

Clinical Pharmacy Services

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Introduction

The profession of pharmacy continues to evolve in response to the changing needs of patients and the many developments that are occurring in the various areas of pharmacy practice. This section of the Hospital Pharmacy in Canada Survey is intended to describe and comment on the nature and evolution of a range of direct patient care pharmacy services and associated administrative activities (e.g. participation on the Pharmacy and Therapeutics Committee) that collectively represent the “clinical” contribution of the pharmacy department.

Since the publication of the 2003/04 survey, a number of reviews and commentaries have been published on the historical development and present status of clinical pharmacy practice. Of particular note, during 2006 the *Annals of Pharmacotherapy* published a series of articles that looked back at the vision for clinical pharmacy practice that a number of pharmacy leaders have promoted over the past 40 years. These articles provide an interesting look at the types of clinical services proposed since the 1960s, as well as the evolution of hospital pharmacy and clinical pharmacy practice around the world.

Since the last survey, the *American Society of Health-System Pharmacists* (ASHP) also published its “Vision 2015” in which it challenged not only pharmacists, but also healthcare organizations, to implement the pharmaceutical services that have been proven to maximize the benefits and minimize the risks of drug therapy¹. ASHP recommends that healthcare organizations begin by documenting baselines for each recommended clinical pharmacy service. The baseline, determined through a survey methodology, establishes the extent to which the organization has already implemented proven clinical pharmacy interventions. The organization is then challenged to achieve the implementation targets for each service that ASHP proposed in its Vision 2015 document. ASHP carries out a survey similar to our *Hospital Pharmacy in Canada Survey* that enables individual institutions and the profession as whole, to track its progress in achieving the Vision 2015 targets.

The Canadian Society of Hospital Pharmacists and APES (l’Association des Pharmaciens d’ tablissements de sant  du Qu bec) are in the process of developing similar initiatives. The ASHP Vision 2015 initiative, and similar ones underway in Canada, are based on a number of studies and systematic reviews that have attempted to identify those clinical pharmacy services that have been shown to have the greatest impact on patient outcomes. The work of researchers such as Bond^{2,3,4,5,6}, Kaboli⁷, Pickard⁸ and others provided the evidence on which ASHP and other organizations have evaluated and prioritized a wide variety of clinical pharmacy services.

For the 2005/06 Hospital Pharmacy in Canada Survey, the questions were designed to collect information that would help determine the extent of implementation of a variety of clinical pharmacy services in Canadian hospitals. In addition, this year’s survey asked pharmacy managers to indicate the priority that they assign to a number of clinical services. By evaluating that information we hoped to be able to assess how well our reported clinical priorities align with the evidence that supports their relative effectiveness. Finally we hoped to be able to comment on how well hospital pharmacies in Canada are positioned to achieve the future (2015) clinical practice targets that are being established by ASHP, CSHP and APES.

Staffing for Clinical Pharmacy

Beginning in the 1999/2000 survey, we included questions concerning the staffing allocated to a number of inpatient and outpatient clinical pharmacy services. Because a significant number of respondents were not able to provide the detailed breakdown of clinical staffing that we had requested in previous surveys, we did not request the information in this section of the survey. However, in the new benchmarking section of the survey, we asked pharmacy managers to provide clinical staffing information for a number of specific practice areas such as general medicine, surgery, critical care, emergency, and outpatient care. Please refer to that section of the survey for clinical staffing information.

Profile of Outpatient Clinical Pharmacy Services

- In this year's survey, 92% (130/142) of respondents indicated that they provided clinical pharmacy services to at least one of 17 outpatient practice areas included in this year's survey. This was an increase from the 71% (102/144) of respondents in 2003/04 who indicated that they provided outpatient clinical pharmacy services. However, this result must be interpreted cautiously, given the redesign of the clinical practice section of this year's survey and the inclusion of 17 practice areas in the 2005/06 survey versus 14 practice areas in the 2003/04 survey.
- The proportion of hospitals that reported they offered a particular outpatient program ranged from a low of 36% (51/142) for transplantation, to 93% (132/142) for emergency. Among the respondents who reported that a particular outpatient care program was offered in their facility, we identified four patient care areas where outpatient clinical pharmacy services were offered by more than 50% of those respondents. Those outpatient care program areas were hematology-oncology (80%, 94/118), renal/dialysis (63%, 57/90), emergency (54%, 71/132) and hematology-anticoagulation (52%, 51/99).
- Among the respondents who reported that they provided outpatient clinical pharmacy services, the proportion offering the service was usually higher for respondents with teaching affiliation or more than 500 beds. This was particularly true for the following clinical pharmacy services: hematology-oncology, renal-dialysis, hematology-anticoagulation, cardiovascular-lipid, infectious-disease/AIDS, transplantation and neurology.
- Regional differences were noted for outpatient clinical pharmacy services. The survey questionnaire does not capture the reasons that could explain those differences.

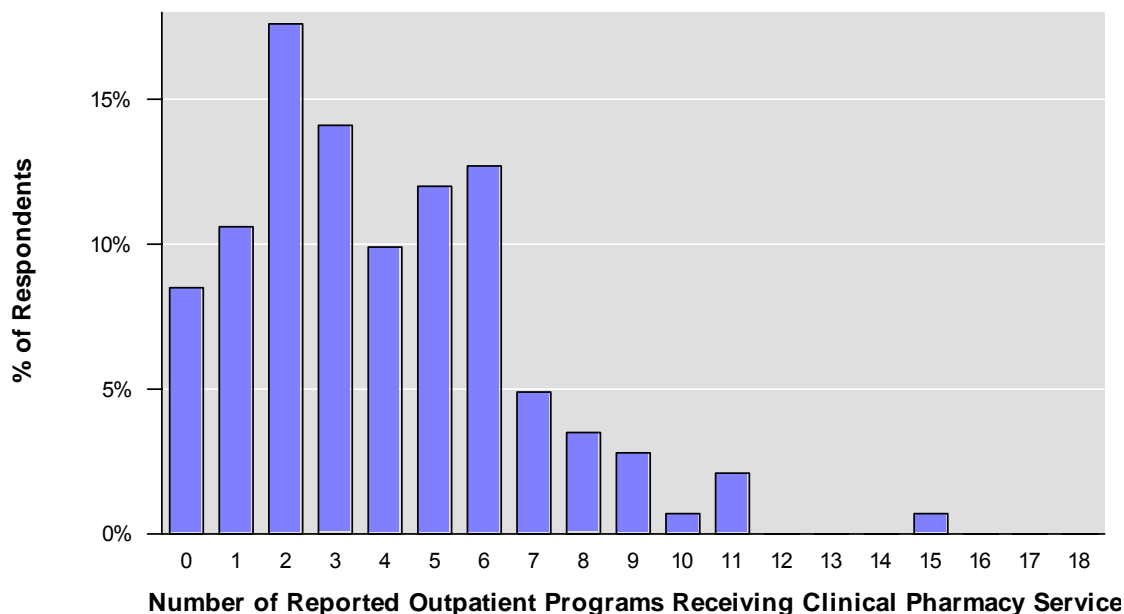
Table B-1 summarizes the profile of clinical pharmacy services for outpatient services in descending order, per bed size, teaching status and region.

Table B-1 Profile of Clinical Pharmacy Services for Outpatient 2005/06

	All	Bed Size			Teaching		Regions				
		100-200	201-500	> 500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)	(20)	(20)	(45)	(42)	(15)
Number of outpatient care programs											
Mean	11.6	9.2	11.6	13.5	13.2	11.0					
Std Dev	5.1	5.7	4.9	4.2	4.4	5.2					
Hematology-oncology											
service provided	118	20	65	33	32	86	17	14	32	40	15
pharmacists assigned	94	12	54	28	29	65	9	9	29	38	9
	80%	60%	83%	85%	91%	76%	53%	64%	91%	95%	60%
Renal / Dialysis											
service provided	90	10	50	30	29	61	10	10	27	32	11
pharmacists assigned	57	3	33	21	21	36	5	7	23	16	6
	63%	30%	66%	70%	72%	59%	50%	70%	85%	50%	55%
Emergency											
service provided	132	21	74	37	35	97	19	18	42	40	13
pharmacists assigned	71	6	43	22	18	53	10	9	30	21	1
	54%	29%	58%	59%	51%	55%	53%	50%	71%	53%	8%
Hematology/anticoagulation											
service provided	99	14	54	31	31	68	14	12	25	38	10
pharmacists assigned	51	3	30	18	16	35	8	7	13	19	4
	52%	21%	56%	58%	52%	51%	57%	58%	52%	50%	40%
Infectious Disease / AIDS											
service provided	92	15	49	28	31	61	11	13	25	31	12
pharmacists assigned	37	5	16	16	18	19	6	9	9	10	3
	40%	33%	33%	57%	58%	31%	55%	69%	36%	32%	25%
Diabetes											
service provided	118	20	65	33	31	87	16	12	36	39	15
pharmacists assigned	46	7	25	14	12	34	2	4	12	22	6
	39%	35%	38%	42%	39%	39%	13%	33%	33%	56%	40%
Cardiovascular / lipid											
service provided	99	15	56	28	30	69	13	14	25	36	11
pharmacists assigned	38	1	22	15	12	26	5	7	10	13	3
	38%	7%	39%	54%	40%	38%	38%	50%	40%	36%	27%
Transplantation											
service provided	51	6	26	19	24	27	10	6	12	17	6
pharmacists assigned	16	1	7	8	12	4	3	4	6	0	3
	31%	17%	27%	42%	50%	15%	30%	67%	50%	0%	50%
Mental Health											
service provided	110	13	62	35	31	79	14	14	33	38	11
pharmacists assigned	30	2	16	12	9	21	1	5	19	5	0
	27%	15%	26%	34%	29%	27%	7%	36%	58%	13%	0%
Geriatrics / LTC											
service provided	93	16	49	28	22	71	13	12	24	32	12
pharmacists assigned	24	5	11	8	5	19	1	8	7	6	2
	26%	31%	22%	29%	23%	27%	8%	67%	29%	19%	17%
Pain / palliative care											
service provided	102	21	51	30	27	75	15	11	26	38	12
pharmacists assigned	27	7	12	8	5	22	3	6	3	11	4
	26%	33%	24%	27%	19%	29%	20%	55%	12%	29%	33%
Asthma/Allergy											
service provided	102	18	54	30	30	72	15	12	25	39	11
pharmacists assigned	16	4	7	5	5	11	1	3	6	5	1
	16%	22%	13%	17%	17%	15%	7%	25%	24%	13%	9%
General Medicine											
service provided	93	14	52	27	31	62	14	9	23	36	11
pharmacists assigned	13	2	8	3	3	10	1	2	5	4	1
	14%	14%	15%	11%	10%	16%	7%	22%	22%	11%	9%
General Surgery											
service provided	105	14	60	31	32	73	16	9	31	37	12
pharmacists assigned	15	1	9	5	3	12	1	2	10	1	1
	14%	7%	15%	16%	9%	16%	6%	22%	32%	3%	8%
Neurology											
service provided	69	7	38	24	26	43	10	9	17	26	7
pharmacists assigned	9	0	5	4	4	5	1	3	2	2	1
	13%	0%	13%	17%	15%	12%	10%	33%	12%	8%	14%
Gynecology / Obstetrics											
service provided	90	12	49	29	25	65	12	11	21	35	11
pharmacists assigned	7	1	3	3	3	4	1	2	2	1	1
	8%	8%	6%	10%	12%	6%	8%	18%	10%	3%	9%
Rehabilitation											
service provided	86	13	47	26	22	64	14	9	25	29	9
pharmacists assigned	6	2	2	2	1	5	0	1	5	0	0
	7%	15%	4%	8%	5%	8%	0%	11%	20%	0%	0%

Figure B-1 illustrates the distribution of the number of outpatient clinical pharmacy services per respondent.

Figure B-1 Respondents Providing Outpatient Clinical Pharmacy Services 2005/06



Base: All respondents (142)

Profile of Inpatient Clinical Pharmacy Services

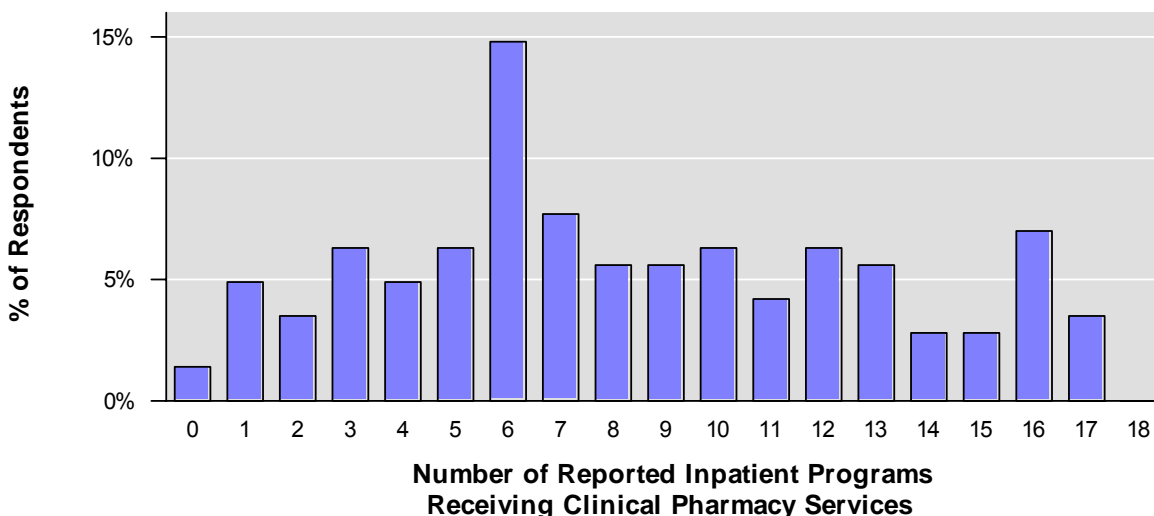
- There was an increase in the total number of respondents that reported at least one inpatient clinical pharmacy service from 69% (100/144) in 2003/04 to 99% (140/142). However, once again this result must be interpreted cautiously, given the redesign of the clinical practice section of this year's survey and the inclusion of 18 inpatient practice areas in the 2005/06 survey, versus 16 inpatient practice areas in the 2003/04 survey.
- The proportion of hospitals that reported they offered a particular inpatient program ranged from a low of 35% (49/142) for transplantation, to 96% (136/142) who provided general medicine services. Among the respondents who reported a specific inpatient care program offered in their facility, we identified eleven where more than 50% of the respondents provided clinical pharmacy services to that patient care program e.g. geriatric/long-term care (LTC) (83%, 100/120), adult critical care (79%, 103/131), hematology-oncology (78%, 91/116), general medicine (78%, 106/136), pain/palliative care (70%, 89/128), cardiovascular/lipid (68%, 81/120), mental health (63%, 80/126), general surgery (63%, 85/135), pediatric/neonatal care (56%, 51/91), renal/dialysis (51%, 46/90), and rehabilitation (50%, 53/105).
- Among the respondents who reported they offered inpatient clinical pharmacy services, the proportion for most clinical areas was higher for respondents from teaching facilities.
- Regional differences were noted for some inpatient clinical pharmacy services. The survey questionnaire does not capture the reasons that could explain those differences.
- Table B-2 summarizes the profile of clinical pharmacy services for inpatient services in descending order, per bed size, teaching status and regions.

Table B-2 Profile of Clinical Pharmacy Services for Inpatient 2005/06

	All	Bed Size			Teaching		Regions				
		100-200	201-500	> 500	Teaching	Non-teaching	BC	Prai	ON	QC	Atl
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)	(20)	(20)	(45)	(42)	(15)
Number of inpatient care programs											
Mean	14.1	11.9	14.3	15.4	14.6	13.9					
Std Dev	3.6	4.6	3.2	3.0	3.5	3.7					
Geriatrics / LTC											
service provided	120	20	68	32	28	92	17	13	39	37	14
pharmacists assigned	100	15	57	28	27	73	13	12	34	30	11
	83%	75%	84%	88%	96%	79%	76%	92%	87%	81%	79%
Adult Critical Care											
service provided	131	21	74	36	32	99	20	20	42	37	12
pharmacists assigned	103	13	57	33	31	72	18	19	39	20	7
	79%	62%	77%	92%	97%	73%	90%	95%	93%	54%	58%
Hematology-oncology											
service provided	116	19	64	33	30	86	16	15	34	39	12
pharmacists assigned	91	11	51	29	28	63	10	11	31	33	6
	78%	58%	80%	88%	93%	73%	63%	73%	91%	85%	50%
General Medicine											
service provided	136	24	77	35	35	101	19	19	43	41	14
pharmacists assigned	106	16	59	31	33	73	16	19	38	25	8
	78%	67%	77%	89%	94%	72%	84%	100	88%	61%	57%
Pain / palliative care											
service provided	128	24	70	34	33	95	18	15	42	38	15
pharmacists assigned	89	17	48	24	21	68	12	12	31	22	12
	70%	71%	69%	71%	64%	72%	67%	80%	74%	58%	80%
Cardiovascular / lipid											
service provided	120	21	66	33	34	86	15	18	40	36	11
pharmacists assigned	81	9	44	28	29	52	9	17	33	17	5
	68%	43%	67%	85%	85%	60%	60%	94%	83%	47%	45%
Mental Health											
service provided	126	17	74	35	34	92	19	17	40	36	14
pharmacists assigned	80	8	44	28	26	54	7	14	35	14	10
	63%	47%	59%	80%	76%	59%	37%	82%	88%	39%	71%
General Surgery											
service provided	135	22	76	37	36	99	19	19	43	41	13
pharmacists assigned	85	11	45	29	25	60	15	18	36	13	3
	63%	50%	59%	78%	69%	61%	79%	95%	84%	32%	23%
Pediatric / Neonatal Critical Care											
service provided	91	12	50	29	28	63	12	11	37	23	8
pharmacists assigned	51	3	26	22	25	26	4	8	30	8	1
	56%	25%	52%	76%	89%	41%	33%	73%	81%	35%	13%
Renal / Dialysis											
service provided	90	13	49	28	27	63	11	12	28	30	9
pharmacists assigned	46	3	24	19	17	29	4	7	20	11	4
	51%	23%	49%	68%	63%	46%	36%	58%	71%	37%	44%
Rehabilitation											
service provided	105	15	60	30	23	82	18	11	38	27	11
pharmacists assigned	53	6	29	18	12	41	5	6	30	7	5
	50%	40%	48%	60%	52%	50%	28%	55%	79%	26%	45%
Hematology/anticoagulation											
service provided	112	16	64	32	31	81	17	14	36	36	9
pharmacists assigned	52	5	31	16	13	39	8	9	19	13	3
	46%	31%	48%	50%	42%	48%	47%	64%	53%	36%	33%
Infectious Disease / AIDS											
service provided	106	19	58	29	30	76	15	13	32	34	12
pharmacists assigned	49	8	21	20	21	28	7	9	18	13	2
	46%	42%	36%	69%	70%	37%	47%	69%	56%	38%	17%
Transplantation											
service provided	49	5	24	20	25	24	9	7	15	15	3
pharmacists assigned	22	1	9	12	21	1	2	5	9	4	2
	45%	20%	38%	60%	84%	4%	22%	71%	60%	27%	67%
Gynecology / Obstetrics											
service provided	121	19	68	34	28	93	18	15	39	36	13
pharmacists assigned	52	8	27	17	16	36	8	4	29	7	4
	43%	42%	40%	50%	57%	39%	44%	27%	74%	19%	31%
Diabetes											
service provided	119	21	66	32	31	88	18	15	32	39	15
pharmacists assigned	49	9	24	16	10	39	5	12	17	12	3
	41%	43%	36%	50%	32%	44%	28%	80%	53%	31%	20%
Neurology											
service provided	91	14	49	28	28	63	13	12	31	26	9
pharmacists assigned	36	3	16	17	19	17	4	7	19	3	3
	40%	21%	33%	61%	68%	27%	31%	58%	61%	12%	33%
Asthma/Allergy											
service provided	109	18	60	31	29	80	15	13	32	39	10
pharmacists assigned	40	7	16	17	14	26	4	9	16	9	2
	37%	39%	27%	55%	48%	33%	27%	69%	50%	23%	20%

Figure B-2 illustrates the distribution of the number of inpatient clinical pharmacy services per respondent.

Figure B-2 Proportion of Respondents Providing Inpatient Clinical Pharmacy Services 2005/06



Base: All Respondents (142)

Clinical Practice Models

Over the past 15 to 20 years there has been an ongoing debate over the relative merits of the “traditional clinical pharmacy model” and the “pharmaceutical care model”. Nimmo and Holland have argued that the type of pharmacy service offered must be adapted to the needs of the patient⁹. This would cover a range of patients, from those who are capable of managing their own medication therapy, to patients who only need a pharmacist to inform them of the potential problems associated with a medication at the time it is dispensed, to those who require more extensive clinical services. Depending on the patient, clinical services might be delivered using a traditional clinical pharmacy model, or the pharmaceutical care model. The Nimmo Holland model suggests that pharmacy departments should tailor the type of clinical pharmacy services/model that they provide to each patient, based on the needs of the patient and the resources available for the department to deliver clinical services.

- There was an increase in the total number of respondents reporting the use of the pharmaceutical care model for the delivery of patient-oriented pharmacy services to inpatients, from 70% (101/144) in 2003/04 to 82% (116/142) in 2005/06. The increase occurred both in teaching and non teaching hospitals. The average reported percentage of inpatient beds serviced was 35%, compared to 30% of inpatient beds in 2003/04. For hospitals reporting the use of the pharmaceutical care model, the proportion is higher in teaching hospitals (95%, 35/37) vs non teaching hospitals (77%, 81/105) and also higher in hospitals with more than 500 beds (92%, 34/37) than in hospitals with 100-200 beds (59%, 16/27). No notable differences were apparent between hospitals with different drug distribution systems, or between the different regions of the country.
- The proportion of respondents reporting the use of the traditional clinical pharmacy services model for the delivery of patient-oriented pharmacy services to inpatients was very similar to the previous survey - 89% (127/142) in 2005/06 versus 88% (126/144) in 2003/04. The average reported percentage of inpatient beds serviced was 49% in 2005/06, compared to 53% in 2003/04.
- Only minor differences were noted between hospitals with different teaching status, bed size, drug distribution systems or between regions.

- The proportion of respondents reporting that some patients do not receive any patient-oriented clinical pharmacy services was very similar to the previous survey with 80% (114/142) in 2005/06 versus 81% (117/144) in 2003/04. The average reported percentage of inpatient beds not serviced was 34% (range 1-98; median 34) in 2005/06 versus 33% in 2003/04. Again, only minor differences were noted regarding teaching status, bed size and distribution systems. The survey did not capture the potential reasons (e.g. shortage, no needs, etc.) that explain the absence of clinical pharmacy services in a third of inpatient beds in hospitals.

The Canadian Council for Health Services Accreditation (CCHSA) is the organization that evaluates and accredits the services provided by most Canadian healthcare organizations. In 2005, CCHSA published a set of Required Organizational Practices (ROPs) that are intended to help insure the safety of patients under the care of a healthcare facility¹⁰.

One chapter in this document addresses the communication strategies that are required to insure continuity of care as patients move between different parts of the healthcare system. The facility must demonstrate that it has the following processes in place:

1. Patients and their families are informed of their role in insuring the safety of the patient, and are provided with verbal and/or written information concerning the care that the patient is receiving
 2. The facility has mechanisms in place to insure the transmission of patient information at critical points in care delivery, such as transitions between sectors of care (e.g. inpatient care, outpatient care, home care, etc.)
 3. The facility has verification processes in place for high-risk situations such as the receipt and communication of the results of critical lab tests, etc.
 4. The facility has a process in place for reconciling medications when the patient moves between sectors of care, and insuring that the information is communicated to the caregivers who will be assuming responsibility for the care of the patient
- Thirty-seven percent (53/142) of respondents indicated that their pharmacy department has established a policy for seamless pharmaceutical care in 2005/06, up from 28% (41/144) in 2003/04. For those respondents reporting the implementation of a seamless care policy, the proportion was higher in teaching hospitals (54%, 20/37) than in non teaching hospitals (33%, 33/105). The proportion who reported having a seamless care policy was the same (40%) in all regions of the country, except BC where only 20% (4/20) reported having one.
 - For hospitals reporting a seamless pharmaceutical care policy, the average percent of patients receiving seamless pharmaceutical was 24.4% (range of 5-100%, median 20%) in 2005/06, which was up from 21% in 2003/04.
 - For hospitals reporting a policy for seamless pharmaceutical care, the information was provided to community pharmacists (92%, 49/53), family physicians (83%, 37/53), long-term care facilities (70%, 37/53), home care providers (60%, 32/53) and others (23%, 12/53).
 - For hospitals reporting a policy for seamless pharmaceutical care, the information provided included: medications the patient is receiving at discharge (96%, 51/53), medications discontinued during stay (72%, 38/53), relevant drug monitoring parameters and lab values (60%, 32/53), care plan information (55%, 29/53), diagnosis (34%, 18/53) and other (21%, 11/53).

Table B-3 summarizes the clinical pharmacy services by clinical practice models.

Table B-3 Clinical Pharmacy Services - Clinical Practice Models 2005/06

	All	Bed Size			Teaching Status	
		100- 200	201- 500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
Pharmaceutical Care model	116	16	66	34	35	81
	82%	59%	85%	92%	95%	77%
Pharmaceutical care % of beds serviced (n=116)	34.6%	25.1%	35.9%	36.4%	50.6%	27.6%
Traditional clinical pharmacy services model	127	27	68	32	30	97
	89%	100%	87%	86%	81%	92%
Traditional clinical pharmacy services % of beds serviced (n= 127)	49.1%	45.2%	50.1%	50.3%	41.2%	51.5%
Some patients do not receive any clinical services	114	23	62	29	28	86
	80%	85%	79%	78%	76%	82%
No patient-oriented clinical services % of beds serviced (n= 114)	33.7%	46.8%	30.7%	29.4%	24.8%	36.6%
Established Policy for Seamless Pharmaceutical Care	53	10	26	17	20	33
	37%	37%	33%	46%	54%	31%
Percent of patients with information transferred (n= 53)	24%	25%	24%	24%	25%	24%
Information is provided to: (n=)	(53)	(10)	(26)	(17)	(20)	(33)
community pharmacists	92%	80%	96%	94%	100%	88%
family physicians	83%	80%	88%	76%	85%	82%
long-term care facilities	70%	70%	73%	65%	65%	73%
home care providers	60%	90%	46%	65%	55%	64%
Other	23%	40%	15%	24%	25%	21%
Information provided includes:						
medications at discharge	96%	90%	100%	94%	100%	94%
medications discontinued during stay	72%	80%	73%	65%	80%	67%
care plan information	55%	70%	46%	59%	65%	48%
relevant drug / monitoring parameter and lab values	60%	70%	54%	65%	70%	55%
diagnosis	34%	30%	23%	53%	45%	27%
other	21%	40%	12%	24%	10%	27%

Evaluation of Clinical Services

In Canada, there are a number of organizations that are involved in promoting the evaluation and improvement of healthcare services. These include CCHSA, regulatory authorities, and professional organizations such as the Canadian Society of Hospital Pharmacists. They encourage high standards of practice through the publication of practice guidelines and standards, professional directives, and continuing education.

- There was a small increase in the total number of respondents reporting the evaluation of the provision of direct patient care pharmacy services - 20% (29/142) in 2005/2006 versus 17% (25/144) in 2003/04.
- The evaluation of direct patient care pharmacy services was reported more often by respondents in teaching (32%, 12/37) and larger bed size hospitals (22%, 8/37) in more than 500 beds, 26%, (20/78) in 201-500 beds, versus 4% (1/27) in the 100-200 bed hospitals.

- For hospitals reporting the evaluation of the provision of direct patient care pharmacy services, four aspects of clinical practice were reported by respondents: documentation (76%, 22/29), implementation of objectives and monitoring plan (62%, 18/29), patient assessment (55%, 16/29) and patient counselling and understanding (34%, 10/29).
- Three methods for evaluation were reported by respondents: retrospective chart review (66%, 19/29), self-evaluation by pharmacists (41%, 12/29) and direct observation (34%, 10/29).
- For hospitals reporting the evaluation of the provision of direct patient care pharmacy services, the proportion of pharmacists who were evaluated was 61% (median 75%) in 2005/06 compared to 42% in 2003/04.

Table B-4 summarizes the evaluation of clinical pharmacy services.

Table B-4 Evaluation of Clinical Pharmacy Services 2005/06

	All	Bed Size			Teaching Status	
		100- 200	201- 500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
Evaluation of direct care services by auditing sample of clinical activities	29 20%	1 4%	20 26%	8 22%	12 32%	17 16%
Evaluation is done by: (n=)	(29)	(1)	(20)	(8)	(12)	(17)
pharmacy managers	12 41%	0 0%	9 45%	3 38%	5 42%	7 41%
pharmacy practice leaders	18 62%	0 0%	14 70%	4 50%	8 67%	10 59%
peers (e.g.. other pharmacists)	13 45%	0 0%	9 45%	4 50%	7 58%	6 35%
Method for evaluation:						
chart review – retrospective	19 66%	0 0%	16 80%	3 38%	10 83%	9 53%
direct observation	10 34%	0 0%	7 35%	3 38%	6 50%	4 24%
self-evaluation by pharmacists	12 41%	1 100%	7 35%	4 50%	6 50%	6 35%
other	11 38%	0 0%	7 35%	4 50%	3 25%	8 47%
Evaluated aspects of clinical practice:						
patient assessment	16 55%	1 100%	12 60%	3 38%	9 75%	7 41%
implementation of objectives and monitoring plan	18 62%	0 0%	16 80%	2 25%	9 75%	9 53%
patient counselling and understanding	10 34%	1 100%	8 40%	1 13%	6 50%	4 24%
documentation	22 76%	1 100%	16 80%	5 63%	10 83%	12 71%
other	7 24%	0 0%	4 20%	3 38%	3 25%	4 24%
Proportion of pharmacists evaluated	60%	80%	55%	72%	43%	73%

Prescribing Rights

The evolution of pharmacy practice is demonstrated most dramatically in the changes that are occurring throughout Canada with respect to prescribing rights. Although the federal government is responsible for the regulatory approval of drugs that can be sold in Canada, each province is responsible for regulating the practice of pharmacy and other healthcare professions that operate within their provincial jurisdiction.

In the past few years a number of provincial jurisdictions have passed legislation that extends prescribing rights to nurses, pharmacists and other healthcare professionals (e.g. Alberta, Manitoba, Quebec). These changes are part of a larger initiative aimed at allowing professionals to fully utilize their training within interdisciplinary models of healthcare delivery.

It is also important to recognize that in most provinces, even those where specific enabling legislation has not been passed; many hospitals have systems in place for delegating prescribing rights to non-physicians.

- There was a small increase in the total number of respondents reporting professionals other than physicians and dentists that prescribe drugs within their organization, up from 67% (96/144) in 2003/04 to 73% (104/142) in 2005/06.
- Regional differences were noted. In Quebec only 40% (17/42) of respondents reported that professionals other than physicians and dentists are prescribing drugs, as compared to BC (95%, 19/20), Ontario (91%, 41/45), Prairies (80%, 16/20) and Atlantic Canada (73%, 11/15). This can partly be explained by the late recognition of nurse practitioners in Quebec.
- For hospitals that reported prescribing rights for other professionals, there was a small increase for nurse practitioners from 47% (45/96) in 2003/04 to 56% (58/104) in 2005/06, and midwives from 45% (43/96) in 2003/04 to 48% (50/104) in 2005/06. There was a minor decrease for prescribing pharmacists from 66% (63/96) in 2003/04 to 63% (66/104) in 2005/06 and for other professionals than the above mentioned groups from 20% (19/96) in 2003/04 to 18% (19/104) in 2005/06.
- Regional differences were noted for nurse practitioners with prescribing rights in Ontario (76%, 31/41), Atlantic Canada (64%, 7/11), Prairies (63%, 10/16), BC (37%, 7/19) and Quebec (18%, 4/17). Regional differences were noted for midwives with prescribing rights - BC (79% , 15/19), Ontario (63%, 26/41), Prairies (31%, 5/16), Quebec (24%, 4/17) and Atlantic Canada (0%).
- Regional differences were also noted for pharmacists with prescribing rights - Quebec (82%, 14/17), Atlantic Canada (73%, 8/11), Ontario (66%, 27/41), Prairies (56%, 9/16) and BC (42%, 8/19).
- For hospitals that reported prescribing rights for pharmacists (63%, 66/104), there was a notable increase in most types of prescribing rights approved for pharmacists. Dependent prescribing for dosage adjustment is by far the most common prescribing right granted to pharmacists and was reported by 79% (52/66) in 2005/06, up from 70% (44/63) in 2003/04. Dependent prescribing for new therapy was reported by 42% (28/66) in 2005/06, a notable increase from 19% (12/63) in 2003/04. Independent prescribing for lab tests was reported by 41% (27/66) in 2005/05, up from 32% (20/63) in 2003/04. Finally, independent prescribing for dosage adjustment was reported by 30% (20/66) in 2005/06, down from 35% (22/63) in 2003/04. It is important to note that these increases occurred despite only a very slight increase in the absolute number of respondents with prescribing rights approved for pharmacists in the previous survey (63 in 2003/04 vs 66 in 2005/06). This suggests that the scope of pharmacist prescribing rights is slowly expanding across the country.
- Regional differences were noted for dependent pharmacist prescribing rights for dosage adjustment in Ontario (85%, 23/27), Quebec (79%, 11/14), BC (75%, 6/8), Atlantic Canada (75%, 6/8) and Prairies (67%, 6/9).

- Regional differences were noted for independent pharmacist prescribing rights for dosage adjustment in Quebec (57%, 8/14), Prairies (33%, 3/9), Atlantic Canada (25%, 2/8), Ontario (22%, 6/27) and BC (13%, 1/8). Regional differences were also noted for independent pharmacist prescribing rights for lab test in Quebec (79%, 11/14), Prairies (44%, 4/9), Ontario (33%, 9/27), Atlantic Canada (25%, 2/8), and BC (13%, 1/8). Lower numbers were noted for independent pharmacist prescribing rights for new therapy in Quebec (14%, 2/14), Prairies (11%, 1/9), Ontario (4%, 1/27), Atlantic Canada (0%) and BC (0%).
- Only minor differences were noted regarding teaching status, bed size and distribution systems.

Table B-5 summarizes the prescribing privileges for other professionals and pharmacists.

Table B-5 Prescribing Privileges 2005/06

	All	Bed Size			Teaching Status	
		100- 200	201- 500	>500	Teaching	Non-Teaching
Hospitals (n=)	(142)	(27)	(78)	(37)	(37)	(105)
Other professionals prescribe drugs (other than physicians and dentists)	104 73%	19 70%	58 74%	27 73%	29 78%	75 71%
Prescribing rights of other professionals (n=)	(104)	(19)	(58)	(27)	(29)	(75)
nurse practitioners	58 56%	11 58%	26 45%	21 78%	25 86%	33 44%
midwives	50 48%	5 26%	30 52%	15 56%	11 38%	39 52%
others	19 18%	2 11%	12 21%	5 19%	8 28%	11 15%
Prescribing rights have been approved for pharmacists	66 63%	7 37%	39 67%	20 74%	19 66%	47 63%
Prescribing rights approved for pharmacists: (n=)	(66)	(7)	(39)	(20)	(19)	(47)
independent, for lab tests	27 41%	2 29%	20 51%	5 25%	8 42%	19 40%
independent, for dosage adjustments	20 30%	1 14%	13 33%	6 30%	6 32%	14 30%
independent, for new therapy	4 6%	0 0%	2 5%	2 10%	2 11%	2 4%
Dependent, for dosage adjustments	52 79%	6 86%	30 77%	16 80%	13 68%	39 83%
Dependent, for new therapy	28 42%	2 29%	16 41%	10 50%	10 53%	18 38%

Priority and Service Level of Clinical Services

In the 1990s and early 2000s, Bond and his colleagues published a number of studies concerning clinical pharmacy services and their impact on mortality, morbidity, length of stay, drug costs and medication errors. These studies did contribute to the emergence of evidence-based data on clinical pharmacy practice and can be used to help prioritize clinical pharmacy services.

Recently, Bond et al published a new analysis of the data that they collected in 1998¹¹, specifically targeted at the association between clinical pharmacy services and adverse drug reactions (ADRs). These authors reported that 12 of 14 clinical pharmacy services were associated with a reduction in adverse drug reactions. This positive association was particularly strong for admission drug histories, drug protocol management, and ADR management. The work of these researchers also demonstrated an association between pharmacist staffing and the number of ADR experienced by patients. Between the 20th percentile of staffing (0.93 ± 0.77 pharmacists per 100 occupied beds) and the 100th percentile of staffing (5.16 ± 4.11 pharmacists per 100 occupied beds) there was a 47.9% reduction in the number of ADRs. In the absence of pharmacist involvement in ADR management, there was a 34.9% increase in the mean number of ADRs/100 admissions, a 13.6% increase in the length of stay, a 53.6% increase in the mortality rate, and an 8.2% increase in drug charges.

In the last survey we asked respondents to identify the clinical pharmacy services available within their organisations and the level of pharmacy services offered. In this survey, we asked the respondents to indicate whether pharmacists participated in ten direct patient care activities (P.C.), three committee participation (C.P.) activities, four drug information/drug use management activities (D.I.), three clinical research (C.R.) activities, and two patient safety/quality improvement activities (P.S.). Respondents were asked to rate the level of each clinical service as follows:

- a score of 1 for a comprehensive service, delivered consistently to all patients requiring the service;
- a score of 2 for a targeted service, delivered to those who most need the service;
- a score of 3 for a limited service, provided only when time and resources permit;
- a score of 4 if the service is not offered.

The lower the mean in the level of service results, the more comprehensive the level of service that the respondents currently reported at their sites.

All respondents (100%, 142/142) were able to indicate the level of clinical pharmacy service provided.

- Table B-6 summarizes the average level of service of 22 clinical pharmacy activities, in descending order, per bed size and teaching status. Some of the clinical pharmacy services provided at a comprehensive level may be given pharmacy attention and resources in response to a regulatory obligation (e.g. P & T Committee, Medication Safety Committee, Infection Control Committee).
- The mean score reported by respondents was lower (i.e. a more comprehensive level of service offered) by at least 0.5 points or more, in favor of teaching vs non-teaching respondents, in the following clinical situations : [C.P.] Medication Safety Committee. [P.C.] Drug therapy evaluation / monitoring. [C.R.] Ethics Review Committee participation. [C.R.] Clinical Trials support. [P.C.] Medication/drug counselling. [D.I.] Formulary Compliance. [P.C.] Medical rounds participation. [D.I.] Inservice Education. [D.I.] Drug Use Evaluation. [P.C.] Admission drug histories. [D.I.] Drug Information and [C.R.] Clinical Research and [P.C.] Seamless Care. A similar pattern was observed for larger bed size hospitals vs smaller bed size hospitals.
- As we discussed in the 2003/04 report, of the clinical pharmacy services identified by Bond et al. as having a positive effect on health outcomes, most of them on average, were not offered on a comprehensive level according to our survey respondents.
 - Bond and al. also suggested that admission histories were associated with a significant improvement in six outcomes (total costs of care (TCC), drug costs (DC), mortality rates (MR), length of stay (LOS), medication errors (ME), adverse drug reactions (ADR), but our respondents seemed to place a low priority on this service. In addition to the evidence to support the value of medication histories, medication reconciliation/seamless care processes, which encompass medication histories, are now included in CCHSA's Required Organizational Practices.

- Similarly, Bond et al's work suggested that pharmacokinetic consultations are not associated with improvements in the quality or cost of care, yet our respondents ranked this service second only to P&T Committee activities in terms of its importance. A number of other clinical pharmacy services, such as participation in medical rounds, medication counselling, and drug therapy evaluation/monitoring showed a similar mismatch between the evidence supporting their effectiveness and the priority ranking that they were given by our respondents.

Table B-6 Average Level of Service 2005/06

	All Mean	All Std Dev	Bed size			Teaching Status		Expected favorable outcomes of clinical pharmacy services on different indicators according to Bond's studies *												
			100-200	201-500	>500	Teaching	Non teaching	T C C	D C	M R	L O S	M E	A D R							
**																				
[C.P.] P&T Committee (n = 140)	1.2	0.7	1.3	1.3	1.1	1.0	1.3													
[P.C.] Pharmacokinetic consultations / monitoring (n = 142)	1.8	0.7	2.3	1.7	1.8	1.7	1.8													
[C.P.] Medication Safety Committee (n = 141)	1.8	1.1	2.0	1.8	1.6	1.3	2.0													
[P.S.] Med Incident Reporting/prevention (n = 142)	1.8	0.9	1.7	1.9	1.8	1.6	1.9													
[P.C.] Lab test ordering / Drug dosage adjustment (n = 142)	2.0	0.8	2.2	2.0	2.1	1.9	2.1													
[P.C.] Drug therapy evaluation / monitoring (n = 142)	2.2	0.8	2.7	2.1	1.9	1.8	2.3													
[C.P.] Infection Control Committee (n= 141)	2.2	1.1	2.6	2.3	1.8	1.9	2.3													
[C.R.] Ethics Review Ctee participation (n= 140)	2.2	1.4	2.9	2.2	1.8	1.5	2.5													
[C.R.] Clinical Trials support (n= 141)	2.3	1.2	3.1	2.3	1.7	1.3	2.7													
[P.S.] ADR monitoring (n = 142)	2.3	0.8	2.7	2.2	2.2	2.2	2.3	+											+	
[P.C.] Medication / drug counselling (n = 140)	2.4	0.6	2.6	2.3	2.3	2.0	2.5													
[P.C.] Patient education program (n= 142)	2.4	0.6	2.4	2.5	2.4	2.3	2.5													
[D.I.] Formulary Compliance (n= 141)	2.4	1.1	3.0	2.4	2.1	1.9	2.6													
[P.C.] TPN team participation (n = 140)	2.5	1.2	2.7	2.4	2.5	2.3	2.6												+	
[P.C.] Medical rounds participation (n= 142)	2.6	0.9	2.7	2.6	2.3	2.0	2.8	+		+									+	
[D.I.] Inservice Education (n = 142)	2.6	0.9	2.9	2.6	2.4	2.1	2.8		+										+	
[D.I.] Drug Use Evaluation (n = 142)	2.6	1.0	3.1	2.6	2.1	1.8	2.9	+												
[P.C.] Admission drug histories (n = 142)	2.7	0.8	3.0	2.6	2.6	2.3	2.8	+	+	+	+								+	
[P.C.] Seamless care services (n = 142)	3.0	0.8	3.2	3.0	2.8	2.4	3.2													
[D.I.] Drug Information (n = 142)	3.0	1.2	3.6	3.2	2.3	1.6	3.5	+	+	+									+	
[C.R.] Clinical Research (n = 141)	3.3	0.9	3.7	3.4	2.8	2.5	3.6	+		+										
[P.C.] Cardiopulmonary resuscitation (CPR) team participation (n = 142)	3.8	0.6	3.9	3.8	3.7	3.6	3.8			+									+	
Drug protocol management			Non applicable to this survey						+	+		+								+
Increased pharmacy staffing/occupied beds			Non applicable to this survey						+	+		+								+
Affiliation with a teaching program			Non applicable to this survey																	+
Decentralized pharmacists			Non applicable to this survey																	+

* Total costs of care (TCC), drug costs (DC), mortality rates (MR), length of stay (LOS), medication errors (ME), adverse drug reactions (ADR)

**Committee participation (C.P.), clinical research (C.R.), patient safety/quality improvement activities (P.S.), drug information/drug use management activities (D.I.), patient care activities (P.C.)

While all respondents (100%, 142/142) provided data on the level of clinical pharmacy service provided by their facility, a much smaller number (68%, 96/142) chose to provide a ranking of direct patient care services in the 2005/06 survey (one being the highest priority and 10 being the lowest priority).

Table B-7 summarizes the average level of service and the average ranking priority of 10 direct patient care pharmacy services.

Table B-7 Comparison of Average Level of Service and the Average Ranking Priority of 10 Direct Patient Care Pharmacy Services 2005/06

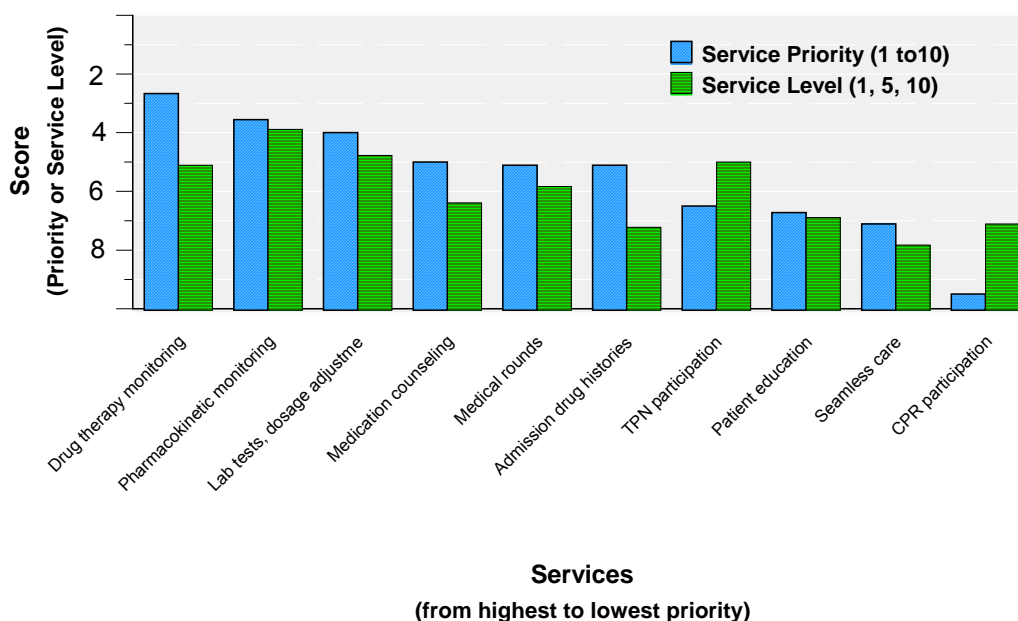
(n=96 who provided both level of service and priority rankings)

	Average level of services (score 1, 2 or 3)		Average priority ranking (score 1 to 10)	
	Mean ± S.D.	Rank	Mean ± S.D.	Rank
[P.C.] Drug therapy evaluation (DTM)/ monitoring	2.0 ± 0.6	2	2.6 ± 1.9	1
[P.C.] Pharmacokinetic consultations / monitoring	1.8 ± 0.7	1	3.6 ± 2.3	2
[P.C.] Lab test ordering / Drug dosage adjustment	2.0 ± 0.7	3	4.0 ± 2.2	3
[P.C.] Medication / drug counselling	2.3 ± 0.6	4	5.0 ± 1.6	4
[P.C.] Admission drug histories	2.6 ± 0.8	8	5.1 ± 2.7	5
[P.C.] Medical rounds participation	2.4 ± 0.9	7	5.1 ± 2.7	6
[P.C.] TPN team participation	2.3 ± 1.2	5	6.5 ± 2.8	7
[P.C.] Patient education program	2.4 ± 0.6	6	6.7 ± 1.7	8
[P.C.] Seamless care services	2.9 ± 0.8	9	7.1 ± 1.9	9
[P.C.] Cardiopulmonary resuscitation (CPR) team participation	3.7 ± 0.7	10	9.5 ± 1.5	10

S.D. = standard deviation

Figure B-3 illustrates the average level of service per direct patient care pharmacy service with the average ranking priority using a similar scale (i.e. we converted the level of service scale (1, 2 and 3) to 1, 5 and 10 scale for comparison purpose). The figure suggests a trend in the same direction between the level of service and the priority ranking given by respondents.

Figure B-3 Clinical Pharmacy Services - Average Service Priority and Level of Service 2005/06



Base: Respondents answering all relevant questions (96)

Although the average numbers trend in the same direction, for almost every service there were respondents who ranked a service number 1 and others who ranked it number 10. Given the discrepancy between the evidence of effectiveness (e.g Bond's papers and others) and the comprehensive rankings, combined with the wide variability in the priority rankings attached to various services by our respondents, we believe there is a need to develop a profession-wide, evidence-based consensus on the services we should be prioritizing and investing our limited resources in.

Finally, we looked at the ASHP 2015 Initiative and identified several key goals related to clinical pharmacy services where corresponding baseline values could be obtained from our 2005/06 report (Table B-8). Future surveys will be designed to contribute to establishing additional baseline values for hospital pharmacy practice in Canada.

Table B-8 ASHP 2015 Goals and Canadian Baselines from the 2005/06 Hospital Pharmacy Survey

ASHP 2015 goal related to clinical pharmacy services	ASHP goals and objectives for pharmacy practice in health systems to be achieved by 2015(<i>Baseline</i>)	Results from the Report on hospital pharmacy in Canada 2005/2006
1.4	75% of hospital inpatients discharged with complex and high-risk medication regimens will receive discharge medication counselling managed by a pharmacist <i>22.4% (95% CI, 17.0-28.9%)</i>	Medication/drug counselling service is offered by 2% (3/142) of respondents at a comprehensive level and at a targeted level by a further 61% (87/142)
4.1	90% of health systems will have an organizational program, with appropriate pharmacy involvement, to achieve significant annual, documented improvement in the safety of all steps in medication use. <i>60.5% (95% CI, 55.4-65.3%)</i>	Medication Safety Committee is offered by respondents at a comprehensive level by 59% (84/142) and a targeted level by 15% (21/142)

Conclusion

This survey marks two decades of collecting information concerning clinical pharmacy services. Very few questions were asked about clinical services in the early editions of the survey, but the importance of this section has grown as the focus of our profession has shifted from distribution to clinical services. In the coming years we expect that we will be interested in adding new questions to help us document the impact that prescribing rights, specialization, and academic credentialing will have on the services that we provide to patients.

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