Executive Summary

Hospital Pharmacy in Canada Survey Report 2020/21

HOSPITAL PHARMACY IN CANADA SURVEY BOARD

2020/21 Hospital Pharmacy in Canada Survey

The *Hospital Pharmacy in Canada 2020/21 Survey Report* provides an important snapshot of the state of pharmacy services in hospitals across the country. This report is the 22nd Edition of the survey report and carries on the tradition of documenting current statistics and analyzing longer-term trends in hospital pharmacies in Canada.

The report looks at how hospital pharmacy is evolving, from the expansion in clinical responsibilities of pharmacy personnel to the uptake of technologies and challenges in human resources.

The report includes analysis of key results, benchmarking for metrics such as staffing ratios, and charts progress against key performance indicators, making it a useful tool for planning, budgeting and internal advocacy.

The COVID-19 pandemic has underscored the importance of pharmacy and its links with services, care, education, research and management. The report offers an overview of how pharmacy responded.

Methodology and Demographics

The 22nd edition of the *CSHP Hospital Pharmacy in Canada Survey* is a descriptive cross-sectional study intended to build a profile of hospital pharmacy practice in Canada between April 1, 2020, and March 31, 2021. Data was collected between July and September 2022, through a third party using the Qualtrics software tool.

Detailed questions touching on every aspect of the work of pharmacy personnel were sent to 228 hospitals with 50 or more acute care beds; 144 responded, representing the full range of institutional sizes. Thirty-three respondents held academic teaching status, 106 were non-teaching and five were pediatric hospitals. Respondents provided data on pharmacy related activities for a total of 42,578 acute care beds (1,375 of which were in pediatric hospitals), with an average of 296 acute care beds per respondent and 28,153 non-acute care beds (41 of which were in pediatric hospitals), with an average of 279 non-acute care beds/respondent for those respondents reporting non-acute care beds in their facility.

While the response rate of 63% was lower than in 2016/17 (83%), given the demands of COVID-19 on all hospitals across Canada the rate is sufficient to consider the findings representative of the state of Canadian hospital pharmacy services in 2020/21.

Not all jurisdictions were in a position to respond. Alberta, which has a single health authority, did not participate because it was in the middle of implementing a province-wide standardized clinical information system. No facilities in the Yukon submitted data. In previous reports, Yukon data was included with data from British Columbia.

A variety of factors are considered to have affected response rates. The total number of institutions responding from Quebec was lower for this survey than for the previous (36 vs. 43) but the total number of acute care beds covered was similar (14,078 vs. 14,188), which likely reflects a reorganization of healthcare delivery in the province. In other cases, multiple hospital pharmacies operated under one pharmacy service. As a result, 29% of respondents reported data for more than one facility.

The average occupancy rate for acute care beds was 81%, with the highest rate in the Atlantic region (Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland and Labrador) at 90% and the lowest in Québec at 74%. The average occupancy rate for non-acute care beds was 79% with the highest rate in British Columbia (85%) and the lowest in the Prairies region (Saskatchewan and Manitoba combined) at 56%. The average acute care inpatient length of stay was 6.9 days.

Fifteen percent of respondents reported their institution owning and operating a community/retail pharmacy on the premises.

Clinical Pharmacy Practice

Despite differences in administrative and regulatory regimes from province to province, the survey results show growth in clinical practice across Canada and include a much-expanded roster of clinical practices.

Since the last report in 2016/17, more provincial legislation has been put in place allowing pharmacists to prescribe, modify and extend prescriptions for drugs. However, since scopes of practice for all healthcare professionals are set out in provincial legislation, the result has been varying changes across the country.

Structured patient care programs

Formal assignment of a pharmacist to a patient care program is a good indicator of a reasonable level of clinical pharmacy support. The survey found that the average facility provided formal pharmacist involvement in 18 structured patient care programs out of a potential list of 38.

The survey found 84% of respondents reported that a pharmacist was assigned to at least one outpatient care program. The national average was 3.4 programs with pharmacist support, the most common being the emergency and oncology departments. However only 38% reported a pharmacist assigned to the emergency department, despite this being the critical entry point for most patients admitted to hospital.

The national average of *inpatient care programs* with pharmacy support was 9.8. At least 95% reported offering at least one program with pharmacy support, similar to the results in 2016/17.

Pharmacy practice models

Pharmacy practice models describe how pharmacy department resources are used to provide patient care services. Depending on the institution and the services offered, a pharmacy department may use more than one practice model, for example, where one pharmacist works in an antimicrobial stewardship role and others share decentralized clinical and distributive activities.

The most common model (73% of respondents) saw pharmacists working in “mostly clinical activities with limited distributive activities,” followed by “similar amounts of distributive and decentralized clinical activities” (54%). Only 38% reported employing pharmacists in “only distributive activities.”

One factor affecting the pharmacy practice models is the increase in regulated pharmacy technicians with licensed scopes of practice. The report provides the first detailed look at how regulated pharmacy technicians and nonregulated pharmacy assistants have been integrated into pharmacy teams and the range of tasks they are taking on, freeing up pharmacists for more clinical, patient care services.

While the extent of clinical care provided by hospital pharmacists continues to grow, questions about specific clinical pharmacy activities found fewer pharmacists performing many activities than in the 2016/17 Report. For example, only 81% reported that pharmacists were involved in identifying, developing, reviewing or approving new medication order sets, down from 91% in 2016/17. Only 62% reported that inpatient pharmacists could work to their full scope of practice, as defined by legislation in their province or territory.

Key performance indicators

The survey also reports on progress responding to the set of eight core clinical pharmacy key performance indicators developed by the Canadian cpKPI Collaborative.

Overall, implementation of cpKPIs that align with Accreditation Canada's Required Organizational Practices (ROPs) appear to be improving. For example, 47% reported collecting data on the proportion of patients who received documented medication reconciliation at discharge, compared to 38% in 2016/17. However, those that are either indirectly associated with the ROPs or that can be performed by healthcare professionals outside of pharmacy have shown little improvement or even declined. There was however a substantial drop in the proportion of patients for whom a pharmacist participated in inter-professional patient care rounds to improve medication management, from 38% in 2016/17 to only 29% in 2020/21.

Drug Distribution Systems

Drug distribution systems have formed the core of pharmacy departments for many years. Over time, distribution systems have evolved to enhance patient safety, create efficiencies, and improve patient outcomes. Distribution practices continue to evolve with the introduction of new standards, adoption and implementation of new technologies and the integration of regulated pharmacy technicians into patient care teams.

The report looks at the rates of use of different types of drug distribution systems, approaches to order entry and verification, availability of pharmacy staff, sterile compounding practices, the storage and handling of medications, traceability of medications and drug purchasing practices.

Inpatient drug distribution systems

Previous reports have documented the transition from traditional dispensing systems to unit-dose systems for inpatient drug distribution. In this survey, 77% of respondents reported using centralized unit-dose systems where unit-dose medications are dispensed from a central pharmacy. Decentralized unit-dose systems, where unit-dose medications are provided from automated dispensing cabinets (ADCs) located in patient care areas, were used by 62% of respondents. These two approaches are the primary drug distribution systems for the vast majority of Canadian acute care beds with 66% of beds being primarily serviced using unit-dose medications dispensed from a central pharmacy and 26.8% of beds serviced through unit-dose medications provided from ADCs.

Use of older, traditional systems remains stable. For example, labelling and dispensing drugs in multi-dose formats was reported by 21% of respondents in 2020/21 and 19% in 2016/17. Storing medications on patient care units in bulk was reported by 18%, the same as in 2016/17.

Automation

The use of pharmacy robotic automation, in which a robotic arm selects the correct drug from racks holding pre-packaged unit-dose medications, has grown from 12% in 2016/17 to 20% in 2020/21. Automated dispensing cabinets were reported by 89% of respondents, compared with 71% in 2013/14 and 80% in 2016/17. The emergency department remains by far the most common location for ADCs.

Medication order entry

Traditionally, pharmacy personnel transcribed written medication orders into a pharmacy information system (PIS). However, with the adoption of computerized provider order entry (CPOE) and electronic health records (EHR), the options for data entry into the PIS have expanded. Transcription of prescribers' orders by pharmacists remained the dominant method of documenting in a Pharmacy Information System (PIS) (72%), with 44% of respondents indicating that order entry into a PIS was completed by pharmacy technicians.

After-hours medication review

The Health Standards Organization standards, which are used by Accreditation Canada, suggest that medication orders be reviewed by a pharmacist before administration. However, most Canadian hospital pharmacy departments are not open 24/7 and only a small fraction of respondents reported an ability to conduct after hours medication order reviews. Unfortunately, this finding is consistent with the findings of previous surveys suggesting that little progress has been made on this aspect of care and significant work is still required in order to ensure better outcomes for patients.

Parenteral admixture services

The number of respondents indicating that they provide or support inpatient parenteral admixture services for their organization was 92%, up only marginally from 2016/17.

Non-hazardous sterile compounding services

Most respondents reported that their pharmacy department was completely accountable for or was the primary source of compounded sterile products. The survey asked about compliance with NAPRA standards and responses showed progress in most areas. Quality assurance processes are an important part of the standards and 88% of respondents reported that they had programs in place for both personnel and product preparation processes.

Hazardous sterile compounding services

Most respondents indicated that hazardous sterile compounds are completely provided (53%) or primarily provided (39%) by the pharmacy department or organization. Larger hospitals generally reported higher rates of compliance with NAPRA or the OPQ standards for physical spaces and equipment used for hazardous sterile compounding than smaller hospitals. Eighty-one percent reported having a quality assurance program. Regionally, Québec continued to lead the nation with the highest compliance with compounding standards for both hazardous and non-hazardous sterile compounding.

Medical surveillance

Only 18% of respondents reported having a medical surveillance program for employees who handle cytotoxic/hazardous drugs. Regionally, BC had the highest rate at 59%.

Closed-system transfer devices

Nationally, 53% of respondents reported the use of closed-system transfer devices for all or some of their hazardous sterile compounding, with 32% of the total respondents reporting using these devices for all hazardous sterile products.

Traceability

The ability to track medications – which patient received which brand and lot of medication – is a standard of practice. Nationally, respondents were evenly split, with exactly half reporting that they had (or did not have) traceability of products. Most respondents used a manual process (68%), with more automated systems, such as barcoding within a hospital information system (28%) and stand-alone systems (18%), used less frequently.

Human Resources

Like other medical professionals, pharmacists and both regulated pharmacy technicians and non-regulated pharmacy assistants are in acute short supply.

The Canadian Institute for Health Information reports that the overall supply of pharmacists in all fields increased over the period from 2016 to 2020 (from 40,888 to 44,094) and that hospital pharmacy positions followed the same trend (from 5,471 to 6,163, respectively, excluding Québec). However, the number of new graduates from pharmacy programs in Canadian universities declined over the same period (from 1,328 to 1,255).

Typical hospital pharmacy department

While institution size, budgets, administrative structures, and regulatory differences affect the composition of individual pharmacy departments, the survey found that a typical department consists of an average of 16.9 full-time equivalent (FTE) pharmacists and 11.5 FTE advanced practice pharmacists. The average ratio of pharmacy technicians (regulated and non-regulated pharmacy assistants) to pharmacists was 1.45, similar to the results in 2016/17.

Staffing ratios

The report presents a variety of ratios for staffing, patient care programs, and drug costs that will be useful for pharmacy directors and managers looking to compare their staffing allocations with other similar-sized hospitals as well as teaching, non-teaching and pediatric facilities.

Four staffing ratios were calculated:

- total budgeted hours/acute patient day,
- inpatient budgeted hours/acute patient day,
- total (inpatient + outpatient) budgeted hours/total (acute + non-acute) patient day, and
- inpatient budgeted hours/total (acute + non-acute) patient day.

Overall, most staffing ratios have increased since 2007/08, indicating steady, continued growth in Canadian hospital pharmacy departments over the past 15 years. However, the increases seen from 2016/17 to 2020/21 appear to be proportionally more important compared to prior reports. This could be the result of the COVID-19 pandemic, which led to lower acute care bed occupancy rates in 2020/21.

The report also provides information on starting and top salaries for a variety of pharmacy department positions, broken down by region, institution size and type, e.g., teaching, pediatric or non-teaching. There was a noticeable gap between salaries of regulated pharmacy technicians and non-regulated pharmacy assistants.

Benchmarking

To better track progress on a variety of fronts, the report also provides a number of benchmarking ratios relevant to hospital pharmacy services. Data collected and published by CIHI are very limited with respect to hospital pharmacy practice and pharmacy directors have expressed the need for more detailed data to help with workforce planning. For those respondents who provided data, ratios for inpatient care programs are presented for paid hours per inpatient bed, per patient day and per inpatient admission. For outpatient care programs ratios are provided as staffing hours paid per 100 outpatient visits. Drug costs per inpatient bed, patient day and inpatient admission are also reported as provided by 43 respondents. Outpatient drug costs per outpatient visit are provided as per 44 respondents.

Pharmacy Technician Practice

The report documents for the first time the tasks performed by regulated pharmacy technicians and non-regulated pharmacy assistants separately; from creating initial inpatient therapy documentation to compounding. The results provide an important benchmark to measure future progress and will be useful to managers looking for opportunities to expand the role of the regulated pharmacy technician within their regulated scope of practice.

As of January 1, 2022, pharmacy technicians were regulated in nine provinces. Nearly half (4,861/9,960) were practising in hospital pharmacy. However, the scope of practice of regulated pharmacy technicians varies. The National Association of Pharmacy Regulatory Authorities (NAPRA) adopted the Pharmacy Technicians' Scope of Practice in Canadian Jurisdictions in December 2021.

Training pharmacy technical staff to perform many of the drug distribution-related duties of a pharmacy potentially leaves pharmacists available to provide a more robust clinical service within the inter-professional care team. A recent study suggested that expanding the use of pharmacy technicians in ward-based roles also has the potential to improve safety, for example through reducing omitted doses and preventing drug diversion and could help address persistent staffing issues by ensuring better use of nursing time.

This report reveals the extent of duties performed by pharmacy technical staff that were previously performed or supervised by pharmacists and describes how the role of regulated pharmacy technicians and non-regulated pharmacy assistants is evolving. The results suggest that non-regulated pharmacy assistants were focused more on clerical duties, while the focus of regulated pharmacy technicians is shifting to more advanced responsibilities.

The results also suggest that there are opportunities to use regulated pharmacy technicians for many functions that are currently performed by pharmacists but fall within the regulated pharmacy technicians' scope of practice. For example, collecting and collating information concerning each patient's pre-admission drug therapy, to support medication reconciliation at admission (e.g. best possible medication history (BPMH) (66%). Only 22% of respondents used pharmacy technical staff to collect data for drug utilization reviews, 17% to create initial inpatient drug therapy documentation and discharge drug therapy plans, only 9% to collect laboratory test results to support drug therapy evaluation, and only 3 % to calculate changes to parenteral nutrition therapy (3%).

The rates of performance of specific functions by regulated pharmacy technicians or non-regulated pharmacy assistants have remained stable over the past decade, except for increases in rates of filling unit-dose trays, preparing patient-specific IV admixtures and replenishing automated dispensing cabinets.

Technical staff checking the work of others has increased by up to 36 percentage points in the categories of traditional prescriptions for new orders and interim orders, patient-specific admixtures, chemotherapy, cardiac arrest trays, compounded extemporaneous products and most notably, the replenishment of automated cabinets.

Respondents indicated the impact of technologies on the workload of regulated pharmacy technicians and non-regulated pharmacy assistants.

The report includes a table showing which pharmacy personnel, i.e. pharmacist, regulated pharmacy technician or non-regulated pharmacy assistant perform various tasks, as reported by respondents.
There is also considerable regional disparity in the tasks regulated pharmacy technicians are asked to take on, which may be a reflection of regional differences in regulation, the availability of qualified candidates, or hospital size.

The report offers some observations and recommendations on steps needed to continue to move hospital pharmacy practice forward by ensuring the successful integration of regulated pharmacy technicians. For example, shortages of regulated pharmacy technicians need to be addressed, more training programs are needed, inconsistencies in education, training and certification requirements need to be reconciled, and some kind of workplace redesign may be needed to support the expanded roles for regulated pharmacy technicians.

Technology

Healthcare technology is advancing rapidly with the introduction of innovative devices and software with powerful processing and storage capacity. The range of equipment and systems available and the pace of change offer healthcare institutions and providers many options for improving safety, efficiency and accuracy while managing healthcare information and serving the needs of patients.

Technologies such as electronic health records, barcoding and CPOE can significantly increase safety and reduce the risk of error. In addition, the COVID-19 pandemic triggered many process changes including more extensive deployment of technologies to refine workflows. The report looks at the rates of utilization of various types of technology.

For example, pharmacy access to laboratory results and other electronic health record information has increased steadily, with 65% of respondents reporting an operational EHR. However, only 19% of respondents reported having an operational CPOE system, compared to 8% in 2009/10.

Barcode technology employed in high-risk areas, such as the emergency department and critical care units, can improve accountability, enhance control of the supply chain and set standards of care at a higher level of reliability. However, compared with its use within pharmacy, barcoded medication administration systems were less prevalent on patient care units.

A majority of respondents (approximately 60%) reported using newer technologies such as fluid transfer pumps in sterile compounding and scanning devices for a pharmacist to remotely manage medication orders.

Survey results indicate several areas where Canadian hospital pharmacies are adopting health IT: integrated EHR, smart pumps with wireless data exchange and regular updates of drug libraries, and barcoding for accuracy of medication preparation and stocking in pharmacies.

The Impact of the COVID-19 Pandemic on Hospital Pharmacy Services

The COVID-19 pandemic affected pharmacy services and the broader medication services in numerous ways. Consequently, hospital pharmacists took on a wide variety of professional activities typically offered by other healthcare professionals.

The report details the various ways hospital pharmacy responded, such as adapting the scope of practice of pharmacy staff, implementing remote and virtual work, expanding the use of technology, the planning and oversight of mass COVID-19 vaccination clinics, and providing critical care skills training for pharmacists. Responses reveal some very useful lessons for future pandemic planning.

The timing of the survey corresponded to the end of the third wave and the start of the fourth wave of hospital admissions, considered to be the “response” phase of emergency management when respondents would have been well aware of its impact on pharmacy operations and services.

Sixty-five percent of respondents reported having pharmacy staff work from home or remotely. The types of activities performed remotely align with the kind of tele-pharmacy services already available in some Canadian hospitals, such as order validation, medication reconciliation and clinical rounds. Decisions whether to support remote work may have depended on access to the necessary technology.

Demands for additional physical space and equipment during the pandemic are presented, in addition to the impact of drug shortages and subsequent inventory management strategies as reported by respondents.

Pharmacy departments struggled with clinical placements for students (only 17% offered remote clinical rotations), inventory management (90% increased their inventory to deal with potential drug shortages, creating storage issues), and increased demands for ICU patient care services (only 5% hired additional pharmacists to cover the ICU, whereas 44% reassigned pharmacists from other patient care areas, and 51% managed with pre-pandemic ICU staffing allocations).

Data was also collected on the impact of COVID-19 on pharmacy staffing. Sixty-three percent of respondents reported having to increase the number of acute care beds during the pandemic and subsequent challenges on pharmacy staffing for the additional beds.

Respondents were asked to rate their level of preparedness for another pandemic in terms of pharmacy operations, clinical pharmacy services, pharmacy education and administration/human resources. Average scores ranged from 5.9 to 6.9, with 1 being not at all prepared and 10 being fully prepared. A substantial proportion of pharmacy leaders did not feel their operations were ready to face the challenges associated with another pandemic.

Respondents were asked 3 questions, 1) What did you find most challenging in managing pharmacy services during the pandemic? 2) What went well in managing pharmacy services during the pandemic? 3) If you had to do it over again, what would you do differently? Themed responses are summarized in the report.

Small Hospitals

For the first time, this year's report includes the results of a new survey for hospitals with fewer than 50 acute care beds, in an effort to create a baseline of small hospital pharmacy practice in Canada. Of the 254 hospitals invited to participate in the survey, 59% (150) responded, providing important information on pharmacy service models, drug distribution systems, staffing, on-site hours of pharmacy services, on-site sterile compounding services (non-hazardous and hazardous), clinical pharmacy services, and the use of technologies.

Respondents represented a total of 3,120 acute care beds (average of 21 per respondent), and 2,485 non-acute care beds (average of 44 per respondent with non-acute care beds). The occupancy rate for acute care beds was an average of 58% and for non-acute care beds an average of 75%.

Almost two-thirds of respondents reported that pharmacy services were provided by an on-site hospital pharmacy. Half (52%) reported that an off-site hospital pharmacy provider was involved and only 11% reported the use of a remote telepharmacy service.

The drug distribution system used for acute care beds was evenly distributed between unit-dose centralized (35%), unit-dose decentralized (33%) and a combination of traditional and total wardstock systems (31%). The drug distribution system used for non-acute care beds was primarily unit-dose centralized system (46%), but traditional and total wardstock remained prominent, with a combined total of 27%.

Small hospitals are especially challenged in maintaining programs with a smaller staffing footprint and volume of activity. Respondents having on-site non-hazardous and hazardous sterile compounding services were 34% and 33% respectively.

Technology use was similar to large hospitals. Smart pumps were reported in use by 80% of respondents while barcoding use during drug preparation was 22% and drug dispensing 17%. Barcoding for medication administration to patients was very low (5%). Eleven percent of respondents reported operational computerized provider order entry (CPOE).

Thirty-seven percent of respondents reported collecting data on clinical pharmacy key performance indicators (cpKPIs).

Data on the average full-time equivalent (FTE) for pharmacists, pharmacy managers, pharmacy technician managers, regulated pharmacy technicians and non-regulated pharmacy assistants is presented.

There was a wide range of hours reported for a pharmacist and/or regulated pharmacy technician and/or non-regulated pharmacy assistant being on-site per week (0 to more than 101).

Small hospitals were also less likely to have formal inpatient or outpatient care programs with a pharmacist assigned. Only 18% reported pharmacist involvement in one or more formal inpatient patient care programs, and only 15% reported pharmacist involvement in one or more formal outpatient patient care programs.

Conclusion

CSHP works to advance the profession and improve patient outcomes through expertise and evidence. This report helps provide the means to create optimal outcomes for our patients, to support excellence in the profession and to achieve meaningful, lasting change in Canada's healthcare systems.

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