaire (in English or in French). The first page of the website contained instructions for completing the survey and a link for downloading a pdf version of the survey questionnaire, for respondents to use in collecting the required data before online entry. This pdf document (also available in English or in French) was 70 pages long. On the website, the survey questions were distributed over 11 web pages. From any questionnaire web page, a respondent could return to the instruction page or move to any other page of the online survey. At the beginning of every questionnaire web page was a list of definitions of terms used in the questions on that page. These definitions also popped up when the cursor was moved over any of these terms in the text of a question.

Completion of the online survey was interactive: if follow-up questions were applicable because of the answer entered to a screening question, a modified version of the questionnaire web page was presented that included these additional questions. After a respondent had saved responses for the current page, the program warned of any fields where non-numeric information had been entered where numeric answers were required. To avoid problems resulting from inconsistent use of periods or commas for decimal indicators, numeric information requiring a decimal place had to be entered in two fields, one for the whole-number part of the number and the other for the decimal part.

By August 8, when the survey website was closed for participation, a total of **170 responding hospitals** had logged on, confirmed that they had 50 or more acute care beds and entered responses to more than 150 of the survey questions (the highest number of responses per respondent was 543 and the median number was 420). Using as a base the 217 potentially qualified hospitals that were invited to participate, the resulting response rate was therefore 78%. The actual response rate may be higher because it is not known if hospitals that never logged on to the survey website or that did not answer any questions had fewer than 50 acute care beds, in which case they would not have been qualified to participate in the survey.

After the survey website was closed, a new site was created, for the exclusive use of the two Managing Editors in performing a quality check of the data submitted by each respondent. At this website, for each hospital pharmacy that

responded to the survey, one of the Managing Editors selected the submitted data for review. The Managing Editor was then presented with a summary page showing 15 different ratios (e.g., calculated occupancy rate for acute care beds, budgeted inpatient hours per acute care inpatient day, total technician + assistant full-time equivalent [FTE] per total pharmacist FTE, pharmacist vacancy rate [as a percentage]). If any of these ratios looked unreasonable, the Managing Editor contacted the responding hospital for an explanation or the corresponding answers were excluded from the analysis. The Managing Editor then proceeded to review data for other sections of the questionnaire, looking for inconsistencies or incorrect entries of numeric data or questionable data. After completion of this review, the data were downloaded from the website and results were tabulated.

The 2013/14 Hospital Pharmacy in Canada Report includes for the first time two chapters reporting results from surveys of front-line staff: one for staff pharmacists and the other for pharmacy technicians and other technical support staff. These supplemental surveys of front-line staff were first conducted in 2011/12, but the results were not included in the 2011/12 Hospital Pharmacy in Canada Report. The survey methodology for these surveys of front-line hospital pharmacy staff was very different from that of the survey of pharmacy directors described above. They were anonymous surveys, for which the sample was determined by pharmacy directors who asked their front-line staff to participate, as described in more detail below.

Between July 3 and July 8, 2014, an email message was sent to the 217 directors of pharmacy who had previously been invited to participate in the survey of directors. Attached to the email were two pdf files, one to be forwarded to all front-line staff pharmacists and the other to be distributed to front-line pharmacy technicians and technical support staff. Each attachment contained an explanation of the supplemental survey, an invitation to participate in the survey and a hyperlink to the website for completing the survey. A password was required to log on to the survey website, with a different password being used for each province. This allowed survey results to be analyzed by province. Otherwise, the identity of each respondent was completely anonymous. Because it is not known how many front-line pharmacy staff members were asked to participate in the survey, it is not possible to calculate a response rate for these supplemental surveys.

The online questionnaire for staff pharmacists asked for responses to 80 questions, distributed over eight web pages, corresponding to the eight sections of the questionnaire. During the period from July 3 to August 14, a total of **718 responding pharmacists** had saved responses for at least two of the eight questionnaire sections. The median number of responses saved was 73 (excluding general comments at the end of the questionnaire), and the median time to complete the survey was 16.5 minutes.

The online questionnaire for technicians and technical support staff asked for responses to 50 questions, distributed over four web pages, corresponding to the four sections of the questionnaire. During the period from July 3 to August 15, a total of **515 responding technicians and technical support staff** had saved responses for at least two of the five questionnaire sections. The median number of responses saved was 45 (excluding general comments at the end of the questionnaire), and the median time to complete the survey was 8.6 minutes.

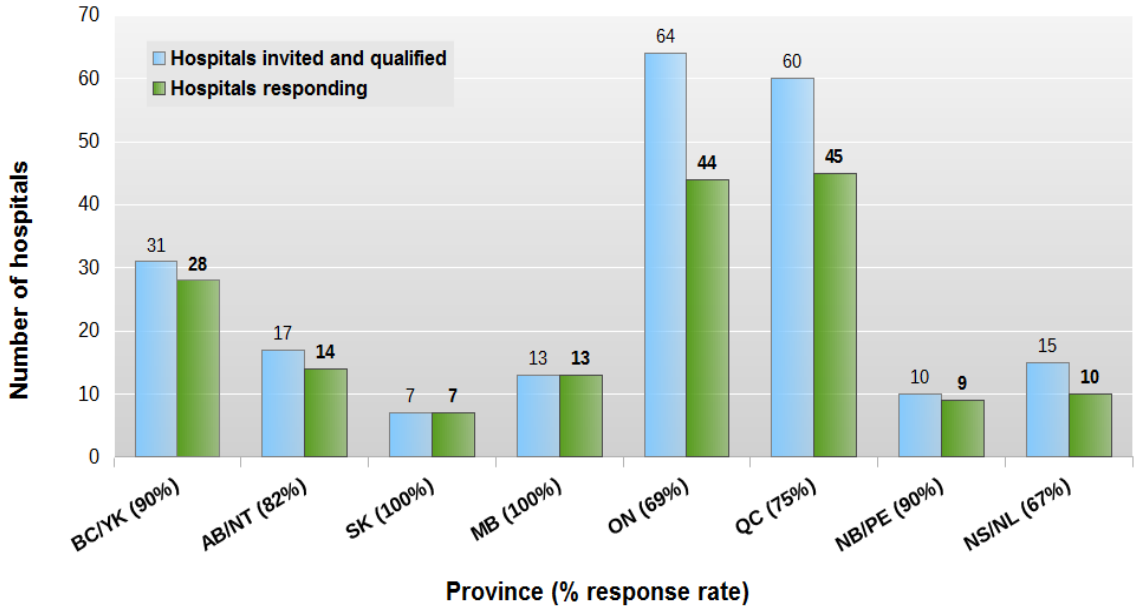
A - Demographics

Emily Musing

The overall 2013/14 survey response rate of 78% (170/217) was very similar to the 2011/12 response rate of 80% (176/219). For the first time, this report includes data collected from a respondent in the Yukon and for the second time, data collected from a respondent in the Northwest Territories.

The breakdown with respect to the proportion of respondents in each of the three bed size categories (50–200 beds, 201–500 beds and > 500 beds) was similar to that of the 2011/12 report, with a slight decrease in the proportion of respondents from organizations with 201 to 500 beds. Smaller hospitals (those with 50–200 beds) continued to represent only a small proportion of the total beds captured by this survey. These smaller hospitals accounted for 10% (5,214/50,260) of the overall total of acute care beds in 2013/14, compared with 9% (4,791/50,549) in 2011/12. There was also little change in the mix of teaching and non-teaching organizations, a ratio that has remained fairly consistent since the Editorial Board adopted (for the 2005/06 report) the definition of teaching status of the Association of Canadian Academic Healthcare Organizations (now part of HealthCareCAN). This year, 75% (128/170) of respondents were from non-teaching organizations and 25% (42/170) from teaching organizations; the corresponding proportions were 74% (131/176) and 26% (45/176), respectively, for 2011/12.

Figure A-1. Response to the Survey by Province, 2013/14, Including Pediatric Hospitals



Note: Total number of respondents (including 7 pediatric hospitals) = 170 (78%, 170/217)

The proportion of respondents from each province or region, as shown in Figure A-1, was very similar to that of previous surveys, with the exception of a new response from the Yukon.

As highlighted in previous Hospital Pharmacy in Canada Reports, the potential variation in respondents to the current survey relative to respondents in past years, due to changes in the hospitals choosing to participate in the survey, means that changes in overall hospital metrics cannot be interpreted as trends when results from this survey are analyzed.

The hospital demographic information presented in Table A-1 represents the average of data reported from hospitals with at least 50 acute care beds.

- The average reported number of acute care beds was 296, an increase over 287 in the 2011/12 report. The average reported number of non-acute care beds, 126, was also greater than the 112 reported for 2011/12.

Table A-1. Hospital Demographic Data – Acute and Non-Acute Care Beds, 2013/14

		Hospital Type		Bed Size			Teaching Status		Region				
	All	Adult	Pediatric	50-200	201-500	>500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
Hospitals (n=)	(170)	(163)	(7)	(47)	(78)	(45)	(42)	(128)	(28)	(34)	(44)	(45)	(19)
Totals:													
Beds - acute care	50,260	48,562	1,698	5,214	18,890	26,156	23,939	26,321	6,839	11,308	13,599	14,046	4,468
Beds - non-acute care	21,426	21,382	44	1,242	7,131	13,053	2,992	18,434	3,730	1,884	3,459	10,913	1,440
Averages:													
Beds - acute care	296	298	243	111	242	581	570	206	244	333	309	312	235
Beds - non-acute care	126	131	6	26	91	290	71	144	133	55	79	243	76
(n=)	(159)	(152)	(7)	(44)	(73)	(42)	(41)	(118)	(27)	(31)	(42)	(41)	(18)
Average length of inpatient stay - acute care (days)	7.2	7.2	5.6	6.8	7.3	7.4	6.9	7.3	8.0	7.3	5.6	7.9	7.3

Base: All respondents (including pediatric hospitals)

- The total number of beds included in this survey was 71,686, of which 50,260 were acute care beds and 23,939 were in teaching hospitals. The relative comprehensiveness of the sample in this survey can be demonstrated by comparison with national statistics. The Canadian Institute for Health Information (CIHI)[1] reported that 73,589 beds were staffed and in operation in Canada in 2012/13, of which 21,873 beds were in teaching hospitals; these CIHI numbers did not capture data from Quebec or Nunavut.

- The average length of stay has remained virtually constant over the three most recent surveys: 7.2 days in 2013/14, 7.2 days in 2011/12 and 7.1 days in 2009/10.

[1] Hospital beds staffed and in operation, fiscal year 2012-2013. In: Canadian MIS database. Ottawa (ON): Canadian Institute for Health Information; [cited 2014 Oct 22]. Available from: www.cihi.ca/CIHI-ext-portal/internet/EN/Quick_Stats/quick+stats/quick_stats_main?xTopic=Spending&pageNumber=1&resultCount=10&filterTypeBy=undefined&filterTopicBy=14&autorefresh=1

B - Clinical Pharmacy Practice

Jean-François Bussières and Richard Jones

Introduction

In this chapter of the Hospital Pharmacy in Canada Report, the focus is on patient-centred (clinical) pharmacy activities. Again this year, the data presented in this chapter show that the role of pharmacists in the hospital practice setting in Canada has passed the tipping point and now focuses primarily on patient-centred responsibilities and accountabilities. Although drug distribution activities remain an important component of overall pharmacy services, pharmacy technicians have largely assumed responsibility for these activities in many hospitals, a trend that is likely to continue until pharmacists play only a minimal role in the drug distribution system. Pharmacy practice, in the context of what hospital pharmacists do on a day-to-day basis, is now primarily "clinical" in nature.

Since the 2011/12 report, there have been a number of developments and publications relevant to the survey data presented in this chapter.

Yee and Haas[1] have written about the necessity of adopting standards of practice for clinical pharmacy. They noted in their editorial that there is a "lack of a standardized and reproducible practice by which clinical pharmacists optimize patients' medication-related outcomes". They advocate for a well-defined patient care process to be used by clinical pharmacists consistently and collaboratively across practice settings. They mention that "[r]esearchers seeking to study the impact of clinical pharmacists on patient outcomes have been hampered by the high degree of variability in clinical pharmacy practice, a situation that has yielded the impression that 'if you've seen one clinical pharmacist practice, you've seen just that—one.'" They also note that "[e]ven experienced clinical pharmacists themselves have widely divergent opinions on the best approach for delivering patient care and the most fitting way to teach it to pharmacy students and residents." It was in response to such diversity of pharmacy practice models and selection of pharmaceutical activities, that the American College of Clinical Pharmacy (ACCP) published, in March 2014, a standard of practice for clinical pharmacists.[2] The document sets forth the ACCP's expectations for clinical pharmacists and is also a reference for those developing and evaluating clinical pharmacy education and training programs. The standard addresses qualifications, the process of care, documentation, collaborative team-based practices, professional development and maintenance of competence, professionalism and ethics, research and scholarship, and other responsibilities.

In 2013, the ACCP published a white paper about desired professional development pathways for clinical pharmacists.[3] The document summarized recommendations for post-graduate education and training for graduates of schools and colleges of pharmacy in the United States (US) and described the preferred pathways for achieving, demonstrating and maintaining competence as clinical pharmacists. Havrda et al.[4] also published guidelines for resident teaching experiences. Both documents should be considered in the development of new entry-level PharmD and post-graduate programs (e.g., MSc in advanced practice, residencies) for pharmacists in Canada.

In August 2014, Haines[5] published an editorial about the importance of board certification. Although it is a voluntary process in pharmacy practice that can be considered expected or desirable, it is not mandated by law, nor is it a requirement for employment in most states in the US. Haines concluded by saying that "board certification will become increasingly important as public demand for greater accountability and quality intensifies. Does board certification really matter? I would say the answer is a qualified yes." Dorsch et al.[6] studied the effect of cardiovascular credentialed pharmacists on process measures and outcomes in myocardial infarction and heart failure. It may be time for Canada to reconsider either establishing its own board certification programs or finding a suitable way to recognize US certification programs more consistently throughout the country.

In 2014, the Council on Credentialing in Pharmacy published a resource paper on credentialing and privileging of pharmacists, with guiding principles for post-licensure credentialing of pharmacists to assist those who are introducing or enhancing a credentialing and privileging system for pharmacists within their healthcare settings.[7] The Council mentioned that "evolving patient care and health system needs and demands have heightened the requisite skills needed by pharmacists to deliver more complex services. Ongoing professional development and competency assessment are integral parts of health professionals' expectations to maintain a contemporary practice."

In Canada, Accreditation Canada published a new version of its Management Medication Standards (MMS)[8] in January 2014. While this standard significantly updates the normative framework for the drug-use process with 175

new and improved criteria, it could certainly better circumscribe the role of decentralized pharmacists at the bedside or in outpatient settings. Barthélémy et al.[9] compared aggregate national results from the MMS and results from the biennial Hospital Pharmacy in Canada Survey and discussed certain significant discrepancies observed between the two sources. Overall, 61% (82) of 134 applicable MMS criteria could be paired with results from the 2009/10 Hospital Pharmacy in Canada Survey. The average calculated discrepancy ratio (± standard deviation) between the two sets of results was 0.62 ± 0.29 (range 0.05–1.19). This suggests the importance of the Hospital Pharmacy in Canada Survey and its contribution to the current corpus of data about pharmacy practice.

Structured Patient Care Programs

The following definition of a "patient care program" was included in the 2007/08 and subsequent surveys:

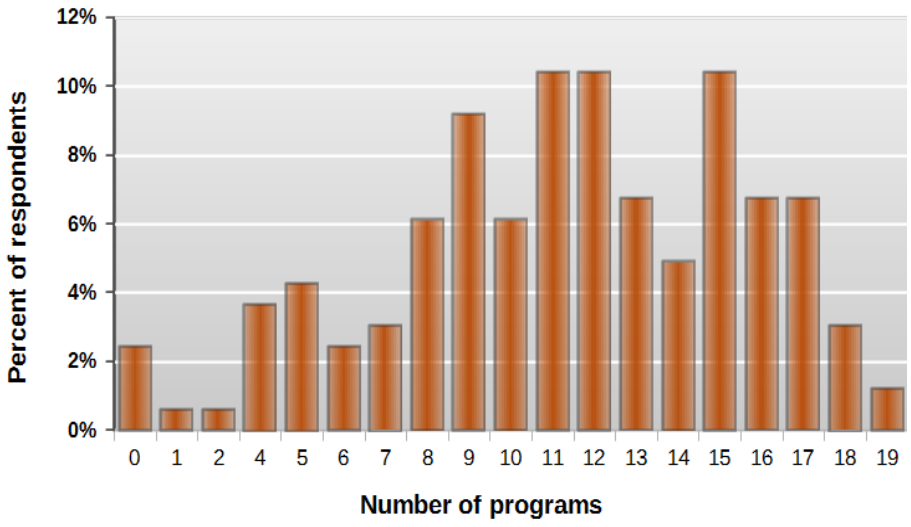
[A] healthcare delivery system that is formally structured around a group of patients with similar healthcare needs (e.g., child health program, mental health program, critical care program). There is usually a physician and/or nurse leader/director for a formal patient care program.

Respondents to the 2007/08 and subsequent surveys have been asked whether their respective facilities had, or did not have, a formal patient care program for each of a number of patient groupings (e.g., general medicine patients, cardiology patients, dialysis patients). Because of this change in the survey, caution is required when comparing the data in the 2013/14 report that deal with patient care programs and pharmacist involvement in those programs with data reported in the 2005/06 and earlier reports. In the 2013/14 survey, respondents were also asked to identify the number and nature of newly supported patient care programs.

- Out of a total of 19 patient care program types listed in the survey, the average number was 11.2 ± 4.3 programs per facility (range 0–19). More specifically, the average number of programs was 9.8 ± 4.6 in British Columbia (BC), 9.4 ± 5.2 in the Prairie provinces, 12.5 ± 3.5 in Ontario (ON), 12.3 ± 3.9 in Quebec (QC) and 11.0 ± 3.9 in the Atlantic provinces. A median number of one newly supported patient care program was reported. [The Prairies comprise Alberta (AB), Saskatchewan (SK), Manitoba (MB) and the Northwest Territories (NT). The Atlantic provinces comprise New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE) and Newfoundland and Labrador (NL).]

- Figure B-1 summarizes the distribution of respondents providing formal patient care programs in 2013/14. This distribution is similar to that shown in the 2011/12 report. Only 2% (4/163) of respondents reported no formal patient care programs.

Figure B-1. Respondents Providing Formal Patient Care Programs, 2013/14



Base: All respondents (n=163)

Respondents who indicated that they had at least one formal patient care program at their hospital were then asked to indicate whether one or more pharmacists were assigned to that program for inpatient and/or outpatient services. Formal assignment of a pharmacist to a patient care program is thought to be a good indicator that a reasonable level of clinical pharmacy support is being provided to the program.

Profile of Outpatient Clinical Pharmacy Services

- In 2013/14, 78% (127/163) of respondents indicated that at their institutions, a pharmacist was assigned to at least one of the 17 outpatient programs listed. This percentage is similar to the 78% (131/168) reported in 2011/12 and the 78% (125/160) reported in 2009/10. It is probable that pharmacists in some hospitals (e.g., smaller hospitals) are also providing clinical pharmacy services, but in a less structured manner, without being assigned to specific patient care programs.

- The average number of outpatient programs with an assigned pharmacist was 2.7 ± 2.6 programs per facility (range 0–15), with an average of 2.0 ± 2.0 programs in BC, 2.3 ± 3.2 programs in the Prairies, 2.9 ± 2.5 programs in ON, 3.4 ± 2.4 programs in QC and 2.8 ± 2.4 programs in the Atlantic provinces.

- Among respondents who reported that programs existed in their facilities, the percentage who reported having a pharmacist assigned to particular outpatient programs ranged from a low of 2% (2/81) for rehabilitation to 81% (88/109) for hematology/oncology (Table B-1). The distribution of outpatient programs with an assigned pharmacist was similar to that in 2011/12, except for transplantation, which increased from 56% (14/25) in 2011/12 to 70% (16/23) in 2013/14.

The percentage of outpatient programs with an assigned pharmacist was lowest for rehabilitation and highest for hematology/oncology.

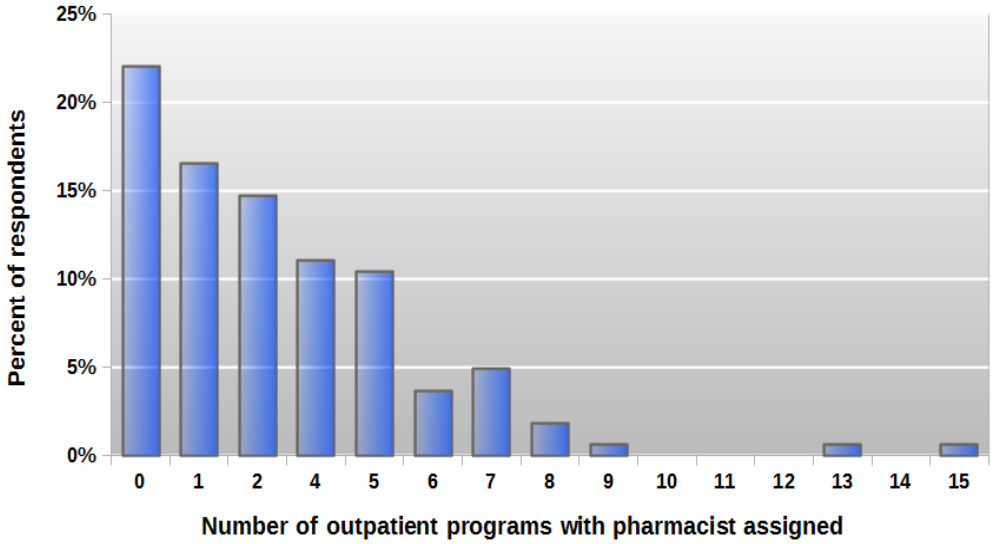
- Among the respondents who reported that a pharmacist was assigned to particular outpatient programs at their hospitals, the proportion doing so was usually higher for teaching than for non-teaching hospitals, except for hematology/oncology.

- Among the respondents who reported that a pharmacist was assigned to the outpatient component of a patient care program, the proportion doing so was usually higher for larger bed-size hospitals (i.e., > 500 beds vs. 50–200 beds). This was particularly true for the following outpatient programs: cardiovascular/lipid, diabetes, hematology/anticoagulation, infectious diseases/AIDS and renal/dialysis. Regional differences were noted for assignment of pharmacists to certain outpatient programs; for example, for hematology/oncology, 43% (6/14) of respondents in the Prairies and 81% (88/109) of respondents nationally; for hematology/anticoagulation, 91% (10/11) of respondents in the Prairies and 57% (40/70) of respondents nationally; and for infectious diseases/AIDS, five of seven in the Prairies and 37% (24/65) of respondents nationally.

Figure B-2 illustrates the number of outpatient programs with pharmacists assigned to the program.

Table B-1 summarizes the profile of pharmacist assignment to outpatient programs in 2013/14.

Figure B-2. Respondents Providing Outpatient Clinical Pharmacy Services, 2013/14



Base: All respondents (n=163)

Table B-1. Profile of Pharmacist Assignment to Outpatient Care Programs, 2013/14

Outpatient Services		All	Bed size			Teaching Status		Regions				
			50-200	201-500	> 500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
Hematology -Oncology	program exists (n=)	(109)	(18)	(53)	(38)	(26)	(83)	(17)	(14)	(26)	(36)	(16)
	pharmacists assigned	88	10	49	29	19	69	11	6	24	35	12
		81%	**56%**	**92%**	**76%**	**73%**	**83%**	**65%**	**43%**	**92%**	**97%**	**75%**
Emergency	program exists (n=)	(141)	(34)	(67)	(40)	(34)	(107)	(23)	(27)	(39)	(38)	(14)
	pharmacists assigned	81	13	36	32	25	56	6	14	26	26	9
		57%	**38%**	**54%**	**80%**	**74%**	**52%**	**26%**	**52%**	**67%**	**68%**	**64%**
Renal / Dialysis	program exists (n=)	(98)	(17)	(44)	(37)	(26)	(72)	(11)	(20)	(23)	(31)	(13)
	pharmacists assigned	61	5	26	30	19	42	8	10	15	19	9
		62%	**29%**	**59%**	**81%**	**73%**	**58%**	**73%**	**50%**	**65%**	**61%**	**69%**
Hematology/ Anticoagulation	program exists (n=)	(70)	(9)	(30)	(31)	(25)	(45)	(12)	(11)	(14)	(30)	(3)
	pharmacists assigned	40	4	15	21	16	24	5	10	6	16	3
		57%	**44%**	**50%**	**68%**	**64%**	**53%**	**42%**	**91%**	**43%**	**53%**	**100%**
Cardiovascular / Lipid	program exists (n=)	(80)	(8)	(38)	(34)	(28)	(52)	(9)	(14)	(28)	(20)	(9)
	pharmacists assigned	30	1	13	16	11	19	3	8	7	9	3
		38%	**13%**	**34%**	**47%**	**39%**	**37%**	**33%**	**57%**	**25%**	**45%**	**33%**
Diabetes	program exists (n=)	(81)	(15)	(35)	(31)	(23)	(58)	(7)	(9)	(23)	(31)	(11)
	pharmacists assigned	26	3	11	12	7	19	2	2	6	12	4
		32%	**20%**	**31%**	**39%**	**30%**	**33%**	**29%**	**22%**	**26%**	**39%**	**36%**
Infectious Disease / AIDS	program exists (n=)	(65)	(5)	(23)	(37)	(29)	(36)	(9)	(7)	(25)	(17)	(7)
	pharmacists assigned	24	1	7	16	17	7	4	5	5	7	3
		37%	**20%**	**30%**	**43%**	**59%**	**19%**	**44%**	**71%**	**20%**	**41%**	**43%**
Mental Health	program exists (n=)	(126)	(26)	(60)	(40)	(32)	(94)	(18)	(23)	(38)	(32)	(15)
	pharmacists assigned	17	2	8	7	7	10	2	4	8	2	1
		13%	**8%**	**13%**	**18%**	**22%**	**11%**	**11%**	**17%**	**21%**	**6%**	**7%**
Transplantation	program exists (n=)	(23)	(1)	(5)	(17)	(23)	(0)	(2)	(6)	(7)	(6)	(2)
	pharmacists assigned	16	0	5	11	16	0	2	5	4	3	2
		70%	**0%**	**100%**	**65%**	**70%**	**0%**	**100%**	**83%**	**57%**	**50%**	**100%**
Geriatrics	program exists (n=)	(100)	(14)	(49)	(37)	(28)	(72)	(17)	(16)	(22)	(36)	(9)
	pharmacists assigned	15	1	6	8	6	9	2	3	5	2	3
		15%	**7%**	**12%**	**22%**	**21%**	**13%**	**12%**	**19%**	**23%**	**6%**	**33%**
Pain / Palliative Care	program exists (n=)	(104)	(18)	(49)	(37)	(28)	(76)	(16)	(16)	(31)	(27)	(14)
	pharmacists assigned	13	1	8	4	4	9	4	2	1	4	2
		13%	**6%**	**16%**	**11%**	**14%**	**12%**	**25%**	**13%**	**3%**	**15%**	**14%**
General Surgery	program exists (n=)	(143)	(36)	(63)	(44)	(35)	(108)	(23)	(28)	(41)	(38)	(13)
	pharmacists assigned	10	1	5	4	3	7	0	1	7	2	0
		7%	**3%**	**8%**	**9%**	**9%**	**6%**	**0%**	**4%**	**17%**	**5%**	**0%**
General Medicine	program exists (n=)	(144)	(38)	(62)	(44)	(34)	(110)	(24)	(27)	(41)	(37)	(15)
	pharmacists assigned	9	0	3	6	5	4	0	2	5	2	0
		6%	**0%**	**5%**	**14%**	**15%**	**4%**	**0%**	**7%**	**12%**	**5%**	**0%**
Asthma / Allergy	program exists (n=)	(48)	(4)	(20)	(24)	(16)	(32)	(6)	(2)	(9)	(27)	(4)
	pharmacists assigned	7	0	1	6	3	4	3	0	1	3	0
		15%	**0%**	**5%**	**25%**	**19%**	**13%**	**50%**	**0%**	**11%**	**11%**	**0%**
Neurology	program exists (n=)	(39)	(0)	(13)	(26)	(21)	(18)	(5)	(7)	(14)	(11)	(2)
	pharmacists assigned	5	0	2	3	3	2	0	3	0	2	0
		13%	**0%**	**15%**	**12%**	**14%**	**11%**	**0%**	**43%**	**0%**	**18%**	**0%**
Gynecology / Obstetrics	program exists (n=)	(110)	(28)	(47)	(35)	(24)	(86)	(16)	(21)	(33)	(30)	(10)
	pharmacists assigned	4	0	1	3	2	2	1	2	0	1	0
		4%	**0%**	**2%**	**9%**	**8%**	**2%**	**6%**	**10%**	**0%**	**3%**	**0%**
Rehabilitation	program exists (n=)	(81)	(17)	(39)	(25)	(16)	(65)	(16)	(15)	(25)	(16)	(9)
	pharmacists assigned	2	0	0	2	1	1	1	0	1	0	0
		2%	**0%**	**0%**	**8%**	**6%**	**2%**	**6%**	**0%**	**4%**	**0%**	**0%**

Base: Respondents who answered question about pharmacy support for outpatient services in facilities with formal programs

Profile of Inpatient Clinical Pharmacy Services

- In 2013/14, 90% (147/163) of respondents indicated that at their institutions, a pharmacist was assigned to at least one of the 18 inpatient programs listed. This percentage is similar to the 88% (147/168) reported in 2011/12, the 89% (143/160) reported in 2009/10 and the 92% (152/166) reported in 2007/08.

- The average number of inpatient programs with an assigned pharmacist was 6.3 ± 4.1 programs per facility (range 0–16 programs), with an average of 6.4 ± 4.2 in BC, 5.1 ± 4.3 in the Prairies, 9.3 ± 3.4 in ON, 4.3 ± 3.3 in QC and 5.8 ± 3.6 in the Atlantic provinces.

- The percentage of respondents who reported having a pharmacist assigned to a particular inpatient program ranged from a low of 10% (8/80) for diabetes to a high of 87% (20/23) for transplantation (Table B-2). The distribution of inpatient programs with an assigned pharmacist was similar to that in 2011/12, except for

renal/dialysis, which decreased from 51% (47/92) in 2011/12 to 42% (41/97) in 2013/14, and infectious diseases/AIDS, which increased from 69% (47/68) in 2011/12 to 82% (56/68) in 2013/14. Such increases are in phase with the Required Organizational Practice of Accreditation Canada concerning antimicrobial stewardship.[10]

- Among the respondents who reported that a pharmacist was assigned to particular inpatient care programs at their hospitals, the proportion doing so was usually higher for teaching than for non-teaching facilities, particularly for the following inpatient programs: transplantation, adult critical care, general medicine, hematology/oncology, cardiovascular/lipid and renal/dialysis. A greater proportion of non-teaching hospitals than teaching hospitals reported pharmacist-supported infectious diseases/AIDS and hematology/anticoagulation programs.

- Among the respondents who reported that a pharmacist was assigned to particular inpatient programs, the proportion of hospitals doing so was usually surprisingly similar for larger bed-size hospitals (i.e., > 500 beds vs. 201-500 beds). However, for inpatient programs related to mental health and transplantation, the proportion of hospitals with assignment of pharmacists to inpatient programs was notably higher for hospitals with 201 to 500 beds than those with more than 500 beds.

- For most program areas, a lower proportion of respondents in QC reported that pharmacists were assigned to inpatient care programs. This may be related to the vacancy rates for pharmacists in QC, which remained considerably higher than the pharmacist vacancy rates in other regions.

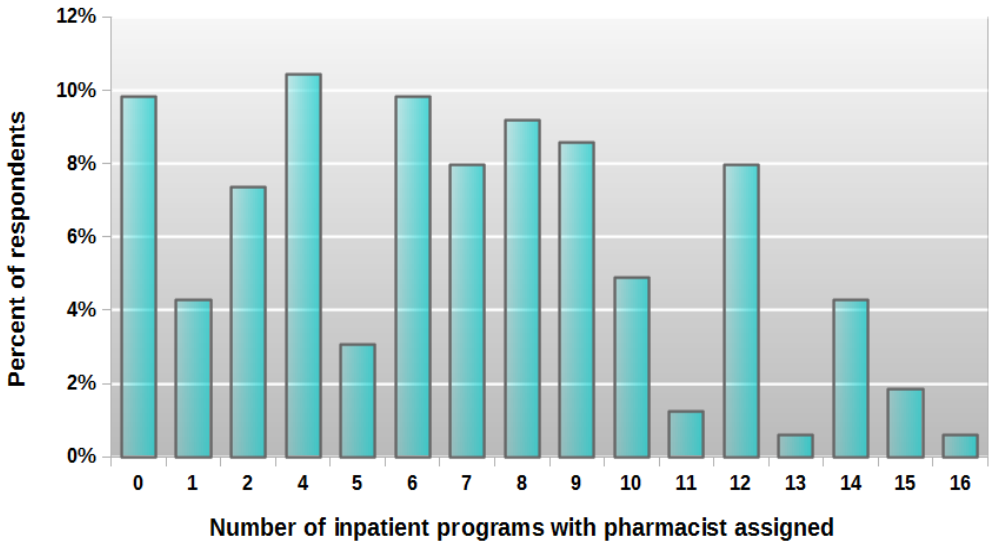
The percentage of inpatient programs with an assigned pharmacist was highest for general medicine, adult critical care and geriatrics.

- Regional differences were noted for assignment of pharmacists to certain inpatient programs: for geriatrics, 53% (8/15) in the Prairies vs. 77% (79/103) nationally; for transplantation, four of six facilities in QC vs. 87% (20/23) nationally; for cardiovascular/lipids, 40% (8/20) in QC and all nine facilities in BC vs. 75% (61/81) nationally; for infectious diseases/AIDS, four of eight facilities in the Prairies vs. 82% (56/68) nationally; for general surgery, 98% (41/42) in ON vs. 69% (101/147) nationally; for rehabilitation, 35% (6/17) in QC and 96% (26/27) in ON vs. 62% (53/85) nationally; for neurology, 9% (1/11) in QC and six of seven facilities in the Prairies vs. 61% (25/41) nationally; for renal/dialysis, 21% (6/29) in QC vs. 42% (41/97) nationally; for gynecology/obstetrics, 3% (1/31) in QC and 80% (28/35) in ON vs. 42% (47/113) nationally; for hematology/anticoagulation, 14% (4/28) in QC and 67% (8/12) in BC vs. 36% (25/69) nationally; and for asthma/allergy, four of six facilities in BC vs. 15% (7/48) nationally.

Figure B-3 illustrates the number of inpatient programs with pharmacists assigned to the program.

Table B-2 summarizes the profile of pharmacist assignment to inpatient care programs in 2013/14.

Figure B-3. Respondents Providing Inpatient Clinical Pharmacy Services, 2013/14



Base: All respondents (n=163)

Table B-2. Profile of Pharmacist Assignment to Inpatient Care Programs, 2013/14

Inpatient Services		All	Bed size 50-200	Bed size 201-500	Bed size > 500	Teaching Status Teaching	Teaching Status Non-teaching	Regions BC	Regions Prai	Regions ON	Regions QC	Regions Atl
General Medicine	program exists (n=)	(151)	(39)	(68)	(44)	(34)	(117)	(25)	(29)	(41)	(40)	(16)
	pharmacists assigned	127	31	57	39	33	94	23	24	40	28	12
		84%	**79%**	**84%**	**89%**	**97%**	**80%**	**92%**	**83%**	**98%**	**70%**	**75%**
Adult Critical Care	program exists (n=)	(146)	(34)	(68)	(44)	(34)	(112)	(22)	(27)	(41)	(39)	(17)
	pharmacists assigned	118	24	57	37	33	85	18	21	41	24	14
		81%	**71%**	**84%**	**84%**	**97%**	**76%**	**82%**	**78%**	**100%**	**62%**	**82%**
General Surgery	program exists (n=)	(147)	(37)	(66)	(44)	(35)	(112)	(24)	(28)	(42)	(39)	(14)
	pharmacists assigned	101	25	45	31	28	73	20	19	41	12	9
		69%	**68%**	**68%**	**70%**	**80%**	**65%**	**83%**	**68%**	**98%**	**31%**	**64%**
Mental Health	program exists (n=)	(128)	(25)	(62)	(41)	(33)	(95)	(18)	(22)	(38)	(33)	(17)
	pharmacists assigned	83	11	47	25	25	58	11	12	33	18	9
		65%	**44%**	**76%**	**61%**	**76%**	**61%**	**61%**	**55%**	**87%**	**55%**	**53%**
Geriatrics	program exists (n=)	(103)	(13)	(53)	(37)	(28)	(75)	(17)	(15)	(23)	(38)	(10)
	pharmacists assigned	79	9	40	30	21	58	16	8	18	29	8
		77%	**69%**	**75%**	**81%**	**75%**	**77%**	**94%**	**53%**	**78%**	**76%**	**80%**
Hematology -Oncology	program exists (n=)	(110)	(18)	(54)	(38)	(26)	(84)	(17)	(13)	(27)	(37)	(16)
	pharmacists assigned	61	6	26	29	20	41	9	7	19	17	9
		55%	**33%**	**48%**	**76%**	**77%**	**49%**	**53%**	**54%**	**70%**	**46%**	**56%**
Cardiovascular / Lipid	program exists (n=)	(81)	(8)	(39)	(34)	(28)	(53)	(9)	(13)	(29)	(20)	(10)
	pharmacists assigned	61	6	30	25	26	35	9	11	26	8	7
		75%	**75%**	**77%**	**74%**	**93%**	**66%**	**100%**	**85%**	**90%**	**40%**	**70%**
Pain / palliative care	program exists (n=)	(106)	(18)	(50)	(38)	(28)	(78)	(16)	(16)	(32)	(28)	(14)
	pharmacists assigned	60	10	28	22	17	43	8	9	24	11	8
		57%	**56%**	**56%**	**58%**	**61%**	**55%**	**50%**	**56%**	**75%**	**39%**	**57%**
Infectious disease / AIDS	program exists (n=)	(68)	(6)	(25)	(37)	(29)	(39)	(10)	(8)	(26)	(17)	(7)
	pharmacists assigned	56	5	21	30	23	33	8	4	25	13	6
		82%	**83%**	**84%**	**81%**	**79%**	**85%**	**80%**	**50%**	**96%**	**76%**	**86%**
Rehabilitation	program exists (n=)	(85)	(17)	(43)	(25)	(16)	(69)	(16)	(15)	(27)	(17)	(10)
	pharmacists assigned	53	10	26	17	11	42	10	6	26	6	5
		62%	**59%**	**60%**	**68%**	**69%**	**61%**	**63%**	**40%**	**96%**	**35%**	**50%**
Pediatrics / Neonatal Critical Care	program exists (n=)	(72)	(7)	(37)	(28)	(21)	(51)	(11)	(16)	(28)	(12)	(5)
	pharmacists assigned	52	3	27	22	19	33	6	13	26	4	3
		72%	**43%**	**73%**	**79%**	**90%**	**65%**	**55%**	**81%**	**93%**	**33%**	**60%**
Gynecology / Obstetrics	program exists (n=)	(113)	(28)	(51)	(34)	(23)	(90)	(16)	(20)	(35)	(31)	(11)
	pharmacists assigned	47	11	23	13	11	36	8	8	28	1	2
		42%	**39%**	**45%**	**38%**	**48%**	**40%**	**50%**	**40%**	**80%**	**3%**	**18%**
Renal / Dialysis	program exists (n=)	(97)	(18)	(42)	(37)	(26)	(71)	(11)	(20)	(24)	(29)	(13)
	pharmacists assigned	41	3	19	19	15	26	8	9	12	6	6
		42%	**17%**	**45%**	**51%**	**58%**	**37%**	**73%**	**45%**	**50%**	**21%**	**46%**
Neurology	program exists (n=)	(41)	(0)	(14)	(27)	(22)	(19)	(5)	(7)	(15)	(11)	(3)
	pharmacists assigned	25	0	9	16	14	11	4	6	12	1	2
		61%	**0%**	**64%**	**59%**	**64%**	**58%**	**80%**	**86%**	**80%**	**9%**	**67%**
Hematology / Anticoagulation	program exists (n=)	(69)	(9)	(30)	(30)	(24)	(45)	(12)	(11)	(15)	(28)	(3)
	pharmacists assigned	25	7	10	8	8	17	8	6	6	4	1
		36%	**78%**	**33%**	**27%**	**33%**	**38%**	**67%**	**55%**	**40%**	**14%**	**33%**
Transplantation	program exists (n=)	(23)	(1)	(5)	(17)	(23)	(0)	(2)	(6)	(7)	(6)	(2)
	pharmacists assigned	20	0	5	15	20	0	2	5	7	4	2
		87%	**0%**	**100%**	**88%**	**87%**	**0%**	**100%**	**83%**	**100%**	**67%**	**100%**
Diabetes	program exists (n=)	(80)	(15)	(34)	(31)	(23)	(57)	(7)	(9)	(22)	(31)	(11)
	pharmacists assigned	8	1	5	2	3	5	2	1	4	0	1
		10%	**7%**	**15%**	**6%**	**13%**	**9%**	**29%**	**11%**	**18%**	**0%**	**9%**
Asthma / Allergy	program exists (n=)	(48)	(4)	(20)	(24)	(16)	(32)	(6)	(2)	(9)	(27)	(4)
	pharmacists assigned	7	1	1	5	3	4	4	0	2	1	0
		15%	**25%**	**5%**	**21%**	**19%**	**13%**	**67%**	**0%**	**22%**	**4%**	**0%**

Base: Respondents who answered question about pharmacy support for inpatient services in facilities with formal programs

These numbers have varied slightly over successive Hospital Pharmacy in Canada Reports, with an overall progressive increase in coverage of patient care programs by pharmacists. These data reflect the wide decentralization of pharmacists in most outpatient clinics and at the bedside in Canada. Brisseau et al.[11] described a Delphi technique used by five sites of a Canadian teaching hospital to prioritize patient care programs with decentralized pharmacists. While the data from the Delphi exercise may suggest that prioritization is based on the current prevalence of decentralized pharmacists, we believe that all patients and clients should benefit from decentralized pharmacists and that current available resources should be taken into account to modulate the level of clinical service provided.

Further evidence of the value of pharmacist involvement in patient care programs has been published since the 2011/12 Hospital Pharmacy in Canada Report, including research articles and systematic reviews describing

pharmacist services provided in the areas of community mental healthcare[12]; inpatient medication review[13]; opioid abuse, diversion and addiction[14]; cardiovascular diseases[15]; heart failure[16,17]; management of coronary artery disease[18]; venous thromboembolism[19]; geriatric patients[20,21]; medication management and adherence[22]; collaboration between pharmacists and general practitioners[23]; care homes for older patients[24]; minority patients[25]; health service utilization and costs in low- and middle-income countries[26]; patient-centred medical homes[27]; nursing homes[28]; seamless care in medication management[29]; strategies to improve reporting of adverse drug reactions[30]; pharmacist–patient interactions[31]; and the effect of pharmacist-provided non-dispensing services on patient outcomes.[26] A sign that the indexed literature is moving westward is the literature review by Penm et al.,[32] which identified the impact of clinical pharmacy services in China. A few papers have also been published about clinical pharmacy services and medication errors.[33,34,35]

Pharmacy Practice Models

The American Society of Health-System Pharmacists (ASHP) and the ASHP Foundation have established the Pharmacy Practice Model Initiative (PPMI), as discussed in previous reports.[36] The PPMI website includes examples of innovative practice models that have been implemented in various institutions, as well as other relevant resources, including a C-suite tool kit.[37]

The ACCP also published a white paper on acute care practice models in which "unit-based" and "service-based" orientation of clinical pharmacists was compared within an acute care pharmacy practice model.[38] A unit-based pharmacist is usually in a position to react to an established order or decision and is frequently focused on task-oriented clinical services, whereas a service-based clinical pharmacist functions as a member of the inter-professional team. The ACCP believes that as a team member, the pharmacist proactively contributes to the decision-making process and the development of patient-centred care plans. "The service-based orientation of the pharmacist is consistent with both the practice vision embraced by ACCP and its definition of clinical pharmacy. The task force strongly recommends that institutions pursue a service-based pharmacy practice model to optimally deploy their clinical pharmacists".[38]

With consideration of the practice model definitions developed by the ACCP and the ASHP, the Hospital Pharmacy in Canada Editorial Board developed descriptions of four practice models for use in the Hospital Pharmacy in Canada Survey. Respondents were asked to indicate which of these practice models were used by their departments, the percentage of inpatient beds served by each model, and the percentage of pharmacists in each hospital who were practising under each model. The practice model definitions are presented here.

Drug distribution centred model: Pharmacists largely function in a drug distribution role, with limited clinical services being provided. Clinical activities are largely limited to pharmacy interventions that occur as a result of drug order review in the central pharmacy.

Separate clinical and distributive practice model: Pharmacists are divided into two groups. One group largely provides distributive services, while the second group largely functions in clinical roles. Those pharmacists who largely function in clinical roles have few or no distributive responsibilities, either in the central pharmacy or in satellite pharmacies.

Clinical practice centred model: Nearly all pharmacists function largely in clinical roles, with less than 20% of their time spent in a distributive role. Pharmacy technicians and/or automation are largely responsible for distributive activities.

Integrated drug distribution/clinical practice model: Nearly all pharmacists have a balance of distributive and clinical responsibilities. The model may include a balanced mix of both distributive and clinical responsibilities during each shift, or a rotation through distributive and clinical shifts.

- In 2013/14, 91% (149/163) of respondents provided information about the clinical practice models in place within their hospitals, similar to the 94% (159/169) who did so in 2011/12 and the 95% (152/160) who did so in 2009/10.

- Not surprisingly, many hospitals reported using more than one practice model. The percentage of respondents using each pharmacy practice model, for some or all beds in the facility, varied, with 74% (112/151) of respondents reporting that they used the integrated drug distribution/clinical practice model, 45% (66/146) the drug distribution centred model, 34% (49/145) the clinical practice centred model and 13% (19/142) the separate clinical and distributive practice model. The percentage of respondents who reported using the integrated drug distribution/clinical practice model increased from 66% (105/159) in the

2011/12 report to 74% (112/151) in the 2013/14 report, perhaps because of increases in computerized prescriber order entry systems and decentralized order validation by pharmacists.

- The mean percentage of inpatient beds covered by the drug distribution centred practice model was higher in smaller hospitals (30% ± 43% in hospitals with 50–200 beds vs. 19% ± 34 in hospitals with 201–500 beds vs. 19% ± 30 in hospitals with > 500 beds) and in non-teaching hospitals (26% ± 39 in non-teaching hospitals vs. 6% ± 12 in teaching hospitals).

- Regional differences were noted, with a lower proportion of inpatient beds covered by the integrated drug distribution/clinical practice model in QC (40%) and the Atlantic provinces (31%) vs. nationally (54%). The percentage of inpatient beds covered by the clinical practice centred model was higher in ON (26%), the Atlantic provinces (26%) and QC (24%) vs. nationally (18%).

- In 2013/14, 34% (55/162) of respondents indicated that they had reviewed their pharmacy practice model in the past 12 months, and 71% (39/55) of these indicated that they had plans to change their pharmacy practice model. In comparison, although 49% (77/157) of respondents to the 2011/12 survey indicated that they had reviewed their pharmacy practice model in the past 12 months, only 53% (41/77) of these planned to change their practice model.

- The sum of the mean percentages of pharmacists practising under the integrated drug distribution/clinical practice model (56%) and the clinical practice centred model (19%) is 75%, which reinforces our earlier comment that Canada has passed the tipping point in hospital pharmacy practice, with 75% of hospital pharmacy practitioners now spending at least 50% of their time performing patient-centred activities.

More than 50% of pharmacists practice in the integrated drug distribution/clinical practice model, with about 20% in the clinical practice-centred model.

Table B-3 summarizes the types of clinical pharmacy practice models.

Table B-3. Pharmacy Practice Models, 2013/14

		Bed size			Teaching Status		Regions				
	All	50-200	201-500	> 500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
a) Base for "Average percentage of inpatient beds": Facilities that provided percentage of beds for each pharmacist practice model (n=)	(149)	(42)	(70)	(37)	(30)	(119)	(23)	(31)	(39)	(40)	(16)
b) Base for "Average percentage of pharmacists": Facilities that provided percentage of pharmacists for each pharmacist practice model (n=)	(147)	(40)	(68)	(39)	(32)	(115)	(20)	(31)	(39)	(42)	(15)
c) Base for "Predominant model planned": Facilities that reviewed their pharmacy practice model during the last 12 months AND planned to change their predominant pharmacy practice model (n=)	(39)	(11)	(18)	(10)	(8)	(31)	(4)	(13)	(9)	(5)	(8)
Drug distribution centred model											
a) Average percentage of inpatient beds	22%	30%	19%	19%	6%	26%	8%	27%	8%	32%	42%
b) Average percentage of pharmacists	**18%**	**28%**	**15%**	**15%**	**4%**	**22%**	**6%**	**25%**	**7%**	**25%**	**34%**
c) Predominant model planned	0	0	0	0	0	0	0	0	0	0	0
	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Separate clinical and distributive practice model											
a) Average percentage of inpatient beds	6%	2%	7%	8%	4%	6%	24%	6%	0%	4%	1%
b) Average percentage of pharmacists	**6%**	**3%**	**8%**	**6%**	**4%**	**7%**	**30%**	**5%**	**1%**	**3%**	**2%**
c) Predominant model planned	1	0	1	0	0	1	1	0	0	0	0
	3%	0%	6%	0%	0%	3%	25%	0%	0%	0%	0%
Integrated drug distribution / clinical practice model											
a) Average percentage of inpatient beds	54%	58%	49%	60%	62%	52%	60%	66%	66%	40%	31%
b) Average percentage of pharmacists	**56%**	**59%**	**51%**	**62%**	**61%**	**55%**	**57%**	**69%**	**65%**	**48%**	**27%**
c) Predominant model planned	15	3	7	5	2	13	2	4	3	2	4
	38%	27%	39%	50%	25%	42%	50%	31%	33%	40%	50%
Clinical practice centred model											
a) Average percentage of inpatient beds	18%	9%	25%	13%	27%	15%	8%	1%	26%	24%	26%
b) Average percentage of pharmacists	**19%**	**10%**	**26%**	**17%**	**30%**	**16%**	**7%**	**1%**	**27%**	**25%**	**37%**
c) Predominant model planned	23	8	10	5	6	17	1	9	6	3	4
	59%	73%	56%	50%	75%	55%	25%	69%	67%	60%	50%

As noted earlier, the ACCP has taken a somewhat different approach to defining models of clinical pharmacy practice. That organization has argued that there are just two models of practice: reactive and proactive.

Reactive model: The pharmacist primarily reacts to an established medication order or decision (referred to by the ACCP as the "unit-based model").

Proactive model: The pharmacist functions as a member of the inter-professional team, proactively contributing to the decision-making process and the development of patient-centred care plans (referred to by the ACCP as the "service-based model"). Inherent to this model is the assumption that the pharmacist is routinely present at the point where drug therapy decisions are being made (e.g., routine participation in inter-disciplinary rounds and the provision of input into most medication therapy decisions that are made).

- In 2013/14, a mean of 62% ± 31% of inpatient beds were serviced by a reactive model. This proportion was higher in non-teaching (66% ± 31%) vs. teaching (47% ± 26%) hospitals.

- In 2013/14, 32% (51/161) of respondents indicated that in the past 12 months they had reviewed their clinical practice model from the perspective of a reactive vs. proactive practice model, and 73% (37/51) of these respondents indicated that they had plans to change their pharmacy practice model toward a more proactive model.

In the 2013/14 survey, respondents were asked to answer questions about how they prioritize the assignment of staff members to various clinical program areas.

- Fifty-two percent (84/162) of respondents reported using an approach that takes advantage of opportunities, 41% (67/162) reported using a structured approach within the pharmacy department to make that decision, and 7% (11/162) reported using a structured multi-disciplinary approach for deciding where pharmacy services should be targeted. These results are similar to those presented in the 2011/12 report.

Evaluation of Clinical Pharmacy Services

Responses to questions about the evaluation of clinical pharmacy services are covered in Chapter H, Evaluation of Pharmacy Services.

Prescribing Rights

In Canada, the Food and Drug Act, the Controlled Drugs and Substances Act and various provincial pharmacy acts define the licensed practitioners who can prescribe drugs. In the past decade, the number of authorized prescribers (e.g., nurse practitioners, registered nurses, optometrists, podiatrists) under federal and provincial regulations has increased, which has led to more collaborative practices.

The term "independent prescribing rights" refers to prescribing rights that are granted to specified healthcare professionals by the legislation governing their practice (e.g., the legislated right for a pharmacist to prescribe, often involving a set of requirements that the pharmacist must meet in order to be able to do so). Generally speaking, independent prescribing rights for pharmacists cover drugs contained in the Prescription Drug List published by Health Canada (previously Schedule F) of the *Food and Drug Act*. Prescribing of narcotics by pharmacists is not permitted under the *Controlled Drugs and Substances Act*.

The term "dependent prescribing rights" refers to prescribing rights that are delegated by a legally recognized prescriber to another healthcare professional who does not have the legal right to prescribe independently (e.g., delegation of a physician's prescribing rights to a pharmacist, usually based on a well-defined protocol that the pharmacist must follow). Dependent pharmacist prescribing generally refers to prescribing that occurs within the context of a collaborative relationship between a pharmacist and a physician.

Pharmacists are drug experts, and their right to prescribe independently or dependently has changed and evolved over the past decade. In 2011, the Canadian Pharmacists Association (CPhA) published its position statement on pharmacist prescribing.[39] In this statement, the CPhA stated that "[a]ll decisions related to medication management, including prescribing, must be collaborative, patient-centred and focused on addressing the health care needs of the patient."[39] The Blueprint for Pharmacy website provides a province-by-province comparison of pharmacists' scope of practice, including prescribing rights.[40] CPhA has published a profile of pharmacists' expanded scope of practice throughout Canada, including their prescribing rights.[41] Finally, Berry published an update on the topic in her book, *Canadian Pharmacy Law*.[42]

Whereas most pharmacists are in favour of expanding the scope of practice, limited funding for additional pharmacists, as well as current workload and professional duties, may limit the ability of society at large to take

advantage of pharmacists´ expertise and potential contribution. Prescribing drugs does require more time than simply validating and dispensing drugs. Moreover, prescribing may require further documentation of pharmacists' evaluation of the patient and the resulting pharmaceutical plan. In 2013, the Canadian Society of Hospital Pharmacists (CSHP) published a guideline with two appendixes about the documentation of pharmacists' activities in the health record.[43] Although there are limited published data about the extent to which Canadian hospital pharmacists do have the privilege to be at the bedside with full access to patient records, pharmacists in most institutions in this country do not have available the time required for large-scale drug prescribing. Pharmacists and all stakeholders should continue to reflect about the optimal prioritization of pharmaceutical activities within the patient care process. Simulations about the prioritization of pharmaceutical activities, as described by Renet et al.,[44,45] may be useful.

Since the 2011/12 report, we have scanned the literature to identify key papers about prescribing rights. Fleming et al.[46] conducted a systematic review to determine the effects of interventions to reduce potentially inappropriate antibiotic prescribing in long-term care facilities. Davey et al.[47] completed a Cochrane review to identify interventions that could improve antibiotic prescribing practices for hospital patients. Gillaizeau et al.[48] conducted a Cochrane review about computerized advice on drug dosage to improve prescribing practice. Reed et al.[49] described the impact of formulary restriction with prior authorization by an antimicrobial stewardship program. Teixeira Rodriguez et al.[50] conducted a systematic review about physicians' antibiotic prescribing behaviour. Ho and Venci[51] reviewed the literature about intervention programs involving the use of mailed letters to influence prescribing behaviours.

In Canada, the Canadian Medical Association and the CPhA published a joint statement about e-prescribing in late 2012.[52] According to the statement, "e-Prescribing is the secure electronic creation and transmission of a prescription between an authorized prescriber and a patient's pharmacy of choice, using clinical Electronic Medical Record (EMR) and pharmacy management software." The statement sets out nine principles and describes the benefits and challenges. Since the 2011/12 report, the CPhA has also been involved in debates and other activities, such as discussing prescription drug abuse, addressing the growing problem of drug shortages across Canada, developing electronic health records, advocating about cuts to benefits for refugees and developing the Canadian Pharmacy Services Framework to help pharmacists deliver expanded patient-centred services.

Finally, the CSHP has published an information paper on prescribing by hospital pharmacists,[53] and Lebel and Bussières[54] published a set of guiding principles to support the selection, planning and implementation of computerized prescriber order entry systems in healthcare settings.

The 2013/14 survey included a number of questions about pharmacist prescribing rights.

- The percentage of respondents reporting that pharmacists had prescribing rights approved within their hospitals has remained constant at 55% over the past three reports (89/163 in 2013/14, 88/159 in 2009/10 and 92/167 in 2011/12).

- Regional differences were noted. Overall, the percentage of respondents reporting prescribing rights approved within their hospitals was lower in the Atlantic provinces (22%, 4/18) and in ON (40%, 17/42) and higher in the Prairies (61%, 20/33), in QC (65%, 28/43) and in BC (74%, 20/27).

For respondents who reported that prescribing rights had been approved for pharmacists within their hospitals, there was a trend toward a decrease in dependent prescribing rights approved for pharmacists and an increase in independent prescribing rights. As the legal framework in most provinces is evolving to allow more pharmacist prescribing, this trend toward independent prescribing rights is likely to continue, assuming that pharmacy managers advocate effectively for this role for pharmacists within their facilities.

- Dependent prescribing for dosage adjustment was reported by 62% (55/89) of respondents with approved prescribing rights in 2013/14, similar to the 64% (59/92) of respondents in 2011/12 and the 69% (59/86) in 2009/10, but lower than the 79% (78/99) in 2007/08.

- Dependent prescribing for laboratory tests was reported by 49% (44/89) of respondents with approved prescribing rights in 2013/14, similar to the 43% (40/92) of respondents in 2011/12, but lower than the 57% (49/86) in 2009/10 and 68% (67/99) in 2007/08.

- Dependent prescribing for new therapy was reported by 38% (34/89) of respondents with approved prescribing rights in 2013/14, similar to the 41% (38/92) of respondents in 2011/12, 34% (29/86) in 2009/10 and 49% (48/98) in 2007/08.

These decreases in dependent prescribing rights have been offset by notable increases in independent prescribing rights.

- Independent prescribing for laboratory tests was reported by 56% (50/89) of respondents with approved prescribing rights in 2013/14, similar to the 59% (54/92) of respondents in 2011/12, but greater than the 49% (42/86) in 2009/10 and 33% (33/99) in 2007/08.

- Independent prescribing for dosage adjustment was reported by 45% (40/89) of respondents with approved prescribing rights in 2013/14, similar to the 48% (44/92) of respondents in 2011/12 and 42% (36/86) in 2009/10, but greater than the 24% (24/99) in 2007/08.

- Independent prescribing for new therapy was reported by 21% (19/89) of respondents with approved prescribing rights in 2013/14, similar to the 16% (15/92) of respondents in 2011/12 and 21% (18/86) in 2009/10, but greater than the 6% (6/99) in 2007/2008.

The percentage of hospitals with independent prescribing rights approved for pharmacists has not increased since 2011/12.

- Regional differences were noted for dependent pharmacist prescribing rights, with the highest percentages reported by respondents in ON for dosage adjustment (94%, 16/17), in QC for dosage adjustment (79%, 22/28) and in the Atlantic provinces for laboratory tests (three of four facilities). For new therapy, QC had the highest rate of dependent prescribing (57%, 16/28).

- Regional differences were also noted for independent pharmacist prescribing rights, with the highest percentages reported by respondents in BC for laboratory tests (75%, 15/20) and dosage adjustments (75%, 15/20) and in the Prairies for laboratory tests (75%, 15/20) and dosage adjustments (75%, 15/20). For new therapy, the Prairies reported the highest level of independent prescribing rights (60%, 12/20).

Table B-4 summarizes prescribing rights for pharmacists.

Table B-4. Prescribing Rights for Pharmacists, 2013/14

		Bed size			Teaching Status		Regions				
	All	50-200	201-500	> 500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
(n=)	(163)	(44)	(74)	(45)	(35)	(128)	(27)	(33)	(42)	(43)	(18)
Prescribing rights have been approved for pharmacists within the hospital	89	21	38	30	21	68	20	20	17	28	4
	55%	**48%**	**51%**	**67%**	**60%**	**53%**	**74%**	**61%**	**40%**	**65%**	**22%**
Base: All respondents											
(n=)	(89)	(21)	(38)	(30)	(21)	(68)	(20)	(20)	(17)	(28)	(4)
Type of prescribing rights approved for pharmacists :											
Independent, for lab tests	50	11	21	18	14	36	15	15	1	18	1
	56%	**52%**	**55%**	**60%**	**67%**	**53%**	**75%**	**75%**	**6%**	**64%**	**25%**
Independent, for dosage adjustment	40	10	17	13	11	29	15	15	2	7	1
	45%	**48%**	**45%**	**43%**	**52%**	**43%**	**75%**	**75%**	**12%**	**25%**	**25%**
Independent, for new therapy	19	5	7	7	9	10	3	12	0	4	0
	21%	**24%**	**18%**	**23%**	**43%**	**15%**	**15%**	**60%**	**0%**	**14%**	**0%**
Dependent, for lab tests	44	11	19	14	8	36	6	5	15	15	3
	49%	**52%**	**50%**	**47%**	**38%**	**53%**	**30%**	**25%**	**88%**	**54%**	**75%**
Dependent, for dosage adjustment	55	11	26	18	12	43	8	6	16	22	3
	62%	**52%**	**68%**	**60%**	**57%**	**63%**	**40%**	**30%**	**94%**	**79%**	**75%**
Dependent, for new therapy	34	5	16	13	10	24	6	4	7	16	1
	38%	**24%**	**42%**	**43%**	**48%**	**35%**	**30%**	**20%**	**41%**	**57%**	**25%**

Base: Facilities with pharmacist prescribing
Note : multiple mentions permissible

Priority and Service Level of Clinical Services

In 2013/14, the Hospital Pharmacy in Canada Survey did not investigate the nature or level of clinical pharmacy services provided by respondents, primarily because the data had remained largely constant over previous reports.

In the past two years, Fernandes and collaborators have developed a core set of national clinical pharmacy key performance indicators (cpKPIs).[55,56] Key performance indicators (KPIs) are defined as quantifiable measures of

quality that can be used to both guide and assess pharmacy practitioners. KPIs should be used to track an organization's progress with specific, essential processes and outcomes. A set of hospital cpKPIs has now been developed using a systematic, pan-Canadian consensus-building (modified Delphi) process. The cpKPIs were grouped into eight evidence-informed critical activity areas (e.g., pharmaceutical care, discharge medication reconciliation, patient medication education) representing hospital pharmacists' best practices demonstrating improvements in meaningful patient outcomes. Each cpKPI was defined by five characteristics: it reflects a desired quality practice, it is a metric that links to direct patient care, it is associated with evidence of impact on meaningful patient outcomes, it is pharmacist-sensitive, and it is feasible to measure. Fernandes et al.[55] reported that a group of panelists completed three Delphi rounds and that eight candidate cpKPIs of activities performed by pharmacists met the consensus definition: "1) performing admission medication reconciliation (including best possible medication history); 2) participating in inter-professional patient care rounds; 3) completing pharmaceutical care plans; 4) resolving drug therapy problems; 5) providing in-person disease and medication education to patients 6) providing discharge patient medication education; 7) performing discharge medication reconciliation; and 8) providing bundled, proactive direct patient care activities." Bannerman et al.[57] also studied how local, provincial and national perspectives on cpKPI critical activity areas compare. They believed that this pan-Canadian collaboration to implement cpKPIs in a standardized way in these domains may serve to advance pharmacy practice to improve patient outcomes.

In 2013, Guérin et al.[58,59] launched a web platform of the best published evidence about the role and impact of pharmaceutical activities. The website has been developed following a structured and reproducible search and analytical method to describe the evidence for 70 themes related to patient care programs, diseases and pharmaceutical activities.[60] The research team has described three approaches to optimize use of the website and its data, which are applicable to pharmacy students and residents, pharmacists and clinicians, and healthcare decision-makers.[61,62,63] The website can be accessed without login or password and includes reference lists, article summaries (in French only), fact sheets (in French only), knowledge transfer strategies and profiles of team members. In March 2014, the research team launched a weekly blog to increase knowledge-sharing with the scientific community.[64]

Support from Pharmacy Technicians for Clinical Pharmacy Services

Responses to questions regarding support from pharmacy technicians for clinical pharmacy services are covered in Chapter F, Pharmacy Technicians.

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C - Drug Distribution Systems

Douglas Doucette

Oral Medication Systems

In most Canadian healthcare institutions, safe, effective and efficient preparation and distribution of medications are carried out by a team of highly trained pharmacy personnel, often aided by an array of automated equipment and integrated work processes. Preparation of medications using traditional manual processes is becoming uncommon, even in small hospital pharmacies, because of the availability of unit-dose packaging and compounded products through supporting regional pharmacy services or pharmaceutical suppliers. Modern institutional pharmacies strive to use technology and efficient processes to minimize the risk of errors in the medication-use system and to increase the time available for pharmacists to spend fulfilling patient-centred responsibilities. Today's healthcare institutions are participating in credentialing through accreditation surveys to enhance patient safety and adherence to standards of best practices, including those for medication management. Pharmacy's role is essential to the safe and effective operation of institutional medication-use systems, the contracting and procurement of pharmaceuticals and equipment for drug distribution and preparation, and the management of drug shortages.

Unit-Dose Systems

- Centralized unit-dose systems, in which unit-dose medications are dispensed from the central pharmacy, were reported to be in use by 75% (118/157) of all respondents (Table C-1). This result is a slight increase from 73% (123/168) in 2011/12 and reflects the steady adoption of centralized unit-dose systems since the 2007/08 report, when the rate was 64% (103/162).

The percentage of facilities with unit-dose systems continues to increase.

- Centralized unit-dose systems were in use in 100% of responding Quebec (QC) hospitals but were less common in other regions: 73% in each of British Columbia/Yukon (BC/YT) (19/26) and Ontario (ON) (29/40), 61% (11/18) in the Atlantic provinces and 56% (18/32) in the Prairie provinces. [The Atlantic provinces comprise New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE) and Newfoundland and Labrador (NL). The Prairies comprise Alberta (AB), Saskatchewan (SK), Manitoba (MB) and the Northwest Territories (NT).]

- Decentralized unit-dose systems in which unit-dose medications are dispensed from a satellite pharmacy were reported to be in use by 8% (12/157) of all respondents (Table C-1). Decentralized unit-dose drug distribution from satellite pharmacies was more commonly reported by respondents in the Prairies (13%, 4/32) and in QC (12%, 5/41) than in the Atlantic provinces (6%, 1/18), ON (5%, 2/40) or BC/YT (0%, 0/26).

- Decentralized unit-dose systems in which unit-dose medications are dispensed from automated dispensing cabinets (ADCs) located in patient care areas servicing inpatient beds (i.e., not including the emergency department [ED], operating rooms and other outpatient locations) were reported to be in use by 50% (78/157) of all respondents, compared with 45% (75/168) in 2011/12 and 36% (57/158) in 2009/10. Provision of medications from ADCs was more common in QC (59%, 24/41) and the Atlantic provinces (56%, 10/18) than in ON (48%, 19/40), BC/YT (46%, 12/26) or the Prairies (41%, 13/32).

- Twenty-five percent of acute care beds were serviced via ADCs in 2013/14 (Figure C-1) vs. 21% in 2011/12.

Centralized and decentralized unit-dose systems are replacing traditional, total wardstock and controlled/carded systems in the servicing of acute care and non-acute care beds.

The increase in Canadian facilities with centralized and decentralized unit-dose systems appears to be attributable to the steady decrease in the use of traditional, total wardstock or controlled/carded drug distribution systems. Since the 2009/10 Hospital Pharmacy in Canada Report, use of traditional drug distribution systems has dropped from 35% (55/158) of facilities to 26% (41/157) in the current report. These trends can also be discerned by comparing data for average percentages of beds over time: 11% of acute care beds in 2013/14 (Figure C-1) down from 19% in 2009/10 and 7% of non-acute care beds in 2013/14 (Figure C-1) down from 11% in 2009/10.

Traditional Systems

Despite the shift toward greater use of unit-dose systems in Canada, the use of traditional and total wardstock drug distribution systems persists in some regions.

- Use of a combination of traditional and total wardstock systems was reported by 61% (11/18) of respondents from the Atlantic provinces for an average 8% of their acute care beds vs. 58% (15/26) in BC/YT for an average 25% of acute care beds, 41% (13/32) in the Prairies for an average 18% of acute care beds, 33% (13/40) in ON for an average 10% of acute care beds and 27% (11/41) in QC for an average of only 4% of acute care beds.

- Combined data from all respondents indicated that, on average, 87% of acute care beds in Canadian hospitals (Figure C-1) received the majority of their scheduled oral doses via a centralized unit-dose system (60%), a decentralized unit-dose system (26%) or a controlled/carded dose system (1%). Those three types of unit-dose drug distribution systems are considered to be safer and more efficient than traditional multi-dose or total wardstock systems (13% of acute care beds combined in this report). On average, 92% of non-acute care beds were reported to receive scheduled oral doses from unit-dose or controlled/carded dose systems.

- There were notable regional variations in the percentage of acute care beds that received the majority of scheduled oral doses via a centralized or decentralized unit-dose system or a controlled/carded dose system (rather than a traditional or total wardstock system): 73% in BC/YT, 79% in the Prairies, 89% in ON, 96% in QC and 90% in the Atlantic provinces.

Table C-1. Drug Distribution Systems, 2013/14 (Percentage of Facilities using Various Drug Distribution Systems for Patient Care Areas with Inpatient Beds)

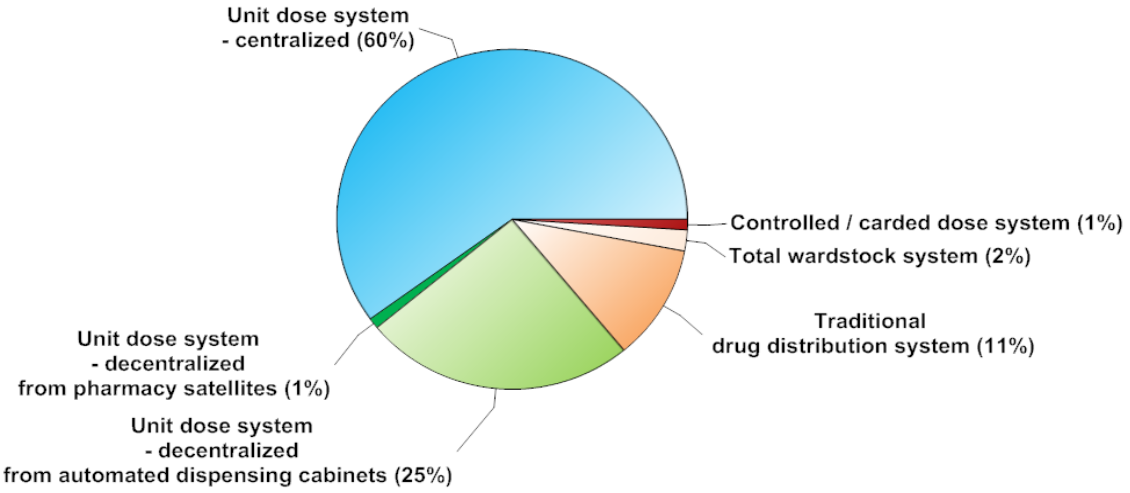
		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n all facilities / facilities with acute beds)	(157)	(43)	(72)	(42)	(33)	(124)
(n facilities with non-acute beds)	(101)	(22)	(49)	(30)	(13)	(88)
(1) Unit dose system - centralized	118	22	58	38	29	89
	75%	**51%**	**81%**	**90%**	**88%**	**72%**
Used for acute beds	112	21	54	37	29	83
	71%	**49%**	**75%**	**88%**	**88%**	**67%**
Used for non-acute beds	68	8	35	25	11	57
	67%	**36%**	**71%**	**83%**	**85%**	**65%**
(2) Unit dose system - decentralized from pharmacy satellites	12	2	3	7	8	4
	8%	**5%**	**4%**	**17%**	**24%**	**3%**
Used for acute beds	12	2	3	7	8	4
	8%	**5%**	**4%**	**17%**	**24%**	**3%**
Used for non-acute beds	1	1	0	0	0	1
	1%	**5%**	**0%**	**0%**	**0%**	**1%**
(3) Unit dose system - decentralized from automated dispensing cabinets	78	17	35	26	25	53
	50%	**40%**	**49%**	**62%**	**76%**	**43%**
Used for acute beds	78	17	35	26	25	53
	50%	**40%**	**49%**	**62%**	**76%**	**43%**
Used for non-acute beds	19	4	10	5	3	16
	19%	**18%**	**20%**	**17%**	**23%**	**18%**
(4) Traditional drug distribution system	41	14	15	12	6	35
	26%	**33%**	**21%**	**29%**	**18%**	**28%**
Used for acute beds	38	14	14	10	6	32
	24%	**33%**	**19%**	**24%**	**18%**	**26%**
Used for non-acute beds	17	6	4	7	2	15
	17%	**27%**	**8%**	**23%**	**15%**	**17%**
(5) Total wardstock system	22	4	14	4	5	17
	14%	**9%**	**19%**	**10%**	**15%**	**14%**
Used for acute beds	21	4	13	4	4	17
	13%	**9%**	**18%**	**10%**	**12%**	**14%**
Used for non-acute beds	11	2	7	2	3	8
	11%	**9%**	**14%**	**7%**	**23%**	**9%**
(6) Controlled / carded dose system	20	6	9	5	2	18
	13%	**14%**	**13%**	**12%**	**6%**	**15%**
Used for acute beds	6	3	1	2	1	5
	4%	**7%**	**1%**	**5%**	**3%**	**4%**
Used for non-acute beds	18	5	9	4	1	17
	18%	**23%**	**18%**	**13%**	**8%**	**19%**

Base: Respondents with complete answers to questions about drug distribution systems

In the United States (US), the trend toward greater use of decentralized distribution systems for medications was reported in the 2011 national survey of dispensing and administration practices in hospital pharmacy, conducted by the American Society of Health-System Pharmacists (ASHP).[1] Respondents to that survey indicated that their structure for pharmacy distribution systems in 2011 was 60% centralized and 40% decentralized (outside of pharmacy), compared with 80% centralized and 20% decentralized in the corresponding 2002 survey. In addition, pharmacy directors responding to the ASHP survey predicted that this balance would continue to shift, eventually reaching 42% centralized and 58% decentralized.[1]

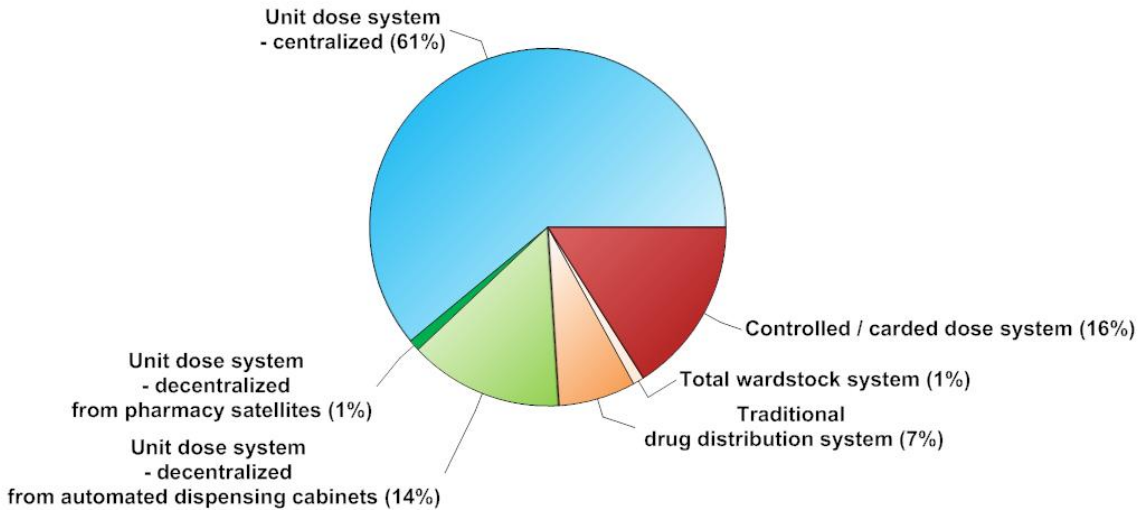
Figure C-1. Drug Distribution Systems – Average Percentage of Beds, 2013/14

Acute Beds



Base: Respondents with complete answers to questions about acute drug distribution systems (n=157)

Non-acute Beds



Base: Respondents with complete answers to questions about non-acute drug distribution systems (n=102)

Automated Dispensing Cabinets

- The use of ADCs in any location within the hospital, either as part of a unit-dose dispensing system or as a method of controlling access to certain medications (such as narcotic medications in a hospital's operating rooms), was reported by 71% (114/161) of the respondents to the 2013/14 survey, a substantial increase from 61% (103/169) in 2011/12 and a doubling since 2007/08 (36%, 59/162).

- Use of ADCs was most commonly reported in QC (81%, 35/43), followed by ON (78%, 31/40), the Atlantic provinces (78%, 14/18), the Prairies (58%, 19/33) and BC/YT (56%, 15/27). Teaching facilities (91%, 31/34) were more likely to have ADCs than non-teaching facilities (65%, 83/127). A greater percentage of hospitals with more than 500 beds used ADCs (93%, 41/44) than was the case for hospitals with 201 to 500 beds (66%, 48/73) and those with 50 to 200 beds (57%, 25/44).

Use of automated dispensing cabinets by Canadian hospitals has doubled since the 2007/08 Hospital Pharmacy in Canada Report.

The adoption of ADCs in Canada parallels the situation in the US, where hospital pharmacies reported almost a doubling in the use of ADCs in their drug distribution systems, rising from 49% of facilities in 1999 to 89% in 2011.[1] In Canada, as noted above, 71% (114/161) of respondents to the 2013/14 Hospital Pharmacy in Canada Survey reported having ADCs in at least one location in their respective facilities. Table C-2 shows the locations of ADCs in those facilities that reported use of these devices.

- For the third consecutive survey, the ED was the most frequently reported location for ADCs, reported by 96% (109/113) of respondents whose facilities had ADCs, an increase from 91% (94/103) in 2011/12 and 94% (79/84) in 2009/10. Adult critical care units remained the second most common location for ADCs, reported by 87% (98/113) of facilities with ADCs, an increase from 80% (82/103) in 2011/12 and 70% (59/84) in 2009/10. The third most frequently reported location for ADCs was general adult medical–surgical units, reported by 73% (83/113) of facilities, up from 66% (68/103) in 2011/12 and 56% (47/84) in 2009/10.

- Modest increases in ADC use were reported for ante- and post-partum units (43%, 49/113), labour and delivery units (44%, 50/113) and mental health units (55%, 62/113), which grew from 26% (22/84), 30% (25/84) and 39% (33/84), respectively, since the 2009/10 report.

- The percentage of respondents who reported the use of ADCs in all other patient care areas has also increased substantially since the 2009/10 report, with the exception of pediatric critical care units, for which usage appeared to be unchanged at 21% (24/113).

- Looking beyond the reported use of ADCs in specific patient care areas and examining survey results by region, the percentage of facilities reporting ADCs in particular locations within the hospital was greater for BC/YT than for other regions, with the exception of ON, which had similarly high usage of ADCs in EDs (100%, 30/30 in ON and 15/15 in BC/YT), operating rooms (90%, 27/30 in ON vs. 93%, 14/15 in BC/YT) and recovery rooms (90%, 27/30 in ON vs. 87%, 13/15 in BC/YT).

- Among the five regions, QC had the lowest frequency of ADC use in all care areas except the ED and adult critical care units, for which usage in QC was similar to that in the rest of the country (data not shown). Notably, respondents in QC often reported that ADCs were to be targeted for implementation in the ED and the adult critical care unit.

ADCs continue to be used most often in emergency departments, adult critical care units and adult medical–surgical units.

Those who reported using ADCs in each location were asked about the use of patient-specific medication profiles.

- The majority of respondents with ADCs in the following specific locations reported using patient-specific profiles to control access to medications in the cabinets (Table C-2): general medical–surgical units, both adult (93%, 76/82) and pediatric (93%, 41/44); critical care units, both adult (83%, 80/96) and pediatric (88%, 21/24); mental health units (90%, 56/62); and ante- and post-partum units (81%, 39/48).

- Forty-five percent (48/107) of respondents reported that their EDs used patient-specific profiles for access to medications in ADCs, unchanged from 2011/12 (45%, 42/94) but an increase from 2009/10 (32%, 25/79). Sixty-three percent (31/49) reported that their labour and delivery units used patient-specific profiles to access medications in ADCs, an increase from 54% (21/39) in 2011/12 and 24% (6/25) in 2009/10.

Table C-2. Use of and Access to Automated Dispensing Cabinets, 2013/14

Location of Automated Dispensing Cabinets		Medications are Accessed from ADCs	Patient Specific Profiles are Used to Control Access
General adult medical / surgical units	*(n=)*	(113) 83 **73%**	(82) 76 **93%**
Adult critical care units	*(n=)*	(113) 98 **87%**	(96) 80 **83%**
Operating rooms	*(n=)*	(113) 63 **56%**	(61) 2 **3%**
Recovery rooms	*(n=)*	(113) 61 **54%**	(60) 7 **12%**
Labor and delivery units	*(n=)*	(113) 50 **44%**	(49) 31 **63%**
Ante / Post-Partum units	*(n=)*	(113) 49 **43%**	(48) 39 **81%**
Mental health units	*(n=)*	(113) 62 **55%**	(62) 56 **90%**
Emergency departments	*(n=)*	(113) 109 **96%**	(107) 48 **45%**
General pediatric medical / surgical units	*(n=)*	(113) 45 **40%**	(44) 41 **93%**
Pediatric critical care units	*(n=)*	(113) 24 **21%**	(24) 21 **88%**

Base for "Where medications are accessed" : Facilities with automated dispensing cabinets (n= 113)
Base for "Where patient specific profiles are used to control access" : Facilities using automated dispensing cabinets at that location

- Short-stay units, such as operating rooms and recovery rooms, continued to lag behind, with 3% (2/61) and 12% (7/60) of respondents, respectively, reporting use of patient-specific profiles to access medications in ADCs in these areas, despite the presence of such cabinets in these types of units in over half of facilities that were using ADCs. This finding may relate to use of ADCs in these areas primarily for secure storage and monitored access to medications for which greater accountability is required (e.g., narcotics or controlled drugs) or medications with high-alert status for enhanced patient safety.

There was increased use of patient-specific medication profiles to control access to medications in ADCs in most patient care areas, except short-stay areas.

In the 2011 ASHP survey,[1] 96.2% of hospitals reported using patient-specific medication profiles in their ADCs, a sharp increase from 32% in the 1999 survey and 72.4% in the 2002 survey.

- Respondents to the 2013/14 Hospital Pharmacy in Canada Survey who reported using ADCs indicated that, on average, 52% of medications were located in storage drawers that gave the nurse access to only a single medication. The remaining 48% of medications were located in storage drawers used for multiple medications, such that the nurse had to select the correct drug from the drugs available. These proportions were similar to those in the past two reports (51% and 49%, respectively, in 2011/12; 50% and 50%, respectively, in 2009/10), which indicates that the configuration of ADCs is somewhat static, despite the increasing implementation of these cabinets in a wide range of patient care areas in facilities across the country.

Despite the rapidity with which ADCs are being implemented in Canadian healthcare institutions, the potential benefits in terms of improvements in patient safety and reductions in cost are still being scrutinized. For example, ADCs may improve the safety of medication delivery by reducing interruptions of staff, who have shorter distances to walk.[2] A survey of nursing staff revealed that the introduction of ADCs made their work easier, helped them to safely provide care to patients and helped to reduce medication incidents.[2] However, nursing staff were dissatisfied with delays in preparation and administration of individual medication doses and the inability to prevent a medication from being administered when a stop-order appeared on the medication administration record.[2] A systematic review of the clinical and economic impact of ADCs in hospitals showed that these devices were effective in reducing drug storage errors and nursing time for inventory counts of controlled substances, but the time

spent by pharmacy technicians to stock the cabinets was increased.[3] The analysis found no evidence that use of ADCs increased the time spent with patients by nurses or pharmacists, decreased medication errors associated with patient harm or lowered costs in Canadian hospitals. The authors concluded that the impact of ADCs was highly institution-specific, and they cautioned Canadian hospitals to carefully analyze their current systems and the potential benefits expected from more widespread use of ADCs.[3]

An analysis of simulated alternatives to a Wisconsin hospital's existing hybrid medication distribution system, with greater dependence on ADCs, predicted an unfavourable shift in staff skill mix and human resource costs (specifically, decreased workload for pharmacy technicians *and* significantly increased workload for nursing staff).[4]

The contradictory results from these two studies emphasize the need for thorough planning and analysis of projects to implement ADCs or other technologies, with a view to assessing the probable impact on staffing mix. It should not be assumed that more automation will result in lesser workloads or cost savings.

Robotic Automation

According to the 2011 ASHP survey,[1] robotics as a type of dispensing automation was reportedly used in 11% of general and children's medical–surgical hospitals, a similar frequency to that reported for Canadian hospitals in this 2013/14 Hospital Pharmacy in Canada Report.

- The use of robotic automation to select and fill patient-specific unit-dose bins or to perform similar tasks has remained steady since the previous report: 12% (19/161) of all respondents in 2013/14 and 13% (22/169) in 2011/12. These robotic dispensing systems were more likely to be reported by respondents from teaching facilities (24%, 8/34), facilities with more than 500 beds (25%, 11/44) and facilities in ON (18%, 7/40) and QC (19%, 8/43) than from non-teaching facilities (9%, 11/127), smaller hospitals of 50 to 200 beds (5%, 2/44) or other regions of the country.

Pharmacy Hours of Operation

- Respondents indicated that the hospital pharmacy was open an average of 79 hours per week, similar to 78 hours per week reported in 2011/12. Pharmacies in teaching hospitals were open for more hours than those in non-teaching hospitals (103 vs. 72 hours). Hospitals with more beds had longer hours of pharmacy operation: average of 97 hours per week for hospitals with more than 500 beds, 77 hours for those with 201 to 500 beds and 61 hours for those with 50 to 200 beds. Respondents from BC/YT, the Prairies and ON had hours of operation slightly above the national average, whereas sites in QC and the Atlantic provinces had hours of operation somewhat below the national average.

Medication Order Entry and Verification

Entry of medication orders into the pharmacy information system continues to be performed most frequently by pharmacists and pharmacy technicians (Table C-3).

- Seventy-eight percent (126/161) of respondents indicated that pharmacy technicians entered prescribers' medication orders into the pharmacy information system, a result similar to that reported in 2011/12 (79%, 133/169) and 2009/10 (73%, 116/160). Seventy-one percent (114/161) of respondents indicated that pharmacists entered prescribers' medication orders, similar to 72% (122/169) in 2011/12 and slightly lower than 78% (125/160) in 2009/10.

Previous surveys asked for the frequency of order entry performed by prescribers without distinguishing between physicians and pharmacists or other prescribers. This question was revised for the 2013/14 Hospital Pharmacy in Canada Survey to allow responses for orders entered by prescribing physicians to be distinguished from those for orders entered by prescribing pharmacists.

- Fourteen percent (23/161) of respondents reported that prescribing physicians performed medication order entry, whereas 19% (30/161) reported that prescribing pharmacists entered medication orders into the hospital's pharmacy information system. Order entry by physicians was highest in ON (38%, 15/40) and in the Atlantic provinces (17%, 3/18) and was less than 10% in the other regions. These differences can be attributed in part to the higher rates of implementation of computerized prescriber order entry (CPOE) systems in ON, as reported in previous Hospital Pharmacy in Canada Reports.

Pharmacists verify the majority of orders entered in pharmacy information systems.

The responses relating to prescribing pharmacists will be of interest in the analysis of future surveys, as the scope of pharmacy practice in Canadian hospitals and health authorities expands to include adaptation of medication orders and eventually more independent prescribing.

Table C-3. Medication Order Entry and Verification, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
Order entry performed by prescribing physicians	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
		23	2	15	6	11	12
		14%	**5%**	**21%**	**14%**	**32%**	**9%**
Verification of order entry by prescribing physicians is done by:	(n=)	(23)	(2)	(15)	(6)	(11)	(12)
A pharmacist only		19	2	13	4	9	10
		83%	**100%**	**87%**	**67%**	**82%**	**83%**
A pharmacy technician only		0	0	0	0	0	0
		0%	**0%**	**0%**	**0%**	**0%**	**0%**
Either a pharmacist or a pharmacy technician		1	0	0	1	1	0
		4%	**0%**	**0%**	**17%**	**9%**	**0%**
Verification of order entry is not required		3	0	2	1	1	2
		13%	**0%**	**13%**	**17%**	**9%**	**17%**
Order entry performed by prescribing pharmacists	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
		30	10	13	7	9	21
		19%	**23%**	**18%**	**16%**	**26%**	**17%**
Verification of order entry by prescribing pharmacists is done by:	(n=)	(27)	(9)	(11)	(7)	(9)	(18)
A pharmacist only		9	2	5	2	3	6
		33%	**22%**	**45%**	**29%**	**33%**	**33%**
A pharmacy technician only		2	1	0	1	0	2
		7%	**11%**	**0%**	**14%**	**0%**	**11%**
Either a pharmacist or a pharmacy technician		4	1	2	1	2	2
		15%	**11%**	**18%**	**14%**	**22%**	**11%**
Verification of order entry is not required		12	5	4	3	4	8
		44%	**56%**	**36%**	**43%**	**44%**	**44%**
Order entry performed by pharmacists , entering prescribers orders	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
		114	35	52	27	26	88
		71%	**80%**	**71%**	**61%**	**76%**	**69%**
Verification of order entry by pharmacists , entering prescribers orders, is done by:	(n=)	(112)	(35)	(51)	(26)	(26)	(86)
A pharmacist only		41	13	20	8	14	27
		37%	**37%**	**39%**	**31%**	**54%**	**31%**
A pharmacy technician only		3	2	0	1	0	3
		3%	**6%**	**0%**	**4%**	**0%**	**3%**
Either a pharmacist or a pharmacy technician		11	5	3	3	3	8
		10%	**14%**	**6%**	**12%**	**12%**	**9%**
Verification of order entry is not required		57	15	28	14	9	48
		51%	**43%**	**55%**	**54%**	**35%**	**56%**
Order Entry performed by pharmacy technicians, entering prescribers orders	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
		126	31	57	38	25	101
		78%	**70%**	**78%**	**86%**	**74%**	**80%**
Verification of order entry by pharmacy technicians, entering prescribers orders, is done by:	(n=)	(126)	(31)	(57)	(38)	(25)	(101)
A pharmacist only		111	27	51	33	21	90
		88%	**87%**	**89%**	**87%**	**84%**	**89%**
A pharmacy technician only		5	2	2	1	1	4
		4%	**6%**	**4%**	**3%**	**4%**	**4%**
Either a pharmacist or a pharmacy technician		4	1	2	1	1	3
		3%	**3%**	**4%**	**3%**	**4%**	**3%**
verification of order entry is not required		6	1	2	3	2	4
		5%	**3%**	**4%**	**8%**	**8%**	**4%**
Order entry performed by other prescribers	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
		15	1	8	6	9	6
		9%	**2%**	**11%**	**14%**	**26%**	**5%**
Verification of order entry by prescribing pharmacists is done by:	(n=)	(14)	(1)	(8)	(5)	(9)	(5)
A pharmacist only		11	1	7	3	6	5
		79%	**100%**	**88%**	**60%**	**67%**	**100%**
A pharmacy technician only		1	0	0	1	1	0
		7%	**0%**	**0%**	**20%**	**11%**	**0%**
Either a pharmacist or a pharmacy technician		1	0	0	1	1	0
		7%	**0%**	**0%**	**20%**	**11%**	**0%**
Verification of order entry is not required		1	0	1	0	1	0
		7%	**0%**	**13%**	**0%**	**11%**	**0%**

Base: All respondents

- For orders entered by prescribing physicians, verification was most frequently carried out by a pharmacist (83%, 19/23), although some respondents (13%, 3/23) indicated that no further verification of a physician's order entry was required (Table C-3). Forty-four percent (12/27) of respondents reported that orders entered by *prescribing* pharmacists did not require additional verification. However, other sites required verification of such orders by another pharmacist (33%, 9/27), by either a pharmacist or pharmacy technician (15%, 4/27), or by a pharmacy technician only (7%, 2/27). Generally, respondents reported that pharmacy technicians continued to verify a relatively low proportion of medication order entry.

- Medication order entry by pharmacy technicians was reported by 78% (126/161) of all respondents, including 58% (19/33) in the Prairies, 65% (26/40) in ON, 72% (13/18) in the Atlantic provinces, 93% (25/27) in BC/YT and 100% (43/43) in QC. Medication orders entered by pharmacy technicians were verified by pharmacists at 88% (111/126) of responding sites.

- Where pharmacists enter prescribers' orders into the system, verification of order entry is not required at 51% (57/112) of the responding sites (Table C-3). Only a pharmacist may verify order entry at 37% (41/112) of responding sites, either a pharmacist or pharmacy technician at 10% (11/112) and only a pharmacy technician at 3% (3/112).

The 2013 ASHP survey revealed differences in order entry practices from the Canadian hospital pharmacy environment.[5] This most recent ASHP survey indicated that medication orders were received in pharmacy electronically through CPOE at 70% of responding hospitals, followed by digital image capture (16.5%), fax (8.5%) and handwritten orders (5%).[5]

Parenteral Admixture Services

Questions about parenteral and cytotoxic compounding were included in the 2013/14 Hospital Pharmacy in Canada Survey after being absent from the 2011/12 survey.

Sterile compounding services for the preparation of products to be administered to patients by intravenous (IV) or other parenteral routes are commonplace in the modern hospital pharmacy.[6] These services were traditionally used to prepare small-volume parenteral agents in batched quantities at lower cost than commercial products and to tailor parenteral nutrition products to individual patient needs, freeing up front-line nurses from reconstitution and preparation of medications for injection on patient care units. However, as drug shortages have begun to affect healthcare systems over the past decade, many hospitals have chosen to take on additional product preparation in their pharmacy sterile compounding services or to seek outsourcing options.[6] The risks of compounding errors have been described in recent publications.[7,8]

- Sixty-six percent (106/161) of respondents provided parenteral admixture services to 90% or more of inpatients in their facilities (Table C-4), similar to the proportion reported for 2009/10 (64%, 102/160). These services were available more often in teaching hospitals and hospitals with larger bed size. There was substantial regional variation, with the highest occurrence of parenteral admixture services in BC/YT (81%, 22/27), ON (73%, 29/40) and QC (70%, 30/43), followed by the Atlantic provinces (50%, 9/18) and the Prairies (48%, 16/33).

- An average of 52% of total parenteral admixture doses were prepared through the parenteral admixture service or were provided as commercially available, ready-to-use products (Table C-4). This proportion has increased only slightly from previous surveys: 50% in 2009/10 and 47% in 2003/04. The average varied by region: 62% in BC/YT, 58% in ON, 53% in the Prairies, 45% in QC and 40% in the Atlantic provinces.

Two out of every three sites reported providing parenteral admixture services to 90% or more of their inpatients.

Various types of automation may be employed to prepare drug products in a parenteral admixture service.

- Use of an automated compounding device or automated syringe-filling device was reported by 38% (55/143) and 32% (46/143) of respondents, respectively (Table C-5). Use of a stand-alone robotic device was reported by only one site. Parenteral admixtures were prepared without the aid of automation in 45% (65/143) of facilities responding to the survey.

- Automated compounding devices were used most often in BC/YT (61%, 14/23) and QC (50%, 21/42), whereas facilities in the Prairies were the most frequent users (52%, 13/25) of automated syringe-filling

devices for parenteral admixtures. Use of automated compounding devices and automated syringe-filling devices was reported by 35% (51/144 and 50/144, respectively) of respondents in 2009/10.

Relative to the Hospital Pharmacy in Canada Survey, the 2011 ASHP survey reported lower use of automated syringe-filling devices for admixture preparation (12.5% of hospitals) but more frequent use of a stand-alone robotic device to compound parenteral admixtures (2.5% of hospitals).[1]

Table C-4. Parenteral Admixture Services, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
Not applicable (no parenteral admixture services)	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
		16	8	7	1	0	16
		10%	**18%**	**10%**	**2%**	**0%**	**13%**
Provision of parenteral admixture services to 90% or more of inpatients		106	18	51	37	31	75
		66%	**41%**	**70%**	**84%**	**91%**	**59%**
Provision of parenteral admixture services to less than 90% of inpatients		39	18	15	6	3	36
		24%	**41%**	**21%**	**14%**	**9%**	**28%**
Average percentage of inpatients receiving parenteral admixture service (for facilities serving < 90%)		37	17	14	6	3	34
		23%	**16%**	**18%**	**54%**	**77%**	**18%**
Base: All respondents							
Average percentage of the total parenteral admixture doses prepared through the parenteral admixture service or provided as commercially available, ready-to-use admixtures	(n=)	(140)	(34)	(63)	(43)	(34)	(106)
		52%	**43%**	**56%**	**53%**	**61%**	**49%**

Base: Facilities with parenteral admixture service

Table C-5. Types of Automation Used to Prepare Parenteral Admixtures, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
	(n=)	(143)	(34)	(66)	(43)	(34)	(109)
Automated syringe filling device		46	8	18	20	16	30
		32%	**24%**	**27%**	**47%**	**47%**	**28%**
Automated compounding device		55	5	23	27	21	34
		38%	**15%**	**35%**	**63%**	**62%**	**31%**
Stand-alone robotic device		1	0	1	0	0	1
		1%	**0%**	**2%**	**0%**	**0%**	**1%**
No automation used to prepare parenteral admixtures		65	23	33	9	10	55
		45%	**68%**	**50%**	**21%**	**29%**	**50%**

Base: Facilities with parenteral admixture service __ Note: multiple mentions permissible

Table C-6. Policies and Procedures for Compounding Sterile Products, 2013/14

		All	50-200	201-500	>500	Teaching	Non-teaching
Written policies and procedures regarding preparation of sterile products are available.	(n=)	(145)	(36)	(66)	(43)	(34)	(111)
		135	32	62	41	31	104
		93%	**89%**	**94%**	**95%**	**91%**	**94%**
Base: Facilities with parenteral admixture service							
Written policies re preparation of sterile products are based on:	(n=)	(135)	(32)	(62)	(41)	(31)	(104)
CSHP Guidelines (1996)		82	19	42	21	19	63
		61%	**59%**	**68%**	**51%**	**61%**	**61%**
USP 797		117	27	54	36	29	88
		87%	**84%**	**87%**	**88%**	**94%**	**85%**
Other		50	11	22	17	13	37
		37%	**34%**	**35%**	**41%**	**42%**	**36%**
Written policies and procedures regarding preparation of sterile products are available and reviewed at least every 2 years.	(n=)	(133)	(32)	(60)	(41)	(31)	(102)
		72	19	31	22	19	53
		54%	**59%**	**52%**	**54%**	**61%**	**52%**

Base: Facilities where written policies and procedures regarding the preparation of sterile products

The 2013/14 Hospital Pharmacy in Canada Survey included several new questions about sterile compounding policy and procedures, training and validation testing. These questions will be included in future surveys to assist in identifying trends in these areas of practice.

- The vast majority of respondents (93%, 135/145) indicated that written policies and procedures for the preparation of sterile products were available at their sites (Table C-6), although only 54% (72/133)

indicated that these documents were reviewed at least every two years. Respondents stated that their written policies and procedures for sterile product preparation were based on USP Chapter <797> (87%, 117/135), CSHP guidelines (61%, 82/135) and other references (37%, 50/135) (Table C-6).

- Virtually all responding sites (98%, 141/144) reported that pharmacy personnel are oriented and trained and must demonstrate competency in compounding sterile preparations, as well as in packaging and labelling the resulting preparations (Table C-7). Forty-one percent (59/144) of respondents reported that pharmacy staff involved in preparing *low- to moderate-risk* compounded sterile preparations must perform a didactic review at least annually. At 42% (59/142) of responding sites, staff involved in preparing *high-risk* compounded sterile preparations must perform a similar didactic review at least annually. These validation procedures for pharmacy staff were in place most frequently in QC (67%, 28/42 for low- to moderate-risk preparations; 57%, 24/42 for high-risk preparations) and least frequently in BC/YT (8%, 2/24 for low- to moderate-risk preparations; 8%, 2/24 for high-risk preparations).

- Formal training in sterile admixture procedures (e.g., sterile technique, clean room procedures, labelling of product, operating procedures for sterile hoods), refresher training and evaluation programs for pharmacy technicians were reported by 94% (135/144) of respondents and for pharmacists with responsibility for sterile compounding by 55% (79/144) of respondents (Table C-7a). Sixty-seven percent (91/135) of respondents indicated that pharmacy technicians received regular refresher training and/or evaluations related to sterile product policies and procedures, and 56% (44/78) reported this type of training and evaluation for pharmacists.

- There was wide regional variation in the reporting of formal training for pharmacists: QC 79% (33/42), ON 57% (20/35), the Prairies 50% (13/26), the Atlantic provinces 47% (8/17) and BC/YT 21% (5/24). Results differed to an even greater degree with regard to refresher and/or evaluation programs for pharmacists: QC 91% (30/33), the Prairies 46% (6/13) and ON 40% (8/20), with no respondents in the Atlantic provinces or BC/YT reporting refresher or evaluation programs for pharmacists.

Table C-7a. Training Practices for Compounding Sterile Products, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
Personnel are trained and must demonstrate competency in compounding sterile preparations and in packaging and labeling the resulting preparations.	(n=)	(144)	(36)	(65)	(43)	(34)	(110)
		141	34	65	42	34	107
		98%	**94%**	**100%**	**98%**	**100%**	**97%**
Pharmacy staff involved in preparing low- to moderate-risk compounded sterile preparations must participate in a didactic review at least annually.	(n=)	(144)	(36)	(65)	(43)	(34)	(110)
		59	12	28	19	20	39
		41%	**33%**	**43%**	**44%**	**59%**	**35%**
Pharmacy staff involved in preparing high-risk compounded sterile preparations must participate in a didactic review at least annually.	(n=)	(142)	(34)	(65)	(43)	(34)	(108)
		59	10	29	20	22	37
		42%	**29%**	**45%**	**47%**	**65%**	**34%**
Pharmacists with responsibility for sterile compounding receive formal training in areas of sterile admixture.	(n=)	(144)	(36)	(65)	(43)	(34)	(110)
		79	17	38	24	22	57
		55%	**47%**	**58%**	**56%**	**65%**	**52%**
Pharmacists with responsibility for sterile compounding undergo regular refresher programs and/or evaluations related to sterile product policies and procedures.	(n=)	(78)	(16)	(38)	(24)	(22)	(56)
		44	8	23	13	12	32
		56%	**50%**	**61%**	**54%**	**55%**	**57%**
Pharmacy technicians with responsibility for sterile compounding receive formal training in areas of sterile admixture.	(n=)	(144)	(34)	(65)	(43)	(34)	(108)
		135	32	61	42	34	101
		94%	**89%**	**94%**	**98%**	**100%**	**92%**
Pharmacy technicians with responsibility for sterile compounding undergo regular refresher programs related to sterile product policies and procedures.	(n=)	(135)	(32)	(61)	(42)	(34)	(101)
		91	18	44	29	26	65
		67%	**56%**	**72%**	**69%**	**76%**	**64%**

Base: Facilities with parenteral admixture service

- The frequency of cleaning the floor in the pharmacy clean rooms (where flow hoods are located) was reported as daily or weekly by 92% (133/144) and 8% (11/144) of respondents, respectively (Table C-7b).

Ninety-eight percent of respondents reported that pharmacy personnel were trained and required to demonstrate competency in sterile compounding procedures.

- Single-use ampules or vials were reported to be discarded immediately after first use in 60% (87/144) of facilities, within 24 hours of first use in 34% (49/144) and more than 24 hours after first use in 6% (8/144) (Table C-7b).

- The frequency with which personnel checked temperatures of refrigerators and freezers used to store medications was daily in 93% (149/161) of the facilities, weekly in 3% (5/161), monthly in 1% (1/161) and less than monthly or not at all in 4% (6/161) (Table C-7b).

Table C-7b. Safety Practices for Compounding Sterile Products, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
Frequency of cleaning the floor in the pharmacy clean rooms (where flow hood is located):	(n=)	(144)	(36)	(65)	(43)	(33)	(111)
Daily		133	30	61	42	32	101
		92%	**83%**	**94%**	**98%**	**97%**	**91%**
Weekly		11	6	4	1	1	10
		8%	**17%**	**6%**	**2%**	**3%**	**9%**
Monthly		0	0	0	0	0	0
		0%	**0%**	**0%**	**0%**	**0%**	**0%**
Less often than monthly		0	0	0	0	0	0
		0%	**0%**	**0%**	**0%**	**0%**	**0%**
When single use ampules or vials are discarded:	(n=)	(144)	(35)	(66)	(43)	(34)	(110)
Immediately after first use		87	22	41	24	17	70
		60%	**63%**	**62%**	**56%**	**50%**	**64%**
Within 24 hours of first use		49	13	21	15	13	36
		34%	**37%**	**32%**	**35%**	**38%**	**33%**
More than 24 hours after first use		8	0	4	4	4	4
		6%	**0%**	**6%**	**9%**	**12%**	**4%**
Base: Facilities with parenteral admixture service							
Frequency refrigerator and freezer temperatures are checked by personnel:	(n=)	(161)	(44)	(73)	(44)	(34)	(127)
Daily		149	40	69	40	33	116
		93%	**91%**	**95%**	**91%**	**97%**	**91%**
Weekly		5	1	1	3	1	4
		3%	**2%**	**1%**	**7%**	**3%**	**3%**
Monthly		1	0	1	0	0	1
		1%	**0%**	**1%**	**0%**	**0%**	**1%**
Less often than monthly or not at all		6	3	2	1	0	6
		4%	**7%**	**3%**	**2%**	**0%**	**5%**

Base: All respondents

Cytotoxic and Hazardous Drugs

Exposure to cytotoxic and hazardous drugs is potentially harmful to healthcare workers in the pharmacy and in patient care areas, as well as to patients and family members who are present in care areas where these drugs are administered.[9,10,11] Questions about cytotoxic and hazardous drugs were omitted from the 2011/12 Hospital Pharmacy in Canada Survey but were reintroduced into the current survey. Findings of the current survey and comparisons with results from 2009/10 are reported here.

- Preparation and/or administration of IV cytotoxic drugs (e.g., oncology drugs) in the previous fiscal year was reported by 93% (149/161) of respondents, with preparation of these drugs by the pharmacy department at 97% (144/149) of these sites (Table C-8a).

- A medical surveillance program for employees who handle cytotoxic drugs was reported by only 10% (15/149) of respondents whose pharmacies prepared cytotoxic drugs. Such surveillance programs appear to be in decline, as they were reported by 14% (21/146) of responding sites in 2009/10 and 27% (39/146) of sites in 2007/08.

The availability of medical surveillance programs for employees who handle cytotoxic drugs appears to be in decline.

A number of recent studies have reported the benefits of closed-system transfer devices (CSTDs) in reducing contamination by hazardous drugs.[12,13,14,15,16,17] Surface contamination with cyclophosphamide was significantly reduced, though not eliminated, when CSTDs were implemented in 30 US hospital pharmacies over the period 2004 to 2010 (to replace standard drug preparation techniques).[12] Along with other protective measures, the use of CSTDs should be increased to help protect healthcare workers from exposure to hazardous drugs. Training programs for handling hazardous drugs have been described,[18] and new standards for the handling of hazardous drugs are being developed by the United States Pharmacopeial Convention.[19]

- In the 2013/14 Hospital Pharmacy in Canada Survey, 14% (20/147) of respondents reported that CSTDs were used to prepare all cytotoxic drugs, and 19% (28/147) reported that CSTDs were used to prepare some

cytotoxic drugs. The remainder of facilities (67%, 99/147) reported that they did not use CSTDs (Table C-8a). The use of CSTDs varied regionally, with no use of CSTDs being reported by 92% (24/26) of respondents in BC/YT, 76% (13/17) in the Atlantic provinces, 70% (26/37) in ON, 56% (22/39) in QC and 50% (14/28) in the Prairies. Conversely, CSTDs were used for the preparation of all cytotoxic drugs most frequently in the Prairies (32%, 9/28), followed by ON (19%, 7/37), QC (8%, 3/39), the Atlantic provinces (6%, 1/17) and BC/YT (0%, 0/26).

Table C-8a. Preparation and Administration of Cytotoxic Drugs, 2013/14

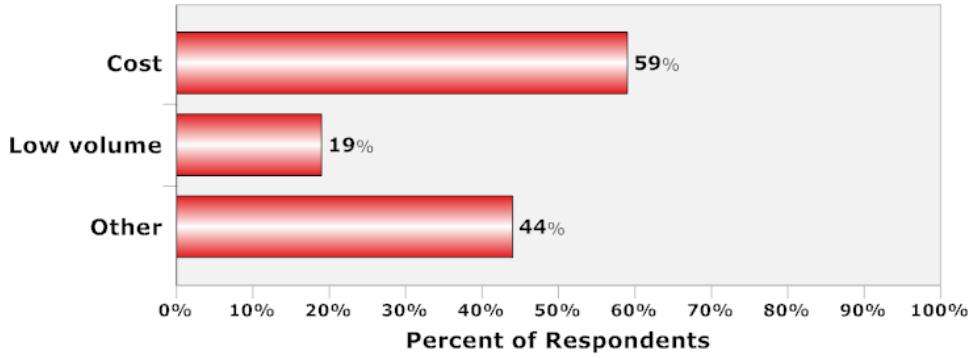
		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n=)	(161)	(44)	(73)	(44)	(34)	(127)
IV cytotoxic drugs were prepared and/or administered by the hospital in the last fiscal year.	149	37	69	43	32	117
	93%	**84%**	**95%**	**98%**	**94%**	**92%**
Base: All respondents						
Pharmacy department prepared IV cytotoxic doses. (n=)	(149)	(37)	(69)	(43)	(32)	(117)
	144	35	68	41	31	113
	97%	**95%**	**99%**	**95%**	**97%**	**97%**
There is a medical surveillance program in place for employees who handle cytotoxic drugs. (n=)	(149)	(37)	(69)	(43)	(32)	(117)
	15	5	7	3	0	15
	10%	**14%**	**10%**	**7%**	**0%**	**13%**
Cytotoxic drugs prepared using a closed system: (n=)	(147)	(36)	(68)	(43)	(32)	(115)
yes, for all drugs	20	7	9	4	5	15
	14%	**19%**	**13%**	**9%**	**16%**	**13%**
yes, for some drugs	28	7	9	12	6	22
	19%	**19%**	**13%**	**28%**	**19%**	**19%**

Base: Hospitals preparing / administering IV cytotoxic drugs

- The reasons given for not using a CTSD for all cytotoxic drugs included cost (59%, 75/127) and low volume (19%, 24/127) (Figure C-2). The reasons given for implementing CSTDs for the preparation of all cytotoxic drugs were employee safety (100%, 20/20), patient safety (70%, 14/20) and audit or regulatory recommendation (30%, 6/20).

High cost and low volume were the main reasons cited for not using closed-system transfer devices to prepare all cytotoxic drugs.

Figure C-2. Reasons Why a Closed System Device Is Not Used for All Cytotoxic Drugs, 2013/14



Base: Hospitals preparing / administering IV cytotoxic drugs and not using a closed system for all cytotoxic drugs (n= 127)

- Written policies and procedures to ensure the health and safety of employees preparing, transporting, administering and/or disposing of cytotoxic drugs were reported by 95% (142/149) of responding facilities (Table 8b). The frequency of various elements of these documents remained essentially unchanged from the 2009/10 report, except for the presence of sections on equipment maintenance (decreased from 88% [119/135] in 2009/10 to 82% [116/142] in the current report), response to spills (decreased from 99% [133/135] to 91% [129/142]) and environmental sampling (increased from 33% [44/135] to 44% [63/142]) (Table C-8b).

Employee safety, patient safety and audit or regulatory recommendations were cited as rationales for adopting closed-system transfer devices for preparation of all cytotoxic drugs in a facility.

Table C-8b. Policies and Procedures for the Preparation and Administration of Cytotoxic Drugs, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
There are written policies and procedures for preparing, transporting, administering and/or disposing of cytotoxic drugs.	(n=)	(149)	(37)	(69)	(43)	(32)	(117)
		142	33	68	41	31	111
		95%	**89%**	**99%**	**95%**	**97%**	**95%**
Base: Hospitals preparing / administering IV cytotoxic drugs							
Written policies and procedures address and define the following:	(n=)	(142)	(33)	(68)	(41)	(31)	(111)
Definition of cytotoxic drugs		131	32	60	39	28	103
		92%	**97%**	**88%**	**95%**	**90%**	**93%**
Handling of cytotoxic drugs		139	33	66	40	30	109
		98%	**100%**	**97%**	**98%**	**97%**	**98%**
Personal protective equipment		141	33	67	41	31	110
		99%	**100%**	**99%**	**100%**	**100%**	**99%**
Safe practices for administering cytotoxic drugs		132	30	65	37	30	102
		93%	**91%**	**96%**	**90%**	**97%**	**92%**
Equipment maintenance		116	24	58	34	24	92
		82%	**73%**	**85%**	**83%**	**77%**	**83%**
Decontamination and cleaning		139	32	67	40	28	111
		98%	**97%**	**99%**	**98%**	**90%**	**100%**
Waste handling		135	33	63	39	30	105
		95%	**100%**	**93%**	**95%**	**97%**	**95%**
Response to spills		129	31	63	35	30	99
		91%	**94%**	**93%**	**85%**	**97%**	**89%**
Environmental sampling		63	14	31	18	15	48
		44%	**42%**	**46%**	**44%**	**48%**	**43%**

Base: Hospitals preparing / administering IV cytotoxic drugs and who have written policies __ Note: multiple mentions permissible

- Ninety-eight percent (145/148) of respondents reported that approved biological safety cabinets were used to prepare cytotoxic drugs (Table C-9). The percentage of respondents using a Class II, Type A biological safety cabinet increased from 12% (17/139) in 2009/10 to 25% (36/143) in 2013/14. Use of Class II, Type B1 and Class II, Type B2 biological safety cabinets decreased proportionately.

- Fifty-seven percent (82/145) of respondents reported that the biological safety cabinet was in an ISO Class 7 room, physically separated from other sterile product preparation areas, up slightly from 51% (72/140) in 2009/10. Of the facilities with a separate ISO Class 7 room, 96% (79/82) reported that negative pressure was maintained in this separate room (Table C-9), an increase from 88% (63/72) in 2009/10.

- A list of hazardous drugs, based on specific criteria, was established in 83% (123/149) of responding facilities (Table C-10), an increase over the 70% (111/159) in 2009/10. Written policies and procedures for preparing, transporting, administering and/or disposing of hazardous drugs were available at 76% (94/123) of responding hospitals. Most of the elements included in these documents remain unchanged from 2009/10, except for an increase in the inclusion of a definition of "hazardous", from 89% (81/91) in 2009/10 to 97% (90/93) in 2013/14.

Table C-9. Biological Safety Cabinets, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
Cytotoxic drugs are prepared in an approved Biological Safety Cabinet:	(n=)	(148)	(36)	(69)	(43)	(32)	(116)
		145	35	67	43	32	113
		98%	**97%**	**97%**	**100%**	**100%**	**97%**
Class of Biological Safety Cabinets	(n=)	(143)	(33)	(67)	(43)	(32)	(111)
Class II Biological Safety Cabinet Type A		36	10	16	10	10	26
		25%	**30%**	**24%**	**23%**	**31%**	**23%**
Class II Biological Safety Cabinet Type B1		11	2	3	6	2	9
		8%	**6%**	**4%**	**14%**	**6%**	**8%**
Class II Biological Safety Cabinet Type B2		100	21	47	32	21	79
		70%	**64%**	**70%**	**74%**	**66%**	**71%**
Class III Biological Safety Cabinet		2	0	1	1	1	1
		1%	**0%**	**1%**	**2%**	**3%**	**1%**
Other		4	1	3	0	0	4
		3%	**3%**	**4%**	**0%**	**0%**	**4%**
The Biological Safety Cabinet is in an ISO Class 7 room that is physically separated from other sterile product preparation areas.	(n=)	(145)	(35)	(67)	(43)	(32)	(113)
		82	13	42	27	20	62
		57%	**37%**	**63%**	**63%**	**63%**	**55%**
Negative pressure is maintained in this separate room.	(n=)	(82)	(13)	(42)	(27)	(20)	(62)
		79	13	39	27	18	61
		96%	**100%**	**93%**	**100%**	**90%**	**98%**

Base: Hospitals preparing / administering IV cytotoxic drugs

Table C-10. Policies and Procedures for Hazardous Drugs, 2013/14

		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
There a list of hazardous drugs based on specific criteria. (n=)	(149)	(37)	(69)	(43)	(32)	(117)
	123	28	58	37	29	94
	83%	**76%**	**84%**	**86%**	**91%**	**80%**
There are written policies and procedures for preparing, transporting, administering and/or disposing of hazardous drugs. (n=)	(123)	(28)	(58)	(37)	(29)	(94)
	94	21	46	27	24	70
	76%	**75%**	**79%**	**73%**	**83%**	**74%**
Base: Hospitals preparing / administering IV cytotoxic drugs						
Written policies and procedures address and define the following: (n=)	(93)	(21)	(46)	(26)	(24)	(69)
Definition of hazardous drugs	90	20	45	25	24	66
	97%	**95%**	**98%**	**96%**	**100%**	**96%**
Handling of hazardous drugs (receiving, storage and transport)	91	21	44	26	24	67
	98%	**100%**	**96%**	**100%**	**100%**	**97%**
Personal protective equipment	92	21	45	26	24	68
	99%	**100%**	**98%**	**100%**	**100%**	**99%**
Procedures for crushing tablets , opening capsules, preparing compounded mixtures	76	18	34	24	21	55
	82%	**86%**	**74%**	**92%**	**88%**	**80%**
Use of equipment for repackaging	79	17	37	25	23	56
	85%	**81%**	**80%**	**96%**	**96%**	**81%**
Safe practices for administering hazardous drugs	86	19	42	25	23	63
	92%	**90%**	**91%**	**96%**	**96%**	**91%**
Containment ... hazardous drugs ... in equipment designed for sterile products	65	15	29	21	18	47
	70%	**71%**	**63%**	**81%**	**75%**	**68%**

Base: Hospitals with written policies for preparing, transporting, administering and/or disposing of hazardous drugs
__ Note: multiple mentions permissible

Inventory Control, Medication Shortages and Outsourcing

Inventory Turnover

- The average reported inventory turnover rate for 2013/14 was 9.8 times, unchanged from 2011/12. This apparent levelling-off follows the downward trend from 10.2 in 2009/10 and 10.6 in 2007/08. Inventory turnover rates of 11.7 and 9.2 were reported by teaching and non-teaching hospitals, respectively. Turnover rate increased with increasing bed size of the responding facilities: 7.2 for hospitals with 50 to 200 beds, 9.9 for those with 201 to 500 beds and 12.2 for those with more than 500 beds.

- Regional differences were noted, with inventory turnover rates for each of QC and ON averaging 11.6, compared with 9.5 in BC/YT, 8.2 in the Atlantic provinces and 6.2 in the Prairies.

The ongoing challenge of managing drug shortages across Canada may be influencing some pharmacies to hold larger inventory levels for some medications.

Medication Shortages

In recent years, hospital pharmacists and other healthcare professionals have become used to dealing with drug shortages. In a recent editorial, Vaillancourt commented on the numerous causes of drug shortages, including supply disruptions, changes in regulatory requirements, scarcity of raw ingredients, product recalls, government pricing strategies and monopolization of manufacturing.[20] The author posited the need for more innovative procurement methods to maintain healthy competition in the pharmaceutical marketplace. New questions were added to the 2013/14 survey to gather information on the impact of medication shortages in hospital pharmacies.

- Respondents estimated that the management of medication shortages required an average of 0.4 full-time equivalent (FTE) pharmacist, 0.5 pharmacy technician and 0.2 other pharmacy support staff annually (Table C-11).

- Respondents estimated the impact of medication shortages on patient care as low (43%, 69/161), moderate (41%, 66/161) or high (16%, 26/161) (Table C-11). Prairie sites most often rated the impact as high (38%, 12/32), while Atlantic respondents were least likely to rate the impact as high (6%, 1/18). The impact was rated as low or moderate by 63% (20/32) of respondents in the Prairies, 81% (22/27) in BC/YT, 88% (36/41) in ON, 93% (40/43) in QC and 94% (17/18) in the Atlantic provinces.

- Specific impacts of medication shortages on an institution or region included increased drug costs (reported by 90% [142/158] of respondents), temporary drug-related adverse events associated with replacement therapies (28%, 45/158), preventable morbidity (14%, 22/158), delay or cancellation of surgery (11%, 17/158) and increased length of hospital stay (11%, 17/158). One respondent (in the Atlantic provinces) reported that replacement therapies resulted in permanent drug-related adverse events and preventable mortality due to treatment delays.

Medication shortages have reportedly increased drug costs and drug-related adverse events, have caused delay or cancellation of surgery, and have increased lengths of stay and preventable morbidity.

Table C-11, Impact of Medication Shortages, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
FTEs required to manage medication shortages:							
Pharmacist FTEs	(n=)	(144)	(36)	(65)	(43)	(31)	(113)
		0.4	**0.2**	**0.3**	**0.5**	**0.5**	**0.3**
Pharmacy technician FTEs	(n=)	(149)	(37)	(69)	(43)	(31)	(118)
		0.5	**0.4**	**0.5**	**0.7**	**0.7**	**0.5**
Other pharmacy support staff FTEs	(n=)	(91)	(19)	(39)	(33)	(27)	(64)
		0.2	**0.1**	**0.2**	**0.3**	**0.4**	**0.2**
Impact of medication shortages on patient care:	(n=)	(161)	(43)	(73)	(45)	(35)	(126)
Low Impact		69	16	33	20	11	58
		43%	**37%**	**45%**	**44%**	**31%**	**46%**
Moderate Impact		66	19	28	19	15	51
		41%	**44%**	**38%**	**42%**	**43%**	**40%**
High Impact		26	8	12	6	9	17
		16%	**19%**	**16%**	**13%**	**26%**	**13%**
Other impacts of medication shortages:	(n=)	(158)	(43)	(71)	(44)	(34)	(124)
Increased drug costs		142	36	65	41	31	111
		90%	**84%**	**92%**	**93%**	**91%**	**90%**
Delay or cancellation of surgery		17	4	6	7	4	13
		11%	**9%**	**8%**	**16%**	**12%**	**10%**
Increased length of hospital stay		17	5	5	7	2	15
		11%	**12%**	**7%**	**16%**	**6%**	**12%**
Hospital readmission		9	3	3	3	2	7
		6%	**7%**	**4%**	**7%**	**6%**	**6%**
Temporary drug-related adverse events associated with replacement therapies		45	10	21	14	10	35
		28%	**23%**	**30%**	**32%**	**29%**	**28%**
Permanent drug-related adverse events associated with replacement therapies		2	1	1	0	0	2
		1%	**2%**	**1%**	**0%**	**0%**	**2%**
Preventable morbidity associated with delays in treatment		22	8	8	6	5	17
		14%	**19%**	**11%**	**14%**	**15%**	**14%**
Preventable mortality associated with delays in treatment		1	1	0	0	0	1
		1%	**2%**	**0%**	**0%**	**0%**	**1%**
Other		56	17	20	19	13	43
		35%	**40%**	**28%**	**43%**	**38%**	**35%**

Base: All respondents

Barthélémy et al.[21] evaluated data reported on a Canadian drug shortage website for the period September 2012 to August 2013 and found a 54% decrease in the number of reported drug shortages relative to the previous 12-month period. Unfortunately, this analysis also showed increases in the average duration of drug shortages and in the proportion of parenteral drug formulations in shortage status.

In 2012, the Canadian Society of Hospital Pharmacists (CSHP), the Canadian Pharmacists Association and the Canadian Medical Association (CMA) surveyed their respective memberships to learn more about drug shortages and the impact on healthcare professionals' practice and patient care. A number of similar questions were found in the three surveys. Sixty-four percent of CMA respondents felt that drug shortages had consequences for patients. Seventy-eight percent of CSHP respondents agreed or strongly agreed that drug shortages were negatively affecting patients, and 59% agreed or strongly agreed that patient care had been compromised as a result.[22] Like the Hospital Pharmacy in Canada 2013/14 Survey, these three surveys showed that the most frequent consequences for patients were treatment delays or stoppages, receipt of a less effective medication or formulation, and additional time or cost required to obtain an alternative medication. Respondents to these society surveys indicated that patients had longer hospital stays, greater post-operative pain, delayed or cancelled procedures, readmission to hospital or worsening of their medical condition,[22] although these outcomes were less frequent than in the current Hospital Pharmacy in Canada survey. In a drug shortage survey of Canadian anesthesiologists, 49% of respondents felt that they had given an inferior anesthetic and 30% had had to administer a medication with which they were unfamiliar.[23] Respondents

also noted delayed or cancelled surgeries, medication errors, prolonged recovery from anesthesia and increased post-operative complications.[23]

The ongoing requirement to manage drug shortages is eroding the efficiency and safety of Canada's institutional and community-based healthcare networks. Pharmacists frequently find it necessary to mitigate drug shortages through various actions: identifying and obtaining drugs from other sources; communicating changes to pharmacy, medicine and nursing staff; rationing and/or restricting access to drugs that are in short supply; and preparing compounded formulations of a drug, often with a different formulation or route.[24] In addition to the published surveys of healthcare providers, which provide insight into the trends and reasons for shortages, examples of the effects of shortages on patient care have included patient harm due to medication errors and inconsistencies, which may arise from unexpected changes in dose, strength or potency of an alternative drug or an alternative brand. Lack of sterility or potency of compounded formulations may occur due to inadequate quality control by secondary vendors. All of these issues can lead to adverse events and delayed or cancelled surgeries.[24] Pharmacists and other clinicians should be encouraged to report incidents related to lack of availability of medications to the Institute for Safe Medication Practices Canada or Health Canada.

Outsourcing of Medications

Pharmacies are increasingly challenged to compound sterile preparations that are unavailable commercially. Some pharmacies may not possess the required expertise to handle and prepare these products under acceptable sterile conditions or may not recognize that their practices no longer meet contemporary standards.[25] New questions were added to the 2013/14 Hospital Pharmacy in Canada Survey to gather information on the effects of outsourcing in hospital pharmacies.

- Outsourcing of production or repackaging of any medication product was reported by 63% (102/161) of respondents (Table C-12).
- Respondents reported that preparation and/or repackaging of pharmaceutical products were provided by a community pharmacy (28%, 28/99), another hospital (5%, 5/99) or a private compounding service (78/%, 77/99) (Table C-12).
- Reasons for outsourcing included staff limitations, space or facility limitations, problems with quality control, lack of product availability and cost savings.

Table C-12. Outsourcing the Preparation or Packaging of Medication, 2013/14

			Bed Size			Teaching Status	
		All	50-200	201-500	>500	Teaching	Non-teaching
Hospital pharmacy is involved in outsourcing the production or repackaging of any products.	(n=)	(161)	(43)	(73)	(45)	(35)	(126)
		102	16	49	37	27	75
		63%	**37%**	**67%**	**82%**	**77%**	**60%**
Base: All respondents							
Dosage forms outsourced	(n=)	(94)	(13)	(45)	(36)	(25)	(69)
Oral Solids		39	7	19	13	9	30
		41%	**54%**	**42%**	**36%**	**36%**	**43%**
Oral Liquids		30	1	16	13	10	20
		32%	**8%**	**36%**	**36%**	**40%**	**29%**
Topical Products		48	6	21	21	11	37
		51%	**46%**	**47%**	**58%**	**44%**	**54%**
IV Syringes		18	2	7	9	7	11
		19%	**15%**	**16%**	**25%**	**28%**	**16%**
Small Volume IV admixtures (<100mL)		51	8	29	14	13	38
		54%	**62%**	**64%**	**39%**	**52%**	**55%**
Large Volume IV admixtures (>100mL)		37	2	20	15	12	25
		39%	**15%**	**44%**	**42%**	**48%**	**36%**
Oncology admixtures		13	1	6	6	6	7
		14%	**8%**	**13%**	**17%**	**24%**	**10%**
TPN Solutions		14	2	8	4	4	10
		15%	**15%**	**18%**	**11%**	**16%**	**14%**
Organization(s) providing the preparation / repackaging of pharmaceutical products:	(n=)	(99)	(17)	(47)	(35)	(26)	(73)
a private compounding service		77	13	37	27	21	56
		78%	**76%**	**79%**	**77%**	**81%**	**77%**
a community pharmacy		28	5	12	11	6	22
		28%	**29%**	**26%**	**31%**	**23%**	**30%**
another hospital		5	1	3	1	2	3
		5%	**6%**	**6%**	**3%**	**8%**	**4%**

Base: Hospital pharmacies who outsource

The 2011 ASHP survey reported that 70.9% of responding hospitals had partially or completely outsourced some drug preparation activities. Furthermore, outsourcing had increased steadily over the previous decade of surveys (from 21% of hospitals in 2002).[1]

Incidents involving patient harm associated with sub-standard compounding practices have been reported in the popular press and the health literature in the US and Canada. A multi-state outbreak of fungal meningitis and other infections attributed to contamination of compounded injectable corticosteroid from the New England Compounding Center resulted in 61 deaths and adversely affected 749 other patients.[26] Closer to home, an incident involving four hospitals in Ontario and one in New Brunswick resulted in under-dosing of cyclophosphamide for 1007 patients, under-dosing of gemcitabine for 191 patients, and under-dosing of both agents for four patients.[27] The incident involved outsourcing of oncology preparations to a company in Ontario, which had been arranged through a contracting process with a group purchasing organization. It is believed that no patients suffered any serious adverse consequences or death related to use of the diluted products. The subsequent report examined the various factors contributing to the under-dosing and considered ways to prevent future incidents of this nature. The report included 12 recommendations aimed at group purchasing organizations, pharmaceutical manufacturers and suppliers, federal health and pharmacy regulators, provincial colleges of pharmacy, hospitals, clinics and associated pharmacies.[27] The Government of Ontario recently issued guidelines for healthcare organizations for the outsourcing of pharmaceutical compounding services,[28] and other publications have highlighted the need for improved safety in outsourcing practices for sterile admixtures.[29,30,31]

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D - Human Resources

André Bonnici and Chuck Wilgosh

For the past 10 to 15 years, the shortage of hospital pharmacists in both Canada and the United States (US) has been one of the most important challenges the profession has had to face.[1] This issue was especially important coming as it did at a time when demand for pharmaceutical expertise was on the rise, with many novel medication therapies arriving on the marketplace and an ever-increasing complexity of pharmacotherapy regimens being prescribed for the aging patient population in Canadian hospitals. It was clear that the pharmacist's role needed to migrate toward a more clinical role with greater focus on patient care. However, the sometimes-severe staff shortages hindered this transformational change. Recommendations to deal with the pharmacist shortage and thus allow this goal to be achieved were put forth in the "Moving Forward: Pharmacy Human Resources for the Future" study.[2] In large part, changes in the roles and responsibilities of pharmacists and pharmacy technicians were believed to be key enablers. The strategies recommended by the "Moving Forward" study included the regulation of pharmacy technicians, changes in the scopes of practice of pharmacists and pharmacy technicians, more effective integration of foreign-trained pharmacy graduates into the Canadian workforce and an increase in the number of students enrolled in and graduating from Canadian faculties of pharmacy.

Fast forward to 2015, and these recommendations have now been implemented in many provinces. Technician regulation is now a reality in British Columbia (BC), Alberta (AB), Manitoba (MB), Ontario (ON), New Brunswick (NB), Nova Scotia (NS) and Prince Edward Island (PE), with legislation or regulation pending in Saskatchewan (SK) and Newfoundland and Labrador (NL). As a result, the regulatory environment permits registered pharmacy technicians to assume responsibility and accountability for most drug distribution activities, which in turn allows pharmacists to redirect their efforts to more clinically oriented direct patient care activities. Expanded scopes of practice for pharmacists have been implemented or are at some stage of legislative implementation in all jurisdictions. Aspects of an expanded role for pharmacists include making therapeutic substitutions, initiating prescription drug therapy, prescribing laboratory tests and other drug-related direct patient care activities. The number of students admitted to pharmacy programs in Canada has increased substantially in recent years. The 2009/10 Hospital Pharmacy in Canada Report noted that enrolment in the faculties of pharmacy had increased by 50% over the previous decade, and the number of graduates has been increasing as those larger classes have completed their programs. The total number of pharmacy graduates is reported to be 36% higher than it was 10 years ago (Harold Lopatka, Executive Director, Association of Faculties of Pharmacy of Canada, personal communication, November 18, 2010). In a report on the state of Canadian pharmacy in 2011, the Canadian Institute for Health Information (CIHI) noted that the supply of registered pharmacists grew by 19.8% between 2006 and 2011.[3] The per-population supply of pharmacists also increased, from 82.1 per 100,000 population in 2006 to 92.9 per 100,000 population in 2011.[3] CIHI also reported that the number of international pharmacy graduates in Canada has increased, with this group now representing 27.4% of all pharmacists in Canada.[3] It would be reasonable to assume that these changes in the number of pharmacists entering the Canadian workforce would reduce the vacancy rates in both community and hospital settings. There is evidence that this has indeed occurred in Canadian hospitals, as we will show in this chapter. In the US, where similar changes are taking place, the reported vacancy rate for hospital pharmacists fell to an 11-year low of 2.1% in 2013.[4]

Important changes to deal with the shortage of pharmacists and to increase the clinical role of pharmacists have been widely adopted across Canada.

So, with all these recommendations for changes now implemented in most of Canada, has the shortage of pharmacists improved and has the ultimate goal of redirecting pharmacists toward more clinically oriented direct patient care activities been met? As readers will see, the results presented in this chapter of the report seem to point in that direction.

Human Resource Shortages – Pharmacists

- As of March 31, 2014, the average reported vacancy rate for hospital pharmacists (staff pharmacists plus advanced practice pharmacists) was 5.1% (Table D-1). This is lower than the previously stable vacancy rates of 8.1% reported for 2011/12 and 8.2% reported for 2009/10. However, the vacancy rate in Canada still remains higher than the 2.1% vacancy rate reported for the US in 2013.[4]

- Overall, respondents reported a substantially lower number of vacancies than in previous years, with a total of 154 pharmacist positions vacant in 2013/14 (Table D-1), compared with 237 in 2011/12, 235 in 2009/10,

292 in 2007/08 and 270 in 2005/06. The average number of pharmacist positions reported vacant per hospital was 0.99 (154 vacancies reported by 156 hospitals), lower than the 1.5 reported for both 2011/12 (237 vacancies reported by 160 hospitals) and 2009/10 (235 vacancies reported by 159 hospitals).

The vacancy rate for hospital pharmacists has decreased after being stable in the 2 previous reports.

- In 2013/14, Quebec (QC) and BC/Yukon (YT) continued to report the highest pharmacist vacancy rates, 7.4% and 6.8%, respectively (Table D-1). However, these rates represent a major improvement for both jurisdictions relative to 2011/12, when QC and BC had rates of 12.9% and 13.3%, respectively, also the highest rates for that year (Table D-2). Salaries for hospital pharmacists have recently been increased in QC to close the gap in wages between the private sector and hospitals. This may explain the steady fall in the QC vacancy rate, from 16.4% in 2009/10 to 12.9% in 2011/12 and most recently to 7.4% in 2013/14. In BC/YT, where compensation for pharmacists is closer to that in other jurisdictions, a doubling of the class size at the University of British Columbia and decreasing job opportunities elsewhere in the country were likely the primary factors in reducing the vacancy rate. There was also a focused recruiting effort by most of the BC health authorities.

- Almost two-thirds (60%, 25/42) of QC hospitals reported vacant pharmacist positions, while no other province had more than the average 44% (68/156) of hospitals reporting vacancies. Hence, vacant positions remained widespread in the majority of QC hospitals, but were less evident in the rest of Canada.

Human Resource Shortages – Technicians

In previous Hospital Pharmacy in Canada Reports, the pharmacy technician vacancy rate was much less pronounced than the pharmacist vacancy rate. As regulation of pharmacy technicians came into effect, it was postulated that there might be a reduction in the technician pool, if a substantial number of the individuals who were previously called "pharmacy technicians" failed to qualify and be registered as pharmacy technicians under the new regulations.

There is evidence of an emerging pharmacy technician shortage in some provinces.

- In 2013/14, the vacancy rate for pharmacy technicians was 3.5%. When comparing this result to the rates for 2011/12 (2.3%) and 2009/10 (1.5%), readers should recall that before 2013/14, data for technician and assistant vacancies were combined. Although the vacancy rate for technicians does not quite reach that for pharmacists, evidence of an emerging pharmacy technician shortage is being seen in some provinces. The Canadian vacancy rate for pharmacy technicians is approaching the level seen in the US (4.2%).[4]

- The vacancy rates were highest in AB/Northwest Territories (NT) (11.7%) and lowest in BC/YT (1.0%) and NS/NL (0%).

Table D-1. Percent and Number of Positions Vacant as of March 31, 2014

		Bed Size			Teaching Status		Province							
	All	50 - 200	201- 500	>500	Teaching	Non-Teaching	BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
(n=)	(156)	(43)	(72)	(41)	(33)	(123)	(27)	(11)	(7)	(13)	(39)	(42)	(9)	(8)
Pharmacists														
vacant positions	**154**	**18**	**52**	**84**	**62**	**93**	**30**	**17**	**5**	**10**	**31**	**56**	**4**	**0**
vacancy rate	**5.1%**	**7.9%**	**4.7%**	**5.0%**	**3.9%**	**6.5%**	**6.8%**	**4.8%**	**3.5%**	**5.4%**	**3.4%**	**7.4%**	**3.5%**	**0.0%**
(n=)	(141)	(39)	(66)	(36)	(30)	(111)	(27)	(11)	(7)	(6)	(31)	(42)	(9)	(8)
Pharmacy Technicians (either)														
vacant positions	**105**	**5**	**34**	**66**	**74**	**31**	**3**	**37**	**2**	**2**	**35**	**24**	**2**	**0**
vacancy rate	**3.5%**	**1.7%**	**3.2%**	**3.9%**	**4.9%**	**2.0%**	**1.0%**	**11.7%**	**1.5%**	**4.9%**	**4.2%**	**2.3%**	**1.1%**	**0.0%**
(n=)	(144)	(37)	(67)	(40)	(33)	(111)	(25)	(11)	(7)	(13)	(34)	(41)	(6)	(7)
Pharmacist Managers														
vacant positions	**5**	**0**	**0**	**5**	**3**	**2**	**0**	**2**	**1**	**0**	**0**	**2**	**0**	**0**
vacancy rate	**1.7%**	**0.0%**	**0.0%**	**3.5%**	**2.2%**	**1.4%**	**0.0%**	**10.7%**	**5.0%**	**0.0%**	**0.0%**	**2.3%**	**0.0%**	**0.0%**
(n=)	(54)	(8)	(29)	(17)	(17)	(37)	(6)	(9)	(1)	(7)	(14)	(10)	(5)	(2)
Pharmacy Technician Managers														
vacant positions	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
vacancy rate	**1.3%**	**0.0%**	**0.0%**	**2.6%**	**2.6%**	**0.0%**	**0.0%**	**5.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Base: All respondents with FTEs > 0 for the corresponding job categories

- The percentage of hospitals reporting vacant technician positions was highest in AB/NT (36%, 4/11) and ON (32%, 10/31), two provinces that have recently regulated technicians. The percentage of hospitals

reporting technician vacancies was lowest in QC (14%, 6/42) and SK (one hospital), two provinces that have yet to regulate technicians, and in NS/NL (no hospitals).

- Although it would be tempting to conclude that the rise in technician vacancy rates is driven by provinces that have regulated technicians, it should be noted that BC, which has recently regulated technicians, had one of the lowest vacancy rates in Canada, with only 15% (4/27) of BC/YT hospitals reporting vacant technician positions.

Human Resource Shortages – Managers

- The total number of vacant pharmacist manager positions was very low in 2013/14, with only five vacant positions (Table D-1). The vacancy rate of 1.7% was lower than the rates reported for 2011/12 (4.4%) and 2009/10 (7.2%).

- The vacancy rate for pharmacy technician managers was first collected and reported for 2009/10, when there were no vacancies of this type. In both 2011/12 and 2013/14, there was one pharmacy technician manager vacancy. These low vacancy rates reflect the small number of pharmacy technician manager positions in existence to date.

Table D-2. Pharmacist and Technician Vacancy Rates, 2005/06 to 2013/14

			Bed Size			Teaching Status		Province							
		All	50-200	201-500	>500	Teaching	Non-teaching	BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
2013/14	(n=)	(156)	(43)	(72)	(41)	(33)	(123)	(27)	(11)	(7)	(13)	(39)	(42)	(9)	(8)
	Pharmacists	5.1%	7.9%	4.7%	5.0%	3.9%	6.5%	6.8%	4.8%	3.5%	5.4%	3.4%	7.4%	3.5%	0.0%
	Technicians	3.5%	1.7%	3.2%	3.9%	4.9%	2.0%	1.0%	11.7%	1.5%	4.9%	4.2%	2.3%	1.1%	0.0%
2011/12	(n=)	(160)	(40)	(80)	(40)	(36)	(124)	(24)	(14)	(6)	(11)	(48)	(41)	(9)	(7)
	Pharmacists	8.1%	9.3%	7.6%	8.4%	6.0%	10.3%	13.3%	5.5%	8.7%	9.1%	4.5%	12.9%	5.6%	2.9%
	Technicians /Assistants	2.3%	1.7%	2.5%	2.3%	2.5%	2.2%	4.5%	4.0%	7.1%	2.3%	1.3%	2.0%	0.0%	0.0%
2009/10	(n=)	(159)	(33)	(94)	(32)	(43)	(116)	(25)	(15)	(5)	(11)	(51)	(35)	(9)	(8)
	Pharmacists	8.2%	12.%	8.6%	7.2%	7.4%	9.2%	7.1%	4.3%	4.9%	5.4%	6.0%	16.4%	8.8%	3.1%
	Technicians /Assistants	1.5%	2.5%	1.5%	1.4%	2.0%	0.9%	0.9%	1.0%	1.9%	4.7%	1.0%	2.8%	0.5%	0.3%
2007/08	(n=)	(163)	(32)	(90)	(41)	(40)	(123)	(22)	(12)	(7)	(10)	(45)	(51)	(8)	(8)
	Pharmacists	10.4%	9.8%	13.0%	8.2%	9.6%	11.2%	6.6%	10.0%	2.8%	1.0%	8.3%	17.2%	14.3%	6.0%
	Technicians /Assistants	1.4%	2.3%	1.4%	1.3%	1.5%	1.2%	2.6%	3.0%	0.0%	1.5%	1.2%	0.4%	3.5%	0.0%
2005/06	(n=)	(103)	(15)	(56)	(32)	(30)	(73)	(13)	(6)	(3)	(6)	(38)	(28)	(7)	(2)
	Pharmacists	13.3%	22.7%	14.7%	11.4%	10.7%	16.9%	21.7%	11.6%	6.9%	7.0%	11.0%	17.4%	21.0%	4.8%
	Technicians	2.1%	0.8%	2.0%	2.3%	2.3%	1.8%	3.6%	8.9%	4.0%	0.0%	1.3%	0.3%	0.0%	5.3%

Base: All respondents with FTEs > 0 for the corresponding job categories

Pharmacy Staffing Ratios

This section will be most useful for pharmacy directors and managers looking to compare their staffing allocation with that of other similar hospitals or seeking help to justify staffing requirements for new services to their respective administrations. The mean ratios reported here are provided for all responding hospitals, for teaching vs. non-teaching hospitals, for hospitals of different sizes and for the hospitals within each province. The numerator in each ratio is the number of hours of staff time that a pharmacy department has at its disposal to provide pharmacy services (budgeted hours), and the denominator is the number of patient days. The "patient days" measure is widely used to assess and compare workload and resource allocation not only for pharmacy departments, but also for most other departments in the healthcare system, making it a proxy for workload that is universally well accepted by healthcare executives. The use of patient days is admittedly an imperfect proxy for workload in hospital pharmacy, but experience has shown that the results have a high degree of consistency and reproducibility, even when all types of patient days are grouped in the denominator. The 2011/12 Hospital Pharmacy in Canada Report included a benchmarking section, which showed staffing ratios for eight different types of patient days, such as critical care patient days, oncology patient days, medicine patient days and long-term care patient days. Those program-specific staffing ratios can be found in Chapter F (Benchmarking Indicators – Acute Care Hospitals) of the 2011/12 report, and benchmarking will be repeated in the 2015/16 survey. Here, we report only overall pharmacy staffing ratios calculated for the hospital as a whole. We have included four types of ratios to account for the different composition of hospitals in terms of acute care vs. non-acute care beds, as well as to account for the important investment of resources in ambulatory

The most appropriate staffing ratio for assessment of inpatient resources is "inpatient budgeted hours/acute care patient day".

care in some hospitals.

Total budgeted hours/acute care patient day: This ratio excludes from the denominator patient days for non-acute care beds, such as long-term care beds, but it includes in the numerator budgeted hours allotted for non-acute care beds and for ambulatory care services.

Inpatient budgeted hours/acute care patient day: This ratio affords a more accurate view of resources used specifically for inpatient-related acute care beds by excluding from the numerator budgeted hours allotted for ambulatory care and excluding from the denominator patient days for non-acute care beds.

Total budgeted hours/total patient day: This ratio is all inclusive and should be used with caution by pharmacy managers, as there are important variations when the proportion of acute care beds is taken into account. For example, in hospitals with 100% acute care beds, this ratio was 0.89, whereas in hospitals with 10%–39% acute care beds, the ratio decreased markedly, to 0.32 (Table D-3a).

Inpatient budgeted hours/total patient day: This ratio excludes from the numerator the hours devoted to providing ambulatory care services. However, as for the previous ratio, caution should be used, as important variations exist when the proportion of acute care beds is taken into account.

Two of these ratios use total budgeted hours because many facilities were unable to separate non-acute care workload (in hours) from acute care workload.

- As can be seen in Tables D-3a and D-3b, excluding outpatient staffing from the numerator reduced the mean staffing for all hospitals from 0.95 total budgeted hours/acute patient day to 0.86 inpatient budgeted hours/acute care patient day. Likewise, excluding outpatient staffing from the numerator reduced the mean staffing for all hospitals from 0.68 total budgeted hours/total patient day to 0.62 inpatient budgeted hours/total patient day. These data suggest that, on average, about 10% of all pharmacy staffing is dedicated to the provision of outpatient services. The larger the amount of outpatient staffing that a facility has, the greater the difference between ratios that include outpatient staffing in the numerator and those that do not.

Table D-3a. Staffing Ratios – Budgeted Hours/Patient Day, 2013/14, by Percentage of Acute Care Beds

		Bed Size			Teaching Status		Percentage of Acute Beds				
	All	50-200	201-500	>500	Teaching	Non-teaching	10-39%	40-59%	60-79%	80-99%	100%
ALL HOSPITALS											
(n=)	(149)	(41)	(69)	(39)	(31)	(118)	(23)	(24)	(31)	(28)	(43)
Total budgeted hours/ acute patient day	**0.95**	**0.87**	**0.98**	**1.00**	**1.07**	**0.92**	**1.03**	**0.96**	**0.93**	**0.95**	**0.92**
(n=)	(149)	(41)	(69)	(39)	(31)	(118)	(23)	(24)	(31)	(28)	(43)
Inpatient budgeted hours/ acute patient day	**0.86**	**0.81**	**0.89**	**0.85**	**0.96**	**0.83**	**0.88**	**0.86**	**0.84**	**0.88**	**0.84**
(n=)	(142)	(39)	(67)	(36)	(30)	(112)	(22)	(23)	(30)	(24)	(43)
Total budgeted hours/ total patient day	**0.68**	**0.69**	**0.67**	**0.69**	**0.95**	**0.61**	**0.32**	**0.45**	**0.66**	**0.87**	**0.89**
(n=)	(142)	(39)	(67)	(36)	(30)	(112)	(22)	(23)	(30)	(24)	(43)
Inpatient budgeted hours/ total patient day	**0.62**	**0.65**	**0.61**	**0.59**	**0.85**	**0.55**	**0.28**	**0.41**	**0.60**	**0.80**	**0.81**
Base: Respondents who provided FTE and bed size information											
TEACHING HOSPITALS											
(n=)	(31)	(2)	(11)	(18)	(31)	(0)	(0)	(2)	(3)	(12)	(14)
Total budgeted hours/ acute patient day	**1.07**	**.**	**1.03**	**1.09**	**1.07**			**.**	**1.18**	**1.10**	**1.02**
(n=)	(31)	(2)	(11)	(18)	(31)	(0)	(0)	(2)	(3)	(12)	(14)
Inpatient budgeted hours/ acute patient day	**0.96**	**.**	**0.96**	**0.95**	**0.96**			**.**	**1.03**	**0.99**	**0.93**
(n=)	(30)	(2)	(11)	(17)	(30)	(0)	(0)	(2)	(3)	(11)	(14)
Total budgeted hours/ total patient day	**0.95**	**.**	**0.99**	**0.91**	**0.95**			**.**	**0.82**	**0.99**	**1.00**
(n=)	(30)	(2)	(11)	(17)	(30)	(0)	(0)	(2)	(3)	(11)	(14)
Inpatient budgeted hours/ total patient day	**0.85**	**.**	**0.93**	**0.79**	**0.85**			**.**	**0.71**	**0.88**	**0.92**
Base: Respondents who provided FTE and bed size information											
NON-TEACHING HOSPITALS											
(n=)	(118)	(39)	(58)	(21)	(0)	(118)	(23)	(22)	(28)	(16)	(29)
Total budgeted hours/ acute patient day	**0.92**	**0.86**	**0.97**	**0.92**		**0.92**	**1.03**	**0.96**	**0.90**	**0.84**	**0.88**
(n=)	(118)	(39)	(58)	(21)	(0)	(118)	(23)	(22)	(28)	(16)	(29)
Inpatient budgeted hours/ acute patient day	**0.83**	**0.80**	**0.88**	**0.76**		**0.83**	**0.88**	**0.86**	**0.82**	**0.80**	**0.80**
(n=)	(112)	(37)	(56)	(19)	(0)	(112)	(22)	(21)	(27)	(13)	(29)
Total budgeted hours/ total patient day	**0.61**	**0.68**	**0.60**	**0.49**		**0.61**	**0.32**	**0.45**	**0.64**	**0.78**	**0.84**
(n=)	(112)	(37)	(56)	(19)	(0)	(112)	(22)	(21)	(27)	(13)	(29)
Inpatient budgeted hours/ total patient day	**0.55**	**0.63**	**0.55**	**0.42**		**0.55**	**0.28**	**0.40**	**0.59**	**0.74**	**0.76**

. Results not shown because data available for fewer than three facilities

Base: Respondents who provided FTE and bed size information

Note that budgeted hours exclude pharmacy residents

Total budgeted hours = inpatient budgeted hours + outpatient budgeted hours

Total patient days includes both, acute patient days and non-acute patient days

With respect to other staffing ratios that have been included in past Hospital Pharmacy in Canada Reports, a few of the findings are as follows:

- As shown in Tables D-3a and D-3b, teaching hospitals continued to report higher total budgeted hours/acute care patient day (1.07) than non-teaching hospitals (0.92). The largest hospitals, those with more than 500 beds, also continued to report higher total budgeted hours/acute care patient day (1.0) than hospitals with 201 to 500 beds (0.98) and those with 50 to 200 beds (0.87).

- Teaching hospitals also reported higher inpatient budgeted hours/acute care patient day (0.96) than non-teaching hospitals (0.83). Curiously, however, the largest hospitals, those with more than 500 beds, reported inpatient budgeted hours/acute care patient day (0.85) lower than that for hospitals with 201 to 500 beds (0.89) but higher than that for hospitals with 50 to 200 beds (0.81). This pattern can be explained in part by the generally lower inpatient budgeted hours/acute care patient day in large (more than 500 beds) non-teaching hospitals (0.76) compared with teaching hospitals of the same size (0.95).

- AB/NT followed by ON reported the highest staffing ratios (Table D-3b).

When total patient days was used in the denominator, QC respondents reported the lowest staffing ratios of all provinces. This would imply that QC hospitals have a high number of non-acute care patient days. Indeed, QC respondents reported a disproportionate number of non-acute care beds (10,913) vs. acute care beds (14,046) (see Table A-1 in Chapter A, Demographics), as well as a disproportionate number of non-acute care patient days (2,777,260) vs. acute care patient days (4,031,259). These data are consistent with the merger of many QC acute care hospitals with long-term care facilities in recent years.

Table D-3b. Staffing Ratios – Budgeted Hours/Patient Day, 2013/14, by Province

		Bed Size			Teaching Status		Province							
	All	50-200	201-500	>500	Teaching	Non-teaching	BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
ALL HOSPITALS														
(n=)	(149)	(41)	(69)	(39)	(31)	(118)	(27)	(11)	(7)	(11)	(39)	(38)	(9)	(7)
Total budgeted hours/ acute patient day	**0.95**	**0.87**	**0.98**	**1.00**	**1.07**	**0.92**	**0.85**	**1.03**	**0.85**	**0.84**	**1.06**	**0.95**	**0.90**	**0.94**
(n=)	(149)	(41)	(69)	(39)	(31)	(118)	(27)	(11)	(7)	(11)	(39)	(38)	(9)	(7)
Inpatient budgeted hours/ acute patient day	**0.86**	**0.81**	**0.89**	**0.85**	**0.96**	**0.83**	**0.82**	**0.99**	**0.79**	**0.77**	**0.97**	**0.77**	**0.87**	**0.85**
(n=)	(142)	(39)	(67)	(36)	(30)	(112)	(27)	(10)	(7)	(10)	(39)	(35)	(8)	(6)
Total budgeted hours/ total patient day	**0.68**	**0.69**	**0.67**	**0.69**	**0.95**	**0.61**	**0.59**	**0.85**	**0.69**	**0.66**	**0.81**	**0.53**	**0.73**	**0.77**
(n=)	(142)	(39)	(67)	(36)	(30)	(112)	(27)	(10)	(7)	(10)	(39)	(35)	(8)	(6)
Inpatient budgeted hours/ total patient day	**0.62**	**0.65**	**0.61**	**0.59**	**0.85**	**0.55**	**0.56**	**0.81**	**0.64**	**0.59**	**0.74**	**0.43**	**0.69**	**0.70**
Base: Respondents who provided FTE and bed size information														
TEACHING HOSPITALS														
(n=)	(31)	(2)	(11)	(18)	(31)	(0)	(2)	(3)	(2)	(2)	(10)	(8)	(3)	(1)
Total budgeted hours/ acute patient day	**1.07**	**.**	**1.03**	**1.09**	**1.07**		**.**	**0.91**	**.**	**.**	**1.15**	**1.01**	**0.92**	**.**
(n=)	(31)	(2)	(11)	(18)	(31)	(0)	(2)	(3)	(2)	(2)	(10)	(8)	(3)	(1)
Inpatient budgeted hours/ acute patient day	**0.96**	**.**	**0.96**	**0.95**	**0.96**		**.**	**0.83**	**.**	**.**	**1.07**	**0.84**	**0.85**	**.**
(n=)	(30)	(2)	(11)	(17)	(30)	(0)	(2)	(2)	(2)	(2)	(10)	(8)	(3)	(1)
Total budgeted hours/ total patient day	**0.95**	**.**	**0.99**	**0.91**	**0.95**		**.**	**.**	**.**	**.**	**1.04**	**0.96**	**0.82**	**.**
(n=)	(30)	(2)	(11)	(17)	(30)	(0)	(2)	(2)	(2)	(2)	(10)	(8)	(3)	(1)
Inpatient budgeted hours/ total patient day	**0.85**	**.**	**0.93**	**0.79**	**0.85**		**.**	**.**	**.**	**.**	**0.96**	**0.80**	**0.76**	**.**
Base: Respondents who provided FTE and bed size information														
NON-TEACHING HOSPITALS														
(n=)	(118)	(39)	(58)	(21)	(0)	(118)	(25)	(8)	(5)	(9)	(29)	(30)	(6)	(6)
Total budgeted hours/ acute patient day	**0.92**	**0.86**	**0.97**	**0.92**		**0.92**	**0.83**	**1.07**	**0.84**	**0.73**	**1.03**	**0.94**	**0.90**	**0.89**
(n=)	(118)	(39)	(58)	(21)	(0)	(118)	(25)	(8)	(5)	(9)	(29)	(30)	(6)	(6)
Inpatient budgeted hours/ acute patient day	**0.83**	**0.80**	**0.88**	**0.76**		**0.83**	**0.80**	**1.05**	**0.81**	**0.65**	**0.94**	**0.75**	**0.88**	**0.81**
(n=)	(112)	(37)	(56)	(19)	(0)	(112)	(25)	(8)	(5)	(8)	(29)	(27)	(5)	(5)
Total budgeted hours/ total patient day	**0.61**	**0.68**	**0.60**	**0.49**		**0.61**	**0.57**	**0.87**	**0.68**	**0.52**	**0.73**	**0.40**	**0.67**	**0.76**
(n=)	(112)	(37)	(56)	(19)	(0)	(112)	(25)	(8)	(5)	(8)	(29)	(27)	(5)	(5)
Inpatient budgeted hours/ total patient day	**0.55**	**0.63**	**0.55**	**0.42**		**0.55**	**0.55**	**0.84**	**0.65**	**0.44**	**0.67**	**0.32**	**0.64**	**0.68**

. Results not shown because data available for fewer than three facilities

Base: Respondents who provided FTE and bed size information

Note that budgeted hours exclude pharmacy residents

Total budgeted hours = inpatient budgeted hours + outpatient budgeted hours

Total patient days includes both, acute patient days and non-acute patient days

A review of staffing ratios reported in previous Hospital Pharmacy in Canada Reports led to following observations:

- For all hospitals, total budgeted hours/acute care patient day has slowly increased, from 0.81 in 2005/06 to 0.95 in 2013/14. In contrast, total budgeted hours/total patient day has remained essentially constant (within the range of 0.63 to 0.68) since 2007/08, the first time that ratio was determined. These findings indicate

the impact of including non-acute care patient days in the denominator, as doing so masks the increase in resources dedicated to acute care patient care.

- For non-teaching hospitals, total budgeted hours/acute care patient day has increased substantially, from 0.72 in 2005/06 to 0.92 in 2013/14.
- Total budgeted hours/total patient day for non-teaching hospitals has increased from 0.52 in 2007/08 to 0.61 in 2013/14, while this metric has remained essentially constant for teaching hospitals (within the range of 0.92 to 0.97 over the same period). It is clear that resource increases in non-teaching hospitals have been the primary contributing factor to the overall increase in staffing resources.

Resource increases in non-teaching hospitals have been the primary contributing factor to the overall increase in staffing resources since 2005/06.

When using these ratios for department-level analysis, it is important to look at the specific ratios that are most applicable to a particular facility. For example, the teaching or non-teaching status of a hospital will be an important factor to consider. In addition, the size of the hospital and the ratio of acute care to non-acute care patient days may be important. If the facility has a mix of acute care and non-acute care patient days (Table D-3a) or has a lot of staff committed to outpatient services, ratios should be selected to take these particular characteristics into consideration. Some departments may have to use several ratios for comparison purposes. Appropriate use of these ratios will allow pharmacy managers to understand how their staffing compares with that at other similar hospitals. These data may be useful in supporting a request for additional staffing, for defending existing staffing and for illustrating how the mix of acute care vs. non-acute care beds or the mix of inpatient vs. outpatient services must be considered when comparing facilities of the same bed size and/or teaching status.

For example, assume that the facility of interest is a 400-bed non-teaching hospital with 65% acute care beds and a fairly large outpatient component. To determine the acute care staffing ratio, first refer to Table D-3a, specifically the data for non-teaching hospitals. The most appropriate comparators would be the following:

An example of how to use data on staffing ratios is provided.

- Total budgeted hours/acute care patient day = 0.92 for all non-teaching hospitals, 0.97 for non-teaching hospitals with 201 to 500 beds and 0.90 for non-teaching hospitals with 60%–79% acute care beds. The most appropriate staffing ratio for this hospital therefore lies within the range of 0.90 to 0.97, probably closer to the lower end of the range, given the relatively low proportion of acute care beds in this particular institution.

Or

- If the hospital can separate inpatient from outpatient budgeted hours, use inpatient budgeted hours/acute care patient day = 0.83 for non-teaching hospitals, 0.88 for non-teaching hospitals with 201 to 500 beds and 0.82 for non-teaching hospitals with 60%–79% acute care beds. The most appropriate staffing ratio for this hospital therefore lies within the range of 0.82 to 0.88, and again closer to the lower end of this range.

The analysis can be done for a specific province by referring to the pertinent section in Table D-3b. The same analysis may be conducted using inpatient budgeted hours/total patient day or total budgeted hours/total patient day. However, if the necessary data are available to calculate inpatient budgeted hours/acute care patient day, this will provide the most appropriate range of inpatient acute care staffing ratios for this facility, since it avoids the variables related to both outpatient services and non-acute care patient days.

Staff Composition of the Typical Hospital Pharmacy Department

To allow directors to compare the staff composition of their respective departments with those of other comparable hospitals, the Hospital Pharmacy in Canada Report includes data on the number of different types of staff that each responding institution employs (i.e., managers, staff pharmacists, pharmacy technicians, support staff and pharmacy residents). This information is useful for examining issues such as technician/pharmacist ratios, differences in staff composition between different provinces, differences in staff composition between teaching and non-teaching hospitals, and differences in staff composition between hospitals of different bed sizes. New in the 2013/14 report, we present data regarding the age mix of the workforce, as well as the proportion of part-time positions within departments. These data can be useful to predict future staffing needs and trends within a certain province or hospitals of a certain type and bed size.

- The average number of pharmacist positions reported by all respondents, including advanced practice pharmacists, represented 40% of total pharmacy staffing (Figure D-1), identical with what was reported in

2011/12 and 2009/10. The percentage of pharmacists was highest in SK (48%) and lowest in NS/NL (34%).

- Advanced practice pharmacists represented 9.0% of total staffing in 2013/14, an increase over 7.6% in 2011/12. QC respondents reported that advanced practice pharmacists represented 24.7% of total staffing, an increase from 20.6% of total staffing in 2011/12. This high percentage is likely the result of the introduction of the entry-to-practice PharmD degree at both faculties of pharmacy in that province and the growing numbers of graduates slowly integrating into hospital practice. There has also been a substantial increase in the number of residents graduating from the Master's level advanced pharmacotherapy program (Clinical Master's program) in the past two years in QC, which may be due in part to salary increases for hospital pharmacists attracting more candidates. The jurisdiction with the next highest proportion of advanced practice pharmacists was BC/YT, where respondents reported that this group represented 8.7% of total pharmacy staffing. BC also has a PharmD program, but it is a post-baccalaureate program that accepts a much smaller number of students each year than the QC entry-to-practice PharmD programs. These two provinces affect the national average considerably, with the other provinces reporting fewer advanced practice pharmacists.

Table D-4a. Average Budgeted Pharmacy Staffing (FTEs), 2013/14

		Bed Size			Teaching Status		Province							
	All	50-200	201-500	>500	Teaching	Non-teaching	BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
(n=)	(156)	(43)	(72)	(41)	(33)	(123)	(27)	(11)	(7)	(13)	(39)	(42)	(9)	(8)
Staff Pharmacists	15.0	4.9	12.8	29.2	35.4	9.5	12.9	32.2	19.3	14.1	21.5	6.5	12.1	11.4
Advanced Practice Pharmacists	4.5	.4	2.5	12.2	13.0	2.2	3.5	.0	1.0	.8	2.0	11.6	1.3	.9
Pharmacist Managers	1.7	.9	1.4	3.3	3.8	1.2	1.7	1.7	2.0	1.5	1.6	2.1	1.3	1.3
Pharmacy Manager (neither a pharmacist nor a technician)	.2	.0	.1	.5	.6	.1	0.0	0.0	.4	0.0	.2	.4	.2	0.0
Pharmacy Technician Managers	.5	.2	.5	.9	1.2	.3	.3	1.6	.4	.8	.5	.2	.9	.3
Regulated Pharmacy Technician	10.2	2.2	7.3	23.8	24.2	6.4	10.8	27.6	0.0	0.0	15.8	9.0	0.0	.1
Non-regulated Pharmacy Technician	9.2	4.4	7.5	17.3	21.9	5.8	1.5	1.2	18.7	2.9	5.5	15.6	20.0	21.3
Pharmacy Assistants	6.1	1.5	4.4	13.9	12.3	4.4	7.8	16.8	0.0	12.2	9.9	.3	0.0	0.0
Subtotal: Pharmacy Technicians (any) and Pharmacy Assistants	25.5	8.1	19.2	54.9	58.4	16.7	20.1	45.6	18.7	15.1	31.3	24.8	20.0	21.4
Support Personnel (clerical / porter / aide)	1.4	.2	.9	3.4	3.9	.7	1.8	1.5	.8	.6	1.7	1.3	1.0	1.0
Residents	.7	.0	.6	1.4	2.1	.3	.8	.5	.4	.2	.8	.8	.4	.3
Total (including residents)	49.4	14.8	38.1	105.7	118.4	30.9	41.1	83.2	43.2	33.0	59.6	47.7	37.3	36.4

Base: All Respondents providing staffing information

- Combined pharmacist manager and technician manager positions represented 4.5%of staffing in 2013/14, similar to the 4.8% figure reported in 2011/12.

- Table D-4a provides subtotals for technician and assistant positions (combined), to allow comparisons of the 2013/14 results with data in previous reports. Technician and assistant positions represented 52.2% of total staffing in 2013/14, similar to the 51% reported for 2011/12 and 2009/10.

Average staff composition continues to be relatively stable in relation to previous reports.

- Support personnel represented 2.9% of total pharmacy staffing in 2013/14, as opposed to 3.0% in 2011/12, 3.4% in 2009/10 and 3.8% in 2007/08, a slow decline in proportion of support personnel over time.

Table D-4b. Ratio of Pharmacy Technicians + Assistants/Pharmacists, 2013/14

		Bed Size			Teaching Status		Province							
	All	50-200	201-500	>500	Teaching	Non-teaching	BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
(n=)	156	43	72	41	33	123	27	11	7	13	39	42	9	8
Ratio of Technicians + Assistants (inpatient) / all inpatient Pharmacists	1.7	1.8	1.6	1.5	1.3	1.8	1.6	1.7	1.3	1.3	1.7	1.7	1.8	2.0
Ratio of Technicians + Assistants (total) / all Pharmacists (total)	1.5	1.7	1.5	1.4	1.2	1.6	1.4	1.6	1.2	1.3	1.6	1.5	1.7	2.0

Base: All Respondents providing staffing information

- The mean technician + assistant/pharmacist ratio for all hospitals was 1.5 (Table D-4b). When only inpatient staff were considered, the ratio was 1.7 for all hospitals. The ratio for inpatient staff only was higher for non-teaching hospitals (1.8) than teaching hospitals (1.3). The lower ratio in teaching hospitals may be due to a higher number of clinical pharmacists and teaching or research-related pharmacist positions in these institutions, which increases the overall number of pharmacists.

- For all hospitals, the proportion of staff younger than 39 years of age was 51% for pharmacists and 59% for pharmacy technicians (Table D-5).

- The proportion of staff in each age category was relatively well balanced for most provinces. Notably, however, SK had the youngest age mix, with 71% of pharmacists younger than 39 years, and NS/NL had the oldest age mix, with only 24% of pharmacists younger than 39 years.

- Thirty-one percent of pharmacists were in the age group 30–39 years, whereas 34% of technicians were in this age group (Table D-5).

- Eighty-three percent (121/146) of respondents reported that their institutions offered part-time staff pharmacist positions. Seventy-nine percent (62/78) of facilities that employed regulated pharmacy technicians and 74% (61/82) of those that employed non-regulated pharmacy technicians offered part-time positions to these categories of staff.

Part-time positions constitute a reality that is very present, especially in provinces with a younger age mix.

- In terms of the percentage of budgeted positions that were part-time, the means were 26% for staff pharmacists, 25% for regulated technicians and 29% for non-regulated technicians.

- Teaching hospitals had a much lower percentage of part-time staff pharmacists (18%) than non-teaching hospitals (27%). The highest percentage of part-time staff pharmacist positions was in SK (39%), which was also the province with the youngest pharmacist workforce.

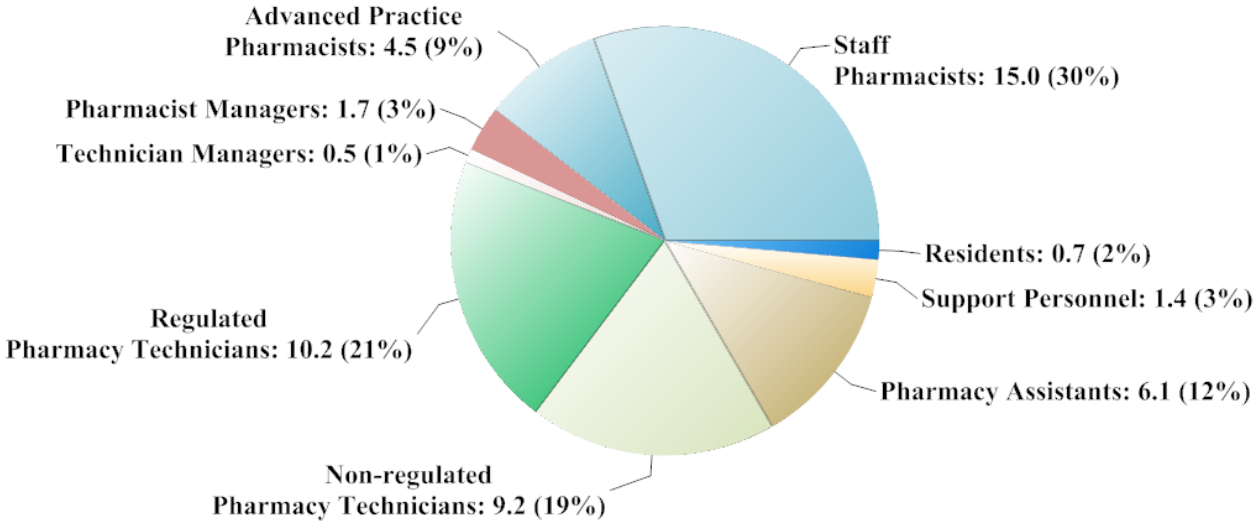
Table D-5. Staff Age Distribution, 2013/14

	(n)	Age Group					
		less than 30 years	30-39 years	40-49 years	50-59 years	60-65 years	more than 65 years
Pharmacists (average %)	(155)	20%	31%	28%	18%	3%	1%
Technicians (average %)	(154)	25%	34%	24%	15%	2%	0%

Base: All respondents

Overall, staff composition has remained relatively unchanged since the 2011/12 report. There continues to be considerable variability among the provinces in terms of the proportion of staff classified as "advanced practice pharmacists". The age mix of the workforce, reported for the first time in 2013/14, seems well balanced across age groups and across job titles. Part-time positions constitute a reality that is very present, especially in provinces with a younger age mix.

Figure D-1. Staff Composition of the Typical Hospital Pharmacy Department, 2013/14



Base: Respondents providing relevant data (156)

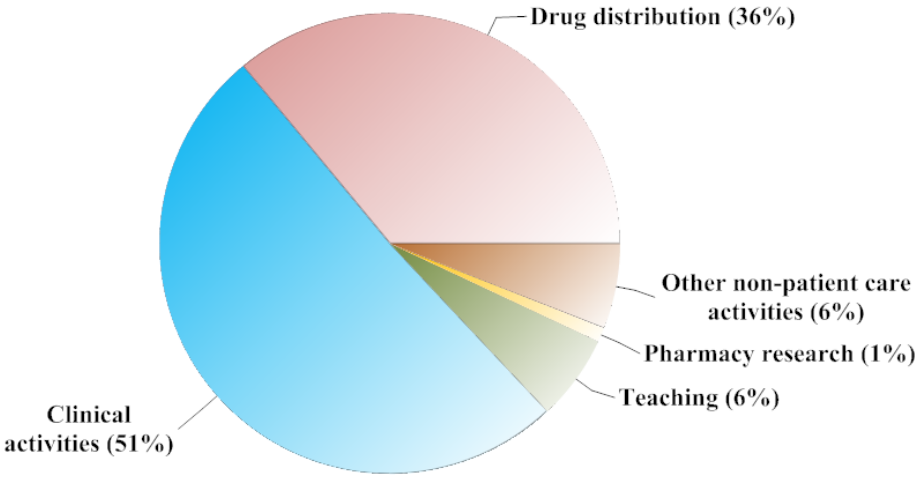
Overall, the proportion of time that pharmacists spend performing different functions has not changed much since the 2011/12 report, but the time spent on clinical activities continues to increase, while the time spent on drug distribution continues to decrease (Table D-6, Figure D-2). Looking at the long-term trends, it is evident that the profession has evolved markedly toward clinical activities. More specifically, the time spent on clinical activities has increased from 33% in 1997/98 to 51% in 2013/14.

Table D-6. Proportion of Pharmacist Time Spent Performing Different Activities, 2013/14

		Bed Size			Teaching Status		Province							
	All	50-200	201-500	>500	Teaching	Non-teaching	BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
(n=)	(160)	(43)	(74)	(43)	(34)	(126)	(27)	(13)	(7)	(13)	(40)	(42)	(9)	(9)
Drug distribution	36%	42%	34%	34%	26%	39%	37%	30%	48%	45%	29%	37%	54%	32%
Clinical activities	51%	46%	53%	51%	59%	48%	52%	58%	39%	45%	57%	46%	38%	55%
Teaching	6%	5%	6%	8%	8%	6%	6%	8%	6%	4%	6%	7%	3%	5%
Pharmacy research	1%	1%	1%	2%	3%	1%	1%	1%	2%	1%	2%	1%	1%	1%
Other non-patient care activities	6%	6%	6%	6%	4%	7%	4%	3%	5%	6%	5%	9%	4%	7%

Base: All respondents --Percentages represent average percentage among respondents

Figure D-2. Proportion of Pharmacist Time Spent Performing Different Activities, 2013/14



Base: Respondents providing relevant data (160)

Salaries

Throughout this section, the calculated salary increases that occurred over the two-year period between 2012/13 and 2013/14 have been annualized. When a percentage increase is referred to in the bullet points below, the percentage reported applies to the average of each of the two years between the 2011/12 report and the 2013/14 report. Salary increases were not directly reported by respondents. For each classification of staff, the average top salary reported in 2012/13 was subtracted from the average top salary reported in 2013/14, and the difference was then annualized for the two-year period between surveys.

- Average salary changes (Table D-7a) for various staff positions ranged from an increase of 1.2% for technician managers to an increase of 3.3% for staff pharmacists and practice leader and coordinator positions.

Average annualized salary increases for staff pharmacists, by province, were from 1.3% to 6.9%.

- The salary increase for staff pharmacists in non-teaching hospitals exceeded that of staff pharmacists in teaching hospitals. This difference may be due to a "catch-up" phenomenon, since salaries in non-teaching hospitals were generally less than those in teaching hospitals in the 2011/12 report.
- Overall, the average staff pharmacist salary increased by 3.3%, higher than the 1% increase documented in the 2011/12 report. The highest staff pharmacist salary increase occurred in QC (6.9%). This increase may be responsible for the decrease in staff pharmacist vacancies in QC in 2013/14 vs. 2011/12.
- The lowest salary increases for staff pharmacists occurred in NB/PE (1.3%) and SK (1.4%). For all other provinces, the reported increases were between 2.3% and 6.9%.

- In 2013/14, there were no notable differences in average staff pharmacist salaries according to hospital size or teaching status (Table D-7b). AB/NT had the highest average top-of-scale staff pharmacist salary ($118,751) and NB/PE the lowest ($90,231).
- For the first time, the 2013/14 survey requested a breakdown of pharmacy technician salaries as regulated vs. non-regulated technicians (Table D-7c). There were no comparable data in the 2011/12 report. In facilities with two levels of pharmacy technician, the average top salaries for level 1 (staff) were $53,060 for regulated technicians vs. $47,070 for non-regulated technicians. The average top salaries for level 2 (senior) were $57,995 for regulated technicians vs. $50,667 for non-regulated technicians.
- As in the 2011/12 report, the majority of pharmacy directors (60%) were paid in the range of $110,000 to $139,000 annually (Table D-8).

Table D-7a. Average Annualized Salary Increases, 2012 to 2014

	Top Salary 2012	Top Salary 2014	All	Teaching Status: Teaching	Teaching Status: Non-teaching	Province: BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
Staff Pharmacist	$94,528	$100,859	3.3%	1.8%	3.8%	3.3%	3.1%	1.4%	2.3%	2.6%	6.9%	1.3%	3.3%
Advanced Practice Pharmacist	$101,066	$107,567	3.2%	2.1%	3.8%	2.1%	.	.	1.9%	4.4%	6.5%	1.5%	.
Pharmacist Manager	$112,628	$119,212	2.9%	1.3%	3.5%	-2.6%	5.8%	4.8%	0.9%	3.5%	6.8%	1.4%	3.0%
Practice Leader / Coordinator (Pharmacist)	$107,997	$115,212	3.3%	3.4%	3.2%	1.7%	4.7%	.	.	4.0%	4.9%	1.3%	.
Pharmacy Supervisor / Coordinator (Pharmacist)	$104,023	$109,079	2.4%	-1.0%	4.3%	6.6%	.	.	.	3.0%	3.0%	.	.
Pharmacy Technician Manager	$70,646	$72,284	1.2%	2.9%	0.5%	0.3%	6.7%	.	3.2%	0.1%	-0.8%	1.3%	.
Pharmacy Assistant	$45,744	$46,303	0.6%	4.2%	-0.3%	1.1%	4.9%	.	1.9%	0.6%	4.3%	.	.

. Results not shown because data available for fewer than three facilities
Base: Respondents who provided relevant salary information
Salary increases for technicians were not calculated, because comparators did not exist for regulated/non-regulated technicians in 2012

Table D-7b. Average Annual Salary by Position, 2013/14

		All	Bed Size: 50-200	201-500	>500	Teaching Status: Teaching	Non-teaching	Province: BC/YT	AB/NT	SK	MB	ON	QC	NB/PE	NS/NL
Staff Pharmacist	(n=)	(143)	(40)	(66)	(37)	(28)	(115)	(27)	(13)	(7)	(12)	(40)	(28)	(9)	(7)
	Start $	82,577	85,389	81,247	81,910	83,614	82,325	75,967	102,096	87,770	90,048	78,976	82,428	82,856	74,638
	(n=)	(144)	(39)	(68)	(37)	(28)	(116)	(27)	(12)	(7)	(12)	(40)	(30)	(9)	(7)
	Top $	100,859	101,474	100,202	101,417	101,066	100,809	96,596	118,751	98,222	102,830	99,955	104,119	90,231	90,748
Advanced Practice Pharmacist	(n=)	(70)	(6)	(34)	(30)	(23)	(47)	(21)	(0)	(3)	(4)	(15)	(22)	(4)	(1)
	Start $	87,233	93,943	86,922	86,242	89,346	86,199	86,350		100,539	96,650	85,451	86,194	87,173	.
	(n=)	(72)	(6)	(36)	(30)	(23)	(49)	(21)	(0)	(3)	(4)	(15)	(24)	(4)	(1)
	Top $	107,567	115,742	107,058	106,542	106,895	107,882	107,365		114,107	112,840	108,682	108,458	92,065	.
Practice Leader / Coordinator (Pharmacist)	(n=)	(60)	(7)	(30)	(23)	(17)	(43)	(20)	(8)	(1)	(1)	(12)	(12)	(4)	(2)
	Start $	90,873	94,033	91,249	89,420	91,367	90,678	87,959	95,757	.	.	86,373	95,341	92,543	.
	(n=)	(58)	(7)	(29)	(22)	(17)	(41)	(20)	(8)	(1)	(1)	(11)	(11)	(4)	(2)
	Top $	115,212	117,369	115,031	114,764	113,860	115,773	121,960	127,332	.	.	110,694	108,871	96,693	.
Pharmacy Supervisor / Coordinator (Pharmacist)	(n=)	(50)	(4)	(24)	(22)	(16)	(34)	(18)	(0)	(2)	(1)	(11)	(15)	(3)	(0)
	Start $	86,887	87,567	86,984	86,659	85,130	87,714	88,968	.	.	.	68,039	93,137	96,221	.
	(n=)	(49)	(4)	(23)	(22)	(16)	(33)	(18)	(0)	(2)	(1)	(11)	(14)	(3)	(0)
	Top $	109,079	116,077	110,472	106,351	105,573	110,779	123,037	.	.	.	89,604	109,487	96,221	.
Pharmacist Manager	(n=)	(120)	(30)	(53)	(37)	(31)	(89)	(21)	(12)	(5)	(9)	(29)	(32)	(7)	(5)
	Start $	96,496	99,128	95,506	95,780	97,381	96,188	81,792	97,290	114,091	112,497	95,319	102,943	93,692	79,443
	(n=)	(120)	(28)	(56)	(36)	(32)	(88)	(22)	(12)	(4)	(9)	(28)	(33)	(7)	(5)
	Top $	119,212	121,000	117,542	120,418	116,602	120,161	112,268	138,650	122,087	121,462	114,992	125,782	101,108	102,372
Pharmacy Manager (neither a pharmacist nor a technician)	(n=)	(31)	(3)	(17)	(11)	(10)	(21)	(15)	(0)	(1)	(0)	(5)	(8)	(2)	(0)
	Start $	62,838	58,664	69,482	53,708	64,467	62,062	56,737		.		83,007	59,614	72,082	
	(n=)	(33)	(4)	(18)	(11)	(10)	(23)	(16)	(0)	(1)	(0)	(6)	(8)	(2)	(0)
	Top $	86,381	90,350	90,397	78,365	84,548	87,177	84,587		.		104,825	75,704	82,313	
Pharmacy Technician Manager	(n=)	(62)	(11)	(30)	(21)	(17)	(45)	(21)	(10)	(1)	(5)	(9)	(7)	(7)	(2)
	Start $	57,286	59,416	54,355	60,357	59,154	56,580	55,249	77,700	.	49,483	63,848	41,354	45,444	.
	(n=)	(62)	(11)	(31)	(20)	(17)	(45)	(21)	(10)	(1)	(5)	(8)	(8)	(7)	(2)
	Top $	72,284	76,695	67,574	77,157	75,026	71,248	73,408	112,775	.	53,354	75,189	46,752	48,979	.
Pharmacy Assistant	(n=)	(69)	(17)	(32)	(20)	(16)	(53)	(24)	(11)	(1)	(8)	(17)	(8)	(0)	(0)
	Start $	40,854	40,687	41,505	39,953	39,663	41,213	42,560	39,493	.	35,826	45,747	32,617		
	(n=)	(68)	(17)	(31)	(20)	(16)	(52)	(24)	(11)	(1)	(8)	(16)	(8)	(0)	(0)
	Top $	46,303	45,160	47,319	45,701	46,323	46,297	46,550	45,175	40,463	41,226	52,680	40,165		
Resident Stipend	(n=)	(57)	(4)	(27)	(26)	(29)	(28)	(18)	(7)	(2)	(1)	(15)	(12)	(2)	(0)
		41,375	47,963	41,134	40,612	38,933	43,904	44,333	50,809	.	.	36,674	38,500	.	

. Results not shown because data available for fewer than three facilities
Base: Respondents who provided relevant salary information

Table D-7c. Salaries of Regulated and Non-regulated Pharmacy Technicians, 2013/14

Starting salaries and top salaries from facilities where there is only one technician level			Bed Size			Teaching Status		Province							
		All	50-200	201-500	>500	Teaching	Non-Teaching	BC/ YT	AB/ NT	SK	MB	ON	QC	NB/ PE	NS/ NL
Regulated Pharmacy Technician - one level only	(n=)	(49)	(12)	(23)	(14)	(11)	(38)	(8)	(11)	(0)	(1)	(18)	(11)	(0)	(0)
	Start $	47,441	52,048	48,800	41,259	47,452	47,438	49,608	58,985		35,020	48,873	33,106		
	(n=)	(49)	(12)	(23)	(14)	(11)	(38)	(8)	(11)	(0)	(1)	(18)	(11)	(0)	(0)
	Top $	56,226	60,697	56,997	51,126	57,033	55,992	51,233	73,604		42,469	57,593	41,491		
Non-Regulated Pharmacy Technician - one level only	(n=)	(58)	(22)	(26)	(10)	(14)	(44)	(4)	(1)	(4)	(4)	(16)	(22)	(2)	(5)
	Start $	40,097	41,812	40,006	36,563	40,032	40,118	42,716	61,000	48,346	35,537	46,863	32,996	41,955	39,729
	(n=)	(58)	(21)	(27)	(10)	(14)	(44)	(4)	(0)	(4)	(4)	(16)	(23)	(2)	(5)
	Top $	46,182	45,999	46,522	45,649	47,175	45,866	43,966		50,796	43,206	55,362	40,180	45,370	45,200
Starting salaries and top salaries from facilities where there are two technician levels			**Bed Size**			**Teaching Status**		**Province**							
		All	50-200	201-500	>500	Teaching	Non-teaching	BC/ YT	AB/ NT	SK	MB	ON	QC	NB/ PE	NS/ NL
Regulated Pharmacy Technician - Level 1 / Staff	(n=)	(30)	(3)	(16)	(11)	(7)	(23)	(16)	(0)	(0)	(0)	(13)	(1)	(0)	(0)
	Start $	49,767	52,315	49,631	49,270	50,509	49,541	50,973				49,752			
	(n=)	(31)	(3)	(17)	(11)	(7)	(24)	(17)	(0)	(0)	(0)	(13)	(1)	(0)	(0)
	Top $	53,060	55,649	52,977	52,481	54,585	52,615	50,828				57,471			
Regulated Pharmacy Technician - Level 2 / Senior	(n=)	(30)	(3)	(16)	(11)	(7)	(23)	(16)	(0)	(0)	(0)	(13)	(1)	(0)	(0)
	Start $	52,978	53,707	53,904	51,432	53,897	52,698	53,261				54,345			
	(n=)	(31)	(3)	(17)	(11)	(7)	(24)	(17)	(0)	(0)	(0)	(13)	(1)	(0)	(0)
	Top $	57,995	58,405	59,173	56,064	61,180	57,067	54,787				63,845			
Non-Regulated Pharmacy Technician - Level 1 / Staff	(n=)	(21)	(3)	(11)	(7)	(7)	(14)	(1)	(0)	(3)	(0)	(4)	(4)	(7)	(2)
	Start $	41,380	45,366	38,142	44,760	44,022	40,059			44,453		50,859	31,686	39,513	
	(n=)	(22)	(3)	(12)	(7)	(7)	(15)	(2)	(0)	(3)	(0)	(4)	(4)	(7)	(2)
	Top $	47,070	52,632	41,976	53,419	50,880	45,292			53,560		59,695	36,951	42,107	
Non-Regulated Pharmacy Technician - Level 2 / Senior	(n=)	(20)	(3)	(10)	(7)	(7)	(13)	(1)	(0)	(3)	(0)	(4)	(3)	(7)	(2)
	Start $	45,402	50,286	40,884	49,762	48,733	43,608			55,348		54,216	32,183	41,579	
	(n=)	(22)	(3)	(12)	(7)	(7)	(15)	(2)	(0)	(3)	(0)	(4)	(4)	(7)	(2)
	Top $	50,667	57,928	44,807	57,601	55,196	48,554			61,951		64,253	38,527	45,038	

. Results not shown because data available for fewer than three facilities
Base: Respondents who provided relevant salary information

Table D-8. Distribution of Director Salary Ranges, 2013/14

	All	Bed Size			Teaching Status		Province							
		50-200	201-500	>500	Teaching	Non-teaching	BC/ YT	AB/ NT	SK	MB	ON	QC	NB/ PE	NS/ NL
(n=)	(158)	(42)	(71)	(45)	(35)	(123)	(25)	(12)	(7)	(13)	(41)	(43)	(8)	(9)
under $ 80,000	1%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	13%	0%
$ 90,000 - $ 99,999	5%	10%	4%	2%	6%	5%	4%	0%	0%	0%	0%	0%	50%	33%
$100 000 - $109 999	11%	19%	10%	4%	6%	12%	0%	0%	43%	0%	17%	7%	13%	33%
$110,000 - $119,999	13%	24%	11%	7%	0%	17%	16%	17%	29%	15%	12%	7%	25%	11%
$120,000 - $129,000	28%	12%	34%	33%	20%	30%	68%	17%	0%	38%	17%	30%	0%	0%
$130,000 - $139,000	19%	19%	17%	22%	20%	19%	4%	17%	0%	38%	22%	26%	0%	22%
$140,000 - $149,999	8%	5%	4%	18%	17%	6%	4%	17%	14%	8%	10%	9%	0%	0%
$150,000 - $159,999	6%	7%	6%	7%	11%	5%	0%	8%	0%	0%	12%	9%	0%	0%
$160,000 or more	9%	5%	13%	7%	20%	6%	4%	25%	14%	0%	10%	12%	0%	0%

Base: All respondents

Structured Practical Experiential Programs for Students

Questions about the experiential training programs that many pharmacy departments provide to students, known as Structured Practical Experiential Programs (SPEPs), were first asked in the 2009/10 Hospital Pharmacy in Canada Survey (see Chapter J, Current Topics, in the 2009/10 Hospital Pharmacy in Canada Report). In 2013/14, a similar set of questions was added to the Human Resources section of the survey to assess the status of these programs and their impact on the resources of hospital pharmacy departments.

In 2013/14, 93% (151/162) of hospitals participating in the Hospital Pharmacy in Canada Survey were actively involved in the provision of SPEP training. These results confirm that there is little opportunity to expand experiential training by increasing the number of hospitals that provide such training.

The majority of respondents reported providing SPEP training for students.

- Of the respondents who reported providing SPEP training, 99% (148/150) provided SPEP for undergraduate pharmacy students, 36% (45/126) for graduate pharmacist students, 52% (67/128) for

residents (Clinical Master's in QC) and 97% (145/149) for pharmacy technician students (Table D-9). As expected, higher percentages of teaching hospitals than non-teaching hospitals provided SPEP training for each category of student, and smaller proportions of hospitals with 50 to 200 beds provided SPEP training than was the case for larger hospitals.

- SPEP training for graduate pharmacy was higher in BC/YT (65%, 17/26), AB (45%, 5/11) and ON (41%, 12/29).
- SPEP training for hospital pharmacy residents and Clinical Master's students was reported to be provided by 47% (16/34) of QC respondents and 85% (22/26) of BC respondents.
- Among hospitals with SPEP training programs, 97% (145/149) reported provision of SPEP training for pharmacy technicians, with BC (100%, 26/26) and ON (97%, 37/38) reporting the highest percentages.

Table D-9. Structured Practical Experiential Programs, 2013/14

		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n=)	(162)	(44)	(74)	(44)	(35)	(127)
Facility provides experiential training for students	151	37	72	42	34	117
	93%	**84%**	**97%**	**95%**	**97%**	**92%**
Experiential training is provided for the following categories of students:						
(n=)	(150)	(36)	(72)	(42)	(34)	(116)
Undergraduate pharmacy students	148	35	71	42	34	114
	99%	**97%**	**99%**	**100%**	**100%**	**98%**
(n=)	(126)	(26)	(62)	(38)	(32)	(94)
Graduate Pharmacy Students	45	2	22	21	20	25
	36%	**8%**	**35%**	**55%**	**63%**	**27%**
(n=)	(128)	(26)	(62)	(40)	(34)	(94)
Pharmacy Residents (Clinical Masters in Quebec)	67	6	35	26	30	37
	52%	**23%**	**56%**	**65%**	**88%**	**39%**
(n=)	(149)	(35)	(72)	(42)	(34)	(115)
Pharmacy Technician Students	145	34	71	40	34	111
	97%	**97%**	**99%**	**95%**	**100%**	**97%**

Base: All respondents

Tables D-10 to D-13 describe the various models of SPEP training programs reported by respondents for students in undergraduate, graduate, resident or Clinical Master's, and technician programs.

For SPEP training of undergraduate pharmacy students (Table D-10), the following was reported:

- About half of respondents who provide undergraduate SPEP training (55%, 80/145) reported that they assigned only one student to each preceptor, while 42% (61/145) reported assigning more than one student per preceptor. Teaching hospitals (55%, 18/33) were more likely to assign multiple students per preceptor. In terms of geographic jurisdictions, most respondents in BC/YT (80%, 20/25) and SK (five of seven respondents) assigned multiple students to one preceptor. The other respondents in each region reported sometimes assigning more than one student to a given preceptor.
- The use of peer-assisted learning and mentoring, whereby senior pharmacy students participate in training junior students, was reported by 37% (54/145) of respondents. Teaching hospitals (70%, 23/33) and respondents in BC/YT (64%, 16/25) most frequently reported using this model.
- The participation of pharmacy faculty members as preceptors for undergraduate pharmacy students in SPEP training programs was reported by 16% (23/145) of respondents, while 18% (26/145) utilized preceptors from other disciplines for undergraduate students.

Residents and graduate students were the students most viewed as an asset to providing patient care.

- Most respondents reported that pharmacy students were directly involved in providing complex care (73%, 106/145), and 61% (89/145) viewed students as an asset in the delivery of pharmacy services.
- Just over one-third of respondents (38%, 55/145) reported that their current model of providing SPEP was easily managed, and just below one-third (30%, 44/145) could accommodate more students using the existing model.

For graduate students (Table D-11), residents or Clinical Master's students (Table D-12) and pharmacy technician students (Table D-13), the models used were generally consistent with the models used for SPEP training of undergraduate students, with a few notable differences:

- For graduate pharmacy students, the frequency of peer-assisted learning (50%, 20/40), use of university faculty preceptors (43%, 17/40), use of preceptors from other disciplines (45%, 18/40) and students being an asset to delivery of care (78%, 31/40) was higher than for undergraduate students, as reported by respondents providing graduate SPEP training . Nearly half of these respondents (45%, 18/40) reported being able to accommodate more graduate students. The relatively greater level of maturity and experience of graduate students is likely the primary reason for these differences.

Table D-10. Features of Structured Practical Experiential Programs (SPEPs) for Undergraduate Pharmacy Students, 2013/14

		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n=)	(145)	(34)	(70)	(41)	(33)	(112)
(1) Only one student at a time is assigned to each preceptor	80	21	39	20	15	65
	55%	62%	56%	49%	45%	58%
(2) More than one student at a time are sometimes assigned to each preceptor	61	12	30	19	18	43
	42%	35%	43%	46%	55%	38%
(3) Only one preceptor at a time is assigned to each student	41	8	20	13	10	31
	28%	24%	29%	32%	30%	28%
(4) More than one preceptor at a time are sometimes assigned to each student	93	24	42	27	21	72
	64%	71%	60%	66%	64%	64%
(5) Peer assisted learning and mentoring is utilized (senior students train junior students)	54	8	25	21	23	31
	37%	24%	36%	51%	70%	28%
(6) University or technician college faculty members sometimes serve as preceptors for these students	23	2	9	12	7	16
	16%	6%	13%	29%	21%	14%
(7) Preceptors from other disciplines sometimes serve as preceptors for these students	26	7	12	7	2	24
	18%	21%	17%	17%	6%	21%
(8) More pharmacy students, or longer periods of experiential training, could be accommodated	30	4	16	10	7	23
	21%	12%	23%	24%	21%	21%
(9) Pharmacy students are directly involved in delivering progressively more complex / comprehensive care	106	21	49	36	27	79
	73%	62%	70%	88%	82%	71%
(10) Pharmacy students are viewed as an asset supporting the delivery of pharmacy services	89	17	44	28	16	73
	61%	50%	63%	68%	48%	65%
(11) The current model of providing structured experiential training is easily managed	55	13	28	14	10	45
	38%	38%	40%	34%	30%	40%
(12) More students could be accommodated using our existing experiential training model	44	7	24	13	7	37
	30%	21%	34%	32%	21%	33%

Base: Facilities providing experiental training for undergraduate pharmacy students __Note: multiple mentions permissible

Table D-11. Features of Structured Practical Experiential Programs (SPEPs) for Graduate Pharmacy Students, 2013/14

		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n=)	(40)	(2)	(18)	(20)	(19)	(21)
(1) Only one student at a time is assigned to each preceptor	19	0	7	12	13	6
	48%	0%	39%	60%	68%	29%
(2) More than one student at a time are sometimes assigned to each preceptor	20	2	11	7	5	15
	50%	100%	61%	35%	26%	71%
(3) Only one preceptor at a time is assigned to each student	16	0	4	12	10	6
	40%	0%	22%	60%	53%	29%
(4) More than one preceptor at a time are sometimes assigned to each student	20	2	11	7	5	15
	50%	100%	61%	35%	26%	71%
(5) Peer assisted learning and mentoring is utilized (senior students train junior students)	20	2	11	7	5	15
	50%	100%	61%	35%	26%	71%
(6) University or technician college faculty members sometimes serve as preceptors for these students	17	2	8	7	3	14
	43%	100%	44%	35%	16%	67%
(7) Preceptors from other disciplines sometimes serve as preceptors for these students.	18	2	9	7	5	13
	45%	100%	50%	35%	26%	62%
(8) More pharmacy students, or longer periods of experiential training, could be accommodated	3	0	2	1	2	1
	8%	0%	11%	5%	11%	5%
(9) Pharmacy students are directly involved in delivering progressively more complex / comprehensive care	34	2	15	17	15	19
	85%	100%	83%	85%	79%	90%
(10) Pharmacy students are viewed as an asset supporting the delivery of pharmacy services	31	2	15	14	12	19
	78%	100%	83%	70%	63%	90%
(11) The current model of providing structured experiential training is easily managed	8	0	4	4	4	4
	20%	0%	22%	20%	21%	19%
(12) More students could be accommodated using our existing experiential training model	18	2	10	6	4	14
	45%	100%	56%	30%	21%	67%

Base: Facilities providing experiental training for graduate pharmacy students __Note: multiple mentions permissible

Table D-12. Features of Structured Practical Experiential Programs (SPEPs) for Pharmacy Residents and Clinical Master's Students, 2013/14

	All	Bed Size			Teaching Status	
		50-200	201-500	>500	Teaching	Non-teaching
(n=)	64	6	33	25	29	35
(1) Only one student at a time is assigned to each preceptor	24	3	13	8	11	13
	38%	50%	39%	32%	38%	37%
(2) More than one student at a time are sometimes assigned to each preceptor	40	3	20	17	18	22
	63%	50%	61%	68%	62%	63%
(3) Only one preceptor at a time is assigned to each student	18	1	9	8	9	9
	28%	17%	27%	32%	31%	26%
(4) More than one preceptor at a time are sometimes assigned to each student	40	5	21	14	14	26
	63%	83%	64%	56%	48%	74%
(5) Peer assisted learning and mentoring is utilized (senior students train junior students)	36	3	15	18	19	17
	56%	50%	45%	72%	66%	49%
(6) University or technician college faculty members sometimes serve as preceptors for these students	21	2	9	10	7	14
	33%	33%	27%	40%	24%	40%
(7) Preceptors from other disciplines sometimes serve as preceptors for these students.	24	2	13	9	6	18
	38%	33%	39%	36%	21%	51%
(8) More pharmacy students, or longer periods of experiential training, could be accommodated	23	3	11	9	7	16
	36%	50%	33%	36%	24%	46%
(9) Pharmacy students are directly involved in delivering progressively more complex / comprehensive care	57	5	29	23	25	32
	89%	83%	88%	92%	86%	91%
(10) Pharmacy students are viewed as an asset supporting the delivery of pharmacy services	55	4	30	21	22	33
	86%	67%	91%	84%	76%	94%
(11) The current model of providing structured experiential training is easily managed	24	3	12	9	12	12
	38%	50%	36%	36%	41%	34%
(12) More students could be accommodated using our existing experiential training model	25	3	14	8	6	19
	39%	50%	42%	32%	21%	54%

Base: Facilities providing experiental training for pharmacy residents __Note: multiple mentions permissible

Table D-13. Features of Structured Practical Experiential Programs (SPEPs) for Pharmacy Technician Students, 2013/14

	All	Bed Size			Teaching Status	
		50-200	201-500	>500	Teaching	Non-teaching
(n=)	(137)	(31)	(67)	(39)	(33)	(104)
(1) Only one student at a time is assigned to each preceptor	97	21	51	25	19	78
	71%	68%	76%	64%	58%	75%
(2) More than one student at a time are sometimes assigned to each preceptor	32	7	13	12	13	19
	23%	23%	19%	31%	39%	18%
(3) Only one preceptor at a time is assigned to each student	56	13	30	13	12	44
	41%	42%	45%	33%	36%	42%
(4) More than one preceptor at a time are sometimes assigned to each student	67	16	30	21	16	51
	49%	52%	45%	54%	48%	49%
(5) Peer assisted learning and mentoring is utilized (senior students train junior students)	26	2	13	11	7	19
	19%	6%	19%	28%	21%	18%
(6) University or technician college faculty members sometimes serve as preceptors for these students	8	0	4	4	3	5
	6%	0%	6%	10%	9%	5%
(7) Preceptors from other disciplines sometimes serve as preceptors for these students.	1	1	0	0	0	1
	1%	3%	0%	0%	0%	1%
(8) More pharmacy students, or longer periods of experiential training, could be accommodated	39	8	20	11	9	30
	28%	26%	30%	28%	27%	29%
(9) Pharmacy students are directly involved in delivering progressively more complex / comprehensive care	25	8	8	9	5	20
	18%	26%	12%	23%	15%	19%
(10) Pharmacy students are viewed as an asset supporting the delivery of pharmacy services	63	12	33	18	14	49
	46%	39%	49%	46%	42%	47%
(11) The current model of providing structured experiential training is easily managed	44	12	23	9	9	35
	32%	39%	34%	23%	27%	34%
(12) More students could be accommodated using our existing experiential training model	36	6	22	8	7	29
	26%	19%	33%	21%	21%	28%

Base: Facilities providing experiental training for pharmacy technician students __Note: multiple mentions permissible

- The findings were similar for residents and Clinical Master's students, with the frequency of peer-assisted learning (56%, 36/64), use of university faculty preceptors (33%, 21/64), use of preceptors from other disciplines (38%, 24/64) and student involvement in the provision of care (89%, 55/64) all higher than for undergraduate students; 39% (25/64) of these respondents reported being able to accommodate more graduate students.

- For pharmacy technician students, the frequency of SPEP models with only one student per preceptor was much higher (71%, 97/137). Peer-assisted learning and mentoring was used by only 19% (26/137) of respondents, and only 6% (8/137) reported receiving assistance from pharmacy technician colleges. These findings were not unexpected, considering that many college training programs for pharmacy technicians are relatively new.

- Only 18% (25/137) of respondents reported that pharmacy technician students were actively involved in the provision of care, and 46% (63/137) considered this group of students to be an asset in supporting the delivery of pharmacy services. These percentages can be expected to increase as technician training becomes more commonplace.

The final SPEP-related question asked respondents to rate potential enablers to allow accommodation of greater numbers of students (Table D-14):

- The following enablers were rated either very or extremely helpful: academic appointments for preceptors (51%, 75/147) and having coordinators or supervisors from faculties and colleges present at the hospital (53%, 78/146).

- Most other potential enablers were deemed helpful, but to a lesser degree.

Table D-14. Enablers to Accommodate Additional SPEP Students, 2013/14

	(n=)	not helpful	somewhat helpful	very helpful	extremely helpful
(a) New or expanded preceptor training programs	(148)	31	47	57	13
		21%	**32%**	**39%**	**9%**
(b) More flexibility in timing or scheduling of rotations	(147)	24	76	37	10
		16%	**52%**	**25%**	**7%**
(c) Adequate space and equipment to facilitate experiential education	(148)	69	49	21	9
		47%	**33%**	**14%**	**6%**
(d) Simplified evaluation forms and processes	(146)	51	67	24	4
		35%	**46%**	**16%**	**3%**
(e) Better prepared students	(147)	55	64	25	3
		37%	**44%**	**17%**	**2%**
(f) Academic appointments for preceptors	(147)	22	50	53	22
		15%	**34%**	**36%**	**15%**
(g) Rotation coordinators / supervisors from the faculties /colleges regularly present at your facility	(146)	18	50	57	21
		12%	**34%**	**39%**	**14%**
(h) Dedicated university / technical college faculty assisting with precepting students	(147)	45	50	30	22
		31%	**34%**	**20%**	**15%**
(i) Funding to provide backfill for preceptors who are providing experiential education	(147)	98	31	16	2
		67%	**21%**	**11%**	**1%**
(j) No pharmacist or technician vacancies in areas where students are being precepted	(149)	82	47	17	3
		55%	**32%**	**11%**	**2%**
(k) Students assigned to your hospital spending the first week together as a group and learn standardized process skills	(146)	40	71	27	8
		27%	**49%**	**18%**	**5%**
(l) Students in the experiential training component of their pharmacy program attending most of their experiential rotations at your hospital	(145)	34	58	48	5
		23%	**40%**	**33%**	**3%**
(m) Availability of a list of patient care activities which pharmacy students could carry out with minimal supervision at different stages of their education	(147)	29	63	48	7
		20%	**43%**	**33%**	**5%**
(n) Students being active participants in the delivery of essential patient care services at your hospital	(145)	28	68	28	21
		19%	**47%**	**19%**	**14%**

Base: Respondents providing SPEP training

Summary

This year's report indicates that pharmacist vacancy rates have decreased after a period of stability, as reported in the last two Hospital Pharmacy in Canada Reports (2011/12 and 2009/10). At the same time, the vacancy rates for pharmacy technicians are starting to rise in certain provinces. Overall, staff composition has remained relatively unchanged since the 2011/12 report. There continues to be considerable variability among provinces in terms of the percentage of staff classified as "advanced practice pharmacists". The age mix of the workforce, which we have reported for the first time, seems well balanced across age groups and across job titles. Part-time positions constitute a reality that is widespread among pharmacists and technicians, possibly because the workforce is largely female. Part-time positions seem more prevalent in provinces with a younger age mix.

As expected, with the increased supply of pharmacists and most provinces adopting regulations for technicians, the proportion of time that pharmacists spend on clinical activities continues to increase. It will be interesting to observe where these trends lead in the 2015/16 Hospital Pharmacy in Canada Survey and Report.

[1] Pharmacy in Canada: pharmacists' expanded scope of practice. Ottawa (ON): Canadian Pharmacists Association; 2014 Dec [cited 2015 Jan 8]. Available from: www.pharmacists.ca/index.cfm/pharmacy-in-canada/scope-of-practice-canada/

[2] Management Committee. Moving forward: pharmacy human resources for the future. Final report. Ottawa (ON): Canadian Pharmacists Association; 2008.

[3] Pharmacists in Canada, 2011—national and jurisdictional highlights. Ottawa (ON): Canadian Institute for Health Information; 2012 [cited 2012 Nov 25]. Available from: www.cihi.ca/CIHI-ext-portal/pdf/internet/PHARM_2011_HIGHLIGHTS_PROF_EN

[4] 2013 ASHP pharmacy staffing survey results. Bethesda (MD): American Society of Health-System Pharmacists; [cited 2015 Jan 4]. Available from: www.ashp.org/DocLibrary/MemberCenter/SPPM/2013-ASHP-Staffing-Survey.pdf

E - CSHP 2015

Carolyn Bornstein

CSHP 2015 is a quality initiative of the Canadian Society of Hospital Pharmacists (CSHP) that describes a preferred vision for pharmacy practice in the Canadian hospital setting by the year 2015. CSHP 2015 has six goals and 36 objectives with measurable targets for achieving pharmacy practice excellence. By achieving those goals and objectives, hospital pharmacy can significantly enhance its contribution to the safe, effective and evidence-based use of medications and to the overall health of the public. To view the CSHP 2015 documents and other related information, see www.cshp.ca/cshp2015/index_e.asp.

The results of the 2013/14 Hospital Pharmacy in Canada Survey provide the basis for this final report on the progress of Canadian hospitals and pharmacy departments in achieving CSHP 2015 targets since the initiative was launched in 2007. Results are compared with the baseline and progress data that were presented in the 2007/08, 2009/10 and 2011/12 reports. Please note that some of the CSHP 2015 objectives were revised after the 2007/08 report, and baseline data for these objectives therefore appear in the 2009/10 report. For reporting purposes, the Atlantic provinces comprise New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE) and Newfoundland and Labrador (NL), and the Prairie provinces comprise Alberta (AB), Saskatchewan (SK), Manitoba (MB) and the Northwest Territories (NT).

Goal 1: Increase the extent to which pharmacists in hospitals and related healthcare settings help individual hospital inpatients achieve the best use of medications.

Objective 1.1: In 100% of hospitals and related healthcare settings, pharmacists will ensure that medication reconciliation occurs during transitions across the continuum of care (admission, transfer and discharge).

- Medication reconciliation upon hospital admission (92%, 147/160 of respondents) was reported more frequently than medication reconciliation upon transfer between levels of care (56%, 90/160) or upon discharge (73%, 116/160) (Table E-1). Medication reconciliation activity increased notably over the 2009/10 baseline values of 69% (108/157), 41% (64/156) and 36% (56/157) for admission, transfer and discharge, respectively. Medication reconciliation at discharge (73% of respondents) had the largest increase since 2011/12 (44%) and since baseline (36%), with a total increase of 37 percentage points from baseline. This activity is within reach of the CSHP 2015 target of 100%.

- Medication reconciliation upon admission was reported by 100% of teaching hospitals (34/34) and by 100% of facilities in the Prairies (32/32), Ontario (ON) (40/40) and the Atlantic provinces (18/18). Percentages were slightly lower for hospitals of 50 to 200 beds (98%, 42/43) and non-teaching hospitals (90%, 113/126).

- Medication reconciliation upon transfer between levels of care was highest among teaching hospitals (68%, 23/34), among hospitals with 50 to 200 beds (60%, 26/43) and in ON (80%, 32/40).

- For medication reconciliation upon discharge, the highest percentage occurred among teaching hospitals and in ON (88%, 30/34 and 35/40, respectively), followed by hospitals with more than 500 beds (80%, 36/45).

- Regionally, the highest levels of medication reconciliation activity were reported in ON (as detailed above). Despite notable increases in activity since the 2009/10 report, British Columbia/Yukon (BC/YT) had the lowest rates for medication reconciliation on admission (70%, 19/27), on transfer (26%, 7/27) and on discharge (52%, 14/27). The Atlantic provinces showed the most progress in all three areas since 2011/12 (on admission: 100%, 18/18 vs. 83%, 15/18; on transfer: 56%, 10/18 vs. 22%, 4/18; and on discharge: 67%, 12/18 vs. 44%, 8/18).

Medication reconciliation at admission and discharge were very close to 100%, but medication reconciliation upon transfer was still far from the CSHP 2015 target.

Objective 1.2: The medication therapy of 100% of hospital inpatients with complex and high-risk medication regimens will be monitored by a pharmacist.

- Only 7% (12/162) of respondents reported that pharmacists monitored the medication therapy of 100% of inpatients with complex and high-risk medication regimens. This is disappointingly short of the goal of pharmacists at all institutions providing this service to 100% of the targeted population. However, the percentage of respondents reporting that this service was provided to 50% or more of inpatients with complex and high-risk medication regimens was 62% (100/162), up from 55% (93/168) in 2011/12 and the baseline of 47% (74/156) in 2007/08. This progress is encouraging but falls far short of the target. When results for monitoring 50% or more of inpatients were compared by hospital size, the percentage was higher among hospitals of 50 to 200 beds (70%, 30/43) than among hospitals with more than 500 beds (51%, 23/45). Teaching hospitals (80%, 28/35) performed better than non-teaching hospitals (57%, 72/127). The highest response for providing this service to 50% or more of inpatients was from ON (80%, 33/41), and the lowest was from Quebec (QC) (33%, 14/43).

Objective 1.3: In 90% of hospitals, pharmacists manage medication therapy for inpatients with complex and high-risk medication regimens in collaboration with other members of the healthcare team.

- In 2013/14, 88% (142/162) of respondents reported that pharmacists were managing medication therapy for inpatients with complex and high-risk medication regimens in collaboration with other members of the healthcare team. This is very close to the target of having 90% or more of hospitals provide this service and not much different from the 2009/10 baseline (87%, 136/157). This type of collaboration was reported by 100% of teaching hospitals (35/35) and by 100% of respondents in BC/YT (27/27) and the Atlantic provinces (18/18). The lowest response rate was from QC (63%, 27/43).

In 88% of hospitals, pharmacists were involved in the medication management of inpatients with high-risk medication regimens. However, monitoring medication therapy of 100% of these patients occurred in less than 10% of those same hospitals.

Objective 1.4: 75% of hospital inpatients discharged with complex and high-risk medication regimens will receive medication counselling managed by a pharmacist.

- Only 2% (4/162) of respondents indicated that they provided discharge counselling managed by a pharmacist to 75% or more of inpatients with complex and high-risk medication regimens. This value is below the baseline of 3% (4/155) in 2007/08. Among hospitals with 50 to 200 beds, those with more than 500 beds, teaching hospitals and facilities in the Prairies and the Atlantic provinces, no respondents (0%) reported providing this service to 75% to 100% of patients. Eighty-five percent (137/162) of all respondents reported providing this service to less than 50% of their inpatients. With the increase in medication reconciliation at discharge in 2013/14 (see data for Objective 1.1), it is surprising that pharmacists are not using this opportunity to provide medication education.

Although 73% of respondents reported that medication reconciliation was performed at discharge, only 2% reported that a pharmacist provided medication counselling at discharge for inpatients with complex and high-risk regimens.

Objective 1.5: 50% of recently hospitalized patients or their caregivers (family members for example) will recall speaking with a pharmacist while in the hospital.

- Of the 77% (124/162) of respondents who reported conducting client satisfaction surveys, only 23% (28/124) reported that their surveys included a question about speaking to a pharmacist while in hospital. Furthermore, only 4% (1/28) of those respondents met the CSHP 2015 target of having 50% (or more) of recently hospitalized patients or their caregivers (family members, for example) recall speaking with a pharmacist while in the hospital. This is well below the baseline of 11% (6/53) in 2007/08. If more hospital surveys were to ask patients about their interactions with pharmacists, would the rate of recall be higher?

Compared with baseline results in 2007/08 and 2009/10, there was noticeable progress with medication reconciliation at all three transitions of care, particularly admission and discharge. These increases were most likely motivated by Accreditation Canada's introduction of a Required Organizational Practice for medication reconciliation, which occurred after the launch of CSHP 2015. Although 88% of respondents reported that pharmacists were collaboratively managing the medication therapy of inpatients with complex and high-risk medication regimens, only 7% reported that pharmacists were monitoring 100% of these inpatients. Despite the increase in medication reconciliation at discharge, most patients were not receiving discharge counselling by a pharmacist. A recent CSHP online survey of pharmacy directors and managers in Canada resulted in an overwhelming request for support from the Society for all of the Goal 1 objectives (see top 10 high-priority

objectives as listed in the CSHP's survey report[1]). Consequently, the CSHP 2015 website was redesigned in 2013 to provide "Resources to Support the Most Requested CSHP 2015 Objectives" (www.cshp.ca/cshp2015/resources/objective/index_e.asp), in addition to an "Ask the Expert" section (www.cshp.ca/cshp2015/resources/ask/index_e.asp).

For CSHP 2015 Goal 1, the targets of two objectives (Objectives 1.1 and 1.3) are within reach. However, discharge counselling and monitoring the therapy of 100% of inpatients with complex and high-risk medication regimens were being provided by very few respondents, with little or no change from baseline. What is keeping pharmacists from monitoring the therapy they are managing? Is the length of stay too short? If pharmacists were held accountable for their recommendations for medication therapy management, would they be more diligent in monitoring the outcomes of their recommendations? If pharmacists are already providing medication reconciliation at discharge, would this not be the ideal opportunity to educate patients about their medications and increase the chance that patients will recall their interactions with a pharmacist? Increasing one type of interaction may increase the level of achievement for others. Pharmacists must interact with patients to educate them and to ensure safe, effective medication use.

Table E-1. Results for Goal 1, 2013/14

Goal 1: Increase the extent to which pharmacists **help individual hospital inpatients achieve the best use of medications.**

CSHP 2015 Objective			CSHP 2015 Target	% Achievement 2014	% Achievement 2012	% Achievement 2010	% Achievement 2008	2013/14 Hospital Pharmacy in Canada Responses							
								(n=)	yes						no
1.1		In 100% of hospitals and related healthcare settings, pharmacists will ensure that medication reconciliation occurs during transitions across the continuum of care (admission, transfer and discharge).													
		Admission	100%	92%	85%	69%	n/a	(160)	92%						8%
		Transfer	100%	56%	47%	41%	n/a	(160)	56%						44%
		Discharge	100%	73%	44%	36%	n/a	(160)	73%						27%
1.2		The medication therapy of 100% of hospital inpatients with complex and high-risk medication regimens will be monitored by a pharmacist.	100%	7%	10%	5%	≤18%*	(162)		100%	75-99%	50-74%	25-49%	0-24%	
										7%	29%	25%	18%	20%	
1.3		In 90% of hospitals, pharmacists manage medication therapy for inpatients with complex and high-risk medication regimens in collaboration with other members of the healthcare team.	90%	88%	85%	87%	n/a	(162)	88%						12%
1.4		75% of hospital inpatients discharged with complex and high-risk medication regimens will receive medication counselling managed by a pharmacist.	75%	2%	2%	2%	3%	(162)		75-100%		50-74%	25-49%	0-24%	
										2%		13%	22%	62%	
1.5		50% of recently hospitalized patients or their caregivers (family members for example) will recall speaking with a pharmacist while in the hospital.	50%	4%	6%	0%	11%	(28)		50-100%			25-49%	0-24%	
										4%			14%	82%	

* This value represents responses for 75 to 100% of patients in 2007/08

Objective are coded as follows: Target reached or within 15% | 16-30% from target | Far from target

Goal 2: Increase the extent to which pharmacists help individual non-hospitalized patients achieve the best use of medications.

Objective 2.1: In 70% of ambulatory and specialized care clinics providing clinic care, pharmacists will manage medication therapy for clinic patients with complex and high-risk medication regimens, in collaboration with other members of the healthcare team.

- Eighty-five percent (137/162) of respondents reported that their facilities had ambulatory and specialized clinics with pharmacist involvement. This is a small increase from the baseline of 78% (125/161) in 2007/08. The responses were highest among hospitals with more than 500 beds (100%, 45/45), among teaching hospitals (97%, 34/35) and in QC (98%, 42/43) and were lowest in BC/YT (70%, 19/27) and the Prairies (70%, 23/33). Of respondents who reported pharmacist involvement in ambulatory clinics, only 15% (20/137) indicated that pharmacists were managing medication therapy for patients with complex and high-risk medication regimens in 70% or more of these clinics (Table E-2). This value is not much different

from the baseline of 11% (14/133) in 2009/10. The percentage of respondents who reported achieving the 70% target was highest among hospitals of 201 to 500 beds (21%, 13/61), non-teaching hospitals (17%, 18/103) and hospitals from the Prairies (26%, 6/23). These results are very similar to those for 2011/12. Eighty-two percent (14/17) of respondents in the Atlantic provinces and 78% (28/36) of those in ON reported that a pharmacist was managing therapy in under 25% of their ambulatory clinics.

Objective 2.2: In 95% of ambulatory and specialized care clinics, pharmacists will counsel clinic patients with complex and high-risk medication regimens.

- Only 13% (18/137) of respondents met this target in 2013/14, similar to the 2009/10 baseline of 12% (16/134). (The 2007/08 baseline data referred to 75%–100% achievement of the objective, rather than the 95% target used for subsequent surveys.) When the threshold was adjusted to include those respondents who provided this service in 50% or more of their ambulatory care clinics, the response rate increased to 28% (39/137), including 38% (23/60) of respondents from hospitals with 201 to 500 beds. QC respondents (41%, 17/41) were more likely than respondents from other regions to report providing this service to 50% or more of their clinics.

Objective 2.3: In 85% of home care services, pharmacists will manage medication therapy for patients with complex and high-risk medication regimens, in collaboration with other members of the healthcare team.

- Forty-nine percent (79/162) of respondents indicated that their hospitals provided home care services, and in 73% (58/79) of these institutions, a pharmacist was involved with the provision of home care. Of these, 59% (34/58) indicated that pharmacists were managing medication therapy for home care patients with complex and high-risk regimens, in collaboration with other members of the healthcare team. This result represents an increase from the baseline in 2009/10 (48%, 19/40) but was unchanged from 2011/12 (59%, 34/58). The provision of this service was highest among teaching hospitals (88%, 7/8) and in BC/YT (86%, 12/14) and was lower among hospitals with 201 to 500 beds (52%, 11/21) and in the Atlantic provinces (30%, 3/10).

A pharmacist was involved with 73% of home care programs provided by hospitals. Almost 60% of those pharmacists were managing medication therapy in collaboration with other members of the healthcare team.

Table E-2. Results for Goal 2, 2013/14

Goal 2: Increase the extent to which pharmacists **help individual non-hospitalized patients achieve the best use of medications.**

CSHP 2015 Objective			CSHP 2015 Target	% Achievement 2014	% Achievement 2012	% Achievement 2010	% Achievement 2008	2013/14 Hospital Pharmacy in Canada Responses						
								(n=)	yes	70-100%	50-69%	25-49%	0-24%	no
2.1		In 70% of ambulatory and specialized care clinics providing clinic care, pharmacists will manage medication therapy for clinic patients with complex and high-risk medication regimens, in collaboration with other members of the healthcare team.	70%	15%	17%	11%		137		15%	9%	15%	61%	
2.2		In 95% of ambulatory and specialized care clinics, pharmacists will counsel clinic patients with complex and high-risk medication regimens.	95%	13%	12%	12%	≤41%*	137		13%	15%	15%	56%	
2.3		In 85% of home care services, pharmacists will manage medication therapy for patients with complex and high-risk medication regimens, in collaboration with other members of the healthcare team.	85%	59%	59%	48%		58	59%					41%

** This value represents responses for 75 to 100% of clinics with pharmacists counselling patients in 2007/08*

Objective are coded as follows: Target reached or within 15% | 16-30% from target | Far from target

Since the 2007/08 report, the percentage of respondents with ambulatory and specialized clinics having pharmacist involvement increased from 78% to 85%. Despite this increase, the extent of the pharmacist's role in managing medication therapy in these clinics and the provision of medication counselling to clinic patients by a pharmacist has changed little from the 2009/10 baseline. Yet if pharmacists are not involved in medication management or medication counselling in these clinics, what is their role? Will recent and future legislative changes to expand the scope of pharmacists' practice change their role in managing medication therapy for this patient

population? For two of the three CSHP 2015 Goal 2 objectives, the targets have not been realized, with progress to date falling far short of these benchmarks. However, as the role of the pharmacist expands, there is reason for optimism about the future potential for pharmacists' contribution in this practice setting, as well as for medication management in the home care services setting.

Goal 3: Increase the extent to which hospital and related healthcare setting pharmacists actively apply evidence-based methods to the improvement of medication therapy.

Objective 3.1: In 100% of hospitals and related healthcare settings, pharmacists will be actively involved in providing care to individual patients that is based on evidence, such as the use of quality drug information resources, published clinical studies or guidelines, and expert consensus advice.

- Ninety-six percent (155/162) of respondents reported that pharmacists were actively involved in providing evidence-based care (Table E-3). The 100% target was achieved for teaching hospitals (35/35) and in BC/YT (27/27), and achievement was 98% (44/45) among hospitals with more than 500 beds. These results reflect an increase from the baseline of 81% (130/161) in the 2007/08 report. This target is within reach!

Objective 3.2: In 100% of hospitals and related healthcare settings, pharmacists will be actively involved in the development and implementation of evidence-based drug therapy protocols and/or order sets.

- Ninety-five percent (154/162) of respondents reported pharmacists' involvement in this activity, well above the 2009/10 baseline of 85% (133/157) although unchanged from 2011/12 (95%, 159/167). Teaching hospitals (35/35) and facilities in ON (41/41) and the Atlantic provinces (18/18) have already achieved the target of 100%, and—with the exception of the Prairies (85%, 28/33)—all other percentages across bed sizes and regions were 93% or higher! The CSHP 2015 target of 100% is within reach.

Evidence-based patient care and drug therapy protocols and/or order sets appear to be the standard for most pharmacy departments in Canada.

Objective 3.3: 90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive angiotensin-converting enzyme inhibitors or angiotensin receptor blockers at discharge.

Objective 3.4: 90% of hospital pharmacies will participate in ensuring that patients hospitalized for congestive heart failure will receive angiotensin-converting enzyme inhibitors or angiotensin receptor blockers at discharge.

Objective 3.5: 90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive beta-blockers at discharge.

Objective 3.6: 90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive [acetylsalicylic acid] at discharge.

Objective 3.7: 90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive lipid-lowering therapy at discharge.

- A total of 161 respondents had patient populations that included adults with acute myocardial infarction (MI) and/or congestive heart failure (CHF). At many of these institutions, pharmacists were involved in ensuring that patients hospitalized for acute MI received appropriate medication therapy on discharge: an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker (63%, 99/156), a beta-blocker (61%, 95/155), acetylsalicylic acid (63%, 98/156) and lipid-lowering therapy (62%, 97/156). Similarly, 63% (98/156) of respondents indicated that pharmacists actively participated in ensuring that patients with CHF received either an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker. Pharmacists' participation in these activities was higher among teaching hospitals (91% to 94%) than among non-teaching hospitals (53% to 55%). On a regional basis, pharmacist involvement was highest in ON (76% to

The level of pharmacist involvement in ensuring that patients with myocardial infarction receive appropriate, evidence-based therapy on discharge is up slightly from baseline and closer to the target of 90% of patients.

78%), followed closely by the Prairies (72% to 76%), and lowest in QC (40% to 43%). These results are not much higher than the baselines reported for 2009/10, although they are closer to the target of 90%.

Objective 3.8: In 90% of hospitals and related healthcare settings providing clinic care, pharmacists will participate in ensuring that non-hospitalized patients who are receiving medications to decrease blood glucose levels will be assessed at least annually with a HbA1c test.

- The percentage of respondents who reported that their facilities provided outpatient care to patients with diabetes (64%, 104/162) has remained unchanged since 2007/08 (64%, 107/166). However, the percentage of respondents who reported the presence of a pharmacist in the diabetes clinic dropped from 56% (67/119) in 2011/12 to only 48% (50/104) in 2013/14. Among those respondents, 70% (35/50) indicated that it was not current practice for pharmacists to ensure that patients with diabetes undergo HbA1C testing at least annually. This activity was highest among teaching hospitals (57%, 8/14) and in ON (50%, 6/12) and was less likely in hospitals of 50 to 200 beds (17%, 1/6), in non-teaching hospitals (19%, 7/36) and in BC/YT (14%, 1/7). The CSHP 2015 target is not within reach for this practice setting.

Table E-3. Results for Goal 3, 2013/14

Goal 3: Increase the extent to which hospital and related healthcare setting pharmacists **actively apply evidence-based methods to the improvement of medication therapy**.

	CSHP 2015 Objective	CSHP 2015 Target	% Achievement 2014	% Achievement 2012	% Achievement 2010	% Achievement 2008	2013/14 Hospital Pharmacy in Canada Responses		
							(n=)	yes	no
3.1	In 100% of hospitals and related healthcare settings, pharmacists will be actively involved in providing care to individual patients that is based on evidence, such as the use of quality drug information resources, published clinical studies or guidelines, and expert consensus advice.	**100%**	**96%**	94%	90%	n/a	*(162)*	**96%**	**4%**
3.2	In 100% of hospitals and related healthcare settings, pharmacists will be actively involved in the development and implementation of evidence-based drug therapy protocols and/or order sets.	**100%**	**95%**	95%	85%	n/a	*(162)*	**95%**	**5%**
3.3	90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive angiotensin-converting enzyme inhibitors or angiotensin receptor blockers at discharge.	**90%**	**63%**	58%	59%	53%	*(156)*	**63%**	**37%**
3.4	90% of hospital pharmacies will participate in ensuring that patients hospitalized for congestive heart failure will receive angiotensin-converting enzyme inhibitors or angiotensin receptor blockers at discharge.	**90%**	**63%**	56%	54%	50%	*(156)*	**63%**	**37%**
3.5	90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive beta-blockers at discharge.	**90%**	**61%**	59%	59%	52%	*(155)*	**61%**	**39%**
3.6	90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive aspirin at discharge.	**90%**	**63%**	58%	59%	52%	*(156)*	**63%**	**37%**
3.7	90% of hospital pharmacies will participate in ensuring that patients hospitalized for an acute myocardial infarction will receive lipid-lowering therapy at discharge.	**90%**	**62%**	58%	59%	51%	*(156)*	**62%**	**38%**
3.8	In 90% of hospitals and related healthcare settings providing clinic care, pharmacists will participate in ensuring that non-hospitalized patients who are receiving medications to decrease blood glucose levels will be assessed at least annually with a HbA1c test.	**90%**	**30%**	34%	28%	23%	*(50)*	**30%**	**70%**
3.9	In 70% of hospitals and related healthcare settings, pharmacists will be actively involved in medication- and vaccination-related infection control programs.	**70%**	**31%**	33%	45%	n/a	*(162)*	**31%**	**69%**

Objective are coded as follows: **Target reached or within 15%** **16-30% from target** **Far from target**

Objective 3.9: In 70% of hospitals and related healthcare settings, pharmacists will be actively involved in medication- and vaccination-related infection control programs.

- Seventy-eight percent (126/162) of respondents indicated that their pharmacists were actively involved in medication-related infection control programs, an increase from 68% (114/168) in 2011/12. However, only 33% (52/157) of respondents reported active involvement of pharmacists in vaccination-related infection control programs, and only 31% (50/162) reported pharmacist involvement in both types of program, much lower than the baseline result of 45% (69/155) in 2009/10. The highest results for pharmacist involvement in both types of program continued to be for hospitals with more than 500 beds (40%, 18/45), teaching hospitals (46%, 16/35) and facilities in ON (49%, 20/41). Pharmacist involvement was lowest in the Atlantic provinces (11%, 2/18).

In almost every hospital represented by respondents to the 2013/14 survey, pharmacists were actively involved in providing evidence-based patient care and in developing and implementing evidence-based drug therapy protocols and/or order sets. Canadian hospitals have improved over the 2009/10 baseline and are very close to achieving the CSHP 2015 targets for these two objectives. There have been continuous small increases since the 2007/08 report in terms of pharmacists ensuring compliance with drug therapy objectives related to MI or CHF. One might question whether, once drug protocols and/or order sets have been developed, the responsibility for their implementation becomes that of other healthcare professionals, rather than pharmacists. Despite the increase in the number of diabetes outpatient clinics since 2007/08, the number of such clinics with a pharmacist present is decreasing, and among those where a pharmacist is present, very few are ensuring that HbA1c is tested at least annually. In fact, this objective was identified as a "low priority" in an informal online survey of Canadian pharmacy directors and managers that was used to determine the implementation status and priority level (low, medium or high) of the CSHP 2015 objectives.[2] Perhaps the recent Accreditation Canada standard for antimicrobial stewardship has caused the focus of pharmacists to shift away from vaccination-related infection control programs to medication-related infection control programs.

In summary, only two of the nine Goal 3 objectives are more than 30 percentage points from the target. This is encouraging progress over the eight years of the initiative.

Goal 4: Increase the extent to which pharmacy departments in hospitals and related healthcare settings have a significant role in improving the safety of medication use.

Objective 4.1: 90% of hospitals and related healthcare settings will have an organizational program, with appropriate pharmacy involvement, to achieve significant annual, documented improvement in the safety of all steps in medication use.

- The 2011/12 survey data indicated that 78% (131/168) of respondents had such a medication safety quality improvement program in place. Unfortunately, the 2013/14 survey data showed a drop to 60% (96/161) (Table E-4), the lowest response rate since the baseline value of 64% (102/160) in 2007/08. Teaching hospitals surpassed the CSHP 2015 target for this objective in 2011/12 (95%, 36/38), but fell back substantially, to only 71% (24/34) in 2013/14. The response rate for BC/YT dropped from 88% (22/25) in 2011/12 to just 33% (9/27) in 2013/14, and the rate for hospitals with more than 500 beds dropped from 88% (38/43) to 61% (27/44). This CSHP 2015 objective was identified by pharmacy directors and managers in 2013 as one of the top 10 for which support was desired.[1] Despite the drop, for which there is no apparent explanation, the overall response rate is within 30 percentage points of the CSHP 2015 target.

Objective 4.2: 80% of pharmacies in hospitals and related healthcare settings will conduct an annual assessment of the processes used for compounding sterile medications, consistent with established standards and best practices.

- Only 31% (51/162) of respondents reported conducting an annual review of sterile product quality improvement processes, a decline from 48% (80/167) in 2011/12 and not much higher than the baseline of 24% (39/161) in 2007/2008. Teaching hospitals (51%, 18/35) and hospitals in QC (51%, 22/43) were closest to the target but still fell far short relative to responses in 2011/12. BC/YT (15%, 4/27) and the Atlantic provinces (6%, 1/18) were farthest from the target. These results are disappointing and confusing in light of recent increased attention to sterile compounding procedures in hospitals. Has there been a substantial shift to outsourcing of sterile compounding instead of implementing the recommended processes of USP Chapter <797>[3] or provincial regulations?

There was a noticeable lack of progress in the area of annual assessment of the quality of the sterile products service.

Objective 4.3: 80% of hospitals have at least 95% of routine medication orders reviewed for appropriateness by a pharmacist before administration of the first dose.

- As in 2011/12, one-third (33%, 53/160) of respondents indicated that they did not achieve the performance target for review of routine medication orders. Although there was no change from the previous report, the 67% success rate is within 15 percentage points of the CSHP 2015 target. Teaching hospitals (80%, 28/35) achieved the target, and hospitals in QC (79%, 34/43) were very close to target. The lowest responses were reported for hospitals with 50 to 200 beds (60%, 25/42) and in the Prairies (61%, 20/33) and the Atlantic provinces (61%, 11/18).

Objective 4.4: 100% of medication orders in a hospital's emergency department will be reviewed by hospital pharmacists within 24 hours.

- Review by a pharmacist, within 24 hours, of some or all medication orders written in the emergency department (ED) was reported by 74% (120/162) of respondents, similar to the 75% (126/169) result in 2011/12 and above the baseline of 68% (107/158) in 2007/08. Rates were highest among hospitals with more than 500 beds (91%, 41/45) and facilities in QC (100%, 43/43) and were lowest among hospitals with 50 to 200 beds (53%, 23/43) and those from the Prairies (55%, 18/33). With the exception of a drop for Atlantic respondents, from 83% (15/18) in 2011/12 to 67% (12/18) in 2013/14, all other sub-group response rates remained essentially unchanged from 2011/12. Among respondents who reported that some or all medication orders written in the ED were reviewed by pharmacists within 24 hours, 77% (92/119) specified that this occurred for 75% to 100% of orders, up slightly from the previous report (74%, 93/126). The CSHP 2015 target of 100% of ED medication orders being reviewed within 24 hours by a pharmacist was achieved by 34% (41/119) compared with 29% (37/126) of respondents in 2011/12. Baseline data in 2007/08 captured the respondents who reviewed 75% to 100% (vs. the revised target of 100%) of orders (59%, 61/103). In terms of sub-groups, BC/YT respondents again had the highest compliance rate, at 50% (10/20), and hospitals with 50 to 200 beds (43%, 10/23) were close behind. The response rate was lowest for the Atlantic provinces (8%, 1/12). Progress toward this target has slowly improved but results remain far short of the goal of 100% of orders being reviewed within 24 hours.

More hospitals were having pharmacists review orders from the emergency department, but this measure still fell far short of the target of reviewing 100% of orders within 24 hours.

Objective 4.5: 90% of hospital pharmacies will participate in ensuring that patients receiving antibiotics as prophylaxis for surgical infections will have their prophylactic antibiotic therapy discontinued within 24 hours after the surgery end time.

- Forty-eight percent (77/162) of respondents indicated that this practice was in place, well below the CSHP 2015 target of 90%. This result is an improvement over the baseline of 39% (62/159) in 2007/08, but there has been no progress since 2011/12 (48%, 80/168). Teaching hospitals were more likely to have this practice in place (71%, 25/35) than non-teaching hospitals (41%, 52/127). Seventy-three percent (30/41) of ON respondents reported having this practice in place. Response rates continued to be low among hospitals with 50 to 200 beds (30%, 13/43 vs. 29%, 12/41 in 2011/12) and in the Atlantic provinces (only 6%, 1/18 vs. 22%, 4/18). Perhaps this activity will increase as hospitals implement antimicrobial stewardship programs to meet Accreditation Canada requirements.

Objective 4.6: 85% of pharmacy technicians in hospitals and related healthcare settings will be certified by a clearly identifiable and recognized training program.

- The survey question concerning pharmacy technician certification was revised in 2011/12 to reflect the changing landscape of pharmacy technician roles and the existence of regulation in many provinces. Consequently, these data should not be directly compared with results from before 2011/12. The revised question ("What percentage of pharmacy technicians have completed either a recognized certification program or an accredited college training program?") eliminated non-accredited training programs from the responses. Thirty-nine percent (63/161) of respondents reported that 85% or more of their pharmacy technicians had completed such programs. The highest response rates were for ON (58%, 23/40), BC/YT (44%, 12/27) and hospitals with 50 to 200 beds (42%, 18/43). In addition, BC/YT had the greatest increase from the previous report (12%, 3/26 in 2011/12). QC had the lowest response rate (21%, 9/43). As pharmacy technician regulation expands across the country, these numbers will likely increase, as discussed in Chapter F (Pharmacy Technicians).

Objective 4.7: 75% of pharmacies in hospitals utilize a unit-dose system for drug distribution for 90% or more of their total beds.

- The CSHP 2015 target of 75% has been surpassed, with 81% (131/161) of respondents indicating that they had achieved this level of unit-dose distribution. Higher rates were reported among teaching hospitals (94%, 33/35), hospitals with more than 500 beds (87%, 39/45), QC hospitals (95%, 41/43) and ON hospitals (90%, 37/41). Rates were lower, but still increased over 2011/12, for hospitals with 50 to 200 beds (70%, 30/43 vs. 54%, 22/41 in 2011/12) and in BC/YT (56%, 15/27 vs. 42%, 11/26 in 2011/12). For all categories of respondents, rates increased by at least 20 percentage points from the 2007/08 baseline values, with the exception of the Prairies (75%, 21/28 at baseline vs. 76%, 25/33 in 2013/14).

Objective 4.8: 100% of new pharmacists entering hospital and related healthcare setting practice will have completed a Canadian Hospital Pharmacy Residency Board-accredited residency.

- Of the respondents who hired pharmacists in the 12 months preceding the survey, 22% (30/135) were able to restrict their hiring to pharmacists who had completed accredited residency programs, similar to the 23% (33/145) who did so in 2011/12. This hiring target was reached by 38% (16/42) of hospitals with more than 500 beds, 34% (11/32) of teaching hospitals and 75% (24/32) of QC facilities; however, no respondents in the Prairies (0/29) or the Atlantic provinces (0/12) met this target. In BC/YT, 15% (4/26) of the respondents met the 100% hiring target.

Table E-4. Results for Goal 4, 2013/14

Goal 4: Increase the extent to which pharmacy departments in hospitals and related healthcare settings **have a significant role in improving the safety of medication use.**

CSHP 2015 Objective			CSHP 2015 Target	% Achievement 2014	% Achievement 2012	% Achievement 2010	% Achievement 2008	2013/14 Hospital Pharmacy in Canada Responses							
								(n=)	yes						no
4.1		90% of hospitals and related healthcare settings will have an organizational program, with appropriate pharmacy involvement, to achieve significant annual, documented improvement in the safety of all steps in medication use.	90%	**60%**	78%	62%	64%	(161)	**60%**						**40%**
4.2		80% of pharmacies in hospitals and related healthcare settings will conduct an annual assessment of the processes used for compounding sterile medications, consistent with established standards and best practices.	80%	**31%**	48%	29%	24%	(162)	**31%**						**69%**
4.3		80% of hospitals have at least 95% of routine medication orders reviewed for appropriateness by a pharmacist before administration of the first dose.	80%	**67%**	66%	61%	59%	(160)	**67%**						**33%**
4.4		100% of medication orders in a hospital's emergency department will be reviewed by hospital pharmacists within 24 hours.	100%	**34%**	29%	27%	≤59%*	(119)		**100%**	**75-99%**	**50-74%**	**25-49%**	**0-24%**	
										34%	**43%**	**11%**	**7%**	**5%**	
4.5		90% of hospital pharmacies will participate in ensuring that patients receiving antibiotics as prophylaxis for surgical infections will have their prophylactic antibiotic therapy discontinued within 24 hours after the surgery end time.	90%	**48%**	48%	45%	39%	(162)	**48%**						**52%**
4.6		85% of pharmacy technicians in hospitals and related healthcare settings will be certified by a clearly identifiable and recognized training program**.	85%	**39%**	33%	63%	≤59%*	(161)		**85-100%**	**50-84%**	**25-49%**	**0-24%**		
										39%	**19%**	**3%**	**39%**		
4.7		75% of pharmacies in hospitals utilize a unit-dose system for drug distribution for 90% or more of their total beds.	75%	**81%**	75%	76%	62%	(161)	**81%**						**19%**
4.8		100% of new pharmacists entering hospital and related healthcare setting practice will have completed a Canadian Hospital Pharmacy Residency Board (CHPRB)-accredited residency.	100%	**22%**	23%	29%	n/a	(135)		**100%**	**75-99%**	**50-74%**	**25-49%**	**0-24%**	
										22%	**7%**	**9%**	**11%**	**50%**	

These values represent the responses for 75 to 100% in 2007/08

****Survey question in 2011/12 and 2013/14 was reworded to ask, "What percentage of pharmacy technicians have completed either a recognized certification program or an accredited college training program?***

Objective are coded as follows: Target reached or within 15% | 16-30% from target | Far from target

It is concerning to see the lack of progress with organizational programs to review safe medication use and the limited progress to assess sterile compounding practices at least annually. The result for the objective of having 95% of routine medication orders reviewed by a pharmacist before administration of first doses is still 13 percentage points from the 80% CSHP 2015 target. Despite an encouraging increase in the involvement of pharmacists in the review of ED medication orders, very little progress has been made toward the target of reviewing 100% of ED medication orders within 24 hours. It is also surprising that pharmacists' participation in ensuring discontinuation of post-surgical prophylactic antibiotic therapy is so far from the 90% target, given Accreditation Canada's requirement for antimicrobial stewardship programs. The utilization of unit-dose medication distribution systems has surpassed the CSHP 2015 target of 75% of Canadian hospitals! Pharmacy technician training requirements continue to evolve across the country as provinces discuss and implement pharmacy technician regulation. The number of pharmacy technicians working in hospitals who have completed an accredited college training program or recognized certification program continues to grow. The hiring of pharmacists who have completed an accredited hospital pharmacy residency program will continue to be a challenge. In this regard, it is encouraging to learn that the number of residency positions increased from 72 in 2007 to 100 in 2014 (Gloria Day, Canadian Pharmacy Residency Board administrator, personal communication; Nov. 3, 2014). Congratulations to QC, where success with this CSHP 2015 target was high.

Residency programs have increased from 72 positions in 2007/08 to 100 in 2013/14 but there are not enough residency-trained pharmacists to meet the hiring needs of Canadian hospitals.

For three of the objectives within Goal 4, either the target has been reached or results are within 30 percentage points of the target. For the remaining five objectives, results are nowhere near the CSHP 2015 targets, although there has been slow and continuous progress with three of them.

Goal 5: Increase the extent to which hospitals and related healthcare settings apply technology effectively to improve the safety of medication use.

Objective 5.1: 75% of hospitals will use machine-readable coding to verify medications before dispensing.

- Only 23% (37/162) of respondents reported routine use of machine-readable coding in the inpatient pharmacy to verify medications before dispensing (Table E-5), a noticeable increase over the baseline of 13% (20/158) in 2007/08 but only a modest increase from the 20% (33/168) in 2011/12. There was higher utilization of such coding by hospitals with more than 500 beds (36%, 16/45), non-teaching hospitals (24%, 31/127) and QC facilities (40%, 17/43); utilization was lowest in BC/YT (7%, 2/27). Progress with implementation of this type of technology is slow but continues.

Objective 5.2: 75% of hospitals will use machine-readable coding to verify all medications before administration to a patient.

- Use of machine-readable coding to verify patients' identity and the accuracy of medication administration at the point of care was unchanged from the previous report: 4% (6/168) in 2011/12 vs. 4% (7/161) in 2013/14. Use of this technology was highest in ON (17%, 7/41), with no other regions reporting this practice. The baseline value was 1% (1/158) in 2007/08.

The use of barcode systems for positive identification of medications is slowly increasing, but their use before administration to patients is noticeably absent in most hospitals in Canada.

Objective 5.3: For routine medication prescribing for inpatients, 75% of hospitals will use computerized prescriber order entry systems that include clinical decision support.

- Ten percent (16/162) of respondents indicated that a computerized prescriber order entry system with clinical decision support was in place at their facilities, up slightly from 9% (15/168) in 2011/12 and only a small increase from the baseline of 7% (11/159) in 2007/08. Higher implementation rates were reported by teaching hospitals (23%, 8/35), hospitals with 201 to 500 beds (15%, 11/74) and ON facilities (20%, 8/41). One or more respondents in every category (bed size, teaching status and region) reported use of a computerized prescriber order entry system, and progress continues, if slowly. Nonetheless, Canadian hospitals are far from reaching the CSHP 2015 target.

Objective 5.4: 100% of hospital pharmacists will use computerized pharmacy order entry systems that includes clinical decision support.

- Eighty-four percent (136/162) of respondents reported that computerized pharmacy order entry with clinical decision support was in place, a notable increase over the baseline value of 69% (110/159) in 2007/08. Use of this technology was highest in QC (95%, 41/43), BC/YT (89%, 24/27) and teaching hospitals (89%, 31/35). Response rates in all respondent categories increased over 2011/12 results, but the Atlantic region was the lowest, at 67% (12/18). Overall, this CSHP 2015 target appears within reach.

Sixteen percent of respondents were not using a computerized pharmacy order entry system with clinical decision support.

Objective 5.5: In 75% of hospitals and related healthcare settings, pharmacists will use medication-relevant portions of patients' electronic medical records for managing patients' medication therapy.

- Fifty-four percent (87/162) of respondents reported that their hospitals had electronic health records (EHRs), compared with 48% (81/168) in 2011/12 and the baseline of 33% (52/159) in 2007/08. This value remains below (but is getting closer to) the target of 75%. Of respondents using EHRs, 94% (82/87) indicated that pharmacists used the medication-relevant portions of the record to manage patients' medication therapy. Category responses ranged from 89% to 100%. The CSHP target of 75% for this objective has been surpassed in hospitals that use EHRs. The availability of EHRs was highest in BC/YT (70%, 19/27), ON (68%, 28/41), hospitals with 201 to 500 beds (64%, 47/74) and the Atlantic provinces (61%, 11/18). Availability was lowest in the Prairies (39%, 13/33) and QC (37%, 16/43), although both of these regions saw increases since 2011/12.

Among the 54% of respondents using electronic health records, nearly all reported that pharmacists were using relevant portions to manage patients' medication therapy.

Table E-5. Results for Goal 5, 2013/14

Goal 5: Increase the extent to which hospitals and related healthcare settings **apply technology effectively to improve the safety of medication use.**

	CSHP 2015 Objective	CSHP 2015 Target	% Achievement 2014	% Achievement 2012	% Achievement 2010	% Achievement 2008	2013/14 Hospital Pharmacy in Canada Responses		
							(n=)	yes	no
5.1	75% of hospitals will use machine-readable coding to verify medications before dispensing.	75%	23%	20%	17%	13	(162)	23%	80%
5.2	75% of hospitals will use machine-readable coding to verify all medications before administration to a patient.	75%	4%	4%	5%	1%	(161)	4%	96%
5.3	For routine medication prescribing for inpatients, 75% of hospitals will use computerized prescriber order entry systems that include clinical decision support.	75%	10%	9%	6%	7%	(162)	10%	90%
5.4	100% of hospital pharmacists will use computerized pharmacy order entry systems that include clinical decision support.	100%	84%	78%	77%	69%	(162)	84%	16%
5.5	In 75% of hospitals and related healthcare settings, pharmacists will use medication-relevant portions of patients' electronic medical records for managing patients' medication therapy.	75%	94%	96%	89%	81%	(87)	94%	6%
5.6	In 75% of hospitals and related healthcare settings, pharmacists will be able to electronically access pertinent patient information and communicate across settings of care (e.g. hospitals, clinics, home care operations, and chronic care operations) to ensure continuity of pharmaceutical care for patients with complex and high-risk medication regimens.	75%	47%	35%	37%	39%	(160)	47%	53%

Objective are coded as follows: Target reached or within 15% | 16-30% from target | Far from target

Objective 5.6: In 75% of hospitals and related healthcare settings, pharmacists will be able to electronically access pertinent patient information and communicate across settings of care (e.g. hospitals, clinics, home care operations, and chronic care operations) to ensure continuity of pharmaceutical care for patients with complex and high-risk medication regimens.

- Forty-seven percent (75/160) of respondents reported this capability, higher than in 2011/12 (35%, 58/165) and the baseline of 39% (63/160) in 2007/08. Progress to date has brought this result to within 28 percentage points of the CSHP 2015 target of 75%. Responses were similar for teaching hospitals (46%, 16/35) and non-teaching hospitals (47%, 59/125). The highest response rates were from BC/YT (56%, 15/27) and hospitals with more than 500 beds (53%, 24/45).

The implementation of medication management technology (for prescribing, dispensing and administration) in the hospital setting is increasing, but very slowly. The use of barcode technology in the pharmacy has increased since baseline, but its use before medication administration has not. The use of computerized prescriber order entry with clinical decision support has increased by only three percentage points over baseline in 2007/08. It is surprising that 16% of respondents were not using a computerized pharmacy order entry system with clinical decision support. Perhaps the computerized pharmacy order entry system is in place, but without the clinical decision support option, because it is either missing or turned off. Regardless of the reason, achievement for this objective is very close to the CSHP 2015 target of 100%. In a recent CSHP online survey of hospital pharmacy directors and managers, Objectives 5.1, 5.2, 5.3, 5.5 and 5.6 (relating to barcoding, computerized prescriber order entry and EHRs) were ranked in the top 10 objectives for which survey respondents wanted support from CSHP.[1] A CSHP 2015 tool kit is available (to CSHP members) to support the implementation of technology for medication systems (www.cshp.ca/cshp2015/resources/2015Toolkits/Toolkit4.7/index_e.asp?). It is encouraging to see the increased use of EHRs by pharmacists for medication management. For three of the six objectives within Goal 5, the CSHP 2015 target has been reached or the result is within 30 percentage points. For the other three objectives (barcoding for dispensing, barcoding for medication administration and computerized prescriber order entry), results are far from the target and have changed little from the 2007/08 baseline. No doubt, Canadian hospitals will continue to improve their use of technology, though perhaps not as quickly as might be desired.

Goal 6: Increase the extent to which pharmacy departments in hospitals and related healthcare settings engage in public health initiatives on behalf of their communities.

Objective 6.1: 60% of pharmacies in hospitals and related healthcare settings will have specific ongoing initiatives that target community health.

- Only 13% (20/159) of respondents reported that their pharmacies had specific ongoing initiatives targeting community health (Table E-6), well below the baseline of 21% (33/160) in 2007/08. The response rate was highest in ON (23%, 9/40) and the Atlantic provinces (22%, 4/18), but was only 7% (3/42) in hospitals with 50 to 200 beds, 4% (1/27) in BC/YT and 6% (2/32) in the Prairies. This CSHP objective was ranked as a "low-priority" objective in CSHP online surveys in 2012 and 2013.[1,2]

Objective 6.2: 85% of hospital pharmacies will participate in ensuring that high risk patients in hospitals and related healthcare settings receive vaccinations for influenza and pneumococcus.

- Thirty-one percent (50/161) of respondents indicated that they had a process in place for both influenza and pneumococcus vaccinations, higher than the baseline of 23% (36/159) in 2007/08. The reported achievement for influenza vaccination alone was slightly higher (39%, 62/161), especially among teaching hospitals (51%, 18/35) and in BC/YT (56%, 15/27). For pneumococcal vaccination alone, 31% (50/160) of respondents reported pharmacy involvement. The CSHP 2015 target of 85% is not within reach.

Objective 6.3: 80% of hospital pharmacies will participate in ensuring that hospitalized patients who smoke receive smoking-cessation counselling.

- Only 19% (30/162) of respondents reported having a process in place for ensuring that hospitalized patients who smoke would receive smoking-cessation counselling, lower than the response rate in 2011/12 (27%, 45/168) and the same as the baseline value of 19% (30/160) in 2007/08. Participation was highest in the Atlantic provinces (33%, 6/18) and in teaching hospitals (26%, 9/35). Of pharmacy departments that did not participate in ensuring availability of smoking-cessation counselling, 65% (79/121) indicated that such counselling was provided by another healthcare professional in their hospital. When results for provision of smoking-cessation counselling by a pharmacist or by another healthcare professional were combined, the response rate was 67% (30+79/162), 13 percentage points below the CSHP 2015 target of 80%.

Smoking-cessation counselling provided by pharmacists was below the CSHP 2015 target. However, when the results for provision of this service by a pharmacist or another healthcare professional are combined, the result of 67% is not far from the CSHP 2015 target.

Objective 6.4: 90% of pharmacy departments in hospitals and related healthcare settings will have formal up-to-date emergency preparedness programs integrated with their hospitals and related healthcare settings' and their communities' emergency preparedness and response programs.

- Seventy percent (113/162) of respondents reported having an emergency preparedness program in place, higher than the baseline value of 54% (86/160) in 2007/08 and not far from the CSHP 2015 target of 90%. There was no notable difference among hospitals of different bed sizes, but such programs were more common in teaching hospitals (86%, 30/35) than in non-teaching hospitals (65%, 83/127). Availability of emergency preparedness programs was highest in BC/YT (93%, 25/27) and the Atlantic provinces (83%, 15/18), and lowest in QC (44%, 19/43).

According to these survey results, respondents were not very involved with community health initiatives. There was little improvement in participation of hospital pharmacists in vaccination and smoking-cessation programs since baseline data were collected in 2007/08. These results indicate that in many hospitals, smoking-cessation programs are being provided not by pharmacists, but by other healthcare professionals. When the data for both types of providers are combined, the CSHP 2015 target for offering smoking-cessation counselling is within reach. The establishment of an integrated emergency preparedness program has decreased since 2009/10, but the CSHP 2015 target remains within reach. A 2012 CSHP online survey asking pharmacy directors and managers to rank the priority of CSHP 2015 objectives revealed that Objectives 6.1, 6.2 and 6.3 had very low priority,[2] as reflected in the results of the 2013/14 Hospital Pharmacy in Canada Survey. Nonetheless, targets for two of the Goal 6 objectives are within reach.

Table E-6. Results for Goal 6, 2013/14

Goal 6: Increase the extent to which pharmacy departments in hospitals and related healthcare settings **engage in public health initiatives on behalf of their communities.**

	CSHP 2015 Objective	CSHP 2015 Target	% Achievement 2014	% Achievement 2012	% Achievement 2010	% Achievement 2008	2013/14 Hospital Pharmacy in Canada Responses		
							(n=)	yes	no
6.1	60% of pharmacies in hospitals and related healthcare settings will have specific ongoing initiatives that target community health.	60%	13%	14%	17%	21%	(159)	13%	87%
6.2	85% of hospital pharmacies will participate in ensuring that high risk patients in hospitals and related healthcare settings receive vaccinations for influenza and pneumococcus.	85%	31%	35%	30%	23%	(161)	31%	69%
6.3	80% of hospital pharmacies will participate in ensuring that hospitalized patients who smoke receive smoking-cessation counselling.	80%	19% (67%*)	27% (72%*)	22%	19%	(162)	19% (67%*)	73%
6.4	90% of pharmacy departments in hospitals and related healthcare settings will have formal up-to-date emergency preparedness programs integrated with their hospitals and related healthcare settings' and their communities' emergency preparedness and response programs.	90%	70%	74%	78%	54%	(162)	70%	30%

** Percent of respondents who indicated smoking cessation counselling is provided by either a pharmacist OR another healthcare professional*

Objective are coded as follows: Target reached or within 15% | 16-30% from target | Far from target

Epilogue

CSHP 2015 is a vision of what pharmacy practice excellence could look like in the year 2015. It is based on six goals and 36 supporting objectives with measurable targets, covering many of the services provided by pharmacists in hospitals and related healthcare settings. When it was launched by the CSHP in 2007, Canadian pharmacists were challenged to "hit the target" for as many objectives as they could, in an effort to change both pharmacists' care of their patients and patients' use of their medications. CSHP 2015 has been the longest-running hospital pharmacy practice initiative that CSHP has ever undertaken and supported.

At first, the initiative appeared overwhelming, perhaps even impossible. Yet for eight years, CSHP has steadfastly supported this quality initiative for patient care, challenging members to enhance the safe, effective and evidence-based use of medications, to ultimately improve the health of Canadians. Use of technology to improve medication safety and participation in public health initiatives to improve patient health were also encouraged.

Awareness and promotion of CSHP 2015 took many forms, including a dedicated portion of the CSHP website (which was redesigned in 2013 to accommodate the multiple resources that were being provided to practitioners), a CSHP presence on Twitter (with more than 1000 followers) and a CSHP 2015 blog. In 2010, pharmacy leaders across Canada were invited to "commit" to the CSHP 2015 initiative, by agreeing to include it in their pharmacy department's strategic plan, and to support their pharmacists' efforts in achieving the CSHP 2015 objectives. In response, more than 90 pharmacy leaders committed over 120 organizations and 200 hospital sites.[4] CSHP online

surveys identified pharmacy leaders' priorities for and interest in the CSHP 2015 objectives, as well as their needs for and preferred form of support to achieve the targets. CSHP 2015 Branch Champions engaged pharmacy leadership, front-line pharmacists and pharmacy technicians with the initiative, and many branch competitions were undertaken to share success stories with other CSHP members.

CSHP members were supported in their quest to reach the CSHP 2015 targets with more than 200 CSHP 2015–related posters and presentations at Society conferences, three tool kits, almost 100 success stories (available on the website), 22 webinars, 50 virtual posters and more than 60 volunteer "experts". The CSHP 2015 website has had more than 10,000 hits in the past year!

Progress with the CSHP 2015 initiative has been captured by the Hospital Pharmacy in Canada Report since the 2007/08 report. Baseline data indicated that for eight of the 36 objectives, Canadian hospitals were already within 30 percentage points of the target. Practice change has been slow in some areas (e.g., pharmacist monitoring of medications, medication counselling on discharge, pharmacist involvement in ambulatory care clinics, annual review of safe medication and sterile compounding processes, use of technology and involvement in community health initiatives), but other targets have been realized or surpassed, and for many others results are within 15 to 30 percentage points of the target, as indicated in this 2013/14 report. In fact, for 50% (18/36) of the CSHP 2015 objectives, targets have been reached or results are within 30 percentage points of the target. But has this initiative affected pharmacy practice in Canada?

Although the CSHP 2015 objectives were purely visionary in 2007, 16 (44%) of the objectives align with Accreditation Canada's Medication Management Standards, published in 2013.[5] The number of accredited Canadian pharmacy residency program positions has grown from 72 in 2007 to 100 in 2014 (Gloria Day, Canadian Pharmacy Residency Board administrator, personal communication; Nov. 3, 2014).

What's next after CSHP 2015? In 2011, the American Society of Health-System Pharmacists (ASHP) rolled several objectives from its ASHP 2015 initiative (from which CSHP 2015 was adapted, with permission) into its Pharmacy Practice Model Initiative.[6] The National Dashboard for this new ASHP initiative has five goals that retain many of the ASHP 2015 objectives, including pharmacists performing drug therapy management for inpatients and outpatients (Objectives 1.2, 1.3, 2.1), providing medication education on discharge (1.4, 2.2), reviewing all medication orders before the first dose (4.3), using barcode technology (5.1, 5.2) and computerized prescriber order entry with clinical decision support (5.3), and requiring pharmacists to have completed accredited residency programs (4.8) and pharmacy technicians to have completed a national certification exam (4.6). ASHP continues to encourage pharmacists to strive for many of the ASHP 2015 (and CSHP 2015) objectives within the context of a different initiative.

Half of the CSHP 2015 objectives have been reached or are within 30 percentage points of the target. However, pharmacist monitoring of medication, discharge counselling, outpatient services, medication- and vaccination-related infection control programs, sterile compounding process review, barcoding and computerized prescriber order entry, and community health initiatives still fall far short of CSHP 2015 targets.

Of the eight Canadian clinical pharmacy key performance indicators[7] referred to in Chapter B (Clinical Pharmacy Practice) and Chapter H (Evaluation of Pharmacy Services), the following three are CSHP 2015 objectives: performing admission medication reconciliation (including best possible medication history), providing discharge patient medication education and performing discharge medication reconciliation. Therefore, through implementation of the key performance indicators initiative, some of the CSHP 2015 objectives will continue to be measured and monitored.

Every step taken toward the CSHP 2015 targets is a step closer to the pharmacist's goal of safe and effective medication use by Canadians. The finish line of the CSHP 2015 initiative may have arrived, but pharmacists in hospitals and related healthcare settings will continue to dedicate themselves to providing the best care possible for their patients with the ultimate goal of improving their health and quality of life.

CSHP would like to thank the Hospital Pharmacy in Canada Editorial Board for its support in collecting and reporting data reflecting progress on the CSHP 2015 initiative since 2008.

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F - Pharmacy Technicians

Kyle MacNair

The transition of pharmacy technicians to regulated health professionals started with the rapid introduction of legislation in three provinces—Ontario (ON), Alberta (AB) and British Columbia (BC)—between December 2010 and July 2011.[1] There followed a lull in legislative activity that was broken in August 2013, when Nova Scotia (NS) proclaimed its new Pharmacy Act,[2] followed promptly by Manitoba (MB), which brought into effect its new Pharmaceutical Act on January 1, 2014. The MB legislation was initially passed through the province's legislature in 2006, with the eight-year gap between passage and proclamation resulting from disagreement about details of the supporting regulations.[3] New Brunswick (NB) was the next province to enact new legislation, on July 1, 2014,[4] followed by Prince Edward Island (PE), which enacted new legislation on September 22, 2014.[5]

As of September 2014, legislation to regulate pharmacy technicians was in place in seven Canadian provinces.

Legislation in all seven of these jurisdictions protects the title "Pharmacy Technician" and brings pharmacy technicians under the banner of healthcare professionals. The three remaining provinces are at different points in developing legislation and the corresponding move to protect the Pharmacy Technician title. On December 22, 2012, Newfoundland and Labrador (NL) passed its new Pharmacy Act, which includes provisions for regulation of pharmacy technicians. However, similar to the situation in MB, the supporting regulations remain in draft form and have not yet come into effect.[6] In Saskatchewan (SK), new legislation (Bill 151) that will "regulate pharmacy technicians as licensed members practicing in an independent defined scope of practice with title protection" has been tabled for first reading in the provincial legislature.[7] Quebec (QC) currently has only bylaws defining the limited activities that a pharmacy clerk is allowed to perform under supervision of a pharmacist; however, there are no educational or competency requirements defining who can be considered a clerk.[8] The Ordre des pharmaciens du Québec has recently adopted practice standards and competency profiles for pharmacy technical personnel and is awaiting an evaluation from the ministry of education regarding creation of a technical program to facilitate regulatory change and permit use of the Pharmacy Technician title (personal communication, Marie-Claude Poulin, pharmacist and advisor for drug services and pharmaceutical care, Ordre des pharmaciens du Québec; November 2, 2014). The Yukon (YT) and Northwest Territories (NT) had no legislation in place as of March 31, 2014.

Work has also continued on the national regulatory support structures that will guide and govern the education, competency assessment and licensure of pharmacy technicians.

In 2008, the Canadian Council for Accreditation of Pharmacy Programs (CCAPP) began accrediting schools that offer a pharmacy technician training program. As of late 2014, the CCAPP had granted full accreditation status to 30 Canadian schools and provisional or probationary status to an additional 21 schools.[9] Internationally, one school in Qatar has received full accreditation status from the CCAPP (in 2012).[10]

The Pharmacy Examining Board of Canada (PEBC) continues to offer Qualifying and Evaluating examinations for pharmacy technicians and has increased the number of locations where these exams are offered. The next round of the Qualifying Examination, in March 2015, will be available in 13 cities across 6 provinces, and the next round of the Evaluating Examination, in April 2015, will be offered in 12 cities across 8 provinces.[11] As of November 2014, a total of 5173 individuals had successfully completed both parts of the Qualifying Examination and had become certified with PEBC as Pharmacy Technicians.[12]

The National Pharmacy Technician Bridging Education Program developed by NAPRA is currently offered in-classroom and online by a total of six institutions.

One of the most exciting developments in the area of pharmacy technician education was the launch of the National Pharmacy Technician Bridging Education Program by the National Association of Pharmacy Regulatory Authorities (NAPRA) in April 2013.[13] Originally, three provinces offered bridging programs to assist practising technical staff who had not graduated from a CCAPP-accredited program to upgrade their skills in preparation for the PEBC Qualifying Examination. As legislation was enacted across more provinces, the need for a national program became clear. According to its website, "NAPRA secured funding from the Government of Canada's Inter-provincial Labour Mobility Initiative to revise the existing bridging programs in Alberta, British Columbia and Ontario in order to create a program that was more suitable for national delivery."[13] The resulting program is now being offered in-classroom by five institutions in four provinces and online, to anyone in Canada, by three institutions (with one in-classroom program and one online program being available in both English and French).[14]

With the greater prominence of pharmacy technicians in delivering quality pharmacy care, peer-reviewed research has emerged to elucidate the roles most suitable for technicians. A literature review of articles on technician verification programs was published in the American Journal of Health-System Pharmacists in October 2011.[15] The authors identified 11 studies published between 1978 and 2009 that compared the accuracy of technicians and pharmacists in checking orders filled by a different technician. The overall results showed comparable accuracy rates for pharmacists and technicians, with some trial results significantly favouring checking by technicians.

There has been a marked shift in the nature of literature published on the role of pharmacy technicians away from assessing technical competency in favour of assessing their contribution to more cognitive roles. Several studies have investigated pharmacy technicians working alone or in concert with pharmacists to obtain pre-admission medication histories and conduct admission medication reconciliation.[16,17,18,19] One of these studies further assessed the role of pharmacy technicians in focused prescribing reviews of admitted patients aimed at identifying prescription errors.[19] In all cases, it was found that pharmacy technicians accurately and efficiently carried out these roles within the various healthcare environments. Another notable document published in 2014 was a statement by the American Society of Health-System Pharmacists (ASHP) on the roles of pharmacy technicians in pharmacy informatics.[20] Specifically, the ASHP supports various roles for specially trained pharmacy technicians in pharmacy informatics. According to the position statement, "These roles include automation and technology systems management, management of projects, training and education, policy and governance, customer service, charge integrity, and reporting." To date, the Hospital Pharmacy in Canada Survey has not ascertained how pharmacy technicians participate in pharmacy informatics activities in Canadian hospitals, but the ASHP statement suggests that this aspect may need to be considered in the future.

Research supports an expanded role for pharmacy technicians in obtaining pre-admission medication histories and performing medication reconciliation.

Technician Roles and Validation Requirements

Table F-1. Functions Performed by Technicians, Functions Checked by Technicians and Validation Requirements, 2013/14

	A	B	C	D	E
	(n=)	Function performed (n=A)	Validation required to perform task (n=B)	Checked by technician (n=B)	Validation required to check (n=D)
(01) Perform medication order entry	(162)	123 **76%**	70 **57%**	17 **14%**	15 **88%**
(02) Fill traditional prescriptions, new orders	(159)	139 **87%**	68 **49%**	83 **60%**	75 **90%**
(03) Fill traditional prescriptions, refills	(156)	137 **88%**	67 **49%**	94 **69%**	82 **87%**
(04) Package unit dose items	(162)	150 **93%**	83 **55%**	128 **85%**	111 **87%**
(05) Fill unit dose trays	(159)	121 **76%**	70 **58%**	99 **82%**	86 **87%**
(06) Fill interim doses	(159)	136 **86%**	70 **51%**	106 **78%**	91 **86%**
(07) Prepare patient-specific IV admixtures	(161)	152 **94%**	117 **77%**	82 **54%**	76 **93%**
(08) Prepare batch IV admixtures	(160)	144 **90%**	109 **76%**	92 **64%**	84 **91%**
(09) Prepare TPN solutions	(162)	143 **88%**	108 **76%**	55 **38%**	53 **96%**
(10) Prepare chemotherapy	(162)	140 **86%**	112 **80%**	28 **20%**	27 **96%**
(11) Compound extemporaneous products	(160)	159 **99%**	83 **52%**	105 **66%**	87 **83%**
(12) Fill cardiac arrest trays	(160)	127 **79%**	54 **43%**	104 **82%**	74 **71%**
(13) Replenish automated dispensing cabinets	(160)	114 **71%**	50 **44%**	73 **64%**	46 **63%**

Base: Facilities where technicians support pharmacists

Table F-1 summarizes the functions performed by technicians, indicating for each function whether another technician checks the work as performed by a technician and whether technicians must complete a validation program before performing the function or checking another technician's work. Validation refers to a process internal to each pharmacy department, designed to ensure that the pharmacy technician is qualified to perform the particular task. It is based on a defined policy and/or procedure that describes the training required to perform the

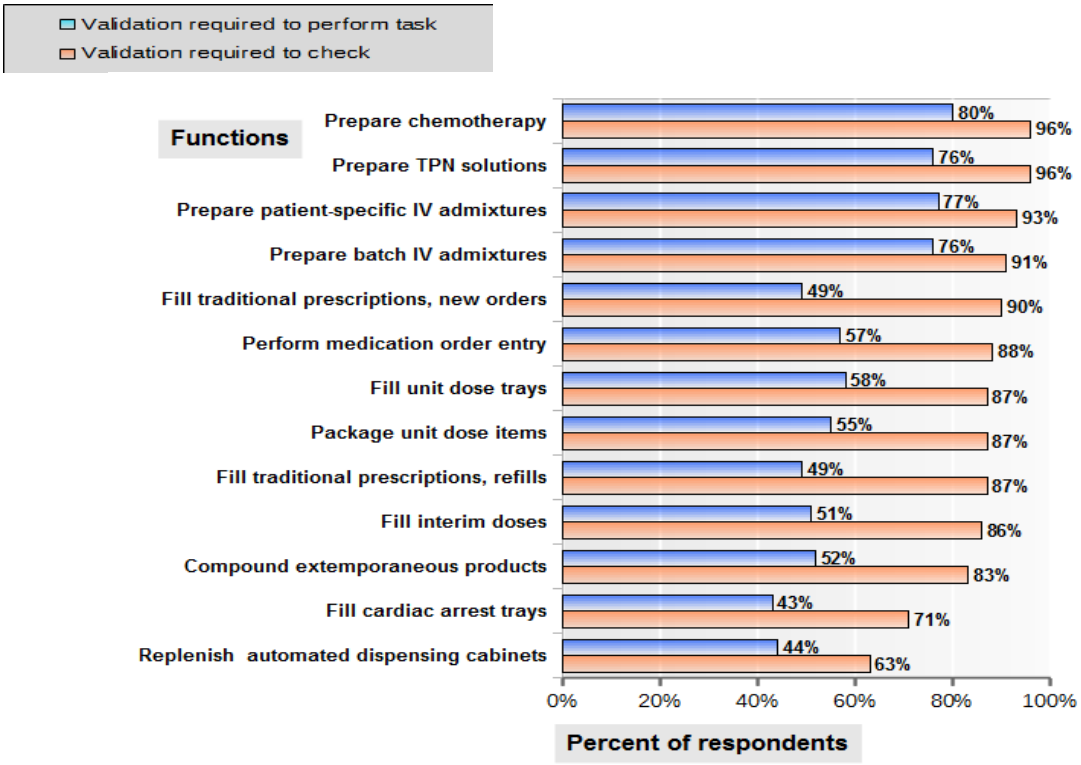
task and establishes the objective assessment criteria that will be used to confirm the pharmacy technician's ability to perform the specific task with a high degree of accuracy.

For the activity of replenishing automated dispensing cabinets, there was a high degree of variability by region and by facility size.

- The rate of pharmacy technicians performing specific functions has remained largely unchanged over the last three reports.
- The only activity that has seen steady growth in performance by technicians has been replenishing automated dispensing cabinets, for which the percentage of facilities where pharmacy technicians perform that specific function has risen from 61% (93/152) in the 2009/10 report to 64% (102/159) in the 2011/12 report to 71% (114/160) in the 2013/14 report. This measure had notable regional variation, with lower rates in BC (48%, 13/27) and the Prairie provinces (AB, SK, MB, NT) (55%, 17/31) and rates exceeding 80% in ON, QC and the Atlantic provinces (NB, PE, NS, NL). Furthermore, rates varied with facility size, the highest rate occurring in facilities with a bed count above 500 (93%, 42/45) and the lowest in facilities with a bed count of 50 to 200 (55%, 23/42).

A pattern noted in the 2011/12 report was that validation was more commonly required to allow a pharmacy technician to check a task than to perform that task. This observation is consistent with the overall belief that if a technician has the final "sign-off" before a product is released to a patient, then stronger quality controls are required than would be the case if a pharmacist did the final check. This pattern was borne out by the 2013/14 results (Figure F-1). The requirement for validation to check the work of others was most prominent in areas with the greatest perceived risk, such as preparation of chemotherapy and preparation of total parenteral nutrition solutions.

Figure F-1. Validation Requirements for Technicians to Perform and Check Various Tasks, 2013/14



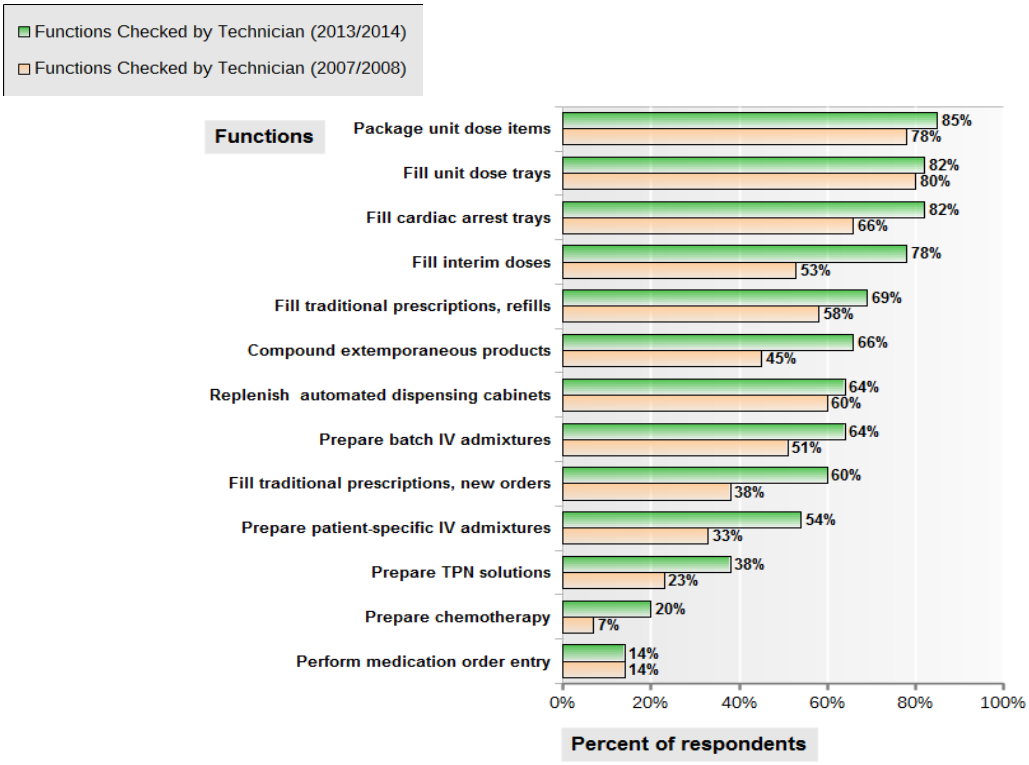
Base for 'Validation Required for Performing Task': Respondents reporting that technicians perform that activity (Table F-1, Column B, n=114-159)
Base for 'Validation Required for Checking': Respondents reporting that technicians check that activity performed by technicians (Table F-1, Column D, n=17-128)

If the results presented in the 2013/14 report are compared with those in the past two reports, it is difficult to identify any substantial shift in the way technicians practise within facilities. However, looking back three reports to 2007/08 reveals a clearer shift in practice. Figure F-2 shows the trends in activities that are checked by technicians between the 2007/08 report and the 2013/14 report. It is evident that the proportion of facilities where technicians check the work of other technicians has grown over this period. Even for activities where errors would lead to greater patient risk, such as batch preparation of intravenous (IV) admixtures, preparation of patient-specific IV mixtures and preparation of total parenteral nutrition solutions, there was an increase of at least 10 percentage points since 2007/08. The rate at which technicians check the work of other technicians in the

The rate of pharmacy technicians checking the work of other technicians has increased steadily over the past four reports.

preparation of chemotherapy remains relatively low, at 20% (28/140), but has almost tripled since the 2007/08 report.

Figure F-2. Functions Checked by Pharmacy Technicians, 2007/08 vs. 2013/14



Base for 'Functions Checked by Technician (2014)': Respondents reporting that technicians perform that activity (Table F-1, Column B, n=114-159)
Base for 'Functions Checked by Technician (2008)': Respondents reporting that technicians perform that activity (Table D-5, Column B, n= 38 to 122)

The 2011/12 report noted a decreasing trend in requirements for validation to allow pharmacy technicians to check various activities. More specifically, for all activities except preparation of chemotherapy, the proportion of respondents requiring validation to perform a check decreased from 2009/10 to 2011/12. This trend was not borne out in the 2013/14 report, in which, for all activities, the rate of a validation requirement stayed the same or increased relative to the 2011/12 report. It is unclear why there was a transient, across-the-board decrease in this measure for the 2011/12 report.

Pharmacy Technician Support for Clinical Pharmacy Services

The participation of pharmacy technicians in activities that support clinical pharmacy services, in addition to supporting drug distribution, was first assessed in the 2007/08 report. The types of activities assessed have varied over the intervening period.

- In the 2013/14 survey, 77% (123/160) of respondents reported that pharmacy technicians performed tasks that directly supported pharmacists in carrying out their clinical activities, an increase from the 69% (116/169) in the 2011/12 report.

- The proportion of respondents who stated that pharmacy technicians performed the task of collecting and collating information concerning patients' pre-admission drug therapy (the first steps in admission medication reconciliation) rose sharply between the 2009/10 report and the 2011/12 report but showed no further growth in the current report, staying at 70% (86/123). However, a great deal of regional disparity was noted, with respondents reporting technicians' support of this clinical activity in 92% (12/13) of Atlantic institutions but only 41% (9/22) of Prairie institutions.

Over three-quarters of respondents reported that pharmacy technicians performed tasks that directly supported clinical activities.

- The rate of pharmacy technicians being tasked to support an institution's medication safety committee was 27% (33/123), which reflects a steady decline since this measure was first reported, in the 2007/08 report (45%, 48/107). At that time, support of the medication safety committee was the second most common activity of pharmacy technicians to support pharmacists in carrying out their clinical activities.

Table F-2 summarizes the roles that pharmacy technicians play in direct support of the pharmacist's clinical role.

Table F-2. Support Roles for Pharmacy Technicians for Clinical Pharmacy Services, 2013/14

		Bed Size			Teaching Status		Region				
	All	50-200	201-500	>500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
(n=)	(160)	(44)	(72)	(44)	(35)	(125)	(26)	(32)	(42)	(42)	(18)
Pharmacy technicians perform tasks that directly support pharmacists in carrying out their clinical activities	123 **77%**	29 **66%**	54 **75%**	40 **91%**	27 **77%**	96 **77%**	15 **58%**	22 **69%**	35 **83%**	38 **90%**	13 **72%**
Tasks performed by pharmacy technicians											
(n=)	(123)	(29)	(54)	(40)	(27)	(96)	(15)	(22)	(35)	(38)	(13)
Serve as the initial Pharmacy liaison for solving drug distribution problems	101 **82%**	24 **83%**	48 **89%**	29 **73%**	21 **78%**	80 **83%**	11 **73%**	17 **77%**	29 **83%**	31 **82%**	13 **100%**
Collect and collate information concerning the patient's pre-admission drug therapy	86 **70%**	16 **55%**	35 **65%**	35 **88%**	26 **96%**	60 **63%**	7 **47%**	9 **41%**	28 **80%**	30 **79%**	12 **92%**
Create initial inpatient drug therapy documentation and discharge drug therapy plan at discharge	25 **20%**	4 **14%**	14 **26%**	7 **18%**	8 **30%**	17 **18%**	3 **20%**	1 **5%**	7 **20%**	12 **32%**	2 **15%**
Collect laboratory test results to support drug therapy evaluation / monitoring	24 **20%**	3 **10%**	16 **30%**	5 **13%**	8 **30%**	16 **17%**	6 **40%**	6 **27%**	0 **0%**	9 **24%**	3 **23%**
Assemble pamphlets and documentation to be given to the patient	23 **19%**	5 **17%**	12 **22%**	6 **15%**	6 **22%**	17 **18%**	3 **20%**	5 **23%**	6 **17%**	5 **13%**	4 **31%**
Calculate changes to parenteral nutrition therapy	8 **7%**	0 **0%**	5 **9%**	3 **8%**	4 **15%**	4 **4%**	4 **27%**	0 **0%**	2 **6%**	1 **3%**	1 **8%**
Collate information used in the preparation of drug formulary submissions	15 **12%**	8 **28%**	4 **7%**	3 **8%**	0 **0%**	15 **16%**	2 **13%**	3 **14%**	5 **14%**	3 **8%**	2 **15%**
Assist in collection of data for presentation to the Medication Safety Committee	33 **27%**	6 **21%**	14 **26%**	13 **33%**	5 **19%**	28 **29%**	4 **27%**	2 **9%**	17 **49%**	5 **13%**	5 **38%**
Collect data for drug utilization review to support the drug use evaluation program	35 **28%**	12 **41%**	11 **20%**	12 **30%**	8 **30%**	27 **28%**	3 **20%**	5 **23%**	14 **40%**	6 **16%**	7 **54%**
Other	21 **17%**	5 **17%**	10 **19%**	6 **15%**	3 **11%**	18 **19%**	4 **27%**	6 **27%**	6 **17%**	4 **11%**	1 **8%**

Base: Facilities where pharmacy technicians perform tasks that directly support pharmacists in carrying out their clinical activities
Note: multiple mentions permissible

The involvement of pharmacy technicians in activities related to admission medication reconciliation was unchanged from the 2011/12

With the expansion of the literature regarding pharmacy technicians' role in the creation of best possible medication histories, it will be necessary to further examine the direction of this question set for future surveys. Currently, the questions are designed to assess to degree to which pharmacy technicians support pharmacists in carrying out their clinical activities, but as the practice of technicians evolves, the survey should begin ascertaining the extent to which pharmacy technicians are directly supporting patient care through certain activities.

Technician Licensing through a Regulatory Authority

Previous surveys assessed pharmacy technician certification by recognized external bodies, specifically the Pharmacy Technician Certification Unit of the Ontario College of Pharmacists, the Pharmacy Technician Certification Board of Alberta, and the PEBC. As noted above, legislation that is now in place in seven provinces (five as of March 31, 2014, the cut-off date for information in the 2013/14 Hospital Pharmacy in Canada Report) protects the Pharmacy Technician title and confers regulatory authority over the practice of pharmacy technicians upon the respective provincial colleges or boards of pharmacy. As such, the survey now assesses the uptake of regulated or licensed pharmacy technicians within hospital practice. Furthermore, the PEBC is now the only institution recognized as providing competency assessment for pharmacy technicians, taking on the role that the Ontario College of Pharmacists Pharmacy Technician Certification Unit and the Pharmacy Technician Certification Board of Alberta previously provided for their respective provinces. Table F-3 displays responses to the question of whether "pharmacy technicians [are] regulated or licensed through a provincial regulatory authority" in each province and also displays the proportion of pharmacy technical staff regulated or licensed by a provincial regulatory authority.

- In provinces where pharmacy technician regulation was in place at the time of the survey, the percentage of respondents who indicated that pharmacy technicians were regulated or licensed through a provincial regulatory authority in their province was only 93% (94/101).

Although it might be anticipated that pharmacy directors' responses to this question would be consistent within each province, discrepancies were noted.

There appears to be confusion on the part of some pharmacy directors as to whether pharmacy technicians are regulated or licensed through their respective provincial regulatory authorities.

- In both MB and NS, not all of the pharmacy directors indicated that pharmacy technicians were regulated or licensed, despite legislation being in place in both of these jurisdictions. This discrepancy may relate to the fact that the changes in legislation had occurred relatively recently in both of these provinces.

Table F-3. Regulated/Licensed Pharmacy Technicians, 2013/14

	All	Teaching Status		Province				
				Legislation In Place as of March 31, 2014				
		Teaching	Non-teaching	BC	AB	MB	ON	NS
Pharmacy technicians licensed or regulated / licensed through a provincial regulatory authority (n=)	(101)	(20)	(81)	(26)	(12)	(13)	(42)	(8)
	94	20	74	26	12	7	42	7
	93%	**100%**	**91%**	**100%**	**100%**	**54%**	**100%**	**88%**
Base: All respondents in provinces with Pharmacy Technician regulation in place								
Percentage of staff that perform technical functions regulated / licensed by a provincial regulatory authority (n=)	(94)	(20)	(74)	(26)	(12)	(7)	(42)	(7)
less than 10%	17	3	14	3	0	7	0	7
	18%	**15%**	**19%**	**12%**	**0%**	**100%**	**0%**	**100%**
10 to 50%	19	7	12	4	2	0	13	0
	20%	**35%**	**16%**	**15%**	**17%**	**0%**	**31%**	**0%**
51 to 90%	38	7	31	15	0	0	23	0
	40%	**35%**	**42%**	**58%**	**0%**	**0%**	**55%**	**0%**
greater than 90%	20	3	17	4	10	0	6	0
	21%	**15%**	**23%**	**15%**	**83%**	**0%**	**14%**	**0%**

Base: Respondents who state that technicians are regulated / licensed

- Among the five provinces that had regulation of pharmacy technicians in place as of March 31, 2014, a substantial degree of variation was noted in terms of the reported proportion of staff that were regulated or licensed.
- The rate of respondents with greater than 90% of pharmacy technical staff regulated or licensed through the pertinent provincial regulatory authority was highest for AB (83%, 10/12).
- In both ON (69%, 29/42) and BC (73%, 19/26), a majority of respondents reported having greater than 50% of pharmacy technical staff regulated or licensed through the pertinent provincial regulatory authority.
- All respondents from MB and NS reported having less than 10% of their pharmacy technical staff regulated or licensed through the pertinent provincial regulatory authority.

Table F-4. Recognition of and Support for Technician Certification and Regulation, 2013/14

	All	Teaching Status		Province (Legislation In Place as of March 31, 2014)					Province (No Legislation In Place as of March 31, 2014)					
		Teaching	Non-teaching	BC	AB	MB	ON	NS	YT/ NT	SK	QC	NB	PE	NL
Educational sessions have been provided to inform pharmacy technicians. (n=)	(162)	(35)	(127)	(26)	(12)	(13)	(42)	(8)	(2)	(7)	(42)	(7)	(2)	(1)
	109	26	83	26	11	11	38	7	0	3	6	5	1	1
	67%	**74%**	**65%**	**100%**	**92%**	**85%**	**90%**	**88%**	**0%**	**43%**	**14%**	**71%**	**50%**	**100%**
Pharmacy technician job descriptions have been revised, requiring new hires to be certified. (n=)	(162)	(35)	(127)	(26)	(12)	(13)	(42)	(8)	(2)	(7)	(42)	(7)	(2)	(1)
	86	19	67	25	11	6	36	4	0	0	4	0	0	0
	53%	**54%**	**53%**	**96%**	**92%**	**46%**	**86%**	**50%**	**0%**	**0%**	**10%**	**0%**	**0%**	**0%**
Existing pharmacy technicians are required to be certified. (n=)	(161)	(35)	(126)	(26)	(12)	(13)	(42)	(7)	(2)	(7)	(42)	(7)	(2)	(1)
	92	20	72	25	12	3	41	2	0	4	3	1	0	1
	57%	**57%**	**57%**	**96%**	**100%**	**23%**	**98%**	**29%**	**0%**	**57%**	**7%**	**14%**	**0%**	**100%**
Financial support is being provided to pharmacy technicians who wish to become certified. (n=)	(161)	(35)	(126)	(26)	(12)	(13)	(42)	(7)	(2)	(7)	(42)	(7)	(2)	(1)
	55	10	45	8	1	1	41	2	1	1	0	0	0	0
	34%	**29%**	**36%**	**31%**	**8%**	**8%**	**98%**	**29%**	**50%**	**14%**	**0%**	**0%**	**0%**	**0%**

Base: All respondents

- The percentage of respondents indicating that job descriptions had been revised to include a requirement that new hires be regulated pharmacy technicians rose, from 44% (73/166) in 2011/12 to 53% (86/162) in 2013/14, an increase of 9 percentage points (Table F-4).

- The percentage of respondents indicating that financial support was being provided to pharmacy technicians who wished to become certified dropped from 45% (73/162) in 2011/12 to 34% (55/161) in 2013/14. The reduction was seen across all provinces.

In all provinces, there was a decline in the proportion of respondents who reported that financial support was being provided to pharmacy technicians who wished to become certified.

Integration of the Pharmacy Technician Workforce

At present, legislation to regulate pharmacy technicians is either enacted or at some point in development in nine provinces. There is little doubt that the greater authority that pharmacy technicians will be granted through legislation is ideally suited for work within institutional hospital pharmacy. Although it is expected that the adoption of regulated pharmacy technicians into hospitals' workforce will, in time, be universal, it is now apparent that even four years after the adoption of regulation in some jurisdictions, there remains a substantial proportion of pharmacy technical staff who are not working as regulated pharmacy technicians. Significant effort is still needed to move large numbers of those currently working as non-regulated pharmacy technicians to fully regulated positions. In addition, contingency planning is needed for those currently working as non-regulated pharmacy technicians who do not proceed to full certification. These two activities (shifting pharmacy technicians into regulated positions and making contingency plans for those who do not become certified) are not mutually exclusive, and some aspect of each will likely occur in individual institutions. A series of questions first posed in the 2011/12 survey and further refined for the 2013/14 survey were designed to elucidate how these integrative steps are being taken. Table F-5 examines the degree to which hospital pharmacy departments have already reached decisions about those who do not qualify as "Pharmacy Technicians" and the nature of those decisions.

Table F-5. Management of Individuals Who Do Not Qualify as Regulated Pharmacy Technicians, 2013/14

		Teaching Status		Province (Legislation In Place as of March 31, 2014)				
	All	Teaching	Non-teaching	BC	AB	MB	ON	NS
(n=)	(101)	(20)	(81)	(26)	(12)	(13)	(42)	(8)
Facility has made decisions concerning the future of previously employed 'Pharmacy Technicians' who fail to qualify.	81	16	65	25	12	8	36	0
	80%	**80%**	**80%**	**96%**	**100%**	**62%**	**86%**	**0%**
Base: All respondents in provinces with Pharmacy Technician license regulation in place								
Employment treatment of former pharmacy technicians who do not qualify as Pharmacy Technicians								
(n=)	(80)	(16)	(64)	(25)	(12)	(8)	(35)	(0)
Their employment with your facility will be terminated.	34	8	26	0	12	0	22	0
	43%	**50%**	**41%**	**0%**	**100%**	**0%**	**63%**	**0%**
They will be offered positions elsewhere in the organization where registration as a pharmacy technician is not required.	11	5	6	3	0	0	8	0
	14%	**31%**	**9%**	**12%**	**0%**	**0%**	**23%**	**0%**
They will be given a new title and continue to work in the pharmacy department.	17	1	16	6	0	8	3	0
	21%	**6%**	**25%**	**24%**	**0%**	**100%**	**9%**	**0%**
Not yet determined	18	2	16	16	0	0	2	0
	23%	**13%**	**25%**	**64%**	**0%**	**0%**	**6%**	**0%**
Base: Facilities where decisions have been made re pharmacy technicians in provinces with Pharmacy Technician regulation in place								
Responsibilities of former pharmacy technicians who do not qualify for as a regulated pharmacy technician and will continue to work in the pharmacy department								
(n=)	(17)	(1)	(16)	(6)	(0)	(8)	(3)	(0)
They will continue to perform the same duties, with the exception of tasks that by law can only be performed by a regulated pharmacy technician.	11	0	11	2	0	8	1	0
	65%	**0%**	**69%**	**33%**	**0%**	**100%**	**33%**	**0%**
They will have a new position description that limits their responsibilities to very basic activities.	3	1	2	2	0	0	1	0
	18%	**100%**	**13%**	**33%**	**0%**	**0%**	**33%**	**0%**
Not yet determined	3	0	3	2	0	0	1	0
	18%	**0%**	**19%**	**33%**	**0%**	**0%**	**33%**	**0%**
Salary treatment of former pharmacy technicians who do not qualify as a regulated pharmacy technician and will continue to work in the pharmacy department								
(n=)	(17)	(1)	(16)	(6)	(0)	(8)	(3)	(0)
They will continue to be paid on the same salary scale as the regulated pharmacy technicians.	1	0	1	0	0	1	0	0
	6%	**0%**	**6%**	**0%**	**0%**	**13%**	**0%**	**0%**
They will be placed on a new salary scale and 'red-circled'.	3	0	3	1	0	1	1	0
	18%	**0%**	**19%**	**17%**	**0%**	**13%**	**33%**	**0%**
They will be placed on a new salary scale that will pay them less.	3	1	2	2	0	0	1	0
	18%	**100%**	**13%**	**33%**	**0%**	**0%**	**33%**	**0%**
Not yet determined	10	0	10	3	0	6	1	0
	59%	**0%**	**63%**	**50%**	**0%**	**75%**	**33%**	**0%**
Base: Facilities where former pharmacy technicians will be given a new title and continue to work in the pharmacy department in provinces with Pharmacy Technician license legislation in place								

- Overall, 80% (81/101) of respondents in provinces with pharmacy technician regulation in place at the time of the survey indicated that they had made some decisions about the future of previously employed pharmacy technicians who do not qualify to become certified as "Pharmacy Technicians" and can no longer use that title (Table F-5). Surprisingly, the number of respondents with a positive response to this question is almost unchanged from the 2011/12 report (88/166), despite an additional two provinces having established regulation of pharmacy technicians since the previous report. Those regions where regulation of pharmacy technicians has been in place for longer, BC (96%, 25/26) and ON (86%, 36/42), had the highest reported decision rates for 2013/14.

Twenty percent of respondents had not made decisions about previously employed pharmacy technicians who do not qualify as regulated pharmacy technicians.

- Of respondents who reported that their institutions had made decisions about those who do not qualify to become certified as pharmacy technicians, there was a fairly even split between those that have decided that employment of these individuals within the facility will be terminated (43%, 34/80) and those that will retain these staff members, either in positions elsewhere in the organization (14%, 11/80) or under a new title such as "Pharmacy Assistant" (21%, 17/80).

- For the 21% (17/80) of respondents whose institutions have decided that they will be giving these individuals a new title, such as "Pharmacy Assistant", a majority (65%, 11/17) further indicated that these staff members will continue to perform the same duties, with the exception of tasks that can be performed only by a regulated pharmacy technician.

- There seems to be less certainty about how individuals with a new title, such as "Pharmacy Assistant", will be paid. Among respondents whose institutions have decided that they will be using a new position title, 59% (10/17) indicated that the salary range had not been determined by the time of the survey.

Table F-6 examines how hiring practices will change in this new environment of pharmacy technician regulation. Among those who indicated that their institutions had made decisions about those who do not qualify to become regulated pharmacy technicians, it was clear that there was no universally agreed-upon direction related to planned hiring practices once pharmacy technician regulation comes into effect.

Table F-6. Planned Pharmacy Technician Hiring Practices, 2013/14

		Teaching Status		Province (Legislation In Place as of March 31, 2014)				
	All	Teaching	Non-teaching	BC	AB	MB	ON	NS
(n=)	(81)	(16)	(65)	(25)	(12)	(8)	(36)	(0)
Only registered pharmacy technicians will be hired to work in the department.	48 **59%**	11 **69%**	37 **57%**	4 **16%**	12 **100%**	0 **0%**	32 **89%**	0 **0%**
Registered technicians will be hired as 'pharmacy technician' and others will be hired under another title.	30 **37%**	5 **31%**	25 **38%**	20 **80%**	0 **0%**	6 **75%**	4 **11%**	0 **0%**
not yet determined	3 4%	0 **0%**	3 **5%**	1 4%	0 0%	2 25%	0 0%	0 0%

Base: Facilities where decisions have been made re pharmacy technicians in provinces with Pharmacy Technician regulationion in place

- The two provinces with the most experience with the regulation of pharmacy technicians, ON and BC, have gone in different directions with regard to hiring practices in the new environment (Table F-6): in ON, 89% (32/36) indicated that only regulated pharmacy technicians will be hired and that no second category of support personnel will be created; however, in BC, 80% (20/25) reported a less restrictive stance, whereby regulated pharmacy technicians will be hired with the Pharmacy Technician title and others will be hired under another title.

It had been expected that in the two years following the 2011/12 report, substantial progress would be made in defining how pharmacy technicians and those who do not become regulated pharmacy technicians will be handled in Canadian hospital environments. Although the degree of certainty has increased slightly, this issue remains a substantial question in many jurisdictions.

Pharmacy Technician Salaries

For a summary and discussion of pharmacy technicians' salaries, see Chapter D, Human Resources.

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G - Future Trends in Pharmacy Practice

Kevin Hall and Jean-François Bussières

Although the Hospital Pharmacy in Canada Report tracks a wide range of indicators and presents a detailed profile of current trends in pharmacy practice, the Editorial Board decided that it would also be worthwhile to explore the beliefs of Canadian hospital pharmacy directors concerning what the future might hold for hospital pharmacy. John F. Kennedy once said, "Change is the law of life. And those who look only to the past or present are certain to miss the future."[1] In the United States (US), the American Society of Health-System Pharmacists (ASHP) has introduced an annual forecasting tool for health systems in that country.[2] The Hospital Pharmacy in Canada Survey used some of the forecast statements that appear in the ASHP forecasting tool, but differences in healthcare systems between Canada and the US necessitated development of our own forecasting tool and data collection methodology.

The Editorial Board was cognizant of the fact that forecasting efforts by individuals, even experts in their fields, can turn out to be embarrassingly wrong. By way of example, Thomas Watson, the chairman of IBM in 1943, is purported to have said, "I think there is a world market for maybe five computers."[3] What can be done, from a methodological perspective, to improve the level of confidence in predictions about the future? In his book The Wisdom of Crowds: Why the Many are Smarter than the Few and How Collective Wisdom Shapes Business, Economies, Societies, and Nations,[4] Surowiecki argued that aggregated data from groups of informed, independent individuals can result in predictions and decisions that are better than those of individual experts. One advantage within the hospital pharmacy practice setting in Canada is the existence of an established, nation-wide survey of hospital pharmacy, the Hospital Pharmacy in Canada Survey, which consistently achieves a response rate of 75% to 80% for all hospitals in Canada with 50 or more acute care beds. The approximately 170 hospital pharmacy directors who regularly participate in each of the biennial Hospital Pharmacy in Canada Surveys fulfill Surowiecki's criteria of being well informed and independent. Who better to ask, as members of a "wise crowd", to contribute their individual perspectives to help create a well-informed group perspective of what future Canadian hospital pharmacy practice is likely to look like in a number of key areas?

In the 2013/14 Hospital Pharmacy in Canada Survey, directors of pharmacy were asked to respond to 40 statements describing the potential future of hospital pharmacy practice in Canada at a point five years in the future (i.e., 2019). The 40 statements covered future scenarios in six domains: hospital pharmacy leadership, pharmacy practice models, ambulatory care, pharmacy operations, pharmacy informatics and the pharmaceutical marketplace. Respondents were asked to indicate, for each statement, the likelihood (very likely, somewhat likely, somewhat unlikely, very unlikely or not applicable) that the statement would accurately reflect reality in their respective hospitals in the year 2019.

To facilitate the written summary provided here and the communication of future trends data, the responses were aggregated into groupings of "likely" (i.e., responses of "very likely" and "somewhat likely") and "unlikely" (i.e., responses of "very unlikely" and "somewhat unlikely"). The data tables in this chapter show the aggregated "likely" and "unlikely" results, as well as details for all response options. These tables do not present regional data, but where regional results are mentioned in the discussion below, the Atlantic provinces comprise New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE) and Newfoundland and Labrador (NL), and the Prairies comprise Alberta (AB), Saskatchewan (SK), Manitoba (MB) and the Northwest Territories (NT).

Hospital Pharmacy Leadership

The statements in the domain of leadership dealt with issues that pharmacy leaders must address in order to optimize the performance of their respective pharmacy departments. Results for the statements included in this section, which reflect "leadership best practices", are presented in Table G-1.

- Overall, 92% (155/169) of respondents thought it likely that their departments would have a strategic planning process in place by 2019, including establishment of goals, a system for tracking achievement and annual reporting to senior management. These results were consistent across subgroups, with over 80% of respondents in all subgroups based on hospital size, teaching status and geographic region anticipating that strategic planning would be in place in their departments by 2019.

Strategic planning is a structured, step-by-step process for ensuring that an organization is aware of the changes occurring in its environment and develops future-oriented strategies to address both the threats and the opportunities that have been identified. The survey results suggest that most hospital pharmacy directors are aware of the importance of strategic planning and, if such planning does not already exist, expect that a formal, structured approach will be in place in their respective departments by 2019. Many pharmacy directors have been exposed to the type of strategic planning that the ASHP has done through its Pharmacy Practice Model Initiative.[5] In Canada, the Canadian Pharmacists Association has led the Blueprint for Pharmacy initiative,[6] and the Canadian Society of Hospital Pharmacists (CSHP) has been working on its CSHP 2015 initiative[7] since the early 2000s.

- Sixty-three percent (106/168) of respondents thought it likely that, by 2019, their respective hospital pharmacy departments would have a formal, documented succession plan for key leadership positions. The percentages of respondents who thought this scenario likely were highest in British Columbia (BC)/Yukon (YT) (86%, 24/28) and in teaching hospitals (76%, 32/42) and were lowest in the Atlantic provinces (58%, 11/19), the smallest hospitals (50–200 beds; 54%, 25/46) and the Prairies (50%, 17/34).

Given the large number of baby boomers now leaving the workforce, development of a formal succession plan seems a wise investment. For example, a recent paper made the case that leadership succession planning is crucial to achieving a pharmacy department's vision.[8] As such, it was somewhat surprising that more than one-third of respondents thought it unlikely that their pharmacy departments would have a formal succession plan by 2019. This issue may become more critical over time, given the difficulty that many hospital pharmacy directors are encountering when they try to interest front-line pharmacists in management positions that become available. Good leadership succession planning should include opportunities for pharmacists to observe and learn from seasoned managers before having to make the decision to move into a management position.

Succession planning is difficult where pharmacists evince a lack of interest in transitioning to management positions.

- Only 45% (72/161) of respondents thought it likely that, by 2019, their pharmacy departments would have a research and/or practice development unit staffed by pharmacists and/or technicians with research and/or practice development assignments. As might be expected, hospital size and teaching status seemed to be important factors in determining the likelihood of such a unit. Only 28% (12/43) of respondents from the smallest hospitals (50–200 beds) thought that this scenario was likely, whereas 55% (24/44) of respondents from the largest hospitals (> 500 beds) thought this scenario likely. A large percentage of respondents from teaching hospitals (83%, 35/42) thought such a unit was likely, whereas only 31% (37/119) of respondents from non-teaching hospitals expected to have such a unit.

The Pharmacy Practice Research Unit at the Centre hospitalier universitaire Sainte-Justine in Montréal, created in 2002, is one example of a hospital-based pharmacy practice research unit.[9]

- Eighty percent (136/169) of respondents thought it likely that, by 2019, hospital brochures would include a description of patient care services offered by pharmacists. For most subgroups based on hospital size, teaching status and region, more than 75% of respondents thought this scenario was likely. The exception was the Prairies, where only 53% (18/34) of respondents thought this scenario was the likely reality in 2019.

In the past, patients have had access to very little information concerning the services they should expect to receive while being cared for in the hospital setting. The current emphasis on patient-centred care is changing that. Patients are now being empowered to become more engaged in the care process; however, to fully participate in their own care, they need to know what they can expect from various healthcare providers. The inclusion of information about the pharmacist's role in hospital information brochures is one step toward ensuring that pharmacists' expertise can be harnessed to help optimize patient care outcomes, particularly drug-related outcomes.

- Ninety-six percent (163/169) of respondents thought it likely that, by 2019, their respective departments would ensure that pharmacists identify themselves during interactions with patients. Furthermore, more than 90% of respondents in all subgroups based on hospital size, teaching status and region thought this scenario likely.

Pharmacists should be engaged in direct, personal interactions with their patients, and patients should ideally know the names and professional designations of the people delivering their care. This form of interaction is important, both for building relationships with patients and for ensuring accountability for the care provided. All pharmacy staff members, including students, residents and technicians, should be expected to clearly identify themselves to every patient and to describe their role in the patient's care during the hospital stay.

- More than three-quarters (78%, 129/165) of respondents thought it likely that, by 2019, their respective hospitals would include in patient satisfaction surveys a question about the patient's recall of interactions with a pharmacist. More than 70% of respondents in all subgroups based on hospital size, teaching status and region thought this scenario was likely. The response was highest for BC/YT, where 96% (26/27) of respondents expressed their belief that such a question would be present in their hospitals' patient satisfaction surveys.

The statements about interactions with patients and patients' recall of interactions with pharmacists are closely related. Most hospital inpatients will receive drug therapy of some kind. If pharmacists are truly practising patient-centred care, they should be interacting with patients, and if those interactions are meaningful to patients, there is a good possibility that the patients will remember them.

- Only 12% (20/168) of respondents thought that, by 2019, their pharmacy department was likely to be managed by a non-pharmacist. The subgroups with the highest percentages of respondents who thought this scenario likely were from Ontario (ON; 28%, 12/43) and the Atlantic provinces (22%, 4/18).

In certain well-known examples, the head of the pharmacy department has not been a pharmacist, and the arrangement has seemed to work well in some cases. In those instances, the non-pharmacist director was supported by excellent managers who had a pharmacy background and in-depth knowledge of the pharmacy profession. However, the argument could be made that if a director of pharmacy with a pharmacy background has been bringing the full benefit of his or her knowledge and expertise to the position, it is unlikely that the hospital's administration would think that a non-pharmacist could bring equivalent value to the position. The survey results suggest that most pharmacy directors are confident that they bring that level of expertise to the director position and believe it unlikely that a non-pharmacist will be managing their department in 2019. Nonetheless, as noted in the discussion of responses for the earlier question on succession planning, hospitals may have difficulty finding a suitable management candidate who is also a pharmacist for the position of director of pharmacy. In 2005, CSHP adopted and published a position statement presenting five reasons why a licensed pharmacist is best suited to hold the position of head of hospital pharmacy services.[10] Although a majority of pharmacists do firmly believe that the head of pharmacy should be pharmacist, the CSHP position statement was the subject of considerable debate within the Canadian hospital pharmacy community.[11,12]

- Ninety-three percent (157/168) of respondents thought it likely that, by 2019, their hospitals would have established a requirement to include a hospital pharmacist on every quality improvement committee concerned with improving outcomes related to medication therapy. For all subgroups based on hospital size, teaching status and region, the percentage of respondents with this view was at least 85%.

These results suggest that most pharmacy directors believe that the expertise of their staff members is recognized by hospital administrators and that this recognition will result in the future inclusion of a pharmacist on any committee dealing with medication management issues. The Medication Management Standards of Accreditation Canada reinforce the need for hospital pharmacists on such committees.[13]

The responses for the 8 statements in the leadership domain suggest that, with few exceptions, a large proportion of respondents believe that most of these "leadership best practices" will be in place in their organizations by 2019.

Table G-1. Future Trends in Hospital Pharmacy Leadership, 2013/14

			Bed Size			Teaching Status	
		All	50-200	200-500	>500	Teaching	Non-teaching
(01) Your hospital pharmacy departments will have a systematic strategic planning process in place that includes the establishment of explicit goals, a system for tracking the achievement of those goals, and an annual report to senior management.	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	155	39	74	42	40	115
		92%	**85%**	**95%**	**93%**	**95%**	**91%**
	Unlikely	14	7	4	3	2	12
		8%	**15%**	**5%**	**7%**	**5%**	**9%**
	very likely	106	19	51	36	34	72
		63%	41%	65%	80%	81%	57%
	somewhat likely	49	20	23	6	6	43
		29%	43%	29%	13%	14%	34%
	somewhat unlikely	8	4	2	2	2	6
		5%	9%	3%	4%	5%	5%
	very unlikely	6	3	2	1	0	6
		4%	7%	3%	2%	0%	5%

Table G-1. Future Trends in Hospital Pharmacy Leadership, 2013/14 (continued)

		All	Bed Size			Teaching Status	
			50-200	200-500	>500	Teaching	Non-teaching
(02) Your hospital pharmacy department will have a formal, documented succession plan for key pharmacy leadership positions.	(n=)	(168)	(46)	(77)	(45)	(42)	(126)
	Likely	106	25	50	31	32	74
		63%	**54%**	**65%**	**69%**	**76%**	**59%**
	Unlikely	62	21	27	14	10	52
		37%	**46%**	**35%**	**31%**	**24%**	**41%**
	very likely	(44)	(5)	(25)	(14)	(9)	(35)
		26%	11%	32%	31%	21%	28%
	somewhat likely	62	20	25	17	23	39
		37%	43%	32%	38%	55%	31%
	somewhat unlikely	45	14	22	9	7	38
		27%	30%	29%	20%	17%	30%
	very unlikely	17	7	5	5	3	14
		10%	15%	6%	11%	7%	11%
(03) Your pharmacy department will have a research and/or practice development unit staffed by pharmacists and/or technicians who are assigned to research and/or practice development activities.	(n=)	(161)	(43)	(74)	(44)	(42)	(119)
	Likely	72	12	36	24	35	37
		45%	**28%**	**49%**	**55%**	**83%**	**31%**
	Unlikely	89	31	38	20	7	82
		55%	**72%**	**51%**	**45%**	**17%**	**69%**
	very likely	(22)	(4)	(11)	(7)	(11)	(11)
		14%	9%	15%	16%	26%	9%
	somewhat likely	50	8	25	17	24	26
		31%	19%	34%	39%	57%	22%
	somewhat unlikely	25	8	11	6	2	23
		16%	19%	15%	14%	5%	19%
	very unlikely	64	23	27	14	5	59
		40%	53%	36%	32%	12%	50%
(04) Brochures which describe your hospital's patient care services will include a description of the patient care services provided by your pharmacists.	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	136	35	60	41	38	98
		80%	**76%**	**77%**	**91%**	**90%**	**77%**
	Unlikely	33	11	18	4	4	29
		20%	**24%**	**23%**	**9%**	**10%**	**23%**
	very likely	(84)	(13)	(43)	(28)	(29)	(55)
		50%	28%	55%	62%	69%	43%
	somewhat likely	52	22	17	13	9	43
		31%	48%	22%	29%	21%	34%
	somewhat unlikely	18	3	11	4	4	14
		11%	7%	14%	9%	10%	11%
	very unlikely	15	8	7	0	0	15
		9%	17%	9%	0%	0%	12%
(05) Your pharmacy department will ensure that pharmacists, in their interactions with patients, identify themselves as a pharmacist, with the goal of insuring that patients accurately recall if they interacted with a pharmacist while in your hospital.	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	163	43	76	44	42	121
		96%	**93%**	**97%**	**98%**	**100%**	**95%**
	Unlikely	6	3	2	1	0	6
		4%	**7%**	**3%**	**2%**	**0%**	**5%**
	very likely	139	35	64	40	39	100
		82%	76%	82%	89%	93%	79%
	somewhat likely	24	8	12	4	3	21
		14%	17%	15%	9%	7%	17%
	somewhat unlikely	5	3	2	0	0	5
		3%	7%	3%	0%	0%	4%
	very unlikely	1	0	0	1	0	1
		1%	0%	0%	2%	0%	1%
(06) Your hospital will have a question in your patient satisfaction surveys which asks if patients recall interacting with a pharmacist while in your hospital.	(n=)	(165)	(45)	(77)	(43)	(41)	(124)
	Likely	129	35	59	35	34	95
		78%	**78%**	**77%**	**81%**	**83%**	**77%**
	Unlikely	36	10	18	8	7	29
		22%	**22%**	**23%**	**19%**	**17%**	**23%**
	very likely	(52)	(15)	(25)	(12)	(20)	(32)
		32%	33%	32%	28%	49%	26%
	somewhat likely	77	20	34	23	14	63
		47%	44%	44%	53%	34%	51%
	somewhat unlikely	31	9	17	5	6	25
		19%	20%	22%	12%	15%	20%
	very unlikely	5	1	1	3	1	4
		3%	2%	1%	7%	2%	3%

Table G-1. Future Trends in Hospital Pharmacy Leadership, 2013/14 (continued)

		All	Bed Size			Teaching Status	
			50-200	200-500	>500	Teaching	Non-teaching
(07) Your pharmacy department will be managed by an individual who is not a pharmacist.	(n=)	(168)	(46)	(77)	(45)	(41)	(127)
	Likely	20	5	11	4	3	17
		12%	**11%**	**14%**	**9%**	**7%**	**13%**
	Unlikely	148	41	66	41	38	110
		88%	**89%**	**86%**	**91%**	**93%**	**87%**
	very likely	9	2	6	1	0	9
		5%	4%	8%	2%	0%	7%
	somewhat likely	11	3	5	3	3	8
		7%	7%	6%	7%	7%	6%
	somewhat unlikely	52	12	29	11	9	43
		31%	26%	38%	24%	22%	34%
	very unlikely	96	29	37	30	29	67
		57%	63%	48%	67%	71%	53%
(08) Your hospital will have established a requirement that a hospital pharmacist must be included on every quality improvement committee that is involved in improving medication therapy-related outcomes.	(n=)	(168)	(46)	(78)	(44)	(42)	(126)
	Likely	157	43	71	43	42	115
		93%	**93%**	**91%**	**98%**	**100%**	**91%**
	Unlikely	11	3	7	1	0	11
		7%	**7%**	**9%**	**2%**	**0%**	**9%**
	very likely	105	22	53	30	31	74
		63%	48%	68%	68%	74%	59%
	somewhat likely	52	21	18	13	11	41
		31%	46%	23%	30%	26%	33%
	somewhat unlikely	7	3	3	1	0	7
		4%	7%	4%	2%	0%	6%
	very unlikely	4	0	4	0	0	4
		2%	0%	5%	0%	0%	3%

Base: All respondents

Pharmacy Practice Models

Pharmacy practice models represent attempts to describe how pharmacists and pharmacy support personnel function within an organization. The models are usually based on the proportion of time that pharmacists spend performing drug distribution and direct patient care activities. They usually also reflect the role that pharmacists play in decision-making about patients' drug therapy (e.g., proactive vs. reactive roles). Finally, practice models define the roles that pharmacy students and pharmacy technicians play in the delivery of care. The perspectives of pharmacy directors on future trends in the domain of pharmacy practice models are summarized in Table G-2.

- Only 49% (80/164) of respondents thought it likely that, by 2019, the number of graduates from accredited hospital pharmacy residency positions would be sufficient to allow at least 75% of vacant pharmacist positions to be filled by personnel who have completed such a program. The percentages with this viewpoint were higher for certain subgroups: 64% (29/45) of respondents from hospitals with over 500 beds and 56% (23/41) of respondents from teaching hospitals. Although 77% (34/44) of Quebec (QC) respondents and 71% (20/28) of BC/YT respondents thought it likely that there would be sufficient residency graduates to achieve the 75% target, only 6% (2/34) of respondents from the Prairies thought so.

Fewer than half of respondents envisioned enough residency graduates to fill 75% of vacant pharmacist positions.

CSHP and ASHP have suggested that hospitals should aim to hire pharmacists who, at a minimum, have completed an accredited hospital pharmacy residency program.[7,14] Unfortunately, the current number of residency positions is insufficient to produce the number of graduates required to achieve the 75% hiring goal. The results of this survey illustrate the problem well. In regions with relatively few residency positions (the Prairies and the Atlantic provinces), low percentages of respondents believed there would be enough residency graduates by 2019 to allow hiring to fill 75% of their vacancies. Given that residency-trained graduates are likely to prefer teaching hospitals or large hospitals with lots of specialty practice options, it is unsurprising that a lower percentage of respondents from the smallest hospitals (50–200 beds) believed it likely that they would be able to achieve the 75% target by 2019. In QC, the residency program has been a master's-level post-graduate degree since 1962, and more than 80% of hospital pharmacists working in QC have completed the master's/residency program.[15] It is therefore not surprising that a much higher proportion of QC respondents believed the statement would reflect reality in that province in 2019.

- Results for the statement that, by 2019, at least 75% of pharmacists hired by the respondent's hospital in the past year will have completed an accredited hospital pharmacy residency program were similar to those concerning the future availability of residency-trained pharmacists (see above), which suggests that the perceived likelihood of hiring residency-trained pharmacists will be closely related to their availability.

An argument could be made for a national strategy to significantly increase the number of residency positions throughout the country, to bring the rest of the country in line with QC, where most hospital pharmacists are trained, at a minimum, at the residency level.

- Eighty-three percent (140/169) of respondents thought it likely that, by 2019, at least 75% of pharmacists in their respective hospitals would be functioning in a clinical practice centred model, working largely in clinical roles and spending less than 20% of their time on distributive activities (e.g., preparing products, verifying orders and checking the distributive work of other pharmacists and technicians). The responses were similar regardless of hospital size, teaching status or region of the country.

The high proportion of pharmacy directors who thought it likely that at least 75% of their pharmacists would be practising in a clinical practice centred model by 2019 is encouraging, but only time will tell if widespread implementation of that model can be achieved by 2019. In another part of the 2013/14 survey, respondents indicated that only 19% of their pharmacists were currently practising in a clinical practice centred model (see Chapter B, Clinical Pharmacy Practice), a small decrease from the 20% figure reported in 2011/12. As such, there is a significant gap between the current reality (19% or 20% of pharmacists estimated to be practising in a clinical practice centred model) and the future reality (at least 75% or more of pharmacists to be practising in this model by 2019) considered likely by 83% of respondents.

- Ninety-four percent (159/169) of respondents thought it likely that, by 2019, their pharmacy departments would use technicians to perform at least 80% of medication distribution activities (including checking the accuracy of medication distribution activities performed by other technicians). The percentage of respondents who categorized this scenario as likely was over 90% in all subgroups based on hospital size, teaching status and region, except for the Atlantic provinces, where only 79% (15/19) of respondents thought this scenario likely by 2019.

The Hospital Pharmacy in Canada Reports over the past 10–15 years have documented a steady decrease in the reported percentage of pharmacists' time that is being spent performing drug distribution activities, with the latest value, for 2013/14, being 36% (see Figure D-2 in Chapter D, Human Resources) . These changes over time lend some support to the 94% of respondents who thought it likely that, by 2019, at least 80% of medication distribution activities in their hospitals would be performed by technicians.

- Eighty percent (128/161) of respondents thought that, by 2019, at least 50% of technical support staff (technicians and pharmacy assistants) would be regulated pharmacy technicians, with considerable variation in the regional responses. At the high end, 96% (27/28) of BC/YT respondents and 100% (43/43) of ON respondents thought it likely that at least half of their technical support staff would be regulated pharmacy technicians in 2019. This result is not surprising, given that BC and ON have already introduced technician regulation. In other regions, the percentages of respondents who thought this scenario likely were lower: 76% (26/34) in the Prairies, 68% (13/19) in the Atlantic provinces and 51% (19/37) in QC. Nonetheless, the fact that the rate of "likely" responses was at least 50% in every region, including QC (where there has been little movement toward technician regulation), suggests widespread acceptance in the hospital pharmacy community that technician regulation will soon be the reality in all provinces.

- Seventy-three percent (123/168) of respondents thought that, by 2019, the majority of pharmacy technicians in their respective departments would be reporting to a manager who is a pharmacy technician (not a pharmacist). The percentages of respondents who thought this scenario likely varied by subgroups, with the highest percentages in BC/YT (89%, 25/28) and in teaching hospitals (83%, 35/42) and the lowest percentages in QC (66%, 29/44) and ON (67%, 29/43). It might seem intuitive that technician regulation and the delegation of drug distribution activities to technicians would result in a natural progression toward having technicians assume management responsibility for the drug distribution centre. However, the data in this section of the survey do not necessarily support that conclusion. The percentages of respondents who envisioned pharmacy technician mangers assuming responsibility for managing other technicians in the drug distribution system were almost identical in ON (67%), where technician regulation has arguably progressed the farthest, and QC (66%), which has taken very few steps toward technician regulation.

- Seventy-nine percent (133/168) of respondents thought it likely that, by 2019, at least 20% of hospital pharmacists in their respective departments would have independent prescribing rights and would work in

collaborative practice models (including initiation and modification of patients' medication therapy). The percentages of respondents who thought this scenario likely were highest in teaching hospitals (86%, 36/42) and in hospitals with over 500 beds (89%, 40/45) and exceeded 70% in every subgroup based on hospital size, teaching status and region.

Results reported in Chapter B, Clinical Pharmacy Practice, suggest that this target for independent prescribing may be quite achievable. That chapter indicates that pharmacists already have independent prescribing rights for new therapy in over 20% of hospitals, and the scope of those independent prescribing rights is likely to grow.

- Only 40% (65/164) of respondents thought it likely that, by 2019, individual pharmacy students in the experiential training component of their pharmacy program would complete most of their experiential rotations at the same hospital, obviating the need for orientation of new students during each rotation and creating longer-term relationships between students and the hospital. The percentages of respondents who thought this scenario likely were highest in ON (50%, 21/42) and in teaching hospitals (49%, 20/41) and lowest in BC/YT (19%, 5/27) and in small hospitals (50–200 beds; 28%, 12/43).

More than 70% of respondents in every subgroup based on hospital size, teaching status and region expected pharmacists to have independent prescribing rights.

Placing students at a single site for most of their rotations has been proposed as a way of reducing the amount of time that hospitals spend orienting students, thereby allowing students to develop a better understanding of the way in which care is delivered at that site. In addition, such a model would enable students to develop relationships with other health professionals on the patient care team, helping them to reach a point where they can begin participating in the delivery of care. This strategy has been successfully implemented in a number of US faculties of pharmacy and their affiliated teaching hospitals.[16] In addition, the final recommendations of the "Moving Forward, Pharmacy Human Resources for the Future" study in Canada included recommendations of this nature that were intended to not only improve experiential training opportunities, but also to bring value to the organizations that offer experiential training.[17] The responses to this statement in the 2013/14 survey may mean that pharmacy directors do not believe this approach would be beneficial to their hospital, that the challenges associated with the change would be too difficult to overcome or that the timeframe of 2019 is too short for an initiative of this magnitude to be implemented.

- Only 46% (76/166) of respondents thought it likely that, by 2019, pharmacy students in the experiential training component of their pharmacy program would be active, regularly scheduled participants in the delivery of essential patient care services. The percentages of respondents who thought this scenario likely were highest in BC/YT (67%, 18/27), in the largest hospitals (> 500 beds; 51%, 23/45), in teaching hospitals (50%, 21/42) and in ON (50%, 21/42).

Respondents in the largest hospitals (> 500 beds) and in teaching hospitals foresaw pharmacy students contributing directly to patient care.

Using students in the delivery of essential patient care services is another strategy that has been pursued in an effort to both enhance the quality of experiential training and deliver value to organizations that host experiential training. This approach has become a common thread running through the pharmacy practice model initiatives that are underway in the US.

- Sixty-seven percent (112/166) of respondents thought it likely that, by 2019, their province's pharmacy regulatory authority and/or their hospital's pharmacy and therapeutics committee would have approved a list of patient care activities that pharmacy students could carry out with minimal supervision at different stages of their education. The percentages of respondents who thought this scenario likely were similar for all subgroups based on hospital size, teaching status and region.

The involvement of regulatory authorities in defining the activities that students can perform with minimal supervision is another strategy for enhancing both the quality of experiential training and the delivery of value to the organizations that host such training.

Table G-2. Future Trends in Pharmacy Practice Models, 2013/14

			Bed Size			Teaching Status	
		All	50-200	201-500	>500	Teaching	Non-teaching
(09) The number of graduates from accredited hospital pharmacy residency positions will be sufficient to enable your hospital to fill at least 75% of your vacant pharmacist positions with a pharmacist who has completed an accredited hospital pharmacy residency program.	(n=)	(164)	(43)	(76)	(45)	(41)	(123)
	Likely	80	11	40	29	23	57
		49%	**26%**	**53%**	**64%**	**56%**	**46%**
	Unlikely	84	32	36	16	18	66
		51%	**74%**	**47%**	**36%**	**44%**	**54%**
	very likely	(46)	(6)	(20)	(20)	(18)	(28)
		28%	14%	26%	44%	44%	23%
	somewhat likely	34	5	20	9	5	29
		21%	12%	26%	20%	12%	24%
	somewhat unlikely	34	12	15	7	9	25
		21%	28%	20%	16%	22%	20%
		50	20	21	9	9	41
		30%	47%	28%	20%	22%	33%
(10) At least 75% of the pharmacists hired by your hospital in the past year will have completed an accredited hospital pharmacy residency program.	(n=)	(162)	(45)	(73)	(44)	(41)	(121)
	Likely	77	11	38	28	24	53
		48%	**24%**	**52%**	**64%**	**59%**	**44%**
	Unlikely	85	34	35	16	17	68
		52%	**76%**	**48%**	**36%**	**41%**	**56%**
	very likely	62	8	29	25	21	41
		38%	18%	40%	57%	51%	34%
	somewhat likely	15	3	9	3	3	12
		9%	7%	12%	7%	7%	10%
	somewhat unlikely	32	10	13	9	8	24
		20%	22%	18%	20%	20%	20%
	very unlikely	53	24	22	7	9	44
		33%	53%	30%	16%	22%	36%
(11) At least 75% of your pharmacists will function in a clinical practice-centred model, defined as one in which pharmacists function largely in clinical roles, with less than 20% of their time spent performing distributive activities (e.g. product preparation, order-verification, checking the distributive work of other pharmacists and technicians, etc.).	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	140	38	66	36	37	103
		83%	**83%**	**85%**	**80%**	**88%**	**81%**
	Unlikely	29	8	12	9	5	24
		17%	**17%**	**15%**	**20%**	**12%**	**19%**
	very likely	74	16	38	20	20	54
		44%	35%	49%	44%	48%	43%
	somewhat likely	66	22	28	16	17	49
		39%	48%	36%	36%	40%	39%
	somewhat unlikely	24	8	9	7	5	19
		14%	17%	12%	16%	12%	15%
	very unlikely	5	0	3	2	0	5
		3%	0%	4%	4%	0%	4%
(12) Your pharmacy department will use technicians to perform at least 80% of medication distribution activities, including the checking of the accuracy of medication distribution activities performed by other technicians ("tech-check-tech").	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	159	44	73	42	42	117
		94%	**96%**	**94%**	**93%**	**100%**	**92%**
	Unlikely	10	2	5	3	0	10
		6%	**4%**	**6%**	**7%**	**0%**	**8%**
	very likely	125	32	58	35	32	93
		74%	70%	74%	78%	76%	73%
	somewhat likely	34	12	15	7	10	24
		20%	26%	19%	16%	24%	19%
	somewhat unlikely	8	2	4	2	0	8
		5%	4%	5%	4%	0%	6%
	very unlikely	2	0	1	1	0	2
		1%	0%	1%	2%	0%	2%
(13) At least 50% of your technical support staff (technicians and pharmacy assistants) staff will be regulated pharmacy technicians.	(n=)	(161)	(45)	(75)	(41)	(41)	(120)
	Likely	128	37	61	30	29	99
		80%	**82%**	**81%**	**73%**	**71%**	**83%**
	Unlikely	33	8	14	11	12	21
		20%	**18%**	**19%**	**27%**	**29%**	**18%**
	very likely	97	25	48	24	24	73
		60%	56%	64%	59%	59%	61%
	somewhat likely	31	12	13	6	5	26
		19%	27%	17%	15%	12%	22%
	somewhat unlikely	18	4	7	7	8	10
		11%	9%	9%	17%	20%	8%
	very unlikely	15	4	7	4	4	11
		9%	9%	9%	10%	10%	9%

Table G-2. Future Trends in Pharmacy Practice Models, 2013/14 (continued)

			Bed Size			Teaching Status	
		All	50-200	201-500	>500	Teaching	Non-teaching
(14) The majority of pharmacy technicians in your department will report to a pharmacy technician manager who is a not a pharmacist, but rather a pharmacy technician.	(n=)	(168)	(46)	(78)	(44)	(42)	(126)
	Likely	123	28	60	35	35	88
		73%	**61%**	**77%**	**80%**	**83%**	**70%**
	Unlikely	45	18	18	9	7	38
		27%	**39%**	**23%**	**20%**	**17%**	**30%**
	very likely	67	14	31	22	22	45
		40%	30%	40%	50%	52%	36%
	somewhat likely	56	14	29	13	13	43
		33%	30%	37%	30%	31%	34%
	somewhat unlikely	23	9	7	7	3	20
		14%	20%	9%	16%	7%	16%
	very unlikely	22	9	11	2	4	18
		13%	20%	14%	5%	10%	14%
(15) At least 20% of hospital pharmacists in your department will have independent prescribing rights and will work in collaborative practice models which enable them to initiate and modify the medication therapy of patients under their care.	(n=)	(168)	(46)	(77)	(45)	(42)	(126)
	Likely	133	33	60	40	36	97
		79%	**72%**	**78%**	**89%**	**86%**	**77%**
	Unlikely	35	13	17	5	6	29
		21%	**28%**	**22%**	**11%**	**14%**	**23%**
	very likely	50	9	28	13	19	31
		30%	20%	36%	29%	45%	25%
	somewhat likely	83	24	32	27	17	66
		49%	52%	42%	60%	40%	52%
	somewhat unlikely	24	11	10	3	4	20
		14%	24%	13%	7%	10%	16%
	very unlikely	11	2	7	2	2	9
		7%	4%	9%	4%	5%	7%
(16) Pharmacy students in the experiential training component of their pharmacy program will complete most of their experiential rotations at your hospital, negating the need for orientation of new students during each rotation, and creating a longer term relationship between the student and your hospital.	(n=)	164	43	78	43	41	123
	Likely	65	12	37	16	20	45
		40%	**28%**	**47%**	**37%**	**49%**	**37%**
	Unlikely	99	31	41	27	21	78
		60%	**72%**	**53%**	**63%**	**51%**	**63%**
	very likely	10	0	8	2	2	8
		6%	0%	10%	5%	5%	7%
	somewhat likely	55	12	29	14	18	37
		34%	28%	37%	33%	44%	30%
	somewhat unlikely	71	23	28	20	17	54
		43%	53%	36%	47%	41%	44%
	very unlikely	28	8	13	7	4	24
		17%	19%	17%	16%	10%	20%
(17) Pharmacy students in the experiential training component of their pharmacy program will be active, regularly scheduled participants in the delivery of essential patient care services at your hospital, to the extent that if the students were not there, additional pharmacist staff would have to be hired to perform those essential services.	(n=)	(166)	(43)	(78)	(45)	(42)	(124)
	Likely	76	16	37	23	21	55
		46%	**37%**	**47%**	**51%**	**50%**	**44%**
	Unlikely	90	27	41	22	21	69
		54%	**63%**	**53%**	**49%**	**50%**	**56%**
	very likely	7	1	4	2	1	6
		4%	2%	5%	4%	2%	5%
	somewhat likely	69	15	33	21	20	49
		42%	35%	42%	47%	48%	40%
	somewhat unlikely	54	16	28	10	14	40
		33%	37%	36%	22%	33%	32%
	very unlikely	36	11	13	12	7	29
		22%	26%	17%	27%	17%	23%
(18) Your province's pharmacy regulatory authority and/or your hospital's Pharmacy and Therapeutics (as required in your province) will have approved a list of patient care activities which pharmacy students can carry out with minimal supervision at different stages of their education (e.g. collecting chart data in year one of their program, interviewing patients in year two of their program, preparing medication reconciliation documents in year 3 of their program, communicating the results of a medication reconciliation to a physician in year 4 of their program, etc.)	(n=)	(166)	(43)	(78)	(45)	(42)	(124)
	Likely	112	24	59	29	28	84
		67%	**56%**	**76%**	**64%**	**67%**	**68%**
	Unlikely	54	19	19	16	14	40
		33%	**44%**	**24%**	**36%**	**33%**	**32%**
	very likely	28	4	16	8	4	24
		17%	9%	21%	18%	10%	19%
	somewhat likely	84	20	43	21	24	60
		51%	47%	55%	47%	57%	48%
	somewhat unlikely	38	12	13	13	11	27
		23%	28%	17%	29%	26%	22%
	very unlikely	16	7	6	3	3	13
		10%	16%	8%	7%	7%	10%

Base: All respondents

Ambulatory Care

The "dehospitalization" of the healthcare system has been actively pursued in Canada and the US over the past few decades. The transition away from hospital-based care has been driven by the desire to deliver healthcare at a lower cost and to improve the patient's experience. This trend has significant implications for hospital pharmacy practice. The focus of care for most patients will continue to move to the ambulatory care setting. In addition, given that drug therapy errors frequently occur when patients transition from one healthcare setting to another, hospital pharmacists will increasingly be expected to assume more responsibility for ensuring that drug therapy information is communicated to community practitioners, and vice versa, when patients move between the hospital and ambulatory care settings. Perspectives on future trends in the domain of ambulatory care are summarized in Table G-3.

- Fifty-two percent (88/169) of respondents thought it likely that, by 2019, their respective pharmacy departments would have systems in place to ensure that, upon discharge of every high-risk patient, a pharmacy practitioner in the hospital setting contacts a counterpart in the community setting to discuss medication therapy and transfer the patient's pharmaceutical care to the community pharmacy practitioner. However, the responses varied widely by region. Only 21% (6/28) of respondents in BC/YT but 60% (27/45) of respondents in QC and 58% (25/43) of those in ON thought this reality likely for their hospitals in 2019.

Seamless transfer of care from one healthcare setting to another has become a priority within many healthcare systems. However, there are significant workload implications that must be addressed before this objective can be achieved, implications that may be reflected in these responses.

- Only 50% (83/167) of respondents believed it likely that, by 2019, their respective pharmacy departments would have a system in place to ensure that any issues related to a patient's access to medication (including issues of cost and insurance coverage) are resolved before discharge. The responses to this statement were similar to those for the previous statement about transfer of care to the community, and workload issues may again have influenced these results.

The issue of access to needed pharmaceuticals will likely remain a challenge as long as outpatient drug coverage is not included as an insured service under the *Canada Health Act*.

- Seventy-one percent (120/168) of respondents thought it likely that, by 2019, pharmacists in their departments would provide ongoing medication therapy management services for selected groups of ambulatory patients receiving multiple or high-risk medications and identified as frequent users of the emergency department or inpatient beds. The responses varied by subgroups, with the lowest percentages in the Atlantic provinces (53%, 10/19) and in the smallest hospitals (50–200 beds; 57%, 26/46) and the highest percentages in teaching hospitals (83%, 34/41) and in QC (80%, 36/45). In many hospitals, this practice has already been established for certain groups of outpatients, such as those receiving dialysis, those who have undergone transplant, and those receiving anticoagulant therapy.

- Sixty-three percent (106/169) of respondents thought it likely that, by 2019, pharmacists in their hospitals would have the authority to write discharge prescription orders to reconcile medications taken before admission, medications discontinued while in hospital and new medications started during the hospital stay. The highest percentages of respondents who thought this scenario likely were in the Prairies (82%, 28/34) and in teaching hospitals (74%, 31/42), whereas the lowest percentages were in the Atlantic provinces (42%, 8/19) and ON (47%, 20/43).

These data contrast with a result presented under the domain of pharmacy practice models (reported earlier in this chapter), where 79% of respondents thought it likely that pharmacists in their departments would have independent prescribing authority in the inpatient setting by 2019. This difference suggests that pharmacy directors may believe that obtaining prescribing rights will be easier, and may occur more quickly, in the inpatient setting than in the outpatient setting.

- Only 44% (74/169) of respondents thought it likely that pharmacists in their hospitals would follow up with all high-risk patients and their healthcare professionals (including community pharmacists), after discharge, to ensure continuity of medication therapy and to assess medication therapy outcomes. The lowest percentages of respondents who thought this scenario likely were in BC/YT (11%, 3/28) and in the Atlantic provinces (32%, (6/19).

These data for the ambulatory care domain indicate that directors may doubt their hospitals' ability to supply the necessary resources for this type of outpatient initiative. Although additional resources may be required to meet the targets described by these statements, pharmacy directors and pharmacists themselves must consider how they can better prioritize their activities, within existing resources, to provide these types of services.

Addressing the transition of discharged patients to the community and performing follow-up for high-risk ambulatory patients will have significant workload implications for hospital pharmacies.

Table G-3. Future Trends in Ambulatory Care, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
(19) Your pharmacy department will have system in place to ensure that for all high risk patients being discharged from your hospital, a pharmacy practitioner in the hospital setting will contact a pharmacy practitioner in the community setting to discuss the patient's medication therapy and transition the patient's pharmaceutical care to the community pharmacy practitioner.	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	88	24	41	23	24	64
		52%	**52%**	**53%**	**51%**	**57%**	**50%**
	Unlikely	81	22	37	22	18	63
		48%	**48%**	**47%**	**49%**	**43%**	**50%**
	very likely	19	4	13	2	7	12
		11%	9%	17%	4%	17%	9%
	somewhat likely	69	20	28	21	17	52
		41%	43%	36%	47%	40%	41%
	somewhat unlikely	63	15	32	16	13	50
		37%	33%	41%	36%	31%	39%
	very unlikely	18	7	5	6	5	13
		11%	15%	6%	13%	12%	10%
(20) Your pharmacy department will have a system in place to ensure that any patient issues related to medication access (including cost and insurance coverage) are resolved before the patient is discharged from the hospital.	(n=)	(167)	(45)	(77)	(45)	(42)	(125)
	Likely	83	20	41	22	28	55
		50%	**44%**	**53%**	**49%**	**67%**	**44%**
	Unlikely	84	25	36	23	14	70
		50%	**56%**	**47%**	**51%**	**33%**	**56%**
	very likely	(22)	(4)	(13)	(5)	(12)	(10)
		13%	9%	17%	11%	29%	8%
	somewhat likely	61	16	28	17	16	45
		37%	36%	36%	38%	38%	36%
	somewhat unlikely	62	17	30	15	9	53
		37%	38%	39%	33%	21%	42%
	very unlikely	22	8	6	8	5	17
		13%	18%	8%	18%	12%	14%
(21) In your hospital, pharmacists will provide ongoing managing medication therapy for selected groups of ambulatory patients who are receiving multiple medications or high risk medication therapy and have been identified by the hospital or health system as frequent users of the emergency department or inpatient beds.	(n=)	(168)	(46)	(77)	(45)	(41)	(127)
	Likely	120	26	61	33	34	86
		71%	**57%**	**79%**	**73%**	**83%**	**68%**
	Unlikely	48	20	16	12	7	41
		29%	**43%**	**21%**	**27%**	**17%**	**32%**
	very likely	39	9	19	11	13	26
		23%	20%	25%	24%	32%	20%
	somewhat likely	81	17	42	22	21	60
		48%	37%	55%	49%	51%	47%
	somewhat unlikely	37	14	13	10	6	31
		22%	30%	17%	22%	15%	24%
	very unlikely	11	6	3	2	1	10
		7%	13%	4%	4%	2%	8%
(22) Pharmacists in your hospital will have the authority to write discharge prescription orders in order to reconcile medications taken before admission, medications discontinued while in hospital, and new medications started during hospitalization.	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	106	25	52	29	31	75
		63%	**54%**	**67%**	**64%**	**74%**	**59%**
	Unlikely	63	21	26	16	11	52
		37%	**46%**	**33%**	**36%**	**26%**	**41%**
	very likely	34	7	16	11	14	20
		20%	15%	21%	24%	33%	16%
	somewhat likely	72	18	36	18	17	55
		43%	39%	46%	40%	40%	43%
	somewhat unlikely	46	13	17	16	10	36
		27%	28%	22%	36%	24%	28%
	very unlikely	17	8	9	0	1	16
		10%	17%	12%	0%	2%	13%

Table G-3. Future Trends in Ambulatory Care, 2013/14 (continued)

(23) Pharmacists in your hospital will follow up with all high-risk patients and their healthcare professionals (including community pharmacists), after discharge, in order to ensure continuity of medication therapy, and assessment of medication therapy outcomes.	(n=)	(169)	(46)	(78)	(45)	(42)	(127)
	Likely	74	18	36	20	22	52
		44%	**39%**	**46%**	**44%**	**52%**	**41%**
	Unlikely	95	28	42	25	20	75
		56%	**61%**	**54%**	**56%**	**48%**	**59%**
	very likely	17	4	13	0	5	12
		10%	9%	17%	0%	12%	9%
	somewhat likely	57	14	23	20	17	40
		34%	30%	29%	44%	40%	31%
	somewhat unlikely	74	18	34	22	17	57
		44%	39%	44%	49%	40%	45%
	very unlikely	21	10	8	3	3	18
		12%	22%	10%	7%	7%	14%

Base: All respondents

Pharmacy Operations

Pharmacy operations refer to the ways in which a pharmacy department executes its responsibilities, including the types of drug distribution systems used to acquire, distribute and manage medications. Perspectives on future trends in the domain of pharmacy operations are summarized in Table G-4.

- Eighty-nine percent (148/167) of respondents thought it likely that, by 2019, sterile products would be compounded in a USP Chapter <797> compliant program operated by their respective hospitals or would be outsourced to another hospital or commercial compounding centre that is USP Chapter <797> compliant. When the responses of subgroups based on hospital size, teaching status and region were examined, the lowest percentages of respondents who thought this scenario likely were from the Prairies (68%, 23/34) and the Atlantic provinces (74%, 14/19).

Nine out of every ten directors foresaw Chapter <797> compliance by 2019, although very few hospitals are currently compliant.

There is fairly widespread agreement, as evidenced by responses to this statement, that the risks associated with compounded sterile products cannot be ignored. Although the vast majority of respondents predicted USP Chapter <797> compliance by 2019, few hospitals in Canada currently have USP Chapter <797> compliant clean rooms, and the cost of upgrading existing facilities, in terms of both resources and time, is high.

Outsourcing to a USP Chapter <797> compliant provider may be feasible in some locations, but this option is not available in most parts of the country. How the profession as a whole will address this issue is unclear. In 2014, CSHP published guidelines for outsourcing pharmaceutical compounding services, to assist pharmacy practitioners who are dealing with these challenges.[18]

- Fully 97% (162/167) of respondents thought it likely that, by 2019, their hospitals would have in place a quality assurance program to ensure the safety and accuracy of sterile products prepared in the pharmacy department and/or in an external compounding facility servicing the hospital. The response rate was at or close to 100% for all subgroups based on hospital size, teaching status and region, except for the Prairies, where only 88% (30/34) of respondents thought such a program would be in place in their hospitals by 2019.

The very high percentage of respondents who indicated that this type of quality assurance program was likely to be in place in their hospitals is encouraging. However, the question that must be asked is whether it is possible to ensure this level of quality when the ability to meet USP Chapter <797> requirements is highly questionable in most Canadian hospitals.

- Eighty percent (134/167) of respondents thought it likely that, by 2019, their hospitals' sterile compounding operations would be accredited by an organization that has been recognized by the pertinent provincial pharmacy regulatory authority.

The National Association of Pharmacy Regulatory Authorities is developing model standards for compounding hazardous and non-hazardous sterile products,[19] based on standards that the Ordre des pharmaciens du Québec published in 2014.[20] The provincial regulatory authorities are proceeding with plans to inspect and accredit sterile compounding facilities used by hospitals and other organizations, a process that will include review of the hospitals' policies and procedures.

- Fifty-four percent (91/167) of respondents thought it likely that, by 2019, their respective hospitals would be part of a group of hospitals serviced by a centralized medication preparation, repackaging and

distribution system. Responses to this statement varied considerably by region, with the highest percentages in the Atlantic provinces (95%, 18/19) and BC/YT (96%, 27/28) and the lowest in QC (23% 10/43) and ON (37%, 16/43).

Centralized medication preparation and distribution programs already exist, or are in the planning stages, in parts of BC and AB. NS is implementing a single provincial health authority and is moving toward centralization of many of its operations. These developments may help to explain the results from those provinces. Health Canada has also started a national consultation, as part of its mandate to ensure the quality of drug products used in Canada.[21]

- Seventy percent (118/168) of respondents thought it likely that, by 2019, their hospitals would be part of a system in which one or more hospitals provide other hospitals with operational support and advice, such as after-hours order verification, on-call support and compounding support. The percentages of respondents who thought this scenario likely were over 60% in all subgroups based on hospital size, teaching status and region, except for QC (48%, 21/44). The highest percentages were in BC/YT (100%, 28/28) and the Atlantic provinces (89%, 17/19).

The creation of regional health authorities was intended to create efficiencies and enhance the quality of patient care services through greater integration, both horizontally and vertically. In certain provinces, such as BC, centralized medication and distribution systems have been established in some regional health authorities. Unfortunately, such changes have been the exception, rather than the rule. Nonetheless, the responses to this statement suggest that progress is occurring in some areas, perhaps driven by issues such as the creation of provincial health authorities in AB, PE and (recently) NS, as well as events such as the sterile compounding failures at several US compounding facilities that caused numerous deaths.[22]

Seven out of every ten directors predicted integration of some components of operations with those of other hospitals in their regions.

- Eighty-six percent (144/168) of respondents believed it likely that, by 2019, their hospitals would require conflict-of-interest disclosures by members of the pharmacy and therapeutics committee and by clinicians who propose new agents for inclusion on the formulary. The percentages of respondents who believed this scenario likely were over 80% in all regions of the country.

A move toward greater openness and transparency has been underway for some time. Many hospitals now have stringent policies governing the relationships between physicians and hospital employees on the one side and members of the pharmaceutical industry on the other. Disclosure of conflicts of interest is an important component of this trend.

Table G-4. Future Trends in Pharmacy Operations, 2013/14

			Bed Size			Teaching Status	
		All	50-200	201-500	>500	Teaching	Non-teaching
(24) Sterile products will be compounded in a USP Chapter 797 compliant program operated by your hospital, or will be outsourced to another hospital or commercial compounding centre that is USP Chapter 797 compliant.	(n=)	167	45	77	45	42	125
	Likely	148	40	66	42	36	112
		89%	**89%**	**86%**	**93%**	**86%**	**90%**
	Unlikely	19	5	11	3	6	13
		11%	**11%**	**14%**	**7%**	**14%**	**10%**
	very likely	115	28	51	36	26	89
		69%	62%	66%	80%	62%	71%
	somewhat likely	33	12	15	6	10	23
		20%	27%	19%	13%	24%	18%
	somewhat unlikely	11	3	7	1	2	9
		7%	7%	9%	2%	5%	7%
	very unlikely	8	2	4	2	4	4
		5%	4%	5%	4%	10%	3%
(25) Your hospital will have a quality assurance program in place which insures, on an ongoing basis, the safety and accuracy of sterile products prepared by your pharmacy department and/or prepared an external compounding facility that services your hospital.	(n=)	167	45	77	45	42	125
	Likely	162	43	75	44	42	120
		97%	**96%**	**97%**	**98%**	**100%**	**96%**
	Unlikely	5	2	2	1	0	5
		3%	**4%**	**3%**	**2%**	**0%**	**4%**
	very likely	114	27	51	36	28	86
		68%	60%	66%	80%	67%	69%
	somewhat likely	48	16	24	8	14	34
		29%	36%	31%	18%	33%	27%
	somewhat unlikely	3	2	0	1	0	3
		2%	4%	0%	2%	0%	2%
	very unlikely	2	0	2	0	0	2
		1%	0%	3%	0%	0%	2%

Table G-4. Future Trends in Pharmacy Operations, 2013/14 (continued)

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
(26) Your hospital's sterile compounding operations will be accredited by an organization which has been recognized by your province's pharmacy regulatory authority as an appropriate entity for assessing the safety and adequacy of sterile compounding facilities and programs.	(n=)	167	45	77	45	42	125
	Likely	134	30	63	41	37	97
		80%	**67%**	**82%**	**91%**	**88%**	**78%**
	Unlikely	33	15	14	4	5	28
		20%	**33%**	**18%**	**9%**	**12%**	**22%**
	very likely	89	18	45	26	24	65
		53%	40%	58%	58%	57%	52%
	somewhat likely	45	12	18	15	13	32
		27%	27%	23%	33%	31%	26%
	somewhat unlikely	28	13	11	4	4	24
		17%	29%	14%	9%	10%	19%
	very unlikely	5	2	3	0	1	4
		3%	4%	4%	0%	2%	3%
(27) Your hospital will be part of a group of hospitals that are serviced by a centralized medication preparation, repackaging, and distribution systems.	(n=)	167	46	77	44	42	125
	Likely	91	26	44	21	19	72
		54%	**57%**	**57%**	**48%**	**45%**	**58%**
	Unlikely	76	20	33	23	23	53
		46%	**43%**	**43%**	**52%**	**55%**	**42%**
	very likely	53	12	28	13	13	40
		32%	26%	36%	30%	31%	32%
	somewhat likely	38	14	16	8	6	32
		23%	30%	21%	18%	14%	26%
	somewhat unlikely	27	7	13	7	9	18
		16%	15%	17%	16%	21%	14%
	very unlikely	49	13	20	16	14	35
		29%	28%	26%	36%	33%	28%
(28) Your hospital will be part of a system where one or more hospitals provide one or more other hospitals with operational support and advice, such as after-hours order verification, on-call support, and compounding support.	(n=)	168	46	78	44	42	126
	Likely	118	31	55	32	26	92
		70%	**67%**	**71%**	**73%**	**62%**	**73%**
	Unlikely	50	15	23	12	16	34
		30%	**33%**	**29%**	**27%**	**38%**	**27%**
	very likely	57	13	29	15	16	41
		34%	28%	37%	34%	38%	33%
	somewhat likely	61	18	26	17	10	51
		36%	39%	33%	39%	24%	40%
	somewhat unlikely	24	10	11	3	7	17
		14%	22%	14%	7%	17%	13%
	very unlikely	26	5	12	9	9	17
		15%	11%	15%	20%	21%	13%
(29) Your hospital will require conflict of interest disclosures by members of your pharmacy and therapeutics committee and by clinicians who propose new agents for formulary addition.	(n=)	168	46	77	45	41	127
	Likely	144	35	69	40	37	107
		86%	**76%**	**90%**	**89%**	**90%**	**84%**
	Unlikely	24	11	8	5	4	20
		14%	**24%**	**10%**	**11%**	**10%**	**16%**
	very likely	103	19	51	33	32	71
		61%	41%	66%	73%	78%	56%
	somewhat likely	41	16	18	7	5	36
		24%	35%	23%	16%	12%	28%
	somewhat unlikely	20	7	8	5	4	16
		12%	15%	10%	11%	10%	13%
	very unlikely	4	4	0	0	0	4
		2%	9%	0%	0%	0%	3%

Base: All respondents

Pharmacy Informatics

Pharmacy informatics encompasses the electronic systems used to collect, store and use electronic health information, with the goal of improving patient care. Unfortunately, progress in this area has been slower and less effective than many had hoped. Perspectives on future trends in the domain of pharmacy informatics are summarized in Table G-5.

- Eighty percent (135/169) of respondents believed it likely that, by 2019, all medication-related computer applications within their hospitals would connect with a single standard source of medication information and a standardized clinical decision support system, which together would ensure consistency of information across all applications. The results were similar for all subgroups based on hospital size, teaching status and region.

In the past, each informatics application (e.g., pharmacy system, computerized prescriber order entry system, automated dispensing technologies) typically had its own database for functions like checking drug interactions and identifying therapeutic duplication. The unfortunate result, in many cases, was the provision of inconsistent information to healthcare professionals. It appears, from the responses to this scenario, that many pharmacy directors expect this situation to be resolved by 2019, with medication-related computer applications in each hospital being connected with a single standard source of medication information. Given the slow evolution in this area over the past several decades, progress on this objective should be reviewed regularly. In particular, whenever interfaces are developed between information systems, pharmacy directors should be involved, to ensure that guiding principles, such as use of a standard medication information database, are followed.[23]

- Sixty-seven percent (113/169) of respondents thought it likely that, by 2019, their hospitals would be using a validated, automated method for identifying the patients most likely to benefit from pharmacy-based patient care services. The responses were fairly consistent across subgroups (i.e., 50% to 70% of respondents thinking this scenario likely), with the exception of BC/YT (79%, 22/28) and ON (77%, 33/43).

Although respondents were optimistic that all medication-related computer applications would be interfaced with other hospital systems, progress to date has been slow.

Identification of patients likely to benefit from pharmacy care is another area where the potential of technology has been recognized for many years, but fulfillment of that potential has been very slow.

- Sixty-seven percent (113/169) of respondents thought it likely that, by 2019, their pharmacy departments would have in place a formal review process to collect data on responses to computer-generated alerts, allowing assessment of alert over-rides and implementation of changes to optimize the value and minimize the drawbacks of computerized decision-support applications. Again, the responses were fairly consistent across subgroups (55% to70% of respondents thinking this scenario likely), with the exception of BC/YT (82%, 23/28) and ON (74%, 32/43).

The results for this scenario are somewhat surprising, given that only 17% of respondents to the 2011/12 survey reported having a policy to deal with over-ride alerts. This is another area where progress toward a valid outcome should be tracked regularly.

- Eighty-one percent (133/165) of respondents thought it likely that, by 2019, a formal process would be in place at their hospitals for regularly collecting and reviewing data on management of smart pump alerts and for reviewing and revising medication libraries in smart pumps. For subgroups based on hospital size, teaching status and region, responses ranged from 71% (32/45) in QC to 100% in BC/YT (28/28).

Once again, the results for this scenario seem optimistic, given that only 24% of hospitals responding to the 2011/12 survey were reviewing data from smart pumps at that time. However, 78% of the hospitals that were doing so had made changes to how the pumps were used as a result of their reviews. Various aspects of smart pump use would seem to be yet another area where ongoing monitoring is warranted.

Although respondents were optimistic that collection and analysis of computer-generated smart pump alerts would occur, progress to date has been slow.

Table G-5. Future Trends in Pharmacy Informatics, 2013/14

			Bed Size			Teaching Status	
		All	50-200	201-500	>500	Teaching	Non-teaching
(30) All medication-related computer applications within your hospital will connect with a single standard source of medication information and a standardized clinical decision support system which together will insure consistency of the information provided, across all applications.	(n=)	169	46	78	45	42	127
	Likely	135	39	61	35	37	98
		80%	**85%**	**78%**	**78%**	**88%**	**77%**
	Unlikely	34	7	17	10	5	29
		20%	**15%**	**22%**	**22%**	**12%**	**23%**
	very likely	72	14	39	19	20	52
		43%	30%	50%	42%	48%	41%
	somewhat likely	63	25	22	16	17	46
		37%	54%	28%	36%	40%	36%
	somewhat unlikely	22	5	11	6	4	18
		13%	11%	14%	13%	10%	14%
	very unlikely	12	2	6	4	1	11
		7%	4%	8%	9%	2%	9%

Table G-5. Future Trends in Pharmacy Informatics, 2013/14 (continued)

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
(31) Your hospital will use a validated, automated method for identifying patients most likely to benefit from pharmacy-based patient care services, including medication therapy monitoring.	(n=)	169	46	78	45	42	127
	Likely	113	26	56	31	30	83
		67%	**57%**	**72%**	**69%**	**71%**	**65%**
	Unlikely	56	20	22	14	12	44
		33%	**43%**	**28%**	**31%**	**29%**	**35%**
	very likely	30	5	18	7	11	19
		18%	11%	23%	16%	26%	15%
	somewhat likely	83	21	38	24	19	64
		49%	46%	49%	53%	45%	50%
	somewhat unlikely	37	15	14	8	6	31
		22%	33%	18%	18%	14%	24%
	very unlikely	19	5	8	6	6	13
		11%	11%	10%	13%	14%	10%
(32) Your pharmacy department will have a formal review process in place that will collect data on how staff responded to computer generated alerts, assess the appropriateness of alert over-rides and implement changes that will optimize the value and minimize the drawbacks of the computerised decision-support applications that exist in your pharmacy information system.	(n=)	169	46	78	45	42	127
	Likely	113	28	54	31	29	84
		67%	**61%**	**69%**	**69%**	**69%**	**66%**
	Unlikely	56	18	24	14	13	43
		33%	**39%**	**31%**	**31%**	**31%**	**34%**
	very likely	25	6	13	6	9	16
		15%	13%	17%	13%	21%	13%
	somewhat likely	88	22	41	25	20	68
		52%	48%	53%	56%	48%	54%
	somewhat unlikely	42	13	19	10	10	32
		25%	28%	24%	22%	24%	25%
	very unlikely	14	5	5	4	3	11
		8%	11%	6%	9%	7%	9%
(33) Your hospital will have a formal process in place for regularly collecting and reviewing data on how smart pump alerts were managed by staff, reviewing medication libraries used in smart pumps, and making changes to the libraries as appropriate.	(n=)	165	44	78	43	40	125
	Likely	133	30	65	38	37	96
		81%	**68%**	**83%**	**88%**	**93%**	**77%**
	Unlikely	32	14	13	5	3	29
		19%	**32%**	**17%**	**12%**	**8%**	**23%**
	very likely	56	10	30	16	23	33
		34%	23%	38%	37%	58%	26%
	somewhat likely	77	20	35	22	14	63
		47%	45%	45%	51%	35%	50%
	somewhat unlikely	24	11	9	4	3	21
		15%	25%	12%	9%	8%	17%
	very unlikely	8	3	4	1	0	8
		5%	7%	5%	2%	0%	6%

Base: All respondents

The Pharmaceutical Marketplace

The pharmaceutical marketplace has received much attention in recent years because of the prevalence of drug shortages, the high cost of many new products, concerns about product quality in a globalized pharmaceutical environment and the potential for counterfeit products to make their way into the supply chain. Perspectives on future trends in the domain of the pharmaceutical marketplace are summarized in Table G-6.

- Fifty-five percent (90/164) of respondents thought it likely that, by 2019, the rate of growth in expenditures for inpatient medicines at their hospitals would be in the lowest 25% of growth rates, relative to other categories of institutional expenses (e.g., salaries and medical supplies).

- A smaller percentage (42%, 69/165) of respondents thought it likely that, by 2019, the rate of growth in expenditures for inpatient medicines at their hospitals would be in the highest 25% of growth rates, relative to other categories of institutional expenses.

These data suggest that hospital pharmacy directors have divergent views about the rate of growth in hospital drug expenditures, with just over half (55%) anticipating a relatively low rate and just under half (42%) expecting the opposite. The Canadian Institute for Health Information (CIHI) and a number of provincial health departments regularly prepare reports on projected increases in various hospital expense categories, which could be helpful to hospital pharmacy directors as they assess future trends in this area. For instance, the annual rate of growth in prescribed drug spending forecast by CIHI for 2014 (0.9%) was at its lowest since 1975, with public-sector drug spending in Canada forecast to grow at a rate of 0.4%, the second-lowest rate since 1997.[24]

- Only 30% (49/165) of respondents thought it likely that, by 2019, the number of medication shortages in their respective hospitals would have decreased by at least 25%, relative to a 2013/14 baseline. The results

were similar for all subgroups based on hospital size, teaching status and region, which suggests that most pharmacy directors do not expect drug shortages to decline.

- By contrast, 47% (77/165) of respondents thought it likely that, by 2019, the number of medication shortages in their hospitals would have increased by at least 25%, relative to a 2013/14 baseline.

Numerous studies have documented the chronic nature of drug shortages in Canada, and there is no sign that resolution of this problem is imminent.[25,26,27,28]

There was no consensus predicting whether drug costs and medication shortages would increase or decrease.

- Sixty-five percent (100/155) of respondents thought it likely that, by 2019, 25% or more of orders for expensive biologic agents at their hospitals would be filled with biosimilar products. The results were similar across all subgroups based on hospital size, teaching status and region.

At the time of the 2013/14 survey, only three "Subsequent Entry Biologics" (Canada's official name for biosimilar products) had been approved for use in Canada. The hospital pharmacy directors who responded to the future trends section of the 2013/14 survey appeared optimistic about the potential for more biosimilar agents to become available for use in Canada by 2019 and for these products to be accepted by prescribers as being equivalent to the original products.

- Only 23% (37/164) of respondents thought it likely that, by 2019, at least 25% of new pharmaceuticals entering the market every year would have an accompanying diagnostic test to enable patient selection or optimal dosing (or both) according to the patient's genetic characteristics. Among subgroups based on hospital size, teaching status and region, the highest percentages of respondents who thought this scenario likely were from the Atlantic provinces (37%, 7/19) and QC (33%, 14/43); in all other subgroups, the percentage of respondents who thought this scenario likely did not exceed 30%. Very few tests of this nature have achieved widespread use at this time.

- Only 34% (56/165) of respondents thought it likely that, by 2019, their hospitals would require chain-of-custody verification for high-cost medications. There was considerable variability among subgroups based on hospital size, teaching status and region. For example, 50% (21/42) of respondents in ON, 48% (21/44) of those in QC and 46% (19/41) of those in teaching hospitals thought this scenario likely, whereas only 11% (3/27) of respondents in BC/YT, 15% (5/34) of those in the Prairies and 18% (8/45) of those in the smallest hospitals (50–200 beds) thought this scenario likely.

Table G-6. Future Trends in the Pharmaceutical Marketplace, 2013/14

		All	Bed Size			Teaching Status	
			50-200	201-500	>500	Teaching	Non-teaching
(34) The rate of growth in expenditures for inpatient medicines at your hospital will be in the lowest 25% of growth rates, compared to your hospital's other categories of institutional expenses (e.g. salaries, medical supplies, etc.)	(n=)	(164)	(45)	(77)	(42)	(40)	(124)
	Likely	90	27	40	23	18	72
		55%	**60%**	**52%**	**55%**	**45%**	**58%**
	Unlikely	74	18	37	19	22	52
		45%	**40%**	**48%**	**45%**	**55%**	**42%**
	very likely	14	5	7	2	3	11
		9%	11%	9%	5%	8%	9%
	somewhat likely	76	22	33	21	15	61
		46%	49%	43%	50%	38%	49%
	somewhat unlikely	53	16	29	8	13	40
		32%	36%	38%	19%	33%	32%
	very unlikely	21	2	8	11	9	12
		13%	4%	10%	26%	23%	10%
(35) The rate of growth in expenditures for inpatient medicines at your hospital will be in the highest 25% of growth rates, compared to your hospital's other categories of institutional expenses (e.g. salaries, medical supplies, etc.)	(n=)	(165)	(45)	(77)	(43)	(40)	(125)
	Likely	69	13	35	21	24	45
		42%	**29%**	**45%**	**49%**	**60%**	**36%**
	Unlikely	96	32	42	22	16	80
		58%	**71%**	**55%**	**51%**	**40%**	**64%**
	very likely	21	1	6	14	7	14
		13%	2%	8%	33%	18%	11%
	somewhat likely	48	12	29	7	17	31
		29%	27%	38%	16%	43%	25%
	somewhat unlikely	60	24	24	12	10	50
		36%	53%	31%	28%	25%	40%
	very unlikely	36	8	18	10	6	30
		22%	18%	23%	23%	15%	24%

Table G-6. Future Trends in the Pharmaceutical Marketplace, 2013/14 (continued)

			Bed Size			Teaching Status	
		All	50-200	201-500	>500	Teaching	Non-teaching
(36) The number of medication shortages that your hospital will have to manage will have decreased by at least 25%, as compared to the baseline in 2013/14.	(n=)	(165)	(45)	(77)	(43)	(40)	(125)
	Likely	49	19	21	9	12	37
		30%	**42%**	**27%**	**21%**	**30%**	**30%**
	Unlikely	116	26	56	34	28	88
		70%	**58%**	**73%**	**79%**	**70%**	**70%**
	very likely	5	3	2	0	1	4
		3%	7%	3%	0%	3%	3%
	somewhat likely	44	16	19	9	11	33
		27%	36%	25%	21%	28%	26%
	somewhat unlikely	70	11	34	25	18	52
		42%	24%	44%	58%	45%	42%
	very unlikely	46	15	22	9	10	36
		28%	33%	29%	21%	25%	29%
(37) The number of medication shortages that your hospital will have to manage will have increased by at least 25%, as compared to the baseline in 2013/14.	(n=)	(165)	(45)	(77)	(43)	(40)	(125)
	Likely	77	18	37	22	16	61
		47%	**40%**	**48%**	**51%**	**40%**	**49%**
	Unlikely	88	27	40	21	24	64
		53%	**60%**	**52%**	**49%**	**60%**	**51%**
	very likely	19	5	7	7	4	15
		12%	11%	9%	16%	10%	12%
	somewhat likely	58	13	30	15	12	46
		35%	29%	39%	35%	30%	37%
	somewhat unlikely	80	24	38	18	21	59
		48%	53%	49%	42%	53%	47%
	very unlikely	8	3	2	3	3	5
		5%	7%	3%	7%	8%	4%
(38) In your hospital, 25% or more of orders for expensive biologic agents will be filled with biosimilar products.	(n=)	(155)	(40)	(74)	(41)	(40)	(115)
	Likely	100	30	42	28	27	73
		65%	**75%**	**57%**	**68%**	**68%**	**63%**
	Unlikely	55	10	32	13	13	42
		35%	**25%**	**43%**	**32%**	**33%**	**37%**
	very likely	28	7	13	8	6	22
		18%	18%	18%	20%	15%	19%
	somewhat likely	72	23	29	20	21	51
		46%	58%	39%	49%	53%	44%
	somewhat unlikely	44	8	25	11	10	34
		28%	20%	34%	27%	25%	30%
	very unlikely	11	2	7	2	3	8
		7%	5%	9%	5%	8%	7%
(39) At least 25% of new pharmaceuticals entering the market every year will have an accompanying diagnostic test that will enable patient selection or optimal dosing (or both) based on the patient's genetic characteristics.	(n=)	(164)	(45)	(75)	(44)	(41)	(123)
	Likely	37	9	15	13	12	25
		23%	**20%**	**20%**	**30%**	**29%**	**20%**
	Unlikely	127	36	60	31	29	98
		77%	**80%**	**80%**	**70%**	**71%**	**80%**
	very likely	2	0	2	0	1	1
		1%	0%	3%	0%	2%	1%
	somewhat likely	35	9	13	13	11	24
		21%	20%	17%	30%	27%	20%
	somewhat unlikely	55	15	24	16	15	40
		34%	33%	32%	36%	37%	33%
	very unlikely	72	21	36	15	14	58
		44%	47%	48%	34%	34%	47%
(40) Your hospital will require chain-of-custody verification for the medications which you dispense.	(n=)	(165)	(45)	(76)	(44)	(41)	(124)
	Likely	56	8	29	19	19	37
		34%	**18%**	**38%**	**43%**	**46%**	**30%**
	Unlikely	109	37	47	25	22	87
		66%	**82%**	**62%**	**57%**	**54%**	**70%**
	very likely	19	3	9	7	6	13
		12%	7%	12%	16%	15%	10%
	somewhat likely	37	5	20	12	13	24
		22%	11%	26%	27%	32%	19%
	somewhat unlikely	66	22	28	16	12	54
		40%	49%	37%	36%	29%	44%
	very unlikely	43	15	19	9	10	33
		26%	33%	25%	20%	24%	27%

Base: All respondents

Conclusion

What use can be made of these results? To begin with, they can help to guide the strategic planning process in individual hospital pharmacy departments by indicating the trends on which each hospital should focus, as well as those that do not seem to be gaining much traction. The results may also identify trends that pharmacists and pharmacy directors could examine in more detail, so that they are both more knowledgeable and better prepared to respond to inquiries from senior hospital managers, pharmacy staff, staff in other departments and external stakeholders, such as members of the pharmaceutical industry.

Staying current with what the future might hold is an important leadership competency.

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H - Evaluation of Pharmacy Services

Richard Jones and Chuck Wilgosh

Hospital pharmacy continues to evolve its range of services. The approach to determining the impact of these services on patient outcomes is becoming more focused, and the establishment of specific measurable activities is underway. Many factors are both supporting and driving the opportunity for such change. This chapter focuses on changes to services that contribute to improved patient outcomes from medication therapy delivered by hospital pharmacists.

The American Society of Health-System Pharmacists has been surveying hospitals in the United States on a rotating cycle of topics, specifically, monitoring, patient education, prescribing, transcription, dispensing and administration.[1,2] The Canadian Society of Hospital Pharmacists (CSHP) is nearing the conclusion of an important change program, CSHP 2015.[3] Accreditation Canada has published Required Organizational Practices[4] and Medication Management Standards[5] for Canadian hospitals. Canada's Blueprint for Pharmacy[6] continues to show results in terms of pharmacist practice, particularly in the community setting. New since the last Hospital Pharmacy in Canada Survey is the release of the first set of clinical pharmacy key performance indicators (cpKPIs)[7] as process- and outcome-based activity metrics measuring pharmacists' impact on patient care in hospital settings.

Evaluating services is essential to assess both what is successful and what is of little value, what has a substantial impact on patient outcomes vs. what is simply considered good practice, and what administrators and other healthcare providers find to be valuable to patient care vs. what pharmacists as a group of professionals believe is important. Governments and administrators alike are continually seeking to define and understand the benefit that pharmacists can deliver to patient outcomes. Understanding the metrics required to advance knowledge of the benefit to patient care outcomes is essential to defining the place of pharmacists on the care team.

Advancing the knowledge of pharmacists' benefit to patient care outcomes is essential.

Feedback on individual performance relative to specific objectives and to the performance of one's peers has long been known as a first valuable tool in shifting and improving the performance of the individual, as well as improving the benefits for the recipient of the practitioner's efforts. Second is the need to ensure that the individual receives regular performance review, including clinical outcomes-based measures. The 2013/14 Hospital Pharmacy in Canada Survey explored the application of medication-related patient outcomes to the performance of individual pharmacists, as well as determining whether pharmacists received regular performance reviews.

Pharmacy departments use many measures for their operational activities, including order turnaround time, production throughput, accuracy of transcription, error rates in production and dispensing, efficiency of production and distribution. These are generally considered to be mechanical process metrics and are often used to provide information regarding the quality of the service. The Required Organizational Practices Handbook 2014 of Accreditation Canada[4] provides numerous operational recommendations (e.g., that access to high-risk medications, as defined by the Institute for Safe Medication Practices Canada, be restricted in significant ways) and other strategies to prevent medication errors. The level of implementation of each recommendation is suitable for audit and evaluation. The release of Accreditation Canada's Medication Management Standards[5] was a major step forward in ensuring that quality performance is embedded in hospitals' production and distribution systems and that evaluation of the medication system occurs. However, evaluation is limited by the absence of measurements of patient outcomes related to pharmacists' application of professional knowledge in optimizing patients' medication therapy.

The 2013/14 Hospital Pharmacy in Canada Report provides information on the current evaluation practices of the hospital pharmacy departments that participated in the Hospital Pharmacy in Canada Survey.

Evaluation of Clinical Pharmacy Services

Pharmacists providing clinical pharmacy services are increasingly asked to justify what they are doing and the linkage between those activities and patients' medication-related outcomes. Although the new Accreditation Canada Medication Management Standards[5] require that a wide variety of systems be in place to ensure quality in production, distribution, storage, product selection and administration activities, they go only as far as requiring that an institutional inter-disciplinary committee act, using evidence and inter-professional systematic review, to determine the medications that will be available in each hospital. CSHP 2015 has been instrumental in guiding pharmacists and pharmacy leaders to prioritize key activities of high value to improving patient care. Such improvements include the application and deployment of technology in production and distribution systems, as well

as in medical record documentation and order-entry processes. The CSHP 2015 goals and objectives have assisted in driving high-benefit clinical activities like medication reconciliation, applying evidence to decisions related to medication therapy and undertaking follow-up discussions with patients. Most recently, a national cpKPI working group has brought forward eight cpKPIs that address both performance of activities and resultant patient care outcomes. The high participation rate in the Hospital Pharmacy in Canada Survey by facilities across the country suggests that directors of pharmacy are focused on addressing the evolving demands and opportunities to improve clinical pharmacy services.

Even as the future of clinical pharmacy services is being subjected to much scrutiny, the use of cpKPIs and inter-professional impact research (i.e., research on the effects of clinical pharmacy services on the ability of nurses and physicians to undertake their patient care services in a coordinated and integrated manner) is increasing. Continuing to conduct research that investigates the factors that best fulfill positive patient outcomes will be important to fully integrating clinical pharmacists into the care team and optimizing their contribution. Such research and cpKPIs will also be useful for gaining the support of hospital administrators and governments to ensure that sufficient pharmacist resources are available. Linking the use and communication of pharmacist feedback and recognition with overall quality and safety improvements in patient experience and clinical outcomes within an inter-professional collaborative system will be central to securing a vibrant future for pharmacists who provide direct patient care.

Providing feedback and focusing on meaningful work are key to motivating employees to achieve even better outcomes for patients.

Respondents to the 2013/14 Hospital Pharmacy in Canada Survey answered questions that were intended to show how pharmacy departments are progressing in their evaluation of the provision of direct patient care (clinical) services. In addition, some aspects of the evaluation of sterile product preparation were requested as follow-up to information about related practices in the 2011/12 report.

- Fifty percent (81/161) of the survey respondents who answered this question reported using a structured approach to define and prioritize pharmacists' activities (Table H-1). This represents only a slight increase from the 47% (79/168) who reported doing so in 2011/12. Teaching hospitals (76%, 26/34) were more likely to use this approach than non-teaching hospitals (43%, 55/127).

There has been very little change in the proportion of respondents who reported that they evaluate direct patient care services provided by pharmacists in their respective hospitals by auditing a sample of clinical activities: 27% (44/161) in 2013/14 vs. 30% (51/168) in 2011/12. In fact, this proportion has not exceeded 31% in the past five surveys. Perhaps these results indicate the degree of difficulty in setting standards and implementing a complex audit of this nature. They may also be related to the inability of hospital administrators to understand the benefit to their care objectives that such audits generate. Of interest to Quebec (QC) pharmacists, only 5% (2/43) of respondents in that province reported auditing clinical services. In British Columbia/Yukon (BC/YT), 52% (14/27) of respondents reported auditing clinical services.

There has been very little change in the number of respondents auditing a sample of clinical activities.

- Of survey respondents who reported that they evaluated the performance of pharmacists by auditing a sample of clinical activities, 66% (29/44) reported that the evaluation was conducted most frequently by pharmacy practice leaders, followed by pharmacy managers (57%, 25/44). As in 2011/12, retrospective chart review (70%, 31/44), direct observation (52%, 23/44) and self-evaluation by pharmacists (48%, 21/44) continued to be the primary methods of evaluation (Table H-1).

- Many of the aspects of clinical practice investigated in the current Hospital Pharmacy in Canada Survey were taken from those identified by the national cpKPI working group. Survey respondents who evaluated clinical practice reported assessing documentation of clinical services provided by their pharmacists (80%, 35/44), medication reconciliation on admission (73%, 32/44), resolution of drug-related problems (68%, 30/44), development and monitoring of an individualized pharmaceutical care plan for patients (59%, 26/44) and participation in inter-professional rounds (52%, 23/44) (Table H-1). No remarkable differences were noted from the results published in the 2011/12 report.

- Fourteen percent of survey respondents (23/161) reported that they had established mechanisms to measure medication-related patient outcomes, a decline from 22% (36/164) in the 2011/12 report. The reasons for this decrease are not clear. Of the 23 respondents who reported having such a mechanism in place, only 2 used those outcome measures when evaluating the performance of individual pharmacists, and 10 reported that they planned to collect and use this information in the future. These low numbers may be related to a failure to recognize benefit from this work, since hospital administrators often do not fully understand the benefit of such metrics.

- Irrespective of the use of outcome measures, respondents indicated that a mean of 49% of hospital pharmacists received individual performance evaluations. This result cannot be compared with data from the 2011/12 survey, in which the question about performance evaluation of pharmacists was based solely on outcomes.

Table H-1. Evaluation of Clinical Services, 2013/14

	---	Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n=)	(161)	(43)	(73)	(45)	(34)	(127)
A structured approach is used to define and prioritize pharmacist activities	81 **50%**	17 **40%**	41 **56%**	23 **51%**	26 **76%**	55 **43%**
The provision of direct patient care services is evaluated by auditing a sample of clinical activities	44 **27%**	8 **19%**	22 **30%**	14 **31%**	15 **44%**	29 **23%**
Base: All respondents						
The evaluation is done by … (n=)	(44)	(8)	(22)	(14)	(15)	(29)
... pharmacy managers	25 **57%**	5 **63%**	10 **45%**	10 **71%**	7 **47%**	18 **62%**
... pharmacy practice leaders	29 **66%**	4 **50%**	15 **68%**	10 **71%**	13 **87%**	16 **55%**
... peers (e.g., other pharmacists)	15 **34%**	2 **25%**	5 **23%**	8 **57%**	7 **47%**	8 **28%**
... physicians	4 **9%**	0 **0%**	2 **9%**	2 **14%**	2 **13%**	2 **7%**
... the pharmacists themselves (self-evaluation)	13 **30%**	2 **25%**	5 **23%**	6 **43%**	6 **40%**	7 **24%**
... other	5 **11%**	1 **13%**	1 **5%**	3 **21%**	3 **20%**	2 **7%**
The method for evaluation used is … (n=)	(44)	(8)	(22)	(14)	(15)	(29)
... chart review - retrospective	31 **70%**	7 **88%**	12 **55%**	12 **86%**	13 **87%**	18 **62%**
... direct observation	23 **52%**	4 **50%**	12 **55%**	7 **50%**	11 **73%**	12 **41%**
... self-evaluation by pharmacists	21 **48%**	4 **50%**	11 **50%**	6 **43%**	10 **67%**	11 **38%**
... peer review	12 **27%**	2 **25%**	5 **23%**	5 **36%**	6 **40%**	6 **21%**
... other	9 **20%**	2 **25%**	5 **23%**	2 **14%**	2 **13%**	7 **24%**
Aspects of clinical practice evaluated (n=)	(44)	(8)	(22)	(14)	(15)	(29)
Admission medication reconciliation and resolution of discrepancies	32 **73%**	6 **75%**	15 **68%**	11 **79%**	11 **73%**	21 **72%**
Development of an individualized pharmaceutical care plan, including its monitoring	26 **59%**	4 **50%**	13 **59%**	9 **64%**	12 **80%**	14 **48%**
Pharmacist resolution of drug related problems	30 **68%**	7 **88%**	13 **59%**	10 **71%**	10 **67%**	20 **69%**
Pharmacist participation in inter-professional patient care rounds*	23 **52%**	3 **38%**	13 **59%**	7 **50%**	10 **67%**	13 **45%**
Patient education during admission	13 **30%**	3 **38%**	7 **32%**	3 **21%**	4 **27%**	9 **31%**
Discharge medication reconciliation	22 **50%**	6 **75%**	10 **45%**	6 **43%**	7 **47%**	15 **52%**
Discharge medication counseling and evaluation of compliance	19 **43%**	5 **63%**	8 **36%**	6 **43%**	7 **47%**	12 **41%**
Answers to drug information questions	17 **39%**	3 **38%**	10 **45%**	4 **29%**	6 **40%**	11 **38%**
Clinical documentation	35 **80%**	5 **63%**	19 **86%**	11 **79%**	12 **80%**	23 **79%**
Other	3 **7%**	0 **0%**	2 **9%**	1 **7%**	2 **13%**	1 **3%**
(n=)	(161)	(43)	(73)	(45)	(34)	(127)
Mechanisms have been established to measure patients' medication-related outcomes.	23 **14%**	3 **7%**	13 **18%**	7 **16%**	7 **21%**	16 **13%**
Base: All respondents						
(n=)	(23)	(3)	(13)	(7)	(7)	(16)
Patients' medication-related outcomes are used to evaluate the performance of individual pharmacists.	2 **9%**	0 **0%**	0 **0%**	2 **29%**	0 **0%**	2 **13%**
There are plans to collect and use outcomes information for evaluation of pharmacists in the future.	10 **43%**	0 **0%**	5 **38%**	5 **71%**	4 **57%**	6 **38%**
(n=)	(22)	(3)	(12)	(7)	(7)	(15)
Average percentage of pharmacists evaluated in the last fiscal year based on medication-related patient outcomes.	**10%**	**27%**	**0%**	**20%**	**0%**	**15%**
Base: Respondents with mechanisms to measure patients' medication-related outcomes						
(n=)	(160)	(43)	(73)	(44)	(34)	(126)
Average percentage of pharmacists receiving performance reviews in the last two years	**49%**	**47%**	**51%**	**49%**	**64%**	**45%**
Base: All respondents						

Evaluation of the Process Related to Sterile Product Preparation

Hospital pharmacy departments continue to report slow progress in implementing new quality assurance practices to ensure the safety of compounded sterile products (Table H-2).

- Fifty-seven percent of respondents (91/161) indicated that they audited the preparation of parenteral admixtures by observing employees for validation of aseptic technique at least once a year. This proportion is essentially the same as was reported in the 2009/10 and 20011/12 reports.
- Twenty-nine percent of respondents (46/161) reported regularly conducting sterility testing on samples collected from surfaces in sterile product preparation areas vs. 23% (39/167) in the 2011/12 report.
- Twenty-five percent of respondents (40/161) indicated that they routinely verified product sterility by laboratory testing of samples from prepared products vs. 29% (49/167) in the 2011/12 report.

Table H-2. Evaluation of the Process Related to Sterile Product Preparation

		Bed Size			Teaching Status	
	All	50-200	201-500	>500	Teaching	Non-teaching
(n=)	(161)	(43)	(73)	(45)	(35)	(126)
Employees preparing parenteral admixtures are observed for validation of aseptic technique at least once a year.	91	20	42	29	26	65
	57%	**47%**	**58%**	**64%**	**74%**	**52%**
Surface sampling in sterile product preparation areas of parenteral admixture service is conducted according to a set protocol.	46	8	21	17	17	29
	29%	**19%**	**29%**	**38%**	**49%**	**23%**
As part of the sterile compounding procedure product sterility is routinely verified by laboratory testing on a sample of the products prepared.	40	8	17	15	15	25
	25%	**19%**	**23%**	**33%**	**43%**	**20%**

Unfortunately, there has been little or no improvement in hospital pharmacy departments' implementation of these quality assurance activities in their respective sterile product services areas. Self-assessment tools are available to identify gaps in practices related to sterile product preparation. Given the risks associated with contamination of parenteral products, additional efforts are required to put in place processes to ensure their safety.

There has been no improvement in implementing quality assurance activities related to sterile product services.

New (and much-anticipated) regulations from Health Canada for both commercial and pharmacy-specific sterile product compounding, to be released in 2015/16, are expected to create new opportunities for hospitals to determine for themselves how best to provide sterile product services within their unit-dose medication services. Future editions of the Hospital Pharmacy in Canada Survey will attempt to assess how hospitals are addressing the new regulations and marketplace opportunities.

Summary

In summary, evaluating pharmacy services can guide the efforts of hospital pharmacy departments, helping to ensure that they are doing the right things, in the right way, with the desired results, at an appropriate cost. The cpKPIs are useful to inform hospital pharmacy departments about areas that warrant attention and improvement, to monitor performance over time and to prioritize improvement activities. Hopefully, as familiarity with evaluation concepts increases, pharmacy departments will adopt the use of cpKPIs as well as the results of various relevant research projects. The result should be improved evaluation of all aspects of pharmacy services, including clinical pharmacy services, and of individual pharmacist performance, with linkage of performance to patient outcomes. This will in turn help to define and demonstrate the benefit that pharmacists can deliver, within the patient care team, in terms of patient outcomes. In this regard, the 2013/14 Hospital Pharmacy in Canada Report will serve as a starting point for future surveys, which will examine the types of feedback and evaluation that departments are deploying.

[1] Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: prescribing and transcribing – 2013. Am J Health Syst Pharm. 2014;71(11):924-42.

[2] Pedersen CA, Schneider PJ, Scheckelhoff DJ. ASHP national survey of pharmacy practice in hospital settings: monitoring and patient education –2012. Am J Health Syst Pharm. 2013;709(9):787-803.

[3] CSHP 2015: a vision of pharmacy practice excellence by the year 2015. Ottawa (ON): Canadian Society of Hospital Pharmacists; 2008.

[4] Required Organizational Practices handbook 2014. Ottawa (ON): Accreditation Canada; 2013.

[5] Medication Management Standards. Ottawa (ON): Accreditation Canada; 2014.

[6] Blueprint for pharmacy. Ottawa (ON): Canadian Pharmacists Association; 2013 Jun.

[7] Fernandez O, Gorman SK, Toombs K. Final Canadian national Delphi consensus results – What are the appropriate national clinical pharmacy key performance indicators (cpKPI) for Canadian hospital pharmacists? [presentation]. Canadian Hospital Pharmacy Leadership Conference; 2013 Jun 8; Alton (ON).

I - Pediatric Pharmacy Services

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Since the last Hospital Pharmacy in Canada Report (for 2011/12), a number of documents with important implications for pediatric pharmacy services have been released. Most notably, beginning in 2011, the Standing Senate Committee on Social Affairs, Science and Technology undertook a four-phase study of prescription pharmaceuticals.[1] The committee was mandated to examine and report on prescription pharmaceuticals in Canada, including but not limited to the following topics[2]:

- the process to approve new prescription pharmaceuticals in Canada
- the post-approval monitoring of prescription pharmaceuticals
- the off-label use of prescription pharmaceuticals
- the unintended consequences associated with the use of prescription pharmaceuticals

The four individual reports offer a broad view of the challenges associated with prescription drug use, including their use in the pediatric population, and present a total of 79 recommendations for improving the drug approval process and the use of drugs in Canada.[3,4,5,6] Although all hospital pharmacists should be aware of the recommendations in these reports, those in the pediatric setting should pay particular attention to the recommendations that are specific to pediatric patients, a vulnerable sub-group of the Canadian population. For example, the third report[5] highlights that the proportion of medications used off-label in pediatric medicine can be as high as 25% of outpatient prescriptions and up to 60% of inpatient prescriptions. Hospital pharmacists have a responsibility to be aware of the issues associated with the use of drugs in children and to advocate for safe and informed use of drugs in these patients.

In 2014, the Council of Canadian Academies published a report addressing the use of pharmaceuticals in children in Canada.[7] Introductory material for this report (appearing on the Council's website) states that "[d]ue to concerns about their vulnerability, children have historically been neglected in drug research and development, including clinical trials. But the reality is that children need medicines and are taking them. Data show that each year, about half of Canadian children use at least one prescription drug. Much of this prescribing is done off-label (i.e., the prescription differs from the authorized use) or without adequate age-related information, a practice that may introduce unnecessary risk of harm to children who need medicine. Recognizing the importance of developing safe and effective medicines specifically for children, the Minister of Health, on behalf of Health Canada, asked the Council of Canadian Academies to provide an evidence-based and authoritative assessment of the state of research and regulations leading to the approval of medicines for children, in Canada and abroad." Five key findings were identified by the 14 members of the expert panel:

- "Children take medications, many of which have not been proven safe and effective for their use.
- "Children respond to medications differently from adults; thus, medicines must be studied in children and formulated for children.
- "Studying medicines in children is always possible and is in their best interests.
- "In the United States and the European Union, pediatric medicines research is encouraged, required, and monitored in ways that offer lessons for Canada.
- "Pediatric medicines research is a Canadian strength, but it requires reinforcement and sustained capacity and infrastructure to realize its full potential."

In Canada, health centres that provide care exclusively to pediatric patients or that care for a significant number of patients in this age group are represented through the Canadian Association of Pediatric Health Centres (CAPHC).[8] Most of the 47 member hospitals from across Canada have a pediatric component that is part of a larger healthcare facility focusing mainly on the care of adults. However, the CAPHC includes 10 pediatric hospitals that focus their services almost exclusively on the care of children: the BC Children's Hospital in Vancouver, the Stollery Children's Hospital in Edmonton, the Alberta Children's Hospital in Calgary, the Children's Hospital in London, the Hospital for Sick Children in Toronto, the Children's Hospital of Eastern Ontario in Ottawa, the Centre hospitalier universitaire Sainte-Justine in Montreal, the Montreal Children's Hospital, the Children's Hospital in Winnipeg and the IWK Health Centre in Halifax.

Since the inception of the Hospital Pharmacy in Canada Survey and Report, all of these pediatric facilities have been invited to participate. Until recently, for reporting purposes, their data were combined with data from adult

hospitals, even though it was widely accepted that there were differences between adult and pediatric hospitals in areas such as staffing requirements (e.g., budgeted hours/patient day). Beginning with the 2011/12 report, however, that shortcoming has been addressed. Data from respondents representing the 10 pediatric hospitals are now analyzed separately from the data collected from adult hospitals, to allow capture and quantification of differences between adult and pediatric pharmacy practice. Therefore, this current chapter presents data from the seven pediatric hospitals that responded to the 2013/14 Hospital Pharmacy in Canada Survey. These data are not included in the results reported in other chapters, with the exception of Chapter G (Future Trends in Pharmacy Practice). In that chapter, data from the seven pediatric hospitals were combined with data from the 163 adult hospitals because there was no obvious reason to expect that perceptions of future trends in pharmacy practice, and health care more generally, would vary between directors of pharmacy in adult and pediatric hospitals.

It should be noted that many of the tables in the current chapter present comparative data for all respondents, along with the data specific to pediatric hospitals. As such, the columns headed "All respondents" and "Teaching" include up to an additional seven respondents beyond the values appearing for the same variables in other chapters of this report; these are the pediatric hospital respondents. In some cases, the inclusion of those seven respondents resulted in small differences between the pediatric and adult chapters in terms of results for "All respondents" and the "Teaching" group. For example, in Table D-3b of Chapter D (Human Resources), the staffing ratio "inpatient budgeted hours/acute care patient day" for teaching hospitals is 0.96 (average of 31 adult teaching hospitals), whereas in Table I-11 of this chapter, the corresponding value is 1.06 (average of 36 hospitals, 31 adult and five pediatric).

Notable differences between results reported by respondents from the seven pediatric hospitals and those from the hospitals that care primarily for adult patients are identified in this chapter. Readers are encouraged to consult the other chapters of this report for definitions of various terms.

Demographics

The 2013/14 survey response rate for the pediatric hospitals was 70% (7/10), compared with the overall response rate of 78% (170/217). Pediatric hospitals were smaller on average than adult hospitals, had a higher proportion of acute care beds and had a shorter average length of stay (Table I-1). In addition, all of the pediatric hospitals with data included in this chapter were teaching hospitals.

The results presented in this chapter are based on a maximum of seven pediatric hospitals. Comparisons with the data for adult hospitals, which are based on a much larger sample of 163 respondents, must be interpreted very cautiously. Each respondent in the pediatric group has a much greater impact, on a percentage basis, than does a respondent in the group of adult hospitals. As a result of these considerations, the Editorial Board has a policy that data based on fewer than 10 respondents are reported as absolute numbers, rather than as percentages.

Table I-1. Hospital Demographic Data, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching	
			Adult	Pediatric	Teach	Non-teaching
Totals:	(n=)	(170)	(163)	(7)	(42)	(128)
Beds - acute care		**50,260**	**48,562**	**1,698**	**23,939**	**26,321**
Beds - non-acute care		**21,426**	**21,382**	**44**	**2,992**	**18,434**
Averages:						
Beds - acute care		**296**	**298**	**243**	**570**	**206**
Beds - non-acute care		**126**	**131**	**6**	**71**	**144**
Average length of inpatient stay - acute care (days)	(n=)	(159)	(152)	(7)	(41)	(118)
		7.2	**7.2**	**5.6**	**6.9**	**7.3**

Clinical Pharmacy Practice

Formal assignment of a pharmacist to a patient care program is thought to be a good indicator that a reasonable level of clinical pharmacy support is being provided to that program. For additional detail about program-related data collection, see Chapter B (Clinical Pharmacy Practice).

According to respondents from the pediatric hospitals, one or more pharmacists were assigned to an average of 3.7 (out of a maximum of 17) outpatient clinical programs and to an average of 8.6 (out of a maximum of 18) inpatient clinical programs (Table I-2).

On average, pharmacists were assigned to support a higher number of inpatient and outpatient clinical programs in pediatric than in adult hospitals.

These values were greater than the corresponding values for adult hospitals, where one or more pharmacists were assigned to averages of 2.7 outpatient and 6.3 inpatient clinical programs.

Table I-2. Number of Formal Programs, Including Pediatric Hospitals, 2013/14

	All	Hospital Type		Teaching Status	
		Adult	Pediatric	Teaching	Non-teaching
(n=)	(170)	(163)	(7)	(42)	(128)
Mean number of formal patient care programs (max=19)	**11.4**	**11.2**	**14.6**	**14.5**	**10.3**
Mean number of pharmacy supported OUTpatient care programs (max= 17)	**2.8**	**2.7**	**3.7**	**4.5**	**2.2**
Mean number of pharmacy supported INpatient care programs (max= 18)	**6.4**	**6.3**	**8.6**	**9.3**	**5.4**

Base: All respondents

Tables I-3 and I-4 summarize outpatient and inpatient clinical pharmacy services, respectively, comparing pediatric hospitals with all respondent hospitals.

Table I-3. Outpatient Clinical Pharmacy Services, Including Pediatric Hospitals, 2013/14

Outpatient Services		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
a) Pain and/or palliative care	program exists (n=)	(110)	(104)	(6)	(34)	(76)
	pharmacist assigned	15	13	2	6	9
		14%	**13%**		**18%**	**12%**
b) Cardiovascular and/or lipid	program exists (n=)	(85)	(800	(5)	(33)	(52)
	pharmacist assigned	30	30	0	11	19
		35%	**38%**		**33%**	**37%**
c) Mental Health	program exists (n=)	(133)	(126)	(7)	(39)	(94)
	pharmacist assigned	18	17	1	8	10
		14%	**13%**		**21%**	**11%**
d) Transplantation	program exists (n=)	(29)	(23)	(6)	(29)	(0)
	pharmacist assigned	19	16	3	19	0
		66%	**70%**		**66%**	**0%**
e) Hematology - oncology	program exists (n=)	(116)	(109)	(7)	(33)	(83)
	pharmacist assigned	94	88	6	25	69
		81%	**81%**		**76%**	**83%**
f) Hematology - anticoagulation	program exists (n=)	(76)	(70)	(6)	(31)	(45)
	pharmacist assigned	41	40	1	17	24
		54%	**57%**		**55%**	**53%**
g) Diabetes	program exists (n=)	(88)	(81)	(7)	(30)	(58)
	pharmacist assigned	26	26	0	7	19
		30%	**32%**		**23%**	**33%**
h) Infectious Disease and/or AIDS	program exists (n=)	(71)	(65)	(6)	(35)	(36)
	pharmacist assigned	26	24	2	19	7
		37%	**37%**		**54%**	**19%**
i) Asthma and/or Allergy	program exists (n=)	(53)	(48)	(5)	(21)	(32)
	pharmacist assigned	7	7	0	3	4
		13%	**15%**		**14%**	**13%**
j) Neurology	program exists (n=)	(45)	(39)	(6)	(27)	(18)
	pharmacist assigned	6	5	1	4	2
		13%	**13%**		**15%**	**11%**
k) Geriatrics	program exists (n=)	(100)	(100)	(0)	(28)	(72)
	pharmacist assigned	15	15	0	6	9
		15%	**15%**		**21%**	**13%**
l) Renal Dialysis	program exists (n=)	(104)	(98)	(6)	(32)	(72)
	pharmacist assigned	64	61	3	22	42
		62%	**62%**		**69%**	**58%**
m) General Medicine	program exists (n=)	(151)	(144)	(7)	(41)	(110)
	pharmacist assigned	10	9	1	6	4
		7%	**6%**		**15%**	**4%**
n) General Surgery	program exists (n=)	(150)	(143)	(7)	(42)	(108)
	pharmacist assigned	11	10	1	4	7
		7%	**7%**		**10%**	**6%**
o) Gynecology and/or Obstetrics	program exists (n=)	(113)	(110)	(3)	(27)	(86)
	pharmacist assigned	6	4	2	4	2
		5%	**4%**		**15%**	**2%**
p) Rehabilitation	program exists (n=)	(84)	(81)	(3)	(19)	(65)
	pharmacist assigned	2	2	0	1	1
		2%	**2%**		**5%**	**2%**
s) Emergency	program exists (n=)	(147)	(141)	(6)	(40)	(107)
	pharmacist assigned	84	81	3	28	56
		57%	**57%**		**70%**	**52%**

Base: Respondents who answered question about pharmacy support in facilities with formal programs

Table I-4. Inpatient Clinical Pharmacy Services, Including Pediatric Hospitals, 2013/14

Inpatient Services		All	Hospital Type: Adult	Hospital Type: Pediatric	Teaching Status: Teaching	Teaching Status: Non-teaching
a) Pain and/or palliative care	program exists (n=)	(112)	(106)	(6)	(34)	(78)
	inpatient pharmacist assigned	61	60	1	18	43
		54%	**57%**		**53%**	**55%**
b) Cardiovascular and/or lipid	program exists (n=)	(86)	(81)	(5)	(33)	(53)
	inpatient pharmacist assigned	65	61	4	30	35
		76%	**75%**		**91%**	**66%**
c) Mental Health	program exists (n=)	(135)	(128)	(7)	(40)	(95)
	inpatient pharmacist assigned	86	83	3	28	58
		64%	**65%**		**70%**	**61%**
d) Transplantation	program exists (n=)	(29)	(23)	(6)	(29)	(0)
	inpatient pharmacist assigned	25	20	5	25	0
		86%	**87%**		**86%**	**0%**
e) Hematology - oncology	program exists (n=)	(117)	(110)	(7)	(33)	(84)
	inpatient pharmacist assigned	68	61	7	27	41
		58%	**55%**		**82%**	**49%**
f) Hematology - anticoagulation	program exists (n=)	(75)	(69)	(6)	(30)	(45)
	inpatient pharmacist assigned	26	25	1	9	17
		35%	**36%**		**30%**	**38%**
g) Diabetes	program exists (n=)	(87)	(80)	(7)	(30)	(57)
	inpatient pharmacist assigned	9	8	1	4	5
		10%	**10%**		**13%**	**9%**
h) Infectious Disease and/or AIDS	program exists (n=)	(74)	(68)	(6)	(35)	(39)
	inpatient pharmacist assigned	58	56	2	25	33
		78%	**82%**		**71%**	**85%**
i) Asthma and/or Allergy	program exists (n=)	(53)	(48)	(5)	(21)	(32)
	inpatient pharmacist assigned	11	7	4	7	4
		21%	**15%**		**33%**	**13%**
j) Neurology	program exists (n=)	(47)	(41)	(6)	(28)	(19)
	inpatient pharmacist assigned	29	25	4	18	11
		62%	**61%**		**64%**	**58%**
k) Geriatrics	program exists (n=)	(103)	(103)	(0)	(28)	(75)
	inpatient pharmacist assigned	79	79	0	21	58
		77%	**77%**		**75%**	**77%**
l) Renal Dialysis	program exists (n=)	(103)	(97)	(6)	(32)	(71)
	inpatient pharmacist assigned	45	41	4	19	26
		44%	**42%**		**59%**	**37%**
m) General Medicine	program exists (n=)	(158)	(151)	(7)	(41)	(117)
	inpatient pharmacist assigned	134	127	7	40	94
		85%	**84%**		**98%**	**80%**
n) General Surgery	program exists (n=)	(154)	(147)	(7)	(42)	(112)
	inpatient pharmacist assigned	107	101	6	34	73
		69%	**69%**		**81%**	**65%**
o) Gynecology and/or Obstetrics	program exists (n=)	(116)	(113)	(3)	(26)	(90)
	inpatient pharmacist assigned	50	47	3	14	36
		43%	**42%**		**54%**	**40%**
p) Rehabilitation	program exists (n=)	(88)	(85)	(3)	(19)	(69)
	inpatient pharmacist assigned	54	53	1	12	42
		61%	**62%**		**63%**	**61%**
q) Adult Critical Care	program exists (n=)	(146)	(146)	(0)	(34)	(112)
	inpatient pharmacist assigned	118	118	0	33	85
		81%	**81%**		**97%**	**76%**
r) Pediatric and/or Neonatal Critical Care	program exists (n=)	(79)	(72)	(7)	(28)	(51)
	inpatient pharmacist assigned	59	52	7	26	33
		75%	**72%**		**93%**	**65%**

Base: Respondents who answered question about pharmacy support in facilities with formal programs

Many factors contribute to an institution's decision to decentralize pharmacists to outpatient and inpatient care programs. In pediatrics, the high prevalence of some diseases (e.g., asthma and allergy) is an important justification for pharmacy services. In addition, in specialty care areas (e.g., pediatric and neonatal critical care, pediatric hematology–oncology), the critical nature of the patient's illness and the type and intensity of drug therapy used are important factors in allocating pharmacy resources to those program areas. The resultant complexity of drug therapy in the pediatric population may be responsible for the more prominent role that pharmacists appear to play in pediatric clinical programs.

Pharmacy Practice Models

Chapter B (Clinical Pharmacy Practice) defines four pharmacy practice models. Data in that chapter, representing 163 adult hospitals, provide a good picture of the extent to which each model is used in adult hospitals

in Canada. Data on the use of the four pharmacy practice models in pediatric hospitals are presented below. There were differences between the pediatric and adult hospitals with respect to the percentages of beds serviced with each of the models:

- integrated drug distribution/clinical practice model for an average of 75% of beds in pediatric hospitals and 54% of beds in adult hospitals
- separate clinical and distributive practice model for 20% of beds in pediatric hospitals and 6% of beds in adult hospitals
- clinical practice centred model for 4% of beds in pediatric hospitals and 18% of beds in adult hospitals
- drug distribution centred model for 1% of beds in pediatric hospitals and 22% of beds in adult hospitals

Respondents were also asked if they had reviewed their institutions' pharmacy practice model in the preceding 12 months and if so, whether they were planning to establish a different predominant practice model.

- Of the three of pediatric hospital respondents who reported reviewing the institution's practice model (i.e., clinical vs. distributive) in the preceding 12 months, only one indicated plans to change (to a clinical practice centred model).

- By comparison, of the 55 adult hospital respondents who reported such a review, 71% (39/55) planned to change the practice model, with 59% (23/39) planning to adopt the clinical practice centered model, 38% (15/39) the integrated drug distribution/clinical practice model and 3% (1/39) the separate clinical and distributive practice model.

Another approach to describing pharmacy practice models is to characterize them as proactive or reactive practice models (for definitions, see Chapter B, Clinical Pharmacy Practice).

- On average, pediatric hospital respondents reported servicing 71% of inpatient beds with a proactive model, in which the pharmacist is regularly present and involved at the point where drug therapy decisions are being made. Most of the remaining beds (i.e., 28% of total beds) were reported to be serviced with a reactive model, in which the pharmacist is not involved at the point where drug therapy decision are made and instead reacts to problems detected during later review of medication orders.

- By comparison, on average, adult hospital respondents reported that 33% of beds were serviced by pharmacists practising in a proactive model and 62% of beds were serviced by pharmacists practising in a reactive model.

- Of the four pediatric hospital respondents who reported reviewing their institutions' clinical practice model (i.e., proactive vs. reactive) in the past 12 months, three indicated plans to change from the reactive model to the proactive model. Similarly, of the 32% (51/161) of adult hospital respondents who reported reviewing the clinical practice model in the previous 12 months, 73% (37/51) reported plans to change. All of those respondents intended to change to the proactive model.

The percentage of pediatric beds serviced with a proactive clinical practice model was more than double that of adult beds.

The primary approach to the assignment of pharmacy staff to programs does not seem to have evolved to a clinical prioritization-based decision-making process. Pharmacy staff assignments were reported as being more opportunistic than planned and, when planning did occur, it usually took place within the pharmacy department, with little multidisciplinary input.

- Four of six pediatric hospital respondents reported that the assignment of pharmacy staff to patient care programs was opportunistic, while the other two respondents indicated that they used a structured approach within the pharmacy department. No respondents reported an interdisciplinary approach for prioritizing the assignment of pediatric pharmacy staff to clinical programs. The pattern in the adult pharmacy setting was similar, with 52% (84/162) of respondents reporting opportunistic staff assignment to patient care programs, while 41% (67/162) reported the use of a structured approach within pharmacy, and 7% (11/162) reported a structured multidisciplinary approach.

Prescribing Rights

Five of the seven pediatric hospital respondents reported that their pharmacists had been granted prescribing rights for either independent or dependent prescribing. By comparison, 55% (89/163) of adult hospital respondents

reported that pharmacists had prescribing rights (Table I-5). The complex nature of pediatric drug therapy and the requirement for tailored dosing for the pediatric population may be factors contributing to the increasing numbers of pharmacists who are being granted prescribing rights in the pediatric practice setting.

Table I-5. Prescribing Rights for Pharmacists, Including Pediatric Hospitals, 2013/14

		Hospital Type		Teaching	
	All	Adult	Pediatric	Teaching	Non-teaching
(n=)	(170)	(163)	(7)	(42)	(128)
Prescribing rights have been approved for pharmacists within the hospital	94 **55%**	89 **55%**	5	26 **62%**	68 **53%**
Base: All respondents					
Type of prescribing rights approved for pharmacists : (n=)	(94)	(89)	(5)	(26)	(68)
Independent, for lab tests	54 **57%**	50 **56%**	4	18 **69%**	36 **53%**
Independent, for dosage adjustment	43 **46%**	40 **45%**	3	14 **54%**	29 **43%**
Independent, for new therapy	22 **23%**	19 **21%**	3	12 **46%**	10 **15%**
Dependent, for lab tests	47 **50%**	44 **49%**	3	11 **42%**	36 **53%**
Dependent, for dosage adjustment	59 **63%**	55 **62%**	4	16 **62%**	43 **63%**
Dependent, for new therapy	38 **40%**	34 **38%**	4	14 **54%**	24 **35%**

Base: Facilities with pharmacist prescribing
Note : multiple mentions permissible

Drug Distribution Systems

Types of Drug Distribution Systems

Relative to other drug distribution models, unit-dose medication systems have long been recognized as safer for the patient and more efficient from the perspectives of both drug cost and staff utilization.[9] Nonetheless, 24% (38/157), 13% (21/157) and 4% (6/157) of adult hospitals reported using a traditional, wardstock or controlled distribution system, respectively, for some of their acute care beds (Table I-6),with some of the hospitals reporting the use of two or more of these systems. In contrast, all seven pediatric hospital respondents reported using a unit-dose system, either centralized or decentralized, for all acute and non-acute care beds (Table I-6). This result represents a change from the 2011/12 survey, when two of seven pediatric respondents reported that they were still using a traditional drug distribution system.

- A mean of 43% of all acute care beds in the seven pediatric facilities were serviced by a centralized unit-dose system (Figure I-1), a considerable increase since 2011/12, when only 25% of acute care beds in seven pediatric facilities were serviced by a centralized unit-dose system. By comparison, in 2013/14, a mean of 60% of all acute care beds in 157 adult hospitals and a mean of 64% of all acute care beds in 40 adult teaching hospitals were serviced by a centralized unit-dose system.

In all seven pediatric hospitals, more than half of the acute care beds were serviced by automated dispensing cabinets.

- A mean of 54% of all acute care beds in seven pediatric facilities, compared with a mean of 25% of all acute care beds in 157 adult hospitals and a mean of 29% of all acute care beds in 40 adult teaching hospitals, were serviced by a decentralized, automated dispensing cabinet (ADC) unit-dose system. This represents an increase since 2011/12, when 36% of all acute care beds in seven pediatric facilities were reported to be serviced by this model.

- No acute care beds in the seven pediatric facilities, compared with a mean of 11% of all acute care beds in 157 adult hospitals and a mean of 3% of all acute care beds in 40 adult teaching hospitals, were serviced by a traditional (multi-dose) drug distribution system. This reflects a change since 2011/12, when two of the seven pediatric respondents, representing 21% of acute care beds in all seven pediatric facilities, reported using a traditional multi-dose drug distribution system

All pediatric hospitals reported that they were using automated dispensing cabinets.

- A mean of 2% of all acute care beds in 157 adult facilities and a mean of 1% of all acute care beds in 40 teaching hospitals were serviced by a wardstock system, and a mean of only 1% of acute care beds in all adult facilities, including teaching hospitals, were serviced by a controlled/carded drug distribution system. None of the seven pediatric hospitals reported using wardstock or controlled/carded systems to service acute care beds.

In all seven pediatric hospitals, no acute care beds were serviced by traditional or wardstock systems.

Table I-6. Percentage of Facilities, Including Pediatric Hospitals, Using Various Drug Distribution Systems, 2013/14

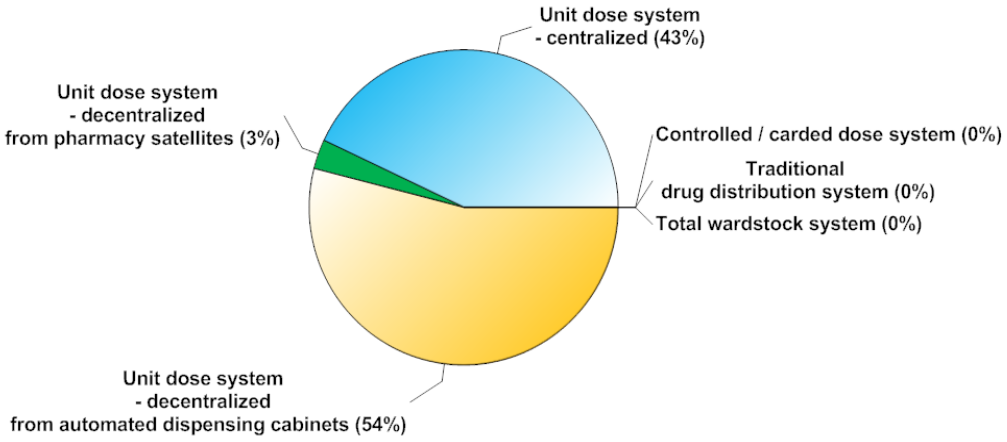
	All	Hospital Type		Teaching Status	
		Adult	Pediatric	Teaching	Non-teaching
(n all facilities / facilities with acute beds)	(164)	(157)	(7)	(40)	(124)
(n facilities with non-acute beds)	(103)	(101)	(2)	(15)	(88)
(1) Unit dose system - centralized	122	118	4	33	89
	74%	**75%**		**83%**	**72%**
used for acute beds	116	112	4	33	83
	71%	**71%**		**83%**	**67%**
used for non-acute beds	69	68	1	12	57
	67%	**67%**		**80%**	**65%**
(2) Unit dose system - decentralized from pharmacy satellites	13	12	1	9	4
	8%	**8%**		**23%**	**3%**
used for acute beds	13	12	1	9	4
	8%	**8%**		**23%**	**3%**
used for non-acute beds	1	1	0	0	1
	1%	**1%**		**0%**	**1%**
(3) Unit dose system - decentralized from automated dispensing cabinets	82	78	4	29	53
	50%	**50%**		**73%**	**43%**
used for acute beds	82	78	4	29	53
	50%	**50%**		**73**	**43%**
used for non-acute beds	20	19	1	4	16
	19%	**19%**		**27%**	**18%**
(4) Traditional drug distribution system	41	41	0	6	35
	25%	**26%**		**15%**	**28%**
used for acute beds	38	38	0	6	32
	23%	**24%**		**15%**	**26%**
used for non-acute beds	17	17	0	2	15
	17%	**17%**		**13%**	**17%**
(5) Total wardstock system	22	22	0	5	17
	13%	**14%**		**13%**	**14%**
used for acute beds	21	21	0	4	17
	13%	**13%**		**10%**	**14%**
used for non-acute beds	11	11	0	3	8
	11%	**11%**		**20%**	**9%**
(6) Controlled / carded dose system	20	20	0	2	18
	12%	**13%**		**5%**	**15%**
used for acute beds	6	6	0	1	5
	4%	**4%**		**3%**	**4%**
used for non-acute beds	18	18	0	1	17
	17%	**18%**		**7%**	**19%**

Base: Respondents with complete answers to questions about drug distribution systems

- One of the seven pediatric facilities reported using robotic type automation to pick and fill patient-specific unit-dose bins.

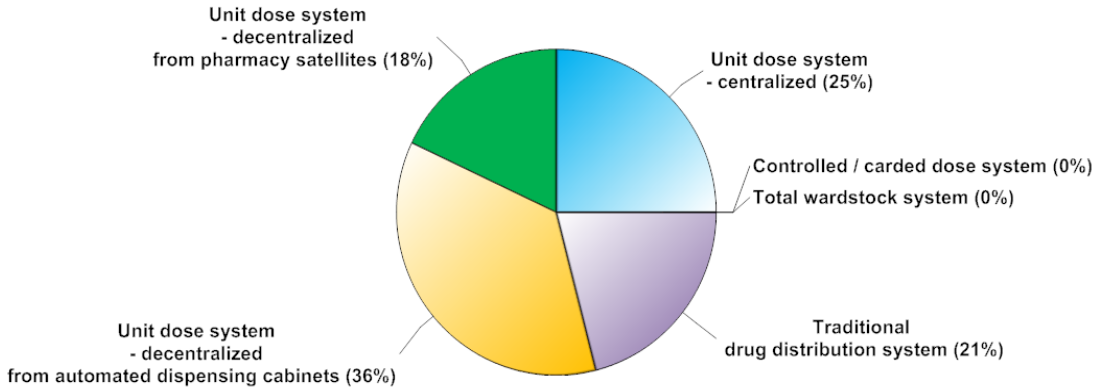
Figure I-1. Average Percentage of Acute Care Beds Serviced by Each Type of Drug Distribution System, 2013/14 (a), with Comparative Data for 2011/12 (b)

Figure I-1.(a) 2013/14



Base: Pediatric hospitals (n=7)

Figure I-1.(b) 2011/12



Base: Pediatric hospitals (n=7)

Other Attributes of Drug Distribution Systems

- All seven pediatric respondents reported that they were using ADCs in one or more locations of the hospital, including the emergency department, operating rooms, recovery rooms and critical care areas. Four of the seven used ADCs as part of the drug distribution system for inpatient beds, either acute care or non-acute care (Table I-6).
- The pediatric hospitals using ADCs reported that, on average, 40% of all medications in each ADC were contained in drawer configurations that limited access to a single drug and/or controlled the number of dosage units that could be accessed simultaneously. On average, the remaining 60% of medications were stored in drawers that allowed access to multiple medications. These results are similar to those from the 2011/12 survey.
- Similar to the results reported for adult hospitals, ADCs used in certain types of short-stay patient care areas in pediatric facilities, such as operating rooms, recovery rooms and emergency departments, were often not "profiled", meaning that access to medications was not linked to and controlled by the patient's medication profile. In contrast, ADCs used in patient care areas where the patient was likely to remain for a longer period were usually linked to, and controlled by, the patient's medication profile.

Parenteral Admixture Services

Given the need to individualize dosing of many medications on the basis of a child's weight and age, drug compounding is a key component of pediatric pharmacy services.

- Respondents from all seven pediatric hospitals reported that their parenteral admixture program provided service to more than 90% of inpatients. By comparison, 66% (106/161) of adult hospital respondents

reported that their parenteral admixture service provided service to 90% or more of inpatients.

- A mean of 71% of total parenteral admixture doses administered in pediatric hospitals were prepared through the parenteral admixture service, compared with a mean of 52% of doses in adult hospitals.
- The rate of adoption of automation for compounding was high in pediatric hospitals, perhaps reflecting the complexity and safety aspects of parenteral therapy in the pediatric setting.
- Five of the seven pediatric respondents reported the use of automated compounding devices, compared with 38% (55/143) of adult hospitals (Table I-7).
- The use of robotics for parenteral compounding has yet to become common practice. Only one respondent from an adult hospital and no pediatric hospital respondents reported the use of robotics for parenteral compounding.
- All seven pediatric hospital respondents and 93% (135/145) of adult facility respondents reported the existence of written policies and procedures for sterile preparation. Five of the seven pediatric hospitals reported reviewing these policies at least every two years, compared to 54% (72/133) of adult facilities.

Table I-7 summarizes sterile compounding data for adult and pediatric hospitals.

Table I-7. Sterile Compounding Practices, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
Type of automation						
	(n=)	(150)	(143)	(7)	(41)	(109)
No automation used to prepare parenteral admixtures		67	65	2	12	55
		45%	**45%**		**29%**	**50%**
Automated syringe filling device		49	46	3	19	30
		33%	**32%**		**46%**	**28%**
Automated compounding device		60	55	5	26	34
		40%	**38%**		**63%**	**31%**
Stand alone robotic device		1	1	0	0	1
		1%	**1%**		**0%**	**1%**
Base: Facilities with parenteral admixture service __ Note: multiple mentions permissible						
Written policies and procedures						
Written policies and procedures regarding preparation of sterile products are available	(n=)	(152)	(145)	(7)	(41)	(111)
		142	135	7	38	104
		93%	**93%**		**93%**	**94%**
Base: Facilities with parenteral admixture service						
Written policies and procedures regarding preparation of sterile products are available and reviewed at least every two years	(n=)	(140)	(133)	(7)	(38)	(102)
		77	72	5	24	53
		55%	**54%**		**63%**	**52%**
Base: Facilities with parenteral admixture service where written policies are available						
Practices concerning the compounding of sterile products						
Personnel … must demonstrate competency in compounding sterile preparations ...	(n=)	(151)	(144)	(7)	(41)	(110)
		148	141	7	41	107
		98%	**98%**		**100%**	**97%**
... pharmacy staff involved in preparing low- to moderate-risk compounded sterile preparations must participate in a didactic review of aseptic technique	(n=)	(151)	(144)	(7)	(41)	(110)
		63	59	4	24	39
		42%	**41%**		**59%**	**35%**
... pharmacy staff involved in preparing high-risk compounded sterile preparations must participate in a didactic review of aseptic technique	(n=)	(149)	(142)	(7)	(41)	(108)
		64	59	5	27	37
		43%	**42%**		**66%**	**34%**
Pharmacists with responsibility for sterile compounding receive formal training ...	(n=)	(151)	(144)	(7)	(41)	(110)
		83	79	4	26	57
		55%	**55%**		**63%**	**52%**
Base: Facilities with parenteral admixture service						
Pharmacists with responsibility for sterile compounding receive formal training and undergo regular refresher programs ...	(n=)	(82)	(78)	(4)	(26)	(56)
		46	44	2	14	32
		56%	**56%**		**54%**	**57%**
Base: Facilities with parenteral admixture service where pharmacists with responsibility for sterile compounding receive formal training						
Pharmacy technicians with responsibility for sterile compounding receive formal training ...	(n=)	(151)	(144)	(7)	(41)	(110)
		141	135	6	40	101
		93%	**94%**		**98%**	**92%**
Base: Facilities with parenteral admixture service						
Pharmacy technicians with responsibility for sterile compounding receive formal training and undergo regular refresher programs ...	(n=)	(141)	(135)	(6)	(40)	(101)
		96	91	5	31	65
		68%	**67%**		**78%**	**64%**
Base: Facilities with parenteral admixture service where technicians with responsibility for sterile compounding receive formal training						

- All seven pediatric hospitals and 87% (117/135) of adult hospitals reported using USP Chapter <797> guidelines for compounding. Four of seven pediatric hospitals and 61% (82/135) of adult facilities also used the CSHP guidelines developing their own policies and procedures.

Table I-8 summarizes data related to sterile compounding of cytotoxic drugs in 2013/14 in both adult and pediatric hospitals.

Table I-8. Sterile Compounding Practices for Cytotoxic Drugs, Including Pediatric Hospitals, 2013/14

		Hospital Type		Teaching Status	
	All	Adult	Pediatric	Teaching	Non-teaching
IV cytotoxic drugs were prepared and/or administered ... in the last fiscal year (n=)	(168) 156 **93%**	(161) 149 **93%**	(7) 7	(41) 39 **95%**	(127) 117 **92%**
Base: All respondents					
Pharmacy department prepares IV cytotoxic doses (n=)	(156) 151 **97%**	(149) 144 **97%**	(7) 7	(39) 38 **97%**	(117) 113 **97%**
Medical surveillance program in place for employees who handle cytotoxic drugs (n=)	(156) 16 **10%**	(149) 15 **10%**	(7) 1	(39) 1 **3%**	(117) 15 **13%**
Cytotoxic drugs are prepared using a closed system – for all drugs (n=)	(154) 20 **13%**	(147) 20 **14%**	(7) 0	(39) 5 **13%**	(115) 15 **13%**
Cytotoxic drugs are prepared using a closed system – for some drugs	32 **21%**	28 **19%**	4	10 **26%**	22 **19%**
Base: Hospitals preparing / administering IV cytotoxic drugs					
Closed system device not used because of... cost (n=)	(134) 79 **59%**	(127) 75 **59%**	(7) 4	(34) 19 **56%**	(100) 60 **60%**
Closed system device not used because of... low volume	27 **20%**	24 **19%**	3	9 **26%**	18 **18%**
Base: Hospitals preparing / administering IV cytotoxic drugs where a closed system is not used for all drugs					
Cytotoxic drugs are prepared in an approved Biological Safety Cabinet (n=)	(155) 152 **98%**	(148) 145 **98%**	(7) 7	(39) 39 **100%**	(116) 113 **97%**
Base: Hospitals preparing / administering IV cytotoxic drugs					
Biologic Safety Cabinet in an ISO Class 7 room that is physically separated from other sterile product preparation areas (n=)	(152) 87 **57%**	(145) 82 **57%**	(7) 5	(39) 25 **64%**	(113) 62 **55%**
Base: Hospitals preparing / administering IV cytotoxic drugs in an approved Biological Safety Cabinet					
Negative pressure maintained in this separate room (n=)	(87) 84 **97%**	(82) 79 **96%**	(5) 5	(25) 23 **92%**	(62) 61 **98%**
Base: Hospitals preparing / administering IV cytotoxic drugs in a separate ISO Class 7 room					
There are written policies and procedures ... preparing, transporting, administering and/or disposing of cytotoxic drugs (n=)	(156) 149 **96%**	(149) 142 **95%**	(7) 7	(39) 38 **97%**	(117) 111 **95%**
Base: Hospitals preparing / administering IV cytotoxic drugs					
Written policies and procedures regarding cytotoxic drugss address and define the following: (n=)	(149)	(142)	(7)	(38)	(111)
Definition of cytotoxic drugs	138 **93%**	131 **92%**	7	35 **92%**	103 **93%**
Handling of cytotoxic drugs	146 **98%**	139 **98%**	7	37 **97%**	109 **98%**
Personal protective equipment	148 **99%**	141 **99%**	7	38 **100%**	110 **99%**
Safe practices for administering cytotoxic drugs	139 **93%**	132 **93%**	7	37 **97%**	102 **92%**
Equipment maintenance	121 **81%**	116 **82%**	5	29 **76%**	92 **83%**
Decontamination and cleaning	146 **98%**	139 **98%**	7	35 **92%**	111 **100%**
Waste handling	142 **95%**	135 **95%**	7	37 **97%**	105 **89%**
Response to spills	136 **91%**	129 **91%**	7	37 **97%**	99 **89%**
Environmental sampling	68 **46%**	63 **44%**	5	20 **53%**	48 **43%**
Base: Hospitals preparing / administering IV cytotoxic drugs who have related written policies and procedures ***Note: multiple mentions permissible***					

- Out of seven pediatric hospital respondents, four (for low- to moderate-risk compounding) and five (for high-risk compounding) reported that staff must participate in an annual didactic review of sterile compounding techniques. In adult facilities, slightly more than 40% of respondents reported that pharmacists involved in the preparation of both low- to moderate-risk and high-risk preparations must participate in an annual didactic review of sterile compounding techniques.

- Technician training in sterile compounding techniques and annual refresher programs appear to have been extensively implemented, perhaps reflecting the expanded role that technicians now play in the preparation of compounded products. Six of seven pediatric hospital respondents and 94% (135/144) of adult hospital respondents reported that pharmacy technicians involved in sterile compounding received formal training. Five of seven pediatric hospital respondents and 67% (91/135) of adult hospital respondents reported that technicians involved in sterile compounding had to undergo regular refresher programs and/or evaluations related to sterile product policies and procedures.

- Cytotoxic drugs were prepared and/or administered in all pediatric hospitals and in 93% (149/161) of adult hospitals.

- Adoption of closed systems for cytotoxic drug preparation was low in both pediatric and adult hospitals. No pediatric hospital respondents and only 14% (20/147) of adult hospital respondents reported using a closed system for all cytotoxic drug preparation. Four of seven pediatric hospital respondents and 19% (28/147) of adult hospital respondents reported using a closed system for some, though not all, cytotoxic drug preparation.

Adoption of closed systems for cytotoxic drug preparation was low in both pediatric and adult hospitals.

- Almost all respondents in both adult and pediatric facilities reported using biological safety cabinets for cytotoxic drug preparation. However, only 57% (82/145) of adult facilities and five of the seven pediatric facilities reported that the biological safety cabinet was located in an ISO Class 7 room that was physically separated from other sterile product preparation areas.

- Forty-four percent (63/142) of adult facilities and five of seven pediatric facilities reported having a written procedure defining the conduct of environmental sampling.

Table I-9 summarizes reported data on the adoption of recommended sterile compounding practices for the preparation of hazardous drugs in both adult and pediatric hospitals in 2013/14.

Table I-9. Sterile Compounding Practices for Hazardous Drugs, Including Pediatric Hospitals, 2013/14

		Hospital Type		Teaching Status	
	All	Adult	Pediatric	Teaching	Non-teaching
There is a list of hazardous drugs based on specific criteria (n=)	(156)	(149)	(7)	(39)	(117)
	128	123	5	34	94
	82%	***83%***		***87%***	***80%***
Base: Hospitals preparing / administering IV cytotoxic drugs					
There are written policies and procedures for preparing, transporting, administering and/or disposing of hazardous drugs (n=)	(128)	(123)	(5)	(34)	(94)
	99	94	5	29	70
	77%	***76%***		***85%***	***74%***
Base: Hospitals preparing / administering IV cytotoxic drugs with a list of hazardous drugs					
Written policies and procedures for preparing, transporting, administering and/or disposing of hazardous drugs address the following: (n=)	(98)	(93)	(5)	(29)	(69)
Definition of hazardous drugs	95	90	5	29	66
	97%	**97%**		**100%**	**96%**
Handling of hazardous drugs	96	91	5	29	67
	98%	**98%**		**100%**	**97%**
Personal protective equipment	97	92	5	29	68
	99%	**99%**		**100%**	**99%**
Procedures for crushing tablets , opening capsules, preparing compounded mixtures	81	76	5	26	55
	83%	**82%**		**90%**	**80%**
Use of equipment for repackaging	84	79	5	28	56
	86%	**85%**		**97%**	**81%**
Safe practices for administering hazardous drugs	91	86	5	28	63
	93%	**92%**		**97%**	**91%**
Containment ... hazardous drugs ... in equipment designed for sterile products	69	65	4	22	47
	70%	**70%**		**76%**	**68%**
Base: Hospitals preparing / administering IV cytotoxic drugs with a list of hazardous drugs and written policies and procedures for preparing, transporting, administering and/or disposing of hazardous drugs					

Medication Order Entry and Verification

With respect to medication order entry and verification in pediatric hospitals, respondents reported the following:

- Medication order entry was performed mostly by pharmacists (five of seven hospitals) and pharmacy technicians (six of seven hospitals). One respondent reported that only a pharmacist could enter a medication order. Two pediatric respondents reported that pharmacists did not enter prescriber orders.

- Two of the seven respondents reported that some medication order entry was performed by prescribing physicians, and one reported some order entry by other prescribers. Of the two respondents who reported that physicians entered orders, one reported that physicians entered 50%–90% of the orders that they wrote and the other reported that the proportion was less than 50%.

Only two of seven pediatric hospitals reported use of prescriber order entry.

- Of the six respondents who reported that technicians could enter orders, one reported that technicians entered 100% of prescriber orders and four reported that technicians entered 50%–90% of orders. All six of these respondents noted that a pharmacist had to verify orders entered by technicians.

- Of the respondents who reported that order entry was conducted by physicians or other prescribers, all required that orders be verified by a pharmacist.

Hours of Service

Ideally, pharmacy services would be provided in a consistent manner, 24 hours a day, seven days a week. However, few hospitals have the resources to do so. As a result, hospitals create alternative systems, such as having a pharmacist on call and/or using automation technologies that allow medications to be accessed during low-demand periods (e.g., nights, weekends), when it is hard to justify having pharmacy staff on site.

- Across the seven pediatric hospitals, the pharmacy was reported to be open and staffed by a pharmacist for an average of 119 hours per week, which represented an increase over 109 hours per week in 2011/12. By comparison, the adult hospitals were reported to be open and staffed an average of 79 hours per week, relatively unchanged since the 2011/12 report. Only one pediatric hospital respondent reported that the pharmacy was open 24 hours a day.

- The average time that the pharmacy was open and staffed in teaching hospitals (adult and pediatric facilities combined) was 103 hours per week.

The longer hours of service in pediatric hospitals may reflect the unique challenges associated with pediatric drug therapy and/or the fact that all of the pediatric facilities were teaching hospitals, with responsibility for a more complex patient population.

Managing Drug Shortages

Drug shortages carry risks for both pediatric and adult hospitals. However, there may be additional risks associated with pediatric drug shortages, considering the precision required in pediatric dosing. The recent withdrawal of pediatric parenteral digoxin from the Canadian market provides an example of the challenges that pediatric hospitals face in terms of finding an alternative product or compounding one internally. It is therefore not surprising that significant pharmacy resources are dedicated to managing drug shortages in pediatric hospitals.

- The pharmacist resources required to manage medication shortages were similar in pediatric hospitals (0.5 full-time equivalent [FTE]) and adult hospitals (0.4 FTE). Likewise, the technician resources required to manage medication shortages were similar in pediatric hospitals (0.6 FTE) and adult hospitals (0.5 FTE). In addition to these pharmacist and technician resources, other support staff (pharmacy assistants, clerks, etc.) were required to help manage medication shortages in both pediatric hospitals (0.6 FTE) and adult hospitals (0.2 FTE).

- The impact of drug shortages was rated as high by one of the seven pediatric hospital respondents and by 16% (26/161) of adult hospital respondents. The impact was rated as moderate by four of seven pediatric respondents and 41% (66/161) of adult hospital respondents.

Outsourcing

Following the oncology under-dosing incident in Ontario in 2013, the Ontario government published guidelines on outsourcing of pharmaceutical compounding services.[10] Reported outsourcing of production was similar in pediatric and adult hospitals (Table I-10), notwithstanding the risks inherent to the pediatric patient population. However, the 2013/14 survey did not capture the magnitude of outsourcing (e.g., number of products, number of doses involved).

- Three of seven pediatric hospitals reported outsourcing of production and/or packaging of pharmaceutical products, compared with 63% (102/161) of adult hospitals.

Table I-10. Outsourcing Practices, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
Hospital pharmacy is involved in outsourcing the production or packaging of any products	(n=)	(168)	(161)	(7)	(41)	(127)
		105	102	3	30	75
		63%	**63%**		**71%**	**60%**
Base: All respondents						
What is outsourced						
Outsourcing of production / packing of Oral Solids	(n=)	(95)	(92)	(3)	(27)	(68)
		41	39	2	11	30
		43%	**42%**		**41%**	**44%**
Outsourcing of production / packing of Oral Liquids	(n=)	(97)	(94)	(3)	(28)	(69)
		31	30	1	11	20
		32%	**32%**		**39%**	**29%**
Outsourcing of production / packing of Topical Products	(n=)	(95)	(92)	(3)	(27)	(68)
		50	48	2	13	37
		53%	**52%**		**48%**	**54%**
Outsourcing of production / packing of IV Syringes	(n=)	(93)	(91)	(2)	(27)	(66)
		19	18	1	8	11
		20%	**20%**		**30%**	**17%**

Base: Facilities with hospital pharmacies involved in outsourcing the production or repackaging of any products

Human Resources

It is rarely disputed that human resource requirements for managing pediatric patients are considerably higher than those required for managing adult patients. However, the magnitude of the difference has not been well documented. The data collected from the seven pediatric hospitals responding to the 2013/14 Hospital Pharmacy in Canada Survey provide a better understanding of these staffing differences.

Staffing Ratios

Four specific staffing ratios (as defined in Chapter D, Human Resources) were calculated for the pediatric hospitals that submitted data and were compared with the corresponding ratios for all adult hospitals and all teaching hospitals (pediatric and adult combined) (see Table I-11). Generally speaking, the four staffing ratios were two to three times greater for pediatric hospitals than for adult hospitals; similarly, the ratios for pediatric hospitals were substantially greater than the corresponding ratios for teaching hospitals (adult and pediatric combined).

- The mean total budgeted hours/acute care patient day was 1.77 for pediatric hospitals (five respondents), 0.95 for adult hospitals (149 respondents) and 1.16 for pediatric and adult teaching hospitals combined (36 respondents).

- The mean inpatient budgeted hours/acute care patient day was 1.70 for pediatric hospitals (five respondents), 0.86 for adult hospitals (149 respondents) and 1.06 for pediatric and adult teaching hospitals combined (36 respondents).

- The mean total budgeted hours/total patient day (acute care plus non-acute care) was 1.71 for pediatric hospitals (five respondents), 0.68 for adult hospitals (142 respondents) and 1.06 for pediatric and adult teaching hospitals combined (35 respondents).

- The mean inpatient budgeted hours/total patient day (acute care plus non-acute care) was 1.65 for pediatric hospitals (five respondents), 0.62 for adult hospitals (142 respondents) and 0.97 for adult and pediatric teaching hospitals combined (35 respondents).

Table I-11. Staffing Ratios – Budgeted Hours/Patient Day, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
Total budgeted hours/ acute patient day	(n=)	(154)	(149)	(5)	(36)	(118)
		0.98	**0.95**	**1.77**	**1.16**	**0.92**
Inpatient budgeted hours/ acute patient day	(n=)	(154)	(149)	(5)	(36)	(118)
		0.89	**0.86**	**1.70**	**1.06**	**0.83**
Total budgeted hours/ total patient day	(n=)	(147)	(142)	(5)	(35)	(112)
		0.71	**0.68**	**1.71**	**1.06**	**0.61**
Inpatient budgeted hours/ total patient day	(n=)	(147)	(142)	(5)	(35)	(112)
		0.65	**0.62**	**1.65**	**0.97**	**0.55**

Base: All Respondents providing relevant information

The staffing differences between pediatric and adult hospitals were substantial. It has been suggested that the teaching hospital status of all of the pediatric hospitals may have been responsible for their increased human resource requirements. However, the ratios for the pediatric hospitals were also markedly higher than the corresponding ratios for adult teaching hospitals (as reported in Chapter D, Human Resources). The reason for this difference may lie in the proportion of acute care vs. non-acute care patient days. Unlike many adult hospitals, pediatric hospitals have few non-acute care patient days. As a result, for pediatric hospitals there is little difference between the first and second staffing ratios described above and reported in Table I-11, since there is little difference between the numbers of acute care patient days and total patient days in the denominator of these ratios. The same holds true with respect to the third and fourth staffing ratios, which are also very similar to each other for pediatric hospitals.

Staff Composition

Table I-12 shows the mean FTEs for each category of pharmacy staff in adult and pediatric hospitals, as well as in teaching and non-teaching hospitals, in 2013/14.

- Advanced practice pharmacists represented a higher mean percentage of total pharmacy staffing in pediatric hospitals (12.6%) than in adult hospitals (9.2%). Advanced practice pharmacists represented 11.3% of all pharmacy staff in teaching hospitals (pediatric and adult combined). In 2011/12, the mean reported percentage of advanced practice pharmacists was 11.6% in pediatric hospitals and about 8% in both adult and teaching facilities.

- Pharmacy technicians and assistants represented a slightly lower mean percentage of total pharmacy staffing in pediatric hospitals (48.1%) than in adult hospitals and teaching hospitals, where they represented 52.3% and 50.0%, respectively, of total pharmacy staffing.

Table I-12. Average Budgeted Pharmacy Staffing, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
Number of FTEs:	(n=)	(162)	(156)	(6)	(39)	(123)
Staff Pharmacists		**15.2**	**15.0**	**20.8**	**33.2**	**9.5**
Advanced Practice Pharmacists		**4.6**	**4.5**	**8.6**	**12.3**	**2.2**
Pharmacy Technicians (regulated + non-regulated)		**19.8**	**19.4**	**29.3**	**43.5**	**12.3**
Pharmacy Assistants		**6.0**	**6.1**	**3.5**	**11.0**	**4.4**
Managers & Support Staff		3.9	3.8	6.0	8.9	2.3
Total FTE's (excluding residents)		**49.5**	**48.8**	**68.2**	**108.9**	**30.7**
Mean ratios	(n=)	(162)	(156)	(6)	(39)	(123)
Technicians + Assistants (total) / all Pharmacists (total)		**1.5**	**1.5**	**1.1**	**1.2**	**1.6**

Base: All Respondents providing staffing information

Staff Time Breakdown by Service Activity

There were differences between pediatric and adult hospitals in terms of the time that pharmacists spent performing different activities (Table I-13).

- Pharmacists in the seven pediatric facilities were reported to spend 53% of their time performing clinical activities, more than was the case in adult hospitals (50%) but less than in teaching hospitals (58%).

- The pattern was reversed for drug distribution activities: pharmacists in the seven pediatric facilities were reported to spend 30% of their time performing drug distribution, less than was the case in adult hospitals (36%) but more than in teaching hospitals (26%).

- Pharmacists in pediatric facilities and in teaching hospitals spent more time performing research and teaching activities than did pharmacists in adult hospitals.

Table I-13. Proportion of Pharmacist Time Spent Performing Different Activities, Including Pediatric Hospitals, 2013/14

		Hospital Type		Teaching Status	
	All	Adult	Pediatric	Teaching	Non-teaching
(n=)	(167	(160)	(7)	(41)	(126)
Drug distribution	36%	36%	30%	26%	39%
Clinical activities	51%	50%	53%	58%	48%
Teaching	6%	6%	9%	9%	6%
Pharmacy research	1%	1%	3%	3%	1%
Other non-patient care activities	6%	6%	5%	4%	7%

Base: All respondents

Pharmacy Technicians

Roles and Validation Requirements

As evidenced by data collected and reported in past Hospital Pharmacy in Canada Reports and elsewhere in the current 2013/14 report (see Chapter F, Pharmacy Technicians), the practice of authorizing technicians to check drug preparation and distribution activities performed by other technicians (tech-check-tech) has been adopted by many hospitals (Table I-14). However, for certain activities, hospital pharmacy managers appear to be cautious about allowing tech-check-tech.

Table I-14. Functions Performed by Technicians, Functions Checked by Technicians and Validation Requirements, Including Pediatric Hospitals, 2013/14

	A		B		C		D		E	
	(n=)		Function performed (n=A)		Validation required to perform task (n=B)		Checked by technician (n=B)		Validation required to check (n=D)	
	Adult	Pediatric	Adult	Pediatric	Adult	Pediatric	Adult	Pediatric	Adult	Pediatric
(01) Perform medication order entry	(162)	(7)	**123**	**5**	**70**	**3**	**17**	**1**	**15**	**1**
			76%		**57%**		**14%**		**88%**	
(02) Fill traditional prescriptions, new orders	(159)	(7)	139	7	68	4	83	1	75	1
			87%		**49%**		**60%**		**90%**	
(03) Fill traditional prescriptions, refills	(156)	(7)	137	7	67	4	94	3	82	2
			88%		**49%**		**69%**		**87%**	
(04) Package unit dose items	(162)	(7)	150	7	83	4	128	6	111	4
			93%		**55%**		**85%**		**87%**	
(05) Fill unit dose trays	(159)	(7)	121	6	70	4	99	6	86	3
			76%		**58%**		**82%**		**87%**	
(06) Fill interim doses	(159)	(7)	136	7	70	4	106	2	91	1
			86%		**51%**		**78%**		**86%**	
(07) Prepare patient-specific IV admixtures	(161)	(7)	152	7	117	4	82	4	76	4
			94%		**77%**		**54%**		**93%**	
(08) Prepare batch IV admixtures	(160)	(7)	144	7	109	4	92	5	84	4
			90%		**76%**		**64%**		**91%**	
(09) Prepare TPN solutions	(162)	(7)	140	7	108	4	55	3	53	3
			86%		**76%**		**38%**		**96%**	
(10) Prepare chemotherapy	(162)	(7)	140	7	112	6	28	0	27	0
			86%		**80%**		**20%**		**96%**	
(11) Compound extemporaneous products	(160)	(7)	159	7	83	4	105	4	87	3
			99%		**52%**		**66%**		**83%**	
(12) Fill cardiac arrest trays	(160)	(7)	127	5	54	3	104	5	74	3
			79%		**43%**		**82%**		**71%**	
(13) Replenish automated dispensing cabinets	(160)	(7)	114	7	50	3	73	3	46	2
			71%		**44%**		**64%**		**63%**	

Base: All respondents

- Only 14% (17/123) of adult hospital respondents and only one of seven pediatric hospital respondents reported using tech-check-tech for verification of medication order entry.

- Few pediatric facilities reported using tech-check-tech to verify the filling of traditional prescription new orders (one of seven) compared with 60% (83/139) of adult hospitals, traditional prescription refills (three of seven) compared with 69% (94/137) of adult hospitals, and chemotherapy preparation (none of seven) compared with 20% (28/140) of adult hospitals.

Support for Clinical Pharmacy Services

- Four of six pediatric hospital respondents reported that technicians performed various tasks that directly supported pharmacists in carrying out their clinical work, but only three pediatric facilities provided data on the clinical support activities performed by pharmacy technicians. The most common area of clinical support in pediatrics (reported by all three of these facilities) was collection of data for drug utilization review to support the drug use evaluation program.

- Two pediatric hospital respondents and 82% (101/123) of adult hospital respondents reported that pharmacy technicians served as the initial pharmacy liaison for solving drug distribution problems.

- Two pediatric hospital respondents and 70% (86/123) of adult hospital respondents reported that technicians collected and collated pre-admission drug therapy in support of medication reconciliation.

- Few or no pediatric respondents reported using pharmacy technicians to provide the other clinical support activities listed in Table I-15.

Table I-15. Support Roles for Pharmacy Technicians for Clinical Pharmacy Services, Including Pediatric Hospitals, 2013/14

	All	Hospital Type		Teaching Status	
		Adult	Pediatric	Teaching	Non-teaching
Pharmacy technicians perform tasks that directly support pharmacists in carrying out their clinical activities (n=)	(166)	(160)	(6)	(41)	(125)
	127	123	4	31	96
	77%	**77%**		**76%**	**77%**
Base: All respondents					
Tasks performed by pharmacy technicians (n=)	(126)	(123)	(3)	(30)	(96)
Serve as the initial Pharmacy liaison for solving drug distribution problems	103	101	2	23	80
	82%	**82%**		**77%**	**83%**
Collect and collate information concerning the patient's pre-admission drug therapy	88	86	2	28	60
	70%	**70%**		**93%**	**63%**
Create initial inpatient drug therapy documentation and discharge drug therapy plan at discharge	26	25	1	9	17
	21%	**20%**		**30%**	**18%**
Collect laboratory test results to support drug therapy evaluation / monitoring	25	24	1	9	16
	20%	**20%**		**30%**	**17%**
Assembly of pamphlets and documentation to be given to the patient	24	23	1	7	17
	19%	**19%**		**23%**	**18%**
Calculate changes to parenteral nutrition therapy	8	8	0	4	4
	6%	**7%**		**13%**	**4%**
Collate information used in the preparation of drug formulary submissions	15	15	0	0	15
	12%	**12%**		**0%**	**16%**
Assist in collection of data for presentation to the Medication Safety Committee	34	33	1	6	28
	27%	**27%**		**20%**	**29%**
Collect data for drug utilization review to support the drug use evaluation program	38	35	3	11	27
	30%	**28%**		**37%**	**28%**
Other	23	21	2	5	18
	18%	**17%**		**17%**	**19%**

Base: Respondents where technicians support pharmacists __ Note: multiple mentions permissible

Technician Certification and Regulation

The regulation of pharmacy technicians provides opportunities to increase the use of pharmacy technicians to perform a number of pharmacy tasks. Expanding the role of pharmacy technicians facilitates the redeployment of pharmacists to drug therapy management, teaching activities and practice research. Tables I-16 to I-19 present data relevant to the status of pharmacy technician certification and regulation in Canadian adult and pediatric hospitals in 2013/14.

- One pediatric hospital respondent and 21% (20/94) of adult hospital respondents from provinces with technician regulation reported that more than 90% of their pharmacy technicians were regulated (i.e., certified and licensed as regulated professionals) (Table 1-16).

Table I-16. Regulated/Licensed Pharmacy Technicians, Including Pediatric Hospitals, 2013/14

	All	Hospital Type		Teaching Status	
		Adult	Pediatric	Teaching	Non-teaching
Proportion of Pharmacy technicians that are regulated (n=)	(109)	(94)	(5)	(20)	(81)
greater than 90% of pharmacy technicians	28	20	1	3	17
	26%	21%		15%	23%
51 to 90% of pharmacy technicians	41	38	2	7	31
	38%	40%		35%	42%
10 to 50 % of pharmacy technicians	20	19	1	7	12
	18%	20%		35%	16%
less than 10% of pharmacy technicians	20	17	1	3	14
	18%	18%		15%	19%

Base : Facilities where technicians are certified

Table I-17 provides information on the recognition and support that adult and pediatric hospital pharmacy departments in Canada provided in 2013/14 to individuals who pursued certification and licensing as regulated pharmacy technicians.

- Five of the seven pediatric hospital respondents reported that certification and licensing as a regulated pharmacy technician was a job requirement, compared with 57% (92/162) of adult facilities (Table I-17).

Table I-17. Recognition of and Support for Technician Certification and Regulation, Including Pediatric Hospitals, 2013/14

	All	Hospital Type		Teaching Status	
		Adult	Pediatric	Teaching	Non-teaching
(n=)	(169)	(162)	(7)	(42)	(127)
Educational sessions have been provided to inform pharmacy technicians	116	109	7	33	83
	69%	**67%**		**79%**	**65%**
Pharmacy technician job descriptions have been revised, requiring new hires to be certified	91	86	5	24	67
	54%	**53%**		**57%**	**53%**
Existing pharmacy technicians are required to be certified	97	92	5	25	72
	58%	**57%**		**60%**	**57%**
Financial support is being provided to pharmacy technicians who wish to become certified	59	55	4	14	45
	35%	**34%**		**33%**	**36%**

Base: All respondents

As the regulation of pharmacy technicians has proceeded, hospitals have had to decide how to deal with individuals who previously worked as pharmacy technicians but did not qualify to register as regulated pharmacy technicians (Table I-18).

- Over half of adult facilities and five of the seven pediatric facilities reported that they had made a decision on the future of individuals who do not achieve regulatory status. About 40% of respondents from both adult and pediatric hospitals reported that there would be no future role for individuals who do not become registered as regulated technicians.

- For both adult and pediatric facilities, response rates to the remainder of the questions in this section were low. One pediatric facility reported that individuals who do not become registered as regulated pharmacy technicians may be given a new title, such as “pharmacy assistant”.

- Among those who responded to a question about the responsibilities and salary of former pharmacy technicians who will be given a new title (such as “pharmacy assistant”), 65% (11/17) of respondents from adult facilities reported that pharmacy assistants would be permitted to continue performing the same duties as when they were called “pharmacy technicians”, with the exception of tasks restricted to regulated technicians. No pediatric hospitals indicated that they would provide that option.

Table I-18. Management of Individuals Who Do Not Qualify as Regulated Pharmacy Technicians, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
Facility has made decisions concerning the future of previously employed 'Pharmacy Technicians' who fail to qualify for registration.	(n=)	(168) 88 **52%**	(161) 83 **52%**	(7) 5	(42) 21 **50%**	(126) 67 **53%**
Base: All respondents						
Employment treatment of former Pharmacy Technicians who do not qualify for registration as a regulated pharmacy technician	(n=)	(87)	(82)	(5)	(21)	(66)
Their employment with your facility will be terminated		36 **41%**	34 **41%**	2	10 **48%**	26 **39%**
They will be offered positions elsewhere in the organization where registration as a pharmacy technician is not required		12 **14%**	12 **15%**	0	5 **24%**	7 **11%**
They will be given a new title and continue to work in the pharmacy department		18 **21%**	17 **21%**	1	2 **10%**	16 **24%**
Not determined		21 **24%**	19 **23%**	2	4 **19%**	17 **26%**
Base: Facilities where decisions have been made re pharmacy technicians						
Responsibilities of former Pharmacy Technicians who do not qualify for registration as a regulated pharmacy technician	(n=)	(18)	(17)	(1)	(2)	(16)
They will continue to perform the same duties, with the exception of tasks that by law can only be performed by a regulated pharmacy technician.		11 **61%**	11 **65%**	0	0 **0%**	11 **69%**
They will have a new position description that limits their responsibilities to very basic activities.		3 **17%**	3 **18%**	0	1 **50%**	2 **13%**
Not determined		4 **22%**	3 **18%**	1	1 **50%**	3 **19%**
Base: Facilities where decisions have been made re pharmacy technicians and where non-registered technicians will be given a new title and continue to work in the pharmacy department						
Salary treatment of former Pharmacy Technicians who do not qualify for registration	(n=)	(18)	(17)	(1)	(2)	(16)
They will continue to be paid on the same salary scale as the registered pharmacy technicians		1 **6%**	1 **6%**	0	0 **0%**	1 **6%**
They will be placed on a new salary scale, but will be 'red-circled'		3 **17%**	3 **18%**	0	0 **0%**	3 **19%**
They will be placed on a new salary scale that will pay them less than their current wage rate		3 **17%**	3 **18%**	0	1 **50%**	2 **13%**
Not determined		11 **61%**	10 **59%**	1	1 **50%**	10 **63%**
Base: Facilities where decisions have been made re pharmacy technicians and where non-registered technicians will be given a new title and continue to work in the pharmacy department						

Table I-19 summarizes planned hiring practices for pharmacy technicians in adult and pediatric hospitals.

Table I-19. Planned Pharmacy Technician Hiring Practices, Including Pediatric Hospitals, 2013/14

		All	Hospital Type		Teaching Status	
			Adult	Pediatric	Teaching	Non-teaching
When pharmacy technician registration comes into effect, with respect to new hirings of technical staff:	(n=)	(88)	(83)	(5)	(21)	(67)
Only registered pharmacy technicians will be hired, no second category of support personnel will be created		51 **58%**	49 **59%**	2	13 **62%**	38 **57%**
Registered pharmacy technicians will be hired as 'Pharmacy Technician', others will be hired as 'Pharmacy Assistant'		32 **36%**	30 **36%**	2	7 **33%**	25 **37%**
Not determined		5 **6%**	4 **5%**	1	1 **5%**	4 **6%**

Base: Facilities where decisions have been made re pharmacy technicians

Evaluation of Pharmacy Practice

The continuous evaluation of pharmacy practice can help to reduce medication errors and improve patient safety.[2,11,12,13] Chapter H (Evaluation of Pharmacy Services) reviews the overall data on the evaluation of pharmacy practice. The current chapter identifies a few areas where there appear to be differences in evaluation practices between adult and pediatric hospitals.

In general, there appeared to be a greater emphasis on the evaluation of pharmacy practice among pediatric facilities than among adult hospitals. However, in most cases the differences were not large (see Table I-20), and the small number of pediatric respondents made it difficult to conclude that these differences in evaluation practices between adult and pediatric hospitals were meaningful.

- Four of the seven pediatric hospitals reported that they evaluated the provision of clinical services by auditing a sample of clinical activities, compared with 27% (44/161) of adult facilities.

- All four of these hospitals reported evaluating the following services for all patients: admission medication reconciliation (vs. 73%, 32/44 of adult facilities), individual care plans and monitoring (vs. 59%, 26/44) and pharmacist resolution of drug-related problems (vs. 68%, 30/44).

In terms of other aspects of pharmacists' clinical practice that are evaluated, the following results were notable:

- Three of four pediatric hospital respondents reported evaluating discharge medication counselling and evaluation of compliance, compared with 43% (19/44) of adult hospitals.

- Three of four pediatric hospital respondents reported evaluating pharmacists' answers to drug information questions, compared with 39% (17/44) of adult hospitals.

Table I-20 summarizes the data related to the evaluation of clinical pharmacist practice in pediatric hospitals.

Table I-20. Evaluation of Clinical Services, Including Pediatric Hospitals, 2013/14

		Hospital Type		Teaching Status	
	All	Adult	Pediatric	Teaching	Non-teaching
A structured approach is used to define and prioritize pharmacist activities (n=)	(168)	(161)	(7)	(41)	(127)
	87	81	6	32	55
	52%	**50%**		**78%**	**43%**
The provision of direct patient care services is evaluated by auditing a sample of clinical activities	48	44	4	19	29
	29%	**27%**		**46%**	**23%**
Base: All respondents					
Aspects of clinical practice evaluated (n=)	(48)	(44)	(4)	(19)	(29)
Clinical documentation	38	35	3	15	23
	79%	**80%**		**79%**	**79%**
Admission medication reconciliation and resolution of discrepancies	36	32	4	15	21
	75%	**73%**		**79%**	**72%**
Pharmacist resolution of drug related problems	34	30	4	14	20
	71%	**68%**		**74%**	**69%**
Development of an individualized pharmaceutical care plan, including its monitoring	30	26	4	16	14
	63%	**59%**		**84%**	**48%**
Pharmacist participation in inter-professional patient care rounds	26	23	3	13	13
	54%	**52%**		**68%**	**45%**
Discharge medication reconciliation	24	22	2	9	15
	50%	**50%**		**47%**	**52%**
Discharge medication counseling and evaluation of compliance	22	19	3	10	12
	46%	**43%**		**53%**	**41%**
Answers to drug information questions	20	17	3	9	11
	42%	**39%**		**47%**	**38%**
Patient education during admission	15	13	2	6	9
	31%	**30%**		**32%**	**31%**
Other	3	3	0	2	1
	6%	**7%**		**11%**	**3%**
Base: Respondents evaluating aspects of clinical practice by auditing a sample of clinical activities					
Note: multiple mentions permissible					
Mechanisms have been established to measure patients' medication-related outcomes (n=)	(168)	(161)	(7)	(41)	(127)
	25	23	2	9	16
	15%	**14%**		**22%**	**13%**
Base: All respondents					
Patients' medication-related outcomes are used to evaluate the performance of individual pharmacists (n=)	(25)	(23)	(2)	(9)	(16)
	3	2	1	1	2
	12%	**9%**		**11%**	**13%**
There are plans to collect and use outcomes information for evaluation of pharmacists in the future? (n=)	(24)	(23)	(1)	(8)	(16)
	11	10	1	5	6
	46%	**43%**		**63%**	**38%**

Base: Respondents with mechanisms to measure patients' medication-related outcomes

The survey also included questions about the evaluation of sterile product preparation.

- Three of seven pediatric hospital respondents reported that they conducted surface sampling in sterile product preparation areas of their parenteral admixture services, compared with 29% (46/161) of adult hospitals. By comparison, in 2011/12, five of seven pediatrics facilities and 23% (39/167) of adult respondents reported that they conducted surface sampling.

- Four of seven pediatric hospital respondents reported that they had a process in place for routinely verifying product sterility by laboratory testing of sample products, compared with 25% (40/161) of adult facilities. The 2013/14 rates for this indicator were slightly lower than the 2011/12 rates (five of seven pediatrics facilities and 29%, 49/167 of adult facilities).

Conclusion

The results presented in this chapter highlight the fact that pediatric hospitals differ from adult hospitals in several respects. Of note are the substantially higher staffing ratios associated with the provision of pharmacy services to pediatric patients. In addition, it appears that pediatric hospitals place a considerably greater emphasis on safety and service evaluation, perhaps because of the unique challenges associated with providing safe and effective medication therapy to pediatric patients.

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J - Front-Line Pharmacists Survey

Kevin Hall and Jean-François Bussières

For over 20 years, the Hospital Pharmacy in Canada Survey has collected data about Canadian hospital pharmacy practice from directors of pharmacy and other senior pharmacy managers. In the 2011/12 survey, two new sections were added, designed to be completed by front-line pharmacists and front-line pharmacy technicians, respectively, to capture the perspectives of pharmacy staff who were not in management positions. Results of the staff surveys were not published as part of the 2011/12 report, but instead were presented as posters at the Canadian Society of Hospital Pharmacists 2014 Banff Seminar, with a summary of each posted on the website www.lillyhospitalsurvey.ca alongside the 2011/12 report. The Editorial Board decided to include the supplemental surveys for front-line staff in the 2013/14 survey cycle and to publish the results as formal chapters within the 2013/14 report.

Each director of pharmacy was asked to forward the appropriate survey to all of their front-line staff pharmacists and pharmacy technicians. The results for front-line pharmacy technicians are reported in Chapter K of this report. This chapter presents the results for front-line pharmacists.

Where data in this chapter are presented by region, the Prairie provinces comprise Alberta (AB), Saskatchewan (SK), Manitoba (MB) and the Northwest Territories (NT), and the Atlantic provinces comprise New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PE) and Newfoundland and Labrador (NL).

Demographics

A total of 718 front-line pharmacists responded to the survey. A response rate cannot be calculated because the actual number of front-line hospital pharmacists who received an invitation to participate is unknown. The Canadian Pharmacists Association estimates that there are 5600 hospital pharmacists in Canada,[1] which suggests participation by roughly 13% of hospital pharmacists in the country.

A total of 718 front-line pharmacists, representing every Canadian province, responded to this supplemental survey.

The survey captured demographic information related to the province in which the respondent was practising, the number of years in practice, and the highest level of formal pharmacy education attained (see Table J-1). No other personal information that might have inadvertently enabled identification of respondents was collected.

Table J-1. Demographic Characteristics of Pharmacist Respondents, 2013/14

	(n=)	%
Province	(718)	100%
British Columbia / Yukon	(73)	**10%**
Alberta / Northwest Territories	(48)	**7%**
Saskatchewan	(58)	**8%**
Manitoba	(65)	**9%**
Ontario	(155)	**22%**
Quebec	(240)	**33%**
New Brunswick	(28)	**4%**
Nova Scotia	(41)	**6%**
Prince Edward Island	(10)	**1%**
Newfoundland / Labrador	(0)	**0%**
Years of practice as a pharmacist	(717)	100%
0 to 5 years	(164)	**23%**
6 to 10 years	(152)	**21%**
11 to 20 years	(184)	**26%**
21 to 30 years	(147)	**21%**
more than 30 years	(70)	**10%**
Highest level of formal pharmacy education / training	(717)	100%
B.Sc. in Pharmacy degree (or equivalent baccalaureate program)	(305)	**43%**
Entry-level Pharm. D. program	(8)	**1%**
Hospital pharmacy residency program	(145)	**20%**
Masters degree in Hospital or Clinical Pharmacy	(180)	**25%**
Post-baccalaureate Pharm. D. program	(50)	**7%**
Board certification by the US-based Board of Pharmacy Specialties (BPS)	(29)	**4%**

Base: All respondents

- Responses were received from hospital pharmacists in every Canadian province. In general, the percentage of respondents from each province was similar to the percentage of the Canadian population living in that province.[2] However, 33% (240/718) of the responses came from hospital pharmacists in Quebec (QC), where only 23% of the Canadian population was living in 2013,[2] which suggests that QC pharmacists may be over-represented in the survey results. Conversely, hospital pharmacists in Ontario (ON) represented only 22% (155/718) of the respondents, with Ontario being home to 39% of the country's population,[2] which suggests that ON pharmacists may be under-represented.

Pharmacists with no more than 10 years' experience accounted for almost half of respondents, far outnumbering respondents in each subsequent 10-year cohort.

- The largest percentage of respondents had a bachelor's degree (43%, 305/717), 25% (180/717) had a master's degree, and 20% (145/717) had completed a hospital pharmacy residency. Twenty-one percent (149/714) of respondents reported that they planned to pursue an additional degree or specialty certification through the Board of Pharmacy Specialties (BPS). Of those planning to pursue an additional degree or certification, 80% (118/148) indicated interest in a pharmacy-based degree or certification, 11% (16/148) in a healthcare-based program, and 5% (7/148) in a business-based program.

Views on Advanced Training and Credentialing

To gather front-line pharmacists' opinions about advanced training and credentialing, respondents were asked to indicate if they strongly agreed, agreed, disagreed or strongly disagreed with several statements on this topic. To facilitate interpretation of the overall results, the responses were aggregated into groupings of "agree" (i.e., responses of "agree" and "strongly agree") and "disagree (i.e., responses of "disagree" and "strongly disagree"). Table J-2 shows the aggregated "agree" and "disagree" results, as well as details for all response options.

Table J-2. Advanced Training and Credentialing of Pharmacists, 2013/14

			Region				
		All	BC/ YT	Prai	ON	QC	Atl
By 2019, all new pharmacists hired to work in the hospital practice setting should be required to have completed an accredited hospital pharmacy residency program.	(n=)	(717)	(73)	(171)	(154)	(240)	(79)
	Agree	389	41	46	49	223	30
		54%	**56%**	**27%**	**32%**	**93%**	**38%**
	Disagree	328	32	125	105	17	49
		46%	**44%**	**73%**	**68%**	**7%**	**62%**
	strongly agree	210	13	8	13	168	8
		29%	18%	5%	8%	70%	10%
	agree	179	28	38	36	55	22
		25%	38%	22%	23%	23%	28%
	disagree	256	25	91	78	17	45
		36%	34%	53%	51%	7%	57%
	strongly disagree	72	7	34	27	0	4
		10%	10%	20%	18%	0%	5%
By 2019, preference should be given to hiring pharmacists who have completed an accredited hospital pharmacy residency program.	(n=)	(715)	(73)	(171)	(153)	(239)	(79)
	Agree	567	64	116	100	230	57
		79%	**88%**	**68%**	**65%**	**96%**	**72%**
	Disagree	148	9	55	53	9	22
		21%	**12%**	**32%**	**35%**	**4%**	**28%**
	strongly agree	305	33	29	36	190	17
		43%	45%	17%	24%	79%	22%
	agree	262	31	87	64	40	40
		37%	42%	51%	42%	17%	51%
	disagree	115	7	43	36	8	21
		16%	10%	25%	24%	3%	27%
	strongly disagree	33	2	12	17	1	1
		5%	3%	7%	11%	0%	1%
A meaningful salary differential should be paid to pharmacists who have completed an accredited hospital pharmacy residency program. (combined residency/Masters degree in Quebec)	(n=)	(717)	(73)	(171)	(155)	(239)	(79)
	Agree	497	60	93	80	221	43
		69%	**82%**	**54%**	**52%**	**92%**	**54%**
	Disagree	220	13	78	75	18	36
		31%	**18%**	**46%**	**48%**	**8%**	**46%**
	strongly agree	218	27	23	31	130	7
		30%	37%	13%	20%	54%	9%
	agree	279	33	70	49	91	36
		39%	45%	41%	32%	38%	46%
	disagree	164	9	55	55	15	30
		23%	12%	32%	35%	6%	38%
	strongly disagree	56	4	23	20	3	6
		8%	5%	13%	13%	1%	8%

Table J-2. Advanced Training and Credentialing of Pharmacists, 2013/14 (continued)

		All	Region				
			BC/ YT	Prai	ON	QC	Atl
Preference should be given to hiring pharmacists who possess specialty certification by the Board of Pharmacy Specialties (BPS), or a similar accrediting organization.	(n=)	(712)	(72)	(170)	(154)	(238)	(78)
	Agree	388	27	92	76	153	40
		54%	**38%**	**54%**	**49%**	**64%**	**51%**
	Disagree	324	45	78	78	85	38
		46%	**63%**	**46%**	**51%**	**36%**	**49%**
	strongly agree	42	2	4	10	24	2
		6%	3%	2%	6%	10%	3%
	agree	346	25	88	66	129	38
		49%	35%	52%	43%	54%	49%
	disagree	282	40	67	70	70	35
		40%	56%	39%	45%	29%	45%
	strongly disagree	42	5	11	8	15	3
		6%	7%	6%	5%	6%	4%
A meaningful salary differential should be paid to pharmacists who possess specialty certification by the BPS, or a similar accrediting organization, and are using their specialty skills in their assigned role.	(n=)	(714)	(72)	(171)	(154)	(238)	(79)
	Agree	495	50	109	94	192	50
		69%	**69%**	**64%**	**61%**	**81%**	**63%**
	Disagree	219	22	62	60	46	29
		31%	**31%**	**36%**	**39%**	**19%**	**37%**
	strongly agree	97	6	9	21	59	2
		14%	8%	5%	14%	25%	3%
	agree	398	44	100	73	133	48
		56%	61%	58%	47%	56%	61%
	disagree	183	18	49	53	37	26
		26%	25%	29%	34%	16%	33%
	strongly disagree	36	4	13	7	9	3
		5%	6%	8%	5%	4%	4%
In order to use the title 'Pharmacy Specialist', or a similar title suggesting recognized expertise in a particular area of practice, a pharmacist must hold a current board certification in heir area of practice from the BPS, or a similar organization.	(n=)	(714)	(73)	(171)	(153)	(238)	(79)
	Agree	481	44	123	104	150	60
		67%	**60%**	**72%**	**68%**	**63%**	**76%**
	Disagree	233	29	48	49	88	19
		33%	**40%**	**28%**	**32%**	**37%**	**24%**
	strongly agree	105	12	22	22	42	7
		15%	16%	13%	14%	18%	9%
	agree	376	32	101	82	108	53
		53%	44%	59%	54%	45%	67%
	disagree	197	24	42	40	74	17
		28%	33%	25%	26%	31%	22%
	strongly disagree	36	5	6	9	14	2
		5%	7%	4%	6%	6%	3%
A Canadian specialty certification process, similar to the BPS program in the US, should be developed in Canada.	(n=)	(713)	(73)	(170)	(153)	(238)	(79)
	Agree	625	61	142	128	218	76
		88%	**84%**	**84%**	**84%**	**92%**	**96%**
	Disagree	88	12	28	25	20	3
		12%	**16%**	**16%**	**16%**	**8%**	**4%**
	strongly agree	240	21	35	52	115	17
		34%	29%	21%	34%	48%	22%
	agree	385	40	107	76	103	59
		54%	55%	63%	50%	43%	75%
	disagree	75	10	25	19	18	3
		11%	14%	15%	12%	8%	4%
	strongly disagree	13	2	3	6	2	0
		2%	3%	2%	4%	1%	0%
I would seriously consider pursuing specialty certification, if the program was easily accessible and affordable.	(n=)	(714)	(73)	(171)	(153)	(238)	(79)
	Agree	595	58	140	131	199	67
		83%	**79%**	**82%**	**86%**	**84%**	**85%**
	Disagree	119	15	31	22	39	12
		17%	**21%**	**18%**	**14%**	**16%**	**15%**
	strongly agree	255	22	53	61	92	27
		36%	30%	31%	40%	39%	34%
	agree	340	36	87	70	107	40
		48%	49%	51%	46%	45%	51%
	disagree	100	12	25	17	34	12
		14%	16%	15%	11%	14%	15%
	strongly disagree	19	3	6	5	5	0
		3%	4%	4%	3%	2%	0%

Table J-2. Advanced Training and Credentialing of Pharmacists, 2013/14 (continued)

		All	Region				
			BC/ YT	Prai	ON	QC	Atl
Hospital pharmacy departments should include scholarly activity (research and publication) as a recognized part of the activities that some or all of their pharmacists are expected to perform.	(n=)	(714)	(72)	(171)	(153)	(239)	(79)
	Agree	528	46	102	112	220	48
		74%	**64%**	**60%**	**73%**	**92%**	**61%**
	Disagree	186	26	69	41	19	31
		26%	**36%**	**40%**	**27%**	**8%**	**39%**
	strongly agree	140	13	15	35	67	10
		20%	18%	9%	23%	28%	13%
	agree	388	33	87	77	153	38
		54%	46%	51%	50%	64%	48%
	disagree	166	25	61	33	18	29
		23%	35%	36%	22%	8%	37%
	strongly disagree	20	1	8	8	1	2
		3%	1%	5%	5%	0%	3%

Base: All respondents

- Fifty-four percent (389/717) of the respondents agreed that, by 2019, all new hospital pharmacists should be required to have completed an accredited hospital pharmacy residency program. In QC, the percentage was much higher: 93% (223/240). This result for QC is not surprising, given that most hospitals in that province already require that pharmacists wanting to work in the hospital setting must have completed a combined Clinical Master's/hospital pharmacy residency. In British Columbia/Yukon (BC/YT), the level of agreement was 56% (41/73), similar to the national result. In all other regions, the majority of respondents disagreed.

- Two-thirds or more of respondents in every region agreed that, by 2019, hiring preference should be given to pharmacists who have completed an accredited hospital pharmacy residency program.

- A majority of respondents in each region agreed that a meaningful salary differential should be paid to pharmacists who have completed an accredited hospital pharmacy residency program. However, the percentages of respondents who agreed were much higher in QC (92%, 221/239) and BC/YT (82%, 60/73) than in the other three regions. The QC results may again reflect the fact that almost all front-line hospital pharmacists in that province have completed a combined Clinical Master's/hospital pharmacy residency. The BC/YT results may reflect the fact that BC has, for many years, graduated a proportionately larger number of pharmacy residents than most other regions of the country. With larger numbers of residency-trained pharmacists within the ranks of front-line pharmacists, it is perhaps not surprising that there was greater support for a meaningful salary differential in those two provinces.

There was general agreement that hiring preference should be given to pharmacists who have completed a residency program and that there should be salary recognition of such pharmacists.

- The extent of support for preferential hiring of pharmacists with specialty certification from the BPS was variable. Overall, 54% (388/712) of respondents agreed with the statement, with the highest level of support in QC (64%, 153/238) and the lowest in BC (38%, 27/72).

- Sixty-nine percent (495/714) of respondents supported a meaningful salary differential for pharmacists with BPS certification. More than 60% of respondents in all regions agreed, with the highest level of support in QC (81%, 192/238).

- Two-thirds (67%, 481/714) of respondents agreed that only BPS-certified pharmacists should be able to use the title "Pharmacy Specialist". It could be that the remaining third of respondents did not believe that specialty certification should be required for use of the title "specialist". Alternatively, pharmacists who did not agree with the statement might have objected to using a US-based certification body to accredit Canadian pharmacy specialists. The responses to the next statement in the survey may shed some light on this issue.

Front-line pharmacists appeared to be supportive of a Canadian process for specialty certification.

- Eighty-eight percent (625/713) of respondents agreed that a Canadian specialty certification process, similar to the BPS in the US, should be developed. Similarly, 83% (595/714) of respondents indicated that they would seriously consider pursuing specialty certification if a certification program were easily accessible and affordable. Together, these results seem to suggest that front-line pharmacists in this country support specialty certification, but would prefer a Canadian process.

- The final statement in this section of the survey dealt with departmental expectations for pharmacists to undertake scholarly activity (research and publication). Seventy-four percent (528/714) of respondents agreed that scholarly activity should be an expectation for some or all pharmacists. The highest level of agreement was in QC (92%, 220/239) and the lowest level in the Prairies (60%, 102/171) and the Atlantic provinces (61%, 48/79).

Views on Activities of Pharmacists

For several decades, the main Hospital Pharmacy in Canada Survey, completed by pharmacy directors and managers, has captured their estimates of the percentage of overall pharmacist time spent performing different types of activities, specifically drug distribution, clinical activities, teaching and research, as well as administrative and other non–patient care activities. Over multiple surveys, as reported by pharmacy directors and managers, the percentage of time spent performing clinical services has been increasing, the percentage of time spent performing drug distribution activities has been decreasing, and the percentage of time spent on the other categories of activity has remained relatively low.

Beginning with the 2011/12 survey, the survey has asked front-line pharmacists to estimate the time they spend performing different types of activities. The results of the 2013/14 survey of front-line pharmacists are reported in Table J-3 and are compared with the estimates provided by 160 pharmacy directors in Figure J-1; for more detail about pharmacy directors' responses, see Chapter D, Human Resources. For each type of activity, the estimates provided by directors of pharmacy and front-line pharmacists were all within 10 percentage points. The most substantial differences were for drug distribution activities, clinical activities and administrative or non–patient care activities.

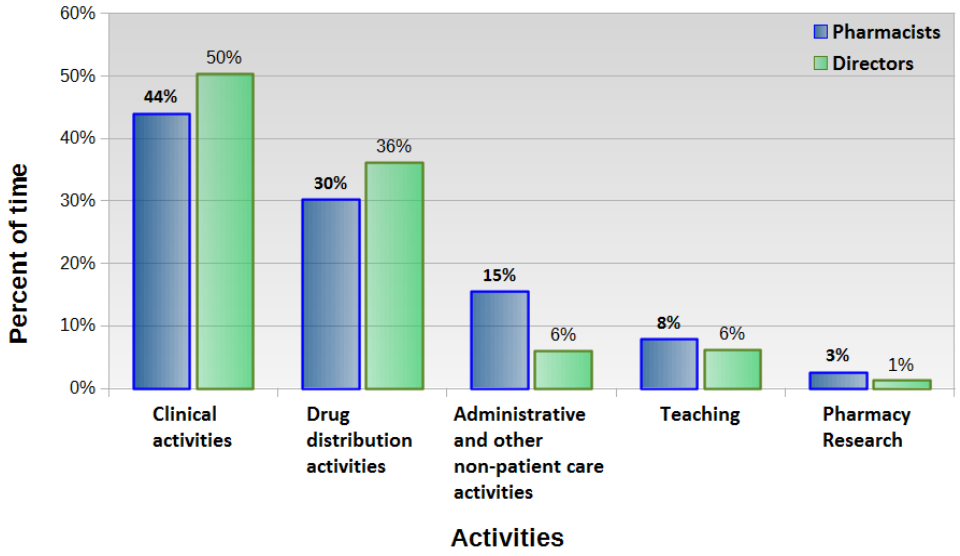
Front-line pharmacists estimated less time spent on clinical activities and more time on administrative and non–patient care activities than did directors.

Table J-3. Pharmacists' Activities, as Reported by Front-Line Pharmacists, 2013/14

		Region				
	All	BC/ YT	Prai	ON	QC	Atl
(n=)	(636)	(65)	(150)	(133)	(219)	(69)
Drug distribution activities	30%	31%	34%	24%	28%	40%
Clinical activities	44%	42%	44%	50%	43%	37%
Teaching	8%	8%	8%	9%	8%	5%
Pharmacy research	3%	3%	2%	4%	2%	2%
Administrative and other non-patient care activities	15%	16%	11%	13%	19%	16%

Base: All respondents (Percentages represent average percentages)

Figure J-1. Percentage of Pharmacists' Time Spent Performing Various Activities, as Estimated by Pharmacists and by Pharmacy Directors, 2013/14



Base: All respondents to Pharmacist Survey (n=636) and all respondents to Director Survey (n=160)

- On average, front-line pharmacists estimated that they spent 30% of their working time performing drug distribution activities, whereas directors of pharmacy estimated that their pharmacists spent 36% of working time on drug distribution.

- On average, front-line pharmacists estimated that they spent 44% of their time performing clinical activities, whereas directors of pharmacy estimated that pharmacists spent 50% of their time on clinical activities.

- Finally, front-line pharmacists estimated that they spent 15% of their time performing administrative, non–patient care activities, whereas directors of pharmacy had a much lower estimate of 6% of pharmacist time spent on administrative duties.

Views on Pharmacy Practice Models

Front-line pharmacists and pharmacy directors were given identical descriptions of four pharmacy practice models: drug distribution centred model, separate clinical and distributive practice model, clinical practice centred model and integrated drug distribution/clinical practice model (see Chapter B, Clinical Pharmacy Practice, for the complete descriptions). Responses concerning pharmacy practice models provided by front-line pharmacists cannot be directly compared with responses provided by directors of pharmacy (as reported in Chapter B), because the questions posed in the two surveys were somewhat different. Directors were asked to estimate the proportion of beds in their respective organizations that were serviced by each type of pharmacy practice model. However, it was felt that many front-line pharmacists might not have sufficient knowledge of either bed numbers in each area of the hospital or their hospitals' pharmacy service delivery model in each of those areas to enable them to provide reasonably accurate estimates of the percentage of beds serviced by each model. Therefore, front-line pharmacists were simply asked to indicate which model best described pharmacy practice in their own setting.

Table J-4. Pharmacy Practice Models, as Reported by Front-Line Pharmacists, 2013/14

		Region					
	All	BC/ YT	Prai	ON	QC	Atl
Current Pharmacy Practice Model: (n=)	(646)	(64)	(154)	(135)	(222)	(71)
Drug distribution centred model	46	4	18	8	12	4
	7%	**6%**	**12%**	**6%**	**5%**	**6%**
Separate drug distribution and clinical practice model	79	20	10	13	23	13
	12%	**31%**	**6%**	**10%**	**10%**	**18%**
Integrated drug distribution / clinical practice model	405	33	107	75	142	48
	63%	**52%**	**69%**	**56%**	**64%**	**68%**
Clinical practice centered model	116	7	19	39	45	6
	18%	**11%**	**12%**	**29%**	**20%**	**8%**
Future Pharmacy Practice Model: (n=)	(645)	(65)	(154)	(134)	(222)	(70)
Drug distribution centred model	2	0	0	0	2	0
	0%	**0%**	**0%**	**0%**	**1%**	**0%**
Separate drug distribution and clinical practice model	47	8	9	16	10	4
	7%	**12%**	**6%**	**12%**	**5%**	**6%**
Integrated drug distribution / clinical practice model	188	24	48	16	78	22
	29%	**37%**	**31%**	**12%**	**35%**	**31%**
Clinical practice centered model	408	33	97	102	132	44
	63%	**51%**	**63%**	**76%**	**59%**	**63%**

Base: All respondents

- Sixty-three percent (405/646) of front-line pharmacists indicated that the integrated drug distribution/clinical practice model best described their practice setting, followed by the clinical practice centred model (18%, 116/646). Much smaller proportions of respondents reported the other two models for their practice setting (see Table J-4).

A clinical practice centred model was favoured by 63% of front-line pharmacists.

- When asked which model they thought their organization should strive to have in place five years or more in the future, 63% (408/645) chose the clinical practice centred model and 29% (188/645) chose the integrated drug distribution/clinical practice model, whereas fewer than 50 respondents chose either of the remaining two models.

Views on CSHP 2015

More than 10 years ago, the Canadian Society of Hospital Pharmacists (CSHP) embarked on a practice improvement initiative called CSHP 2015. Based on the American Society of Health-System Pharmacists' ASHP

2015 initiative, the intent was to set and achieve targets for pharmacy practice improvement by the year 2015. As that initiative comes to an end, the Hospital Pharmacy in Canada Survey asked front-line pharmacists to indicate their level of familiarity and involvement with CSHP 2015 (see Table J-5).

Table J-5. Pharmacists' Familiarity and Involvement with CSHP 2015 Initiative, 2013/14

		Region					
	All	BC/ YT	Prai	ON	QC	Atl
Familiarity with the CSHP 2015 initiative (n=)	(647)	(65)	(154)	(135)	(222)	(71)
I am not at all familiar with the CSHP 2015 initiative.	254	23	33	37	153	8
	39%	**35%**	**21%**	**27%**	**69%**	**11%**
I am aware of the CSHP 2015 initiative, but don't know much about it.	225	25	63	53	53	31
	35%	**38%**	**41%**	**39%**	**24%**	**44%**
I am very familiar with CSHP 2015, but have not been involved with implementing any of its goals or objectives.	121	14	40	32	12	23
	19%	**22%**	**26%**	**24%**	**5%**	**32%**
I am very familiar with CSHP 2015, and have been involved with implementing one or more of its goals or objectives.	47	3	18	13	4	9
	7%	**5%**	**12%**	**10%**	**2%**	**13%**

- Only 7% (47/647) of front-line pharmacist respondents indicated that they were very familiar with CSHP 2015 and had been involved in implementing one or more of its goals or objectives. Nineteen percent (121/647) reported that they were very familiar with CSHP 2015 but had not been involved in implementing any of its goals or objectives, whereas 35% (225/647) reported being aware of but not knowledgeable about the initiative and 39% (254/647) lacked familiarity.

Thirty-nine percent of front-line pharmacists were not at all familiar with the CSHP 2015 initiative.

These results indicate that almost 75% of the front-line pharmacists who participated in this survey knew little or nothing about CSHP 2015 and had not been involved in any aspect of its implementation since its inception over 10 years ago. This finding speaks to the challenges in realizing pharmacy practice change and improvement. Kotter's change model has been advocated as a tool for achieving pharmacy practice change,[3] and anyone developing future change initiatives for hospital pharmacy practice might want to examine strategies such as those described by Kotter, to improve their uptake.

Views on Roles and Responsibilities of Pharmacy Staff

Table J-6. Roles and Responsibilities of Pharmacists and Pharmacy Technicians, as Perceived by Front-Line Pharmacists, 2013/14

			Region				
		All	BC/ YT	Prai	ON	QC	Atl
Assuming that the legal and regulatory issues have been adequately addressed, once a pharmacist has reviewed and released a prescription for processing, technicians and/or technology should be responsible for drug distribution activities (compounding, filling and checking the final product).	(n=)	(635)	(64)	(154)	(130)	(217)	(70)
	Agree	602	62	143	120	210	67
		95%	**97%**	**93%**	**92%**	**97%**	**96%**
	Disagree	33	2	11	10	7	3
		5%	**3%**	**7%**	**8%**	**3%**	**4%**
	strongly agree	305	24	63	60	130	28
		48%	38%	41%	46%	60%	40%
	agree	297	38	80	60	80	39
		47%	59%	52%	46%	37%	56%
	disagree	29	2	9	9	6	3
		5%	3%	6%	7%	3%	4%
	strongly disagree	4	0	2	1	1	0
		1%	0%	1%	1%	0%	0%
Pharmacy practice expectations (an evidence-based prioritization of what each pharmacist is expected to focus their efforts on) should be in place within my facility for patients with similar conditions or needs (e.g. post myocardial infarction patients, patients receiving high-risk medications, etc).	(n=)	(632)	(64)	(153)	(128)	(217)	(70)
	Agree	610	59	149	124	213	65
		97%	**92%**	**97%**	**97%**	**98%**	**93%**
	Disagree	22	5	4	4	4	5
		3%	**8%**	**3%**	**3%**	**2%**	**7%**
	strongly agree	204	19	41	43	88	13
		32%	30%	27%	34%	41%	19%
	agree	406	40	108	81	125	52
		64%	63%	71%	63%	58%	74%
	disagree	21	5	4	3	4	5
		3%	8%	3%	2%	2%	7%
	strongly disagree	1	0	0	1	0	0
		0%	0%	0%	1%	0%	0%

Table J-6. Roles and Responsibilities of Pharmacists and Pharmacy Technicians, as Perceived by Front-Line Pharmacists, 2013/14 (continued)

			Region				
		All	BC/ YT	Prai	ON	QC	Atl
Pharmacists should be expected to adhere to the established practice expectations, and be required to document and justify deviances from the established practice expectations, with the aim of reducing variability of care among patients with similar medical needs.	(n=)	(630)	(62)	(154)	(128)	(216)	(70)
	Agree	562	52	137	117	192	64
		89%	**84%**	**89%**	**91%**	**89%**	**91%**
	Disagree	68	10	17	11	24	6
		11%	**16%**	**11%**	**9%**	**11%**	**9%**
	strongly agree	127	10	28	28	52	9
		20%	16%	18%	22%	24%	13%
	agree	435	42	109	89	140	55
		69%	68%	71%	70%	65%	79%
	disagree	67	10	17	11	23	6
		11%	16%	11%	9%	11%	9%
	strongly disagree	1	0	0	0	1	0
		0%	0%	0%	0%	0%	0%
Pharmacists should be evaluated on a regular basis to insure that established practice expectations and documentation expectations are being met.	(n=)	(634)	(64)	(154)	(129)	(217)	(70)
	Agree	540	57	135	108	175	65
		85%	**89%**	**88%**	**84%**	**81%**	**93%**
	Disagree	94	7	19	21	42	5
		15%	**11%**	**12%**	**16%**	**19%**	**7%**
	strongly agree	93	10	19	29	29	6
		15%	16%	12%	22%	13%	9%
	agree	447	47	116	79	146	59
		71%	73%	75%	61%	67%	84%
	disagree	92	7	19	21	40	5
		15%	11%	12%	16%	18%	7%
	strongly disagree	2	0	0	0	2	0
		0%	0%	0%	0%	1%	0%
Drug distribution services should be available 24 hours a day, either through on-site services, remote services provided through the use of information and automation technologies, or a contracted external provider (e.g. another hospital, etc.)	(n=)	(634)	(63)	(154)	(130)	(217)	(70)
	Agree	459	50	120	104	136	49
		72%	**79%**	**78%**	**80%**	**63%**	**70%**
	Disagree	175	13	34	26	81	21
		28%	**21%**	**22%**	**20%**	**37%**	**30%**
	strongly agree	148	21	36	39	45	7
		23%	33%	23%	30%	21%	10%
	agree	311	29	84	65	91	42
		49%	46%	55%	50%	42%	60%
	disagree	158	12	30	24	73	19
		25%	19%	19%	18%	34%	27%
	strongly disagree	17	1	4	2	8	2
		3%	2%	3%	2%	4%	3%
Clinical services should be available 24 hours a day, either through on-site services, a remote service provided through the use of information and automation technologies, or a contracted external provider (e.g. another hospital, etc.)	(n=)	(635)	(64)	(154)	(130)	(217)	(70)
	Agree	362	37	94	92	102	37
		57%	**58%**	**61%**	**71%**	**47%**	**53%**
	Disagree	273	27	60	38	115	33
		43%	**42%**	**39%**	**29%**	**53%**	**47%**
	strongly agree	87	11	19	27	25	5
		14%	17%	12%	21%	12%	7%
	agree	275	26	75	65	77	32
		43%	41%	49%	50%	35%	46%
	disagree	238	24	51	35	97	31
		37%	38%	33%	27%	45%	44%
	strongly disagree	35	3	9	3	18	2
		6%	5%	6%	2%	8%	3%
I am willing to rotate through a reasonable and equitable schedule of evening, night and weekend shifts to insure that patients receive the pharmacy services (distributive and clinical) which are required to optimize, on a 24 hour a day basis, the drug therapy outcomes of the patients in my hospital.	(n=)	(635)	(64)	(154)	(130)	(217)	(70)
	Agree	301	27	82	59	96	37
		47%	**42%**	**53%**	**45%**	**44%**	**53%**
	Disagree	334	37	72	71	121	33
		53%	**58%**	**47%**	**55%**	**56%**	**47%**
	strongly agree	54	8	13	12	17	4
		9%	13%	8%	9%	8%	6%
	agree	247	19	69	47	79	33
		39%	30%	45%	36%	36%	47%
	disagree	223	25	43	49	79	27
		35%	39%	28%	38%	36%	39%
	strongly disagree	111	12	29	22	42	6
		17%	19%	19%	17%	19%	9%

Base: All respondents

To gather front-line pharmacists' views about the respective roles and responsibilities of pharmacists and pharmacy technicians, respondents were asked to indicate their level of agreement with a number of statements

about pharmacy practice. To facilitate interpretation of the overall results, the responses were aggregated into groupings of "agree" (i.e., responses of "agree" and "strongly agree") and "disagree" (i.e., responses of "disagree" and "strongly disagree"). Table J-6 shows the aggregated "agree" and "disagree" results, as well as details for all response options.

- Almost all respondents (95%, 602/635) agreed that, provided legal requirements have been adequately addressed, once a pharmacist has released a prescription for processing, technicians (or some form of technology) should be responsible for drug distribution activities. This high level of support for having pharmacy technicians assume responsibility for most or all drug distribution activities indicates that pharmacists are prepared for the transition of their role from drug distribution to clinical practice.

- A similar percentage of respondents (97%, 610/632) agreed that their facilities should establish pharmacy practice expectations for patients with similar conditions or needs. Some practising hospital pharmacists feel that individual pharmacists should have the freedom to choose the activities they believe to be most important (or perhaps the activities they prefer to perform) for a specific group of patients. As such, pharmacy practice expectations (e.g., key performance indicators) would be viewed as guidelines only. Others have argued that pharmacists' activities should be determined by the evidence that supports the impact of various activities on patient outcomes. The high level of agreement with this statement suggests that front-line pharmacists believe their activities should be determined by evidence-based, pharmacy practice expectations.

Front-line pharmacists agreed that evidence-based pharmacy practice expectations superseded choosing their own clinical activities.

- Eighty-nine percent (562/630) of respondents agreed that pharmacists should be expected to adhere to established practice expectations and should be required to document and justify deviances from those expectations. This result supports the argument for a formal system to ensure that deviations from practice expectations are justified and documented.

- Eighty-five percent (540/634) of respondents agreed that pharmacists should be evaluated regularly to ensure that established expectations regarding practice and documentation are being met. This result further supports the implications of the previous findings, which indicate that pharmacists accept responsibility and accountability for adhering to established practice expectations, with the aim of reducing the variability in care provided by pharmacy practitioners.

Evaluation of front-line pharmacists should aim to standardize the care provided by pharmacy practitioners.

- Seventy-two percent (459/634) of respondents agreed that some form of drug distribution services should be available 24 hours a day. Although this may, at first glance, seem to represent fairly strong agreement, anything less than 100% suggests that some segment of the pharmacy profession believes that other healthcare disciplines are capable of safely performing drug distribution activities in the absence of pharmacists, without availability of an on-site pharmacist or remote access to a pharmacist through modern communication and automation technologies.

One out of every four front-line pharmacists felt that drug distribution services need not be available 24/7.

- Only 57% (362/635) of respondents agreed that clinical services should be available 24 hours a day. This result suggests that some pharmacists believe their clinical expertise and clinical services are expendable, at least overnight, in the evenings and on weekends.

Slightly more than half of pharmacists felt that clinical pharmacy services should be available 24/7.

- Only 47% (301/635) of front-line pharmacist respondents expressed willingness to rotate through a reasonable and equitable schedule of evening, night and weekend shifts to ensure that patients receive the pharmacy services needed to optimize their drug therapy outcomes.

Less than half of pharmacists were willing to work rotating shifts to provide pharmacy services 24/7.

The responses in this section of the survey suggest that a substantial number of hospital pharmacists are comfortable with the status quo, whereby other healthcare professionals assume some pharmacy responsibilities during evenings, nights and weekends. Do these pharmacists believe this can be done without compromising the safety and effectiveness of the drug distribution system or the drug use management expertise that the pharmacy department provides during regular working hours? Are they aware that this approach may raise the

question of whether this role is really essential at other times of the day? These are issues that seem worthy of consideration by both pharmacists and their managers.

Views on pharmacist prescribing

The Hospital Pharmacy in Canada Survey has been collecting information on the prescribing role of hospital pharmacists for more than a decade. Over that period, there has been a significant increase in the extent of both dependent and independent prescribing rights for pharmacists (see Chapter B, Clinical Pharmacy Practice, for more detail). In the supplemental survey of front-line pharmacists, the section on pharmacist prescribing examined respondents' willingness to adopt various types of prescribing rights as a routine part of their pharmacy practice (see Table J-7).

- The overall (national) percentages of front-line pharmacists who would incorporate the four types of *dependent* prescribing as a routine part of their practice varied from 49% (309/628) for extending prescriptions to 67% (421/628) for prescribing new therapy . Intuitively, it might be expected that pharmacists would be more comfortable adopting dependent prescribing, given that this format allows them to share accountability and risk with an established physician prescriber. It was therefore surprising to find that for three of the four types of prescribing, higher percentages of pharmacists were willing to adopt *independent* prescribing as a routine part of their practice, relative to dependent prescribing. The one exception was independent prescribing for new therapy, for which only 38% (238/628) of the front-line pharmacists indicated that they would be prepared to adopt that form of independent prescribing as a routine part of their practice (relative to 67% who favoured dependent prescribing for new therapy).

Pharmacists were more comfortable with dependent than with independent prescribing of new therapy.

Table J-7. Pharmacists' Perceptions of Pharmacist Prescribing, 2013/14

		Region				
	All	BC/ YT	Prai	ON	QC	Atl
Which of the following prescribing rights would you be prepared to incorporate as a routine part of your practice? (n=)	(628)	(62)	(153)	(127)	(216)	(70)
Dependent right to prescribe lab tests	327	29	75	76	107	40
	52%	**47%**	**49%**	**60%**	**50%**	**57%**
Dependent right to extend (refill) an existing prescription	309	28	75	66	106	34
	49%	**45%**	**49%**	**52%**	**49%**	**49%**
Dependent right to modify (alter the dose, frequency of administration, etc.) an existing prescription	371	31	85	80	131	44
	59%	**50%**	**56%**	**63%**	**61%**	**63%**
Dependent right to prescribe new therapy	421	42	89	92	156	42
	67%	**68%**	**58%**	**72%**	**72%**	**60%**
Independent right to prescribe lab tests	544	54	136	98	203	53
	87%	**87%**	**89%**	**77%**	**94%**	**76%**
Independent right to extend (refill) an existing prescription	520	55	134	98	181	52
	83%	**89%**	**88%**	**77%**	**84%**	**74%**
Independent right to modify (alter the dose, frequency of administration, etc.) an existing prescription	495	51	124	97	170	53
	79%	**82%**	**81%**	**76%**	**79%**	**76%**
Independent right to prescribe new therapy	238	22	63	36	92	25
	38%	**35%**	**41%**	**28%**	**43%**	**36%**

Base: All respondents
Note : multiple mentions permissible

Views on Structured Practical Experiential Programs

In response to the pharmacist shortage of the early 2000s, faculties of pharmacy increased their enrolment of pharmacy students over the past decade. In addition, all pharmacy schools either converted their entry-to-practice bachelor's degree to an entry-to-practice PharmD degree or are planning to do so. Both of these developments have substantially increased the amount of experiential training that faculties of pharmacy must negotiate with training sites and that training sites are expected to deliver. Different models of delivering structured practical experiential program (SPEP) training have been proposed in an effort to ensure that training needs can be met without exceeding the capacity of training sites. The survey of front-line pharmacists presented a number of potential SPEP models (or model components) and asked respondents to indicate how helpful those approaches might be in enabling SPEP training of greater numbers of pharmacy students. To facilitate interpretation of the overall results, the responses were grouped as "very helpful" plus "extremely helpful" vs. "somewhat helpful" plus "not helpful". Table J-8 lists these aggregate responses.

Strategies for Enhancing the Capacity of Structured Practical Experiential Programs, as Perceived by Front-Line Pharmacists, 2013/14

	(n=)	Very or extremely helpful	Somewhat or not helpful
Please rate how useful each of the following would be in enabling your facility to accommodate additional students in your experiential training program.			
1) Adequate space and equipment (e.g., computer access) to facilitate experiential education	(603)	509 **84%**	94 **16%**
2) Funding to provide backfill for preceptors who are providing experiential education	(601)	505 **84%**	96 **16%**
3) No pharmacist or technician vacancies in areas where students are being precepted.	(601)	488 **81%**	113 **19%**
4) Better prepared students	(604)	484 **80%**	120 **20%**
5) An experiential training program in which all students assigned to your hospital spent the first week together as a group, and were taught standardized process skills (e.g. how to locate information in the patient record, how to organize the information needed to conduct a medication reconciliation, etc.) so that when they started with their individual preceptors, they were better prepared to participate in the care delivery process.	(598)	482 **81%**	116 **19%**
6) Simplified evaluation forms and processes	(604)	496 **82%**	108 **18%**
7) The existence of a list of patient care activities, approved by your province's pharmacy regulatory authority and/or your hospital's Pharmacy and Therapeutics Committee (as required in your province) which pharmacy students could carry out with minimal supervision at different stages of their education (e.g. collecting chart data in year one of their program, interviewing patients in year two of their program, preparing medication reconciliation documents in year 3 of their program, communicating the results of a medication reconciliation to a physician in year 4 of their program, etc.).	(599)	418 **70%**	181 **30%**
8) More flexibility in timing or scheduling of rotations.	(600)	392 **65%**	208 **35%**
9) An experiential training model in which students in the experiential training component of their pharmacy program complete most of their experiential rotations at your hospital, negating the need for orientation of new students during each rotation, and creating a longer term relationship between the student and your hospital.	(600)	385 **64%**	215 **36%**
10) Dedicated university / technical college faculty who would assist with precepting students.	(603)	357 **59%**	246 **41%**
11) Academic appointments for preceptors.	(602)	339 **56%**	263 **44%**
12) Rotation coordinators / supervisors from the faculties / colleges that would be based at, or regularly visit, your facility.	(604)	298 **49%**	306 **51%**
13) An experiential training model in which students are active participants in the delivery of essential patient care services at your hospital, to the extent that if the students were not there, additional pharmacist staff would have to be hired to perform those essential services.	(599)	294 **49%**	305 **51%**

Base: All respondents

The results presented in Table J-8 have been grouped into a number of themes:

- Strategies 1–3, each of which had more than 80% support from front-line pharmacists, were related to having adequate staff, facilities and equipment to manage SPEP training. Viewed from the perspective of Maslow's hierarchy of needs,[4] it is unsurprising that if these basic needs have not been addressed, it will be more difficult to engage staff in other efforts to enhance SPEP training.

- Strategies 4–7 related to the students, specifically their preparation before arriving at the SPEP site, their orientation and training once they arrived at the hospital, the activities in which they would be involved, and evaluation processes. Strategies 4, 5 and 6 each had at least 80% support, whereas strategy 7, the specification of particular patient care activities that students could undertake at different stages of their education (with regulatory and institutional approval), had 70% (418/599) support.

Strategies related to staffing, student orientation/training and evaluation were supported by at least 80% of front-line pharmacists.

- Strategies 8 and 9, supported by 65% (392/600) and 64% (385/600) of respondents, respectively, dealt with models for scheduling rotations, including the possibility of having students spend longer periods at a given site.

- Strategies 10–12, supported by 49%–59% of front-line pharmacists, have been suggested by some practitioners as ways for faculties to support and reward preceptors.

- Strategy 13 involved students being active participants in the delivery of essential patient care services. This strategy was derived from the situation in the US, where there is a strong movement toward having

students participate in the delivery of patient care services as part of their SPEP training. The underlying logic is twofold: first, that students will learn more by actually carrying out a task and being responsible for the outcome, and second, that having students participate in the delivery of care will change staff members' view of students from being a burden to being an asset. Accordingly, in a number of US states, the state board of pharmacy or the pharmacy and therapeutics committees of individual hospitals have approved a list of activities that pharmacy students, at various stages of training, can perform with minimal supervision. Strategy 7, discussed above, was based on this approach and was supported by 70% of front-line pharmacist respondents; however, strategy 13, which would seem to flow naturally from strategy 7, received only 49% (294/599) support, a somewhat surprising result. It would seem that many front-line pharmacists are not ready to accept that students can capably manage the pharmaceutical care of their patients.

Only 49% of front-line pharmacists supported active participation by students in managing the care of their patients as a method to enhance SPEP capacity.

Views on Future Trends

The main Hospital Pharmacy in Canada Survey of pharmacy directors included a section entitled "Future Trends in Hospital Pharmacy Practice". That forecasting section, the results of which appear in Chapter G of this report, was intended to capture the opinions of directors of pharmacy concerning the likelihood that certain changes would occur in various areas of pharmacy practice between 2014 and 2019. Many of the same future trend statements were included in the survey of front-line pharmacists (the results of which are summarized in Tables J-9 through J-14), to allow the opinions of these two groups of respondents to be compared. The methods for data collection and presentation for this section of the front-line pharmacist survey were similar to those described in Chapter G for the main director survey.

Table J-9. Future Trends in Hospital Pharmacy Leadership, 2013/14

	Pharmacist Survey		Director Survey	
	(n=)	very or somewhat **Likely**	(n=)	very or somewhat **Likely**
Please indicate the likelihood, in your opinion, that the following statements will accurately describe the state of your hospital or pharmacy department in the year 2019:				
1) Brochures which describe your hospital's patient care services will include a description of the patient care services provided by your pharmacists.	(569)	281 **49%**	(169) .	136 **80%**
2) Your hospital will have a question in your patient satisfaction surveys which asks if patients recall interacting with a pharmacist while in your hospital.	(571)	348 **61%**	(165) .	129 **78%**
3) Your pharmacy department will ensure that pharmacists, in their interactions with patients, identify themselves as a pharmacist, with the goal of insuring that patients accurately recall if they interacted with a pharmacist while in your hospital.	(572)	514 **90%**	(169) .	163 **96%**
4) Your pharmacy department will be managed by an individual who is not a pharmacist	(568)	84 **15%**	(168) .	20 **12%**
5) Your pharmacy department will have a research and/or practice development unit staffed by pharmacists and/or technicians who are assigned to research and/or practice development activities.	(570)	245 **43%**	(161) .	72 **45%**

Base: All respondents

Front-line pharmacists were less optimistic than directors about increased use of the clinical practice centred model with independent prescribing rights.

- For 13 of the 28 statements in common, the percentages of directors and front-line pharmacists who believed that the scenario described was very or somewhat likely to be the reality by 2019 were within 10 percentage points, indicating congruence of views. The difference was between 10 and 20 percentage points for eight of the statements and was greater than 20 percentage points (indicating highly divergent views) for seven of the statements. Some of the notable differences are described below.

Front-line pharmacists predicted a greater role in prescribing and follow-up of high-risk discharged and ambulatory patients.

- Similar to the results presented earlier in this chapter (in the section "Views of Activities of Pharmacists"), a lower percentage of front-line pharmacists (62%, 357/574) than of pharmacy directors (83%, 140/169) anticipated increased time spent in a clinical practice centred model with decreased time spent performing drug distribution activities (Table J-10). Similarly, a lower percentage of front-line pharmacists (62%, 355/574) than of pharmacy directors (79%, 133/168) predicted an increase in independent prescribing rights for pharmacists.

- A greater percentage of front-line pharmacists (80%, 456/571) than of pharmacy directors (63%, 106/169) foresaw that pharmacists would have the authority to write discharge prescriptions and would take responsibility to follow up with high-risk discharged patients and their healthcare professionals (76%, 432/572 vs. 44%, 74/169) (Table J-11).

Front-line pharmacists were generally less optimistic than directors about future trends in pharmacy informatics.

Table J-10. Future Trends in Pharmacy Practice Models, 2013/14

	Pharmacist Survey		Director Survey	
	(n=)	very or somewhat **Likely**	(n=)	very or somewhat **Likely**
Please indicate the likelihood, in your opinion, that the following statements will accurately describe the state of your hospital or pharmacy department in the year 2019.				
6) The number of graduates from accredited hospital pharmacy residency positions will be sufficient to enable your hospital to fill at least 75% of your vacant pharmacist positions with a pharmacist who has completed an accredited hospital pharmacy residency program.	(562)	310 **55%**	(164) .	80 **49%**
7) At least 75% of the pharmacists hired by your hospital in the past year will have completed an accredited hospital pharmacy residency program.	(570)	320 **56%**	(162) .	77 **48%**
8) At least 75% of your pharmacists will function in a clinical practice-centred model, defined as one in which pharmacists function largely in clinical roles, with less than 20% of their time spent performing distributive activities (e.g. product preparation, order-verification, checking the distributive work of other pharmacists and technicians, etc.).	(574)	357 **62%**	(169) .	140 **83%**
9) Your pharmacy department will use technicians to perform at least 80% of medication distribution activities, including the checking of the accuracy of medication distribution activities performed by other technicians ("tech-check-tech").	(571)	456 **80%**	(169) .	159 **94%**
10) At least 50% of your technical support staff (technicians and pharmacy assistants) staff will be regulated pharmacy technicians.	(572)	432 **76%**	(161) .	128 **80%**
11) The majority of pharmacy technicians in your department will report to a pharmacy technician manager who is a not a pharmacist, but rather a pharmacy technician.	(572)	454 **79%**	(168) .	123 **73%**
12) At least 20% of hospital pharmacists in your department will have independent prescribing rights and will work in collaborative practice models which enable them to initiate and modify the medication therapy of patients under their care.	(574)	355 **62%**	(168) .	133 **79%**
13) Pharmacy students in the experiential training component of their pharmacy program will complete most of their experiential rotations at your hospital, negating the need for orientation of new students during each rotation, and creating a longer term relationship between the student and your hospital.	(565)	223 **39%**	(164) .	65 **40%**
14) Pharmacy students in the experiential training component of their pharmacy program will be active, regularly scheduled participants in the delivery of essential patient care services at your hospital, to the extent that if the students were not there, additional pharmacist staff would have to be hired to perform those essential services.	(565)	163 **29%**	(166) .	76 **46%**
15) Your province's pharmacy regulatory authority and/or your hospital's Pharmacy and Therapeutics (as required in your province) will have approved a list of patient care activities which pharmacy students can carry out with minimal supervision at different stages of their education (e.g. collecting chart data in year one of their program, interviewing patients in year two of their program, preparing medication reconciliation documents in year 3 of their program, communicating the results of a medication reconciliation to a physician in year 4 of their program, etc.)	(566)	274 **48%**	(166)	112 **67%**.

Base: All respondents

Table J-11. Future Trends in Ambulatory Care, 2013/14

	Pharmacist Survey		Director Survey	
	(n=)	very or somewhat **Likely**	(n=)	very or somewhat **Likely**
Please indicate the likelihood, in your opinion, that the following statements will accurately describe the state of your hospital or pharmacy department in the year 2019.				
16) Your pharmacy department will have system in place to ensure that for all high risk patients being discharged from your hospital, a pharmacy practitioner in the hospital setting will contact a pharmacy practitioner in the community setting to discuss the patient's medication therapy and transition the patient's pharmaceutical care to the community pharmacy practitioner.	(562)	310 **55%**	(169)	88 **52%**
17) Your pharmacy department will have a system in place to ensure that any patient issues related to medication access (including cost and insurance coverage) are resolved before the patient is discharged from the hospital.	(570)	320 **56%**	(167)	83 **50%**
18) In your hospital, pharmacists will provide ongoing managing medication therapy for selected groups of ambulatory patients who are receiving multiple medications or high risk medication therapy and have been identified by the hospital or health system as frequent users of the emergency department or inpatient beds.	(574)	357 **62%**	(168)	120 **71%**
19) Pharmacists in your hospital will have the authority to write discharge prescription orders in order to reconcile medications taken before admission, medications discontinued while in hospital, and new medications started during hospitalization.	(571)	456 **80%**	(169)	106 **63%**
20) Pharmacists in your hospital will follow up with all high-risk patients and their healthcare professionals (including community pharmacists), after discharge, in order to ensure continuity of medication therapy, and assessment of medication therapy outcomes.	(572)	432 **76%**	(169)	74 **44%**

Base: All respondents

Table J-12. Future Trends in Pharmacy Operations, 2013/14

	Pharmacist Survey		Director Survey	
	(n=)	very or somewhat **Likely**	(n=)	very or somewhat **Likely**
Please indicate the likelihood, in your opinion, that the following statements will accurately describe the state of your hospital or pharmacy department in the year 2019.				
21) Your hospital will be part of a group of hospitals that are serviced by a centralized medication preparation, repackaging, and distribution systems.	(560)	265 **47%**	(167)	91 **54%**
22) Your hospital will be part of a system where one or more hospitals provide one or more other hospitals with operational support and advice, such as after-hours order verification, on-call support, and compounding support.	(561)	268 **48%**	(168)	118 **70%**

Base: All respondents

Table J-13. Future Trends in Pharmacy Informatics, 2013/14

	Pharmacist Survey		Director Survey	
	(n=)	very or somewhat **Likely**	(n=)	very or somewhat **Likely**
Please indicate the likelihood, in your opinion, that the following statements will accurately describe the state of your hospital or pharmacy department in the year 2019.				
23) All medication-related computer applications within your hospital will connect with a single standard source of medication information and a standardized clinical decision support system which together will insure consistency of the information provided, across all applications.	(564)	327 **58%**	(169)	135 **80%**
24) Your hospital will use a validated, automated method for identifying patients most likely to benefit from pharmacy-based patient care services, including medication therapy monitoring.	(569)	283 **50%**	(169)	113 **67%**
25) Your pharmacy department will have a formal review process in place that will collect data on how staff responded to computer generated alerts, assess the appropriateness of alert over-rides and implement changes that will optimize the value and minimize the drawbacks of the computerized decision-support applications that exist in your pharmacy information system.	(565)	278 **49%**	(169)	113 **67%**
26) Your hospital will have a formal process in place for regularly collecting and reviewing data on how smart pump alerts were managed by staff, reviewing medication libraries used in smart pumps, and making changes to the libraries as appropriate.	(539)	304 **56%**	(165)	133 **81%**

Base: All respondents

Table J-14. Future Trends in the Pharmaceutical Marketplace, 2013/14

	Pharmacist Survey		Director Survey	
	(n=)	very or somewhat **Likely**	(n=)	very or somewhat **Likely**
Please indicate the likelihood, in your opinion, that the following statements will accurately describe the state of your hospital or pharmacy department in the year 2019				
27) The number of medication shortages that your hospital will have to manage will have decreased by at least 25%, as compared to the baseline in 2013/14.	(556)	145 **26%**	(165)	49 **30%**
28) The number of medication shortages that your hospital will have to manage will have increased by at least 25%, as compared to the baseline in 2013/14.	(554)	378 **68%**	(165)	77 **47%**

Base: All respondents

- A smaller percentage of front-line pharmacists (58%, 327/564) than of pharmacy directors (80%, 135/169) envisioned medication-related computer applications connected with a single source of medication information (Table J-13).

Front-line pharmacists predicted a greater role in prescribing and follow-up of high-risk discharged and ambulatory patients.

Conclusion

The results of this survey of front-line pharmacists provide insights on the perspectives of pharmacists concerning a number of practice issues. It is hoped that this information will be shared and discussed within hospital pharmacy departments in Canadian hospitals.

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[1] Pharmacists in Canada. Ottawa (ON): Canadian Pharmacists Association; 2015 [cited 2015 Mar 15]. Available from: www.pharmacists.ca/index.cfm/pharmacy-in-canada/pharmacists-in-canada/

[2] Population by year, by province and territory (number). Ottawa (ON): Statistics Canada; [modified 2014 Sep 26; cited 2015 Apr 28]. Available from: www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm

[3] Tsuyuki RT, Schindel TJ. Changing pharmacy practice: the leadership challenge. Can Pharm J. 2008;141(3):174-80.

[4] Maslow AH. A theory of human motivation. Psychol Rev. 1943;50(4):370-96.

K - Front-Line Pharmacy Technicians Survey

Kyle MacNair

Chapter F of this report (Pharmacy Technicians) opens with an extensive review of the recent unprecedented upheaval within the practice of pharmacy technicians in Canada. Seven provinces have introduced legislation that makes pharmacy technicians recognized healthcare professionals. Correspondingly, the education system has been formalized, entry-to-practice requirements have been standardized, and provincial regulatory authorities have been mandated to provide oversight. With all of this change, it is important to understand the perspectives of front-line pharmacy technicians on their practice responsibilities and the emerging regulatory framework within which they work.

To that end, a supplementary survey designed specifically for front-line pharmacy technicians (along with a similar supplementary survey for front-line pharmacists) was developed for the 2011/12 survey, to complement the main Hospital Pharmacy in Canada Survey of pharmacy directors. The email message inviting directors to participate in the main survey also asked them to circulate an invitation to their front-line staff, inviting them to participate in these new surveys of front-line practitioners. Results of the staff surveys were not published as part of the 2011/12 report, but instead were presented as posters at the Canadian Society of Hospital Pharmacists 2014 Banff Seminar (available alongside the 2011/12 report at www.lillyhospitalsurvey.ca).

The Editorial Board decided to include the supplemental surveys for front-line staff in the 2013/14 survey cycle and to publish the results as formal chapters within the 2013/14 report. This chapter presents the results for front-line pharmacy technicians, and Chapter J presents the results for front-line pharmacists.

For the purposes of this chapter, the term "pharmacy technician" is used to describe the individuals who responded to the survey directed to front-line staff in this role. It is recognized that these respondents may or may not be legally recognized as holding the title "Pharmacy Technician", depending on the province where they practise and the status of the provincial qualifying process.

Demographics

A total of 515 front-line pharmacy technicians responded to the survey. A response rate cannot be calculated because the actual number of front-line pharmacy technicians who received an invitation to participate is unknown. The provincial breakdown of respondents, their years of practice and their highest level of training are shown in Table K-1.

A total of 515 pharmacy technicians responded to the supplementary survey.

Table K-1. Demographic Characteristics of Pharmacy Technician Respondents, 2013/14

	(n=)	%
Province	(515)	100%
British Columbia / (Yukon)	(63)	**12%**
Alberta / (Northwest Territories)	(42)	**8%**
Saskatchewan	(27)	**5%**
Manitoba	(21)	**4%**
Ontario	(120)	**23%**
Quebec	(162)	**31%**
New Brunswick	(34)	**7%**
Nova Scotia	(42)	**8%**
Prince Edward Island	(4)	**1%**
Years of practice as a pharmacy technician	(514)	100%
0 to 5 years	(134)	**26%**
6 to 10 years	(117)	**23%**
11 to 20 years	(143)	**28%**
21 to 30 years	(92)	**18%**
more than 30 years	(28)	**5%**
(2) Highest level of education / training in the field of pharmacy	(514)	100%
on the job training only	(34)	**7%**
pharmacy technician correspondence course without physical attendance of classes	(11)	**2%**
formal technician training program of less than one full academic year	(65)	**13%**
formal technician training program of one full academic year	(327)	**64%**
formal technician training program of two full academic years	(69)	**13%**
B. Sc. in Pharmacy program offered by an educational institution located in a country other than Canada	(8)	**2%**

Base: All respondents

- Together, respondents from Quebec (QC; 31%, 162/515) and Ontario (ON; 23%, 120/515) made up more than half of respondents.

- Overall, 77% (396/514) of respondents had formal technician training of one or two years' duration.

Views on Knowledge and Skills

The survey of front-line pharmacy technicians asked a series of questions concerning respondents' beliefs about their knowledge and skills to accurately and safely perform a number of specified tasks (Table K-2).

Table K-2. Pharmacy Technicians' Beliefs Regarding Knowledge and Skills, 2013/14

	(n=)	strongly agree	agree	disagree	strongly disagree	not applicable
Possessing the knowledge and skills required to accurately and safely …						
… package unit dose items	(514)	9	436	65	4	0
		2%	**85%**	**13%**	**1%**	**0%**
… check the work of other technicians who package unit dose items	(513)	18	411	79	2	3
		4%	**80%**	**15%**	**0%**	**1%**
… fill unit dose trays	(514)	38	405	66	5	0
		7%	**79%**	**13%**	**1%**	**0%**
… check the work of other technicians who fill unit dose trays	(514)	51	377	73	10	3
		10%	**73%**	**14%**	**2%**	**1%**
… fill traditional multi-dose prescriptions	(512)	34	387	86	4	1
		7%	**76%**	**17%**	**1%**	**0%**
… check the work of other technicians who fill traditional multi-dose prescriptions	(512)	56	339	92	19	6
		11%	**66%**	**18%**	**4%**	**1%**
… restock automated dispensing cabinets	(512)	47	358	82	16	9
		9%	**70%**	**16%**	**3%**	**2%**
… check the work of other technicians who restock automated dispensing cabinets	514	67	331	87	22	7
		13%	**64%**	**17%**	**4%**	**1%**
… prepare batch IV admixtures	(513)	51	344	86	22	10
		10%	**67%**	**17%**	**4%**	**2%**
… check the work of other pharmacy technicians who prepare batch IV admixtures	(512)	83	284	96	33	16
		16%	**55%**	**19%**	**6%**	**3%**
… prepare patient-specific IV admixtures	(512)	51	350	81	18	12
		10%	**68%**	**16%**	**4%**	**2%**
… check the work of other pharmacy technicians who prepare patient-specific IV admixtures	(513)	88	273	90	43	19
		17%	**53%**	**18%**	**8%**	**4%**
… prepare oncology admixtures	(514)	118	228	89	48	31
		23%	**44%**	**17%**	**9%**	**6%**
… check the work of other pharmacy technicians who prepare oncology admixtures	(513)	168	127	83	89	46
		33%	**25%**	**16%**	**17%**	**9%**
… fill cardiac arrest trays with the required medications	(513)	51	350	89	16	7
		10%	**68%**	**17%**	**3%**	**1%**
… check the work of other pharmacy technicians who fill cardiac arrest trays with the required medications	(514)	56	341	90	17	10
		11%	**66%**	**18%**	**3%**	**2%**
… compound medication preparations (e.g ointments)	(512)	9	418	82	3	0
		2%	**82%**	**16%**	**1%**	**0%**
… check the work of other pharmacy technicians who compound medication preparations	(513)	22	383	93	14	1
		4%	**75%**	**18%**	**3%**	**0%**
… perform medication order entry	(513)	73	287	118	29	6
		14%	**56%**	**23%**	**6%**	**1%**
… check the work of other pharmacy technicians who perform medication order entry	(512)	143	165	90	88	26
		28%	**32%**	**18%**	**17%**	**5%**
… receive verbal orders	(513)	188	78	105	99	43
		37%	**15%**	**20%**	**19%**	**8%**
… verify patient allergy information	(513)	93	222	147	42	9
		18%	**43%**	**29%**	**8%**	**2%**
… serve as a pharmacy liaison and perform activities that improve the drug distribution system	(513)	129	182	127	58	17
		25%	**35%**	**25%**	**11%**	**3%**
… collect and assemble medication use information that is used to perform medication reconciliation on admission, transfer or discharge	(511)	149	165	112	66	19
		29%	**32%**	**22%**	**13%**	**4%**
… collect and assemble laboratory test results and other patient care data that is used by pharmacists in the care of their patients	(513)	216	78	69	116	34
		42%	**15%**	**13%**	**23%**	**7%**
… assemble pamphlets and documentation to be given to the patient by a pharmacist at the time of medication counseling	(513)	191	125	125	51	21
		37%	**24%**	**24%**	**10%**	**4%**
… prepare patient medication schedules to be given to the patient by the pharmacist at the time of patient counseling	(512)	202	105	117	63	25
		39%	**21%**	**23%**	**U**	**5%**
… use established protocols and lab values to calculate changes to parenteral nutrition therapy	(513)	208	37	62	138	67
		41%	**7%**	**12%**	**27%**	**13%**

Table K-2. Pharmacy Technicians' Beliefs Regarding Knowledge and Skills, 2013/14 (continued)

	(n=)	strongly agree	agree	disagree	strongly disagree	not applicable
Possessing the knowledge and skills required to accurately and safely .. (continued)						
... gather and collate information used in the preparation of drug formulary submissions	(508)	206 **41%**	60 **12%**	94 **19%**	105 **21%**	43 **8%**
... gather and collate information on non-compliance with formulary rules	(513)	214 **42%**	52 **10%**	91 **18%**	113 **22%**	43 **8%**
... conduct medication-related audits (e.g., for the Medication Safety committee, for drug utilization review, etc.)	(512)	176 **34%**	81 **16%**	127 **25%**	88 **17%**	40 **8%**
... teach and supervise pharmacy technician students	(514)	38 **7%**	280 **54%**	168 **33%**	20 **4%**	8 **2%**
…provide in-service education/training to pharmacy technicians	(512)	70 **14%**	225 **44%**	165 **32%**	42 **8%**	10 **2%**
... operate a remote dispensing site, without the physical presence of a pharmacist, using a video link for those activities that must be carried out by a pharmacists.	(513)	206 **40%**	122 **24%**	90 **18%**	70 **14%**	25 **5%**
... be solely responsible for drug distribution activities once a pharmacist has reviewed and released a prescription for processing.	(512)	39 **8%**	287 **56%**	154 **30%**	28 **5%**	4 **1%**

Base: All respondents

- Pharmacy technician respondents generally believed they had the knowledge and skills required to perform most tasks. For 33 of the 35 tasks listed in the survey, a majority of respondents (more than 50%) agreed or strongly agreed that they had the knowledge and skills to accurately and safely perform the task. The two exceptions were using protocols to calculate changes to parenteral nutrition therapy and conducting medication-related audits.

For nearly all of the 35 tasks assessed, a majority of pharmacy technician respondents agreed or strongly agreed that they had the knowledge and skills to accurately and safely perform the task.

- For many tasks, there was a strong consensus about knowledge and skills. However, for a few tasks, consensus was less evident, and substantial proportions of respondents agreed and disagreed that they had the appropriate knowledge and skills:
    - Regarding the collection and assembly of laboratory test results and other patient care data used by pharmacists in caring for patients, 36% (185/513) disagreed or strongly disagreed that they had the necessary skills, whereas 57% (294/513) agreed or strongly agreed.
    - Regarding use of established protocols and laboratory values to calculate changes to parenteral nutrition therapy, 39% (200/513) disagreed or strongly disagreed that they had the appropriate knowledge and skills, whereas 48% (245/513) agreed or strongly agreed.
    - Regarding the gathering and collating of information on non-compliance with formulary rules, 40% (204/513) disagreed or strongly disagreed that they had the necessary skills, whereas 52% (266/513) agreed or strongly agreed.

Views on Regulatory Change

The next series of questions focused on pharmacy technician respondents' awareness of regulatory change affecting their profession, as well as their knowledge and intentions about becoming a regulated pharmacy technician. The results (Table K-3) are displayed by province, grouped according to whether legislation protecting the title "Pharmacy Technician" was in place as of March 31, 2014, the end date for the survey.

- Although only 51% (252/499) of respondents in all provinces indicated that their department had provided information about technician regulation, 77% (385/501) were aware that some provinces were introducing regulation.
- For all questions that assessed awareness of regulatory issues, awareness was lowest among QC respondents.
- The provincial disparity in terms of whether respondents had obtained certification as a pharmacy technician through the Pharmacy Examining Board of Canada was expected. ON (73%, 87/119), Alberta (70%, 28/40) and British Columbia (BC; 77%, 48/62), which have all had pharmacy technician legislation in place for four to five years, had the highest rates of certification.

Table K-3. Knowledge of Pharmacy Technician Certification and Regulation, 2013/14

			Provinces With Legislation In Place as of March 31, 2014					Provinces Without Legislation In Place as of March 31, 2014		
		All	BC/ (YT)	AB/ (NT)	MB	ON	NS	SK	QC	NB
Your department has held informational sessions to explain what technician certification and regulation are, the status of certification/regulation across Canada, and the personal implications.	(n=)	(499)	(61)	(40)	(21)	(117)	(41)	(27)	(158)	(34)
		252	44	22	12	74	40	8	36	16
		51%	**72%**	**55%**	**57%**	**63%**	**98%**	**30%**	**23%**	**47%**
You are aware that a number of provinces have already introduced pharmacy technician regulation.	(n=)	(501)	(62)	(40)	(20)	(119)	(41)	(27)	(158)	(34)
		385	60	33	19	104	40	26	71	32
		77%	**97%**	**83%**	**95%**	**87%**	**98%**	**96%**	**45%**	**94%**
You are aware that almost all other provinces are in the planning or implementation stage for pharmacy technician regulation.	(n=)	(499)	(62)	(39)	(21)	(118)	(41)	(27)	(157)	(34)
		353	51	36	20	92	39	27	56	32
		71%	**82%**	**92%**	**95%**	**78%**	**95%**	**100%**	**36%**	**94%**
You have obtained your certification as a pharmacy technician, through the Pharmacy Examining Board of Canada or a similar certification body.	(n=)	(503)	(62)	(40)	(21)	(119)	(41)	(27)	(159)	(34)
	yes	206	48	28	0	87	3	7	28	5
		41%	**77%**	**70%**	**0%**	**73%**	**7%**	**26%**	**18%**	**15%**
Base: All respondents, excluding P.E.I. because data available for fewer than ten respondents.										
You are planning to become a PEBC certified pharmacy technician, eligible for registration as a pharmacy technician.	(n=)	(293)	(14)	(11)	(20)	(32)	(38)	(20)	(129)	(29)
	no	123	5	2	11	6	11	6	70	12
		42%	**36%**	**18%**	**55%**	**19%**	**29%**	**30%**	**54%**	**41%**
	yes	170	9	9	9	26	27	14	59	17
		58%	**64%**	**82%**	**45%**	**81%**	**71%**	**70%**	**46%**	**59%**
Base: Respondents who are not PEBC certified										
You are aware that after Dec 31, 2018, the door to becoming a certified pharmacy technician will be closed.	(n=)	(123)	(5)	(2)	(11)	(6)	(11)	(6)	(70)	(12)
		50	5	1	10	5	9	4	6	10
		41%	**100%**	**50%**	**91%**	**83%**	**82%**	**67%**	**9%**	**83%**
You are aware that, in provinces that have implemented technician regulation, the title of 'Pharmacy Technician' will be restricted to registered pharmacy technicians.	(n=)	(122)	(5)	(2)	(11)	(5)	(11)	(6)	(70)	(12)
		61	5	2	11	5	11	6	10	11
		50%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**14%**	**92%**
You are aware that in provinces that have implemented technician regulation, registration as a Pharmacy Technician will be a requirement for 'Pharmacy Technician' positions.	(n=)	(123)	(5)	(2)	(11)	(6)	(11)	(6)	(70)	(12)
		62	5	2	9	6	9	6	15	10
		50%	**100%**	**100%**	**82%**	**100%**	**82%**	**100%**	**21%**	**83%**
Base: Respondents who are not planning to become PEBC certified										
You are working in a province where technician regulation has already occurred.	(n=)	(499)	(62)	(39)	(21)	(118)	(41)	(27)	(157)	(34)
		257	60	33	11	109	21	0	18	5
		52%	**97%**	**85%**	**52%**	**92%**	**51%**	**0%**	**11%**	**15%**
Base: All respondents, excluding P.E.I. because data available for fewer than ten respondents.										
There have been changes at your job site regarding your job description and/or labour agreement classification, that reflect the regulated status of pharmacy technicians.	(n=)	(233)	(60)	(33)	(10)	(109)	(21)			
		101	41	12	3	44	1			
		43%	**68%**	**36%**	**30%**	**40%**	**5%**			
Your hospital has provided opportunities for an advanced, specialized pharmacy technician roles.	(n=)	(233)	(60)	(33)	(11)	(108)	(21)			
		108	29	15	3	50	11			
		46%	**48%**	**45%**	**27%**	**46%**	**52%**			
There have been changes in your compensation to reflect changes in job descriptions and/or labour agreement classifications.	(n=)	(233)	(60)	(33)	(11)	(108)	(21)			
		71	52	0	0	19	0			
		30%	**87%**	**0%**	**0%**	**18%**	**0%**			

Base: Respondents from provinces with legislation in place as of March 31, 2014

- Similar to findings in the survey of pharmacy directors (see Chapter F), there appeared to be some confusion among pharmacy technicians as to whether pharmacy technician regulation was in place within their respective provinces. Almost half of respondents from Manitoba (48%, 10/21) and Nova Scotia (49%, 20/41) indicated that they were not working in a province with regulation, even though legislation is in place in both of these provinces. Conversely, some respondents from QC (11%, 18/157) and New Brunswick (15%, 5/34) indicated that pharmacy technicians were regulated in their province, even though no legislation is in place.

There was some confusion among pharmacy technicians as to whether regulation of their profession was in place within their respective provinces.

Respondents' General Comments

Of the 515 pharmacy technicians who completed the survey, 148 provided comments in response to an open-ended request at the end of the survey. Given the wide variety of comments received, it was difficult to summarize this content, but careful review revealed three key themes: duties and responsibilities, labour relations and financial concerns.

Duties and Responsibilities

- Many respondents felt that the change to regulation of pharmacy technicians did not fundamentally change their duties and responsibilities, and they questioned the need for the additional training and costs associated with the change. Nonetheless, 43% (101/233) of respondents who worked in a province with regulation indicated that there had been changes in job descriptions and/or labour agreement classifications, and 46% (108/233) indicated that there were opportunities at their institutions for advanced or specialized technician roles (Table K-3).

- Some respondents had another perspective, indicating that the introduction of pharmacy technician regulation had given them more opportunities to use their knowledge and skills in expanded roles.

Labour Relations

- Many respondents suggested that, with the change in regulatory status of pharmacy technicians, either they were in the wrong union (i.e., would need to move to a professional union from their existing technical union) or their union did not understand their needs as a professional group.

- Just under 10% of the respondents who provided general comments indicated a belief that a person's status as a pharmacy technician should be grandfathered on the basis of previous experience.

Financial Concerns

- About one-quarter of the respondents who provided general comments mentioned compensation. Almost universally, they noted either that their current compensation was inadequate if there were new responsibilities associated with regulation or that their compensation would not be increased when regulation was introduced. This sentiment is consistent with responses to the question about changes in compensation to reflect changes in job description (Table K-3): only 30% (71/233) of respondents, all of them from BC or ON, indicated that compensation changes had occurred.

There was a general concern that no compensation increases will be associated with new responsibilities for pharmacy technicians.

- Many respondents were concerned about the costs associated with completing certification, and some were concerned about the lack of financial support from their employers.

Overall, the majority of respondents' comments reflected negative views about the process for regulating pharmacy technicians in each province. Underlying many of these negative comments was a general feeling that pharmacy technicians themselves do not have any control over the changes occurring within their role and working environments; in other words, all of these changes are being made for them, not with them. It is important for pharmacy directors to appreciate the existence of these strong sentiments within the pharmacy technician community and to take them into consideration when introducing practice change.

Appendix I - List of Tables and Figures

Chapter E - CSHP 2015

Chapter F - Pharmacy Technicians

Chapter G - Future Trends in Pharmacy Practice

Chapter H - Evaluation of Pharmacy Services

Chapter I - Pediatric Pharmacy Services

Chapter J - Front-Line Pharmacists Survey

Chapter K – Front-Line Pharmacy Technicians Survey

Appendices

Recognition List

We wish to recognize all of the healthcare facilities in the list below for their willingness to contribute to the success of the 2013/14 Hospital Pharmacy in Canada Survey. Respondents from hospitals that appear in this list participated, or attempted to participate, in the survey by submitting data from their respective facility on or before August 1, 2014. Please note that some data from some respondents were not included in the analysis if the data provided were incomplete, insufficient or inconsistent with answers given to previous questions.

Revised October 2015

Hospitals 50-200 beds

Bethesda Hospital, Steinbach, MB
Brockville General Hospital, Brockville, ON
Campbell River Hospital, Campbell River, BC
Children's Hospital of Eastern Ontario, Ottawa, ON*
Colchester East Hants Health Authority, Truro, NS
Concordia Hospital, Winnipeg, MB
Cornwall Community Hospital, Cornwall, ON
CSSS du Coeur de l'Ile, Montréal, QC
CSSS Maria-Chapdelaine, Dolbeau-Mistassini, QC
CSSS Rocher Percé, Chandler, QC
Cumberland Regional Health Authority, Amherst, NS
Cypress Regional Hospital, Swift Current, SK
Dartmouth General Hospital, Dartmouth, NS
Dauphin General Hospital, Dauphin, MB
Delta Hospital, Delta, BC
Guelph General Hospital, Guelph, ON
Guysborough Antigonish Strait Health Authority, Antigonish, NS
Hôpital de Montréal pour enfants, Montréal, QC*
Hôpital Fleury, Montréal, QC
Huron Perth Healthcare Alliance, Stratford, ON
Institut de cardiologie de Montréal, Montréal, QC*
Lake of the Woods District Hospital, Kenora, ON
Leduc Community Hospital, Leduc, AB
Lloydminster Hospital, Lloydminster, SK
Miramichi Regional Hospital, Miramichi, NB*
Moose Jaw Union Hospital, Moose Jaw, SK
Muskoka Algonquin Health Care, Huntsville Bracebridge, ON
Norfolk General Hospital, Simcoe, ON
Northern Lights Regional Health Centre, Fort McMurray, AB
Pictou County Health Authority, New Glasgow, NS
Prince County Hospital, Summerside, PE
Richmond General Hospital, Richmond, BC
Selkirk & District General Hospital, Selkirk, MB
South West Nova Health Authority, Yarmouth, NS
Stanton Territorial Hospital, Yellowknife, NT
Stollery Children's Hospitals, Edmonton, AB*
Sturgeon Community Hospital, St. Albert, AB
The Scarborough Hospital, Birchmount Campus, Scarborough, ON
Thompson General Hospital, Thompson, MB
Timmins & District Hospital, Timmins, ON
Vernon Jubilee Hospital, Vernon, BC
Victoria General Hospital, Winnipeg, MB
Victoria Hospital, PAPHR, Prince Albert, SK
Wetaskiwin Hospital & Care Center, Wetaskiwin, AB
Whitehorse General Hospital, Whitehorse, YK
Woodstock General Hospital, Woodstock, ON
Yorkton Regional Health Center, Yorkton, SK

Hospitals 201-500 beds

Boundary Trails Health Center, Winkler, MB
Brandon Regional Hospital, Brandon, MB
Brant Community Healthcare System, Brantford, ON
Burnaby Hospital, Burnaby, BC
Campbellton Regional Hospital, Campbellton, NB
Centre hospitalier St. Mary's, Montréal, QC
Centre Hospitalier Universitaire Dr Georges-L-Dumont, Moncton, NB
Centre hospitalier universitaire Sainte-Justine, Montréal, QC*
Chatham Kent Health Alliance, Chatham, ON
Children's Women's Health Centre of BC, Vancouver, BC*
Chilliwack Hospital / Fraser Canyon Hospital, Chilliwack, BC
Cowichan District Hospital, Duncan, BC
CSSS Beauce, Beauceville, QC
CSSS de Charlevoix, La Malbaie, QC
CSSS de la région de Thetford, Thetford Mines, QC
CSSS de Papineau, Gatineau, QC
CSSS des Aurores-Boréales, La Sarre, QC
CSSS Lac-Saint-Jean-Est, Alma, QC
CSSS l'Ouest-de-l'Île, Pointe Claire, QC
CSSS Montmagny-L'Islet, Montmagny, QC
CSSS Rimouski-Neigette, Rimouski, QC
CSSS Rivière-du-Loup, Rivière-du-Loup, QC
CSSS Sept-Iles, Sept-Iles, QC
CSSS Sorel-Tracy, Sorel-Tracy, QC
Dr Everett Chalmers Hospital, Fredericton, NB
Eagle Ridge Hospital, Port Moody, BC
Edmundston Regional Hospital, Edmundston, NB
Grace Hospital, Winnipeg, MB
Grey Bruce Health Services, Owen Sound, ON
Grey Nuns Community Hospital, Edmonton, AB*
Hôpital général de Montréal, Montréal, QC*
Hôpital Laval, Sainte-Foy, QC*
Hôpital Royal-Victoria, Montréal, QC*
Hôpital Santa Cabrini, Montréal, QC

continued

**** Teaching Hospitals (ACAHO)***

Hospitals 201-500 beds (continued)

Hôtel-Dieu de Lévis, Lévis, QC
IWK Health Centre, Halifax, NS*
Kingston General Hospital, Kingston, ON*
Kootenay Boundary Regional Hospital, Trail, BC
Langley Memorial Hospital, Langley, BC
Lethbridge Regional Hospital, Lethbridge, AB
Mackenzie Health, Richmond Hill, ON
Markham-Stouffville Hospital, Markham, ON
Medicine Hat Regional Hospital, Medicine Hat, AB
Misericordia Community Hospital, Edmonton, AB*
Montfort Hospital, Ottawa, ON*
Mount Sinai Hospital, Toronto, ON*
North Bay Regional Health Centre, North Bay, ON
North York General Hospital, Toronto, ON
Peace Arch Hospital, FHA, White Rock, BC
Penticton Regional Hospital / South Okanagan Hospital, Penticton, BC
Peterborough Regional Health Centre, Peterbrough, ON
Queen Elizabeth Hospital, Charlottetown, PE
Queen's Park Care Centre, New Westminster, BC
Quinte Healthcare Corporation, Belleville, ON
Red Deer Regional Hospital, Red Deer, AB
Ridge Meadows Hospital, Maple Ridge, BC
Rouge Valley Health, Centenary, Ajax & Pickering, Toronto, ON
Royal Columbian Hospital, New Westminster, BC
Royal Inland Hospital, Kamloops, BC
Royal Jubilee Hospital & Victoria General Hospital, Victoria, BC
Royal Victoria Regional Health Centre, Barrie, ON
Saanich Peninsula Hospital, Victoria, BC
Saint John Regional Hospital, Saint John, NB*
Sault Area Hospital, Sault Ste Marie, ON
Seven Oaks General Hospital, Winnipeg, MB
Southern Health-Santé Sud, Portage la Prairie, MB
SouthLake Regional Health Centre, Newmarket, ON
St. Joseph's Hospital, Comox, BC
St. Michael's Hospital, Toronto, ON*
The Credit Valley Hospital, Mississauga, ON
The Hospital for Sick Children, Toronto, ON*
The Moncton Hospital, Moncton, NB*
The Scarborough Hospital, General Campus, Scarborough, ON
Toronto East General Hospital, Toronto, ON
Toronto General Hospital (UHN), Toronto, ON*
Toronto Western Hospital (UHN), Toronto, ON*
University Hospital of Northern BC, Prince George, BC
William Osler - Etobicoke General Hospital, Etobicoke, ON

Hospitals 500+ beds

Abbotsford Regional Hospital/ Mission Memorial Hospital, Abbotsford, BC
Calgary Zone Pharmacy Services, Alberta Health Services, Calgary, AB*
Cape Breton District Health Authority, Sydney, NS
CH de l'Université de Montréal, Montréal, QC*
CH universitaire de Sherbrooke, Sherbrooke, QC*
CHU de Québec, Québec, QC*
CSSS Chicoutimi, Chicoutimi, QC
CSSS Drummond, Drummondville, QC
CSSS Gatineau, Gatineau, QC
CSSS Haut Richelieu / Rouville, St Jean sur Richelieu, QC
CSSS Jardins-Roussillon, Châteauguay, QC
CSSS Lac-Des-Deux-Montagnes, Saint-Eustache, QC
CSSS Lasalle et du Vieux Lachine, LaSalle, QC
CSSS Laval, Laval, QC
CSSS l'Énergie, Shawinigan, QC
CSSS Pierre-Boucher, Longueuil, QC
CSSS Richelieu-Yamaska, Saint-Hyacinthe, QC
CSSS Sud De Lanaudiére, Terrebonne, QC
CSSS Sud-Ouest-Verdun, Montréal, QC
Grand River Hospital, Kitchener, ON
Hamilton Health Sciences Corporation, Hamilton, ON*
Hôpital Charles-LeMoyne, Greenfield Park, QC
Hôpital du Sacré-Coeur de Montréal, Montréal, QC*
Hôpital général juif Sir Mortimer B. Davis, Montréal, QC*
Hôpital Maisonneuve-Rosemont, Montréal, QC*
Kelowna General Hospital, Kelowna, BC
Lions Gate Hospital, North Vancouver, BC
London Health Sciences Centre, London, ON*
Mississauga Hospital & Queensway Health, Mississauga, ON
Niagara Health System, St. Catharines, ON
Providence Health Care, Vancouver, BC*
Queen Elizabeth II Health Sciences Centre, Halifax, NS*
Regina Qu'Appelle Health Region, Regina, SK*
Royal Alexandra Hospital, Edmonton, AB*
Saskatoon Health Region, Saskatoon, SK*
St. Boniface Hospital, Winnipeg, MB*
St. Joseph's Health Care Hamilton, Hamilton, ON*
Surrey Memorial Hospital, Surrey, BC
The Ottawa Hospital, Ottawa, ON*
University of Alberta Hospital & Mazankowski Heart, Edmonton, AB*
Vancouver General Hospital, Vancouver, BC*
Western Health Authority, Corner Brook, NL
William Osler - Brampton Civic Hospital, Brampton, ON
Windsor Regional Hospital, Windsor, ON
Winnipeg Health Sciences Centre, Winnipeg, MB*

**** Teaching Hospitals (ACAHO)***

Appendix III - Key Ratios

The key ratios tabulated below can be used to carry out a high level comparison of a participating pharmacy department to those in similar hospitals across Canada, specifically for comparing pharmacy staffing, inventory turnover rates, and acute/non-acute drug costs. The ratios represent the mean of the results for the hospitals in each subgroup and are provided by hospital size and teaching status to allow pharmacy managers to compare their department to their closest peer group. Details on how the ratios have been calculated for a participating hospital that has provided sufficient data can be found in a pdf document that can be requested by the pharmacy manager at each participating hospital (by sending an e-mail to the Research Analyst, paul@pdora.com , with the subject line: 'Request for respondent questionnaire'). This pdf document also contains not only the hospital's key ratios, but also the benchmarking ratios (if applicable) and the hospital's responses to each survey question.

Please note that facility-specific data are only available to the participating hospital.

2013/14 KEY RATIOS				Adult Hospitals					
					Bed Size			Teaching Status	
	Participating Facility's Ratio	All Hospitals	Pediatric Hospitals	All Adult Hospitals	50-200	201-500	>500	Teaching Hospitals	Non-teaching Hospitals
Inpatient budgeted hours per acute inpatient day	(n=)	(154)	(5)	(149)	(41)	(69)	(39)	(31)	(118)
		0.89	**1.70**	**0.86**	**081**	**0.89**	**0.85**	**0.96**	**0.83**
Inpatient budgeted hours per total (acute + non-acute) inpatient day	(n=)	(147)	(5)	(142)	(39)	(67)	(36)	(30)	(112)
		0.65	**1.71**	**0.62**	**0.65**	**0.61**	**0.59**	**0.85**	**0.55**
Total (inpatient + outpatient) budgeted hours per acute inpatient day	(n=)	(154)	(5)	(149)	(41)	(69)	(39)	(31)	(118)
		0.98	**1.77**	**0.95**	**0.87**	**0.98**	**1.00**	**1.07**	**0.92**
Total (inpatient + outpatient) budgeted hours per total (acute + non-acute) inpatient day	(n=)	(147)	(5)	(142)	(39)	(67)	(36)	(30)	(112)
		0.71	**1.71**	**0.68**	**0.69**	**0.67**	**0.69**	**0.95**	**0.61**
Inpatient technician + assistant FTE / inpatient pharmacist FTE (weighted)	(n=)	(162)	(6)	(156)	(43)	(72)	(41)	(33)	(123)
		1.6	**1.2**	**1.7**	**1.8**	**1.6**	**1.5**	**1.3**	**1.8**
Pharmacist vacancy rate (weighted)	(n=)	-	-	(156)	(43)	(72)	(41)	(33)	(123)
		-	**-**	**5.1**	**7.9**	**4.7**	**5.0**	**3.9**	**6.5**
Inventory turnover rate	(n=)	(144)	(5)	(139)	(36)	(65)	(38)	(33)	(106)
		9.8	**9.5**	**9.8**	**7.2**	**9.9**	**12.2**	**11.7**	**9.2**
Drug costs per acute day	(n=)	(144)	(5)	(139)	-	-	-	-	(106)
		$36.90	**$69.47**	**$35.73**	**-**	**-**	**-**	**-**	**$33.46**

Notes