

# Drug Distribution Systems

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## Oral Medication Systems

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

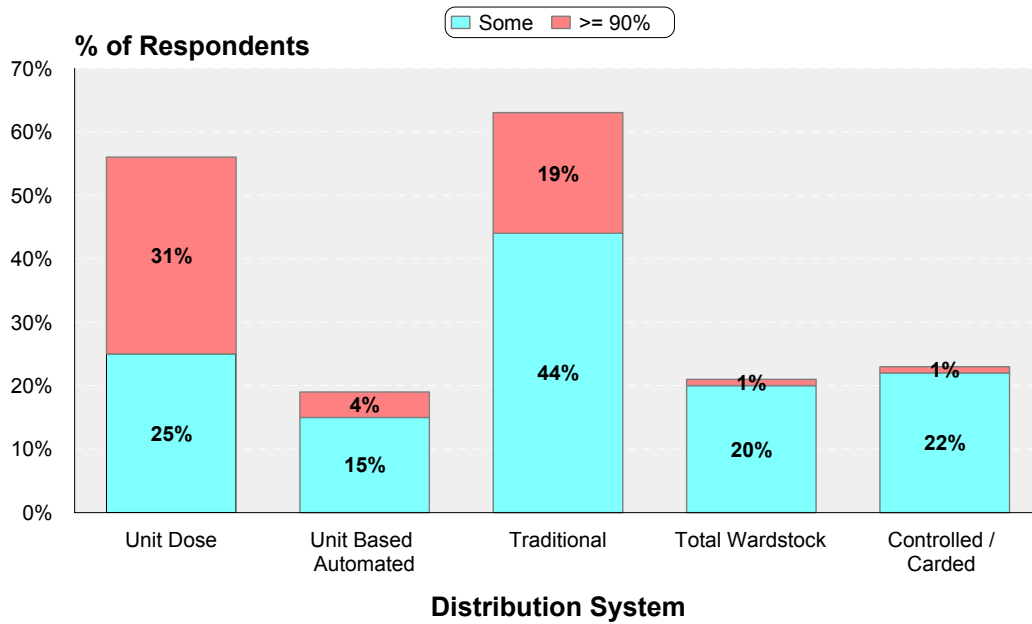
- There has been a slow but steady increase in the number of respondents reporting use of unit dose systems over the past years, indicating progress toward use of safer drug distribution systems within Canadian hospitals. In spite of this modest progress, traditional and total wardstock systems were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

**Table D-1. Drug Distribution Systems 2003/04**

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

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

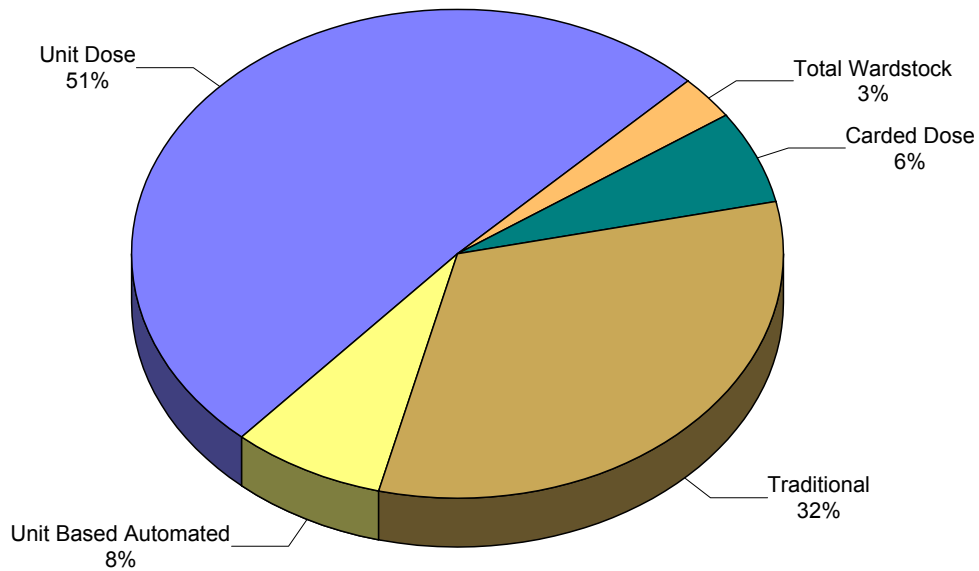
**Figure D-1. Drug Distribution Systems 2003/04**



Base: All respondents (144)

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

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



Base: All respondents (144)

- Among respondents who reported unit dose drug distribution, 63% (51/81) reported using a centralized automated dispensing system. Of these, 82% (42/51) use a canister type system and 18% (9/51) use a robotic system (six respondents in Quebec, two in Ontario and one in Atlantic Canada).
- The reported use of unit based automated dispensing systems increased slightly from 22 respondents (18%) in 2001/02 to 29 respondents (20%) in this year's survey. Among respondents reporting the use of unit based automated dispensing systems, the number used in Emergency Departments increased substantially, from 10/22 (45%) in 2001/02 to 23/29 (79%) in 2003/04. Drug distribution systems to Emergency Departments often rely on nurses choosing doses from extensive floorstock supplies, with the attendant risk of errors. Automated dispensing systems can be used to minimize vulnerability to medication misadventure, improve security controls, and increase the safety consciousness of staff members in these typically busy patient care areas.<sup>(2)</sup>

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

### **Medication Order Entry**

- Pharmacists and technicians continue to be reported as the categories of personnel who most frequently perform medication order entry (Table D-2), with almost identical percentages of respondents reporting order entry by pharmacists (79%) as technicians (78%). Pharmacy technician order entry has remained relatively stable over the past number of years, with 73% of respondents reporting that technicians entered orders in 2001/02 and 77% in 1999/2000.
- The reported percentage of pharmacist verification of medication order entry increased from 2001/02, regardless of the category of personnel entering the medication order. The importance of pharmacist review of medication orders for therapeutic appropriateness is well documented as a safe medication use practice and can occur either prior to or after actual medication order entry. Verification of medication order entry itself can provide a check in the medication use system to ensure not only therapeutic appropriateness when order entry is completed by other than pharmacists, but also transcription accuracy.
- There has been a notable increase in the percentage of respondents reporting that orders entered by pharmacists are verified by pharmacists; 41% of respondents who reported pharmacists perform order entry also reported that pharmacist order entry is verified by a pharmacist, compared to 27% in 2001/02. The survey did not address the number of respondents who may have a technician check for computer order entry or transcription accuracy.

**Table D-2. Medication Order Entry 2003/04**

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

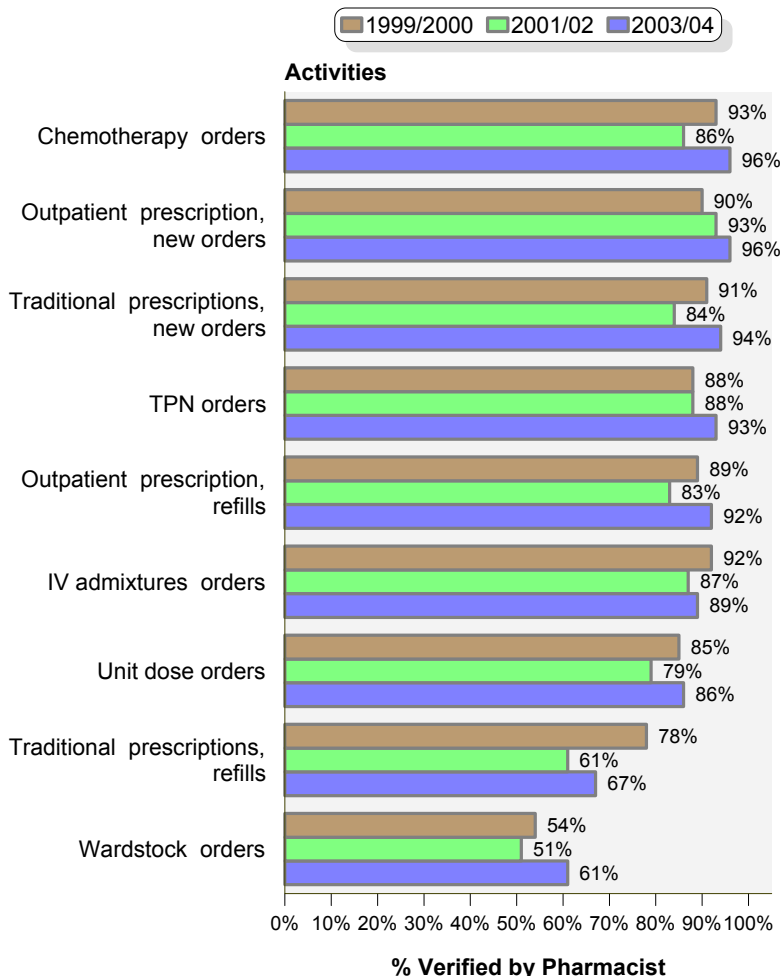
- There has been minimal change in the medication order types reported as entered by technicians since the previous Annual Report, with the exception of unit dose orders. The percentage of respondents reporting technician unit dose order entry has increased from 35% in 2001/02 to 49% in 2003/04 (Table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

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

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

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

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



*Base: Respondents reporting that technicians enter orders for individual categories*

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

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

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

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

- Manual preparation of MARs was reported by 44% of respondents.
- Fifty-six percent of respondents reported that MARs are generated in hard copy through the pharmacy information system and manually documented.
- Fifteen respondents (10%) reported that MARs are generated electronically, share a common database with the pharmacy information system and documentation is on-line. This was more commonly reported in teaching facilities (14%, 8/56) and in those with >500 beds (13%, 5/38) and was least commonly reported by respondents in non-teaching facilities (8%, 7/88) and those with 100-200 beds (5%, 2/38). Twelve of the 15 respondents reporting use of electronically generated MARs were from Quebec, with one from each of the Prairies, Ontario and Atlantic Canada.
- Approximately half (56%) of all respondents reported a patient’s allergy status is visible on each page of the MAR. Ensuring that allergy status is clearly available and consistently reinforced may prevent untoward events ranging from minor allergic responses to anaphylaxis.
- Only 3% (5/144) of all respondents provided the patient with a copy of the MAR or a similar ongoing medication record. This is similar to the less than 4% reported in American hospitals.<sup>(3)</sup> Providing patients with a copy of the MAR indicates a willingness to involve the patient in their own care, which in turn can enhance patient safety.

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

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

### Technicians Checking Technicians

- Eighty-seven percent (125/144) of respondents reported technicians check the work of other technicians.
- Table D-5 outlines activities performed by technicians and the percentage of respondents reporting that “tech check tech” processes are in place, as well as those that report established certification procedures (See also Figures D-4 and D-5).

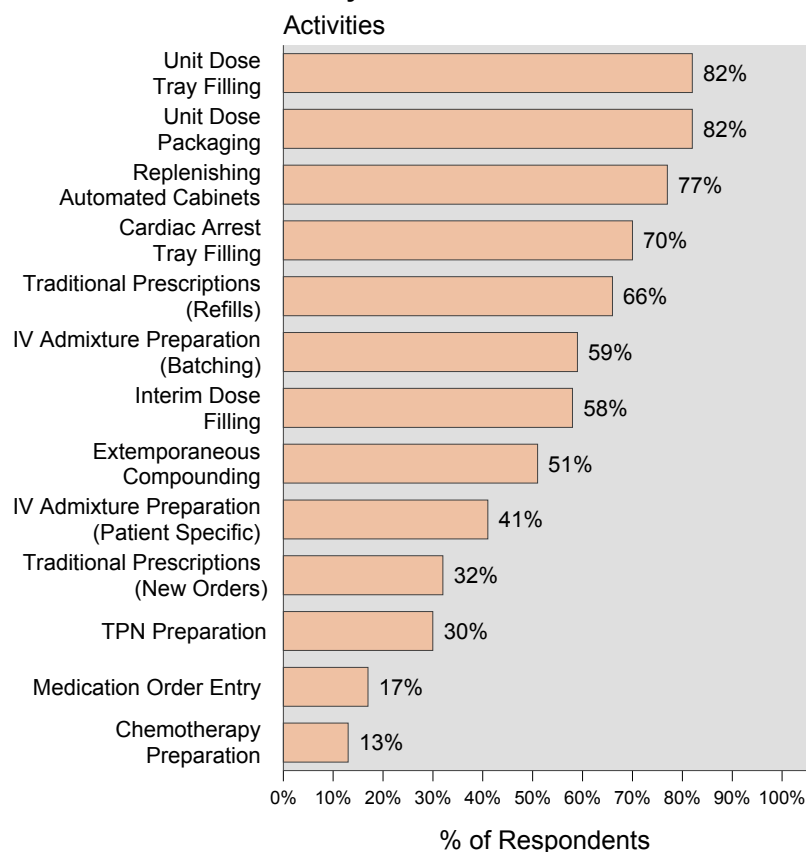
**Table D-5. Technician Activities Checked by Other Technicians and Certification Required 2003/04**

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

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

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

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

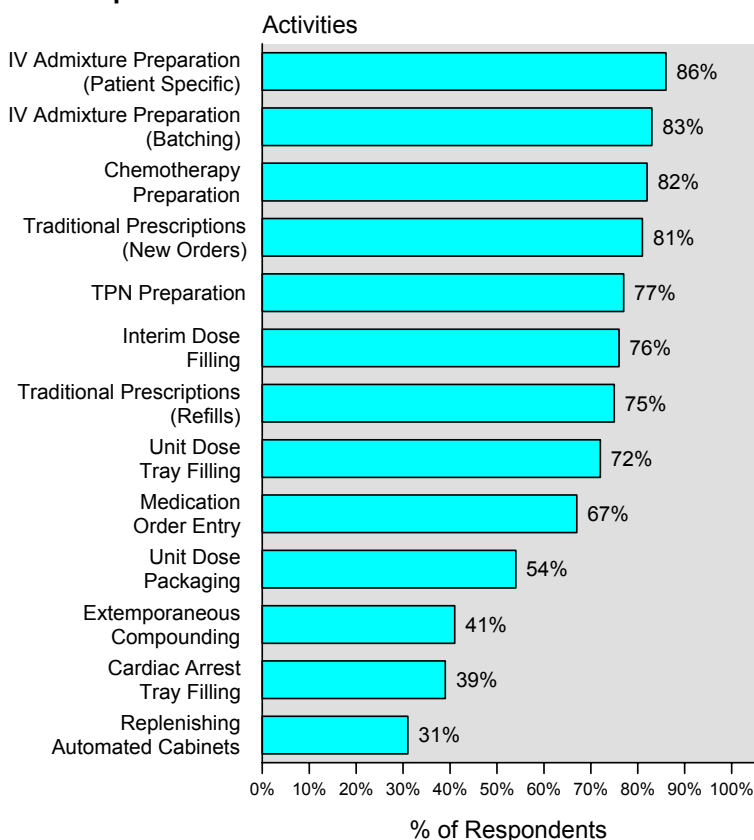


Base: Respondents reporting that function is performed

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

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

**Figure D-5. Certification Required 2003/04**



Base: Respondents using technician check technician

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

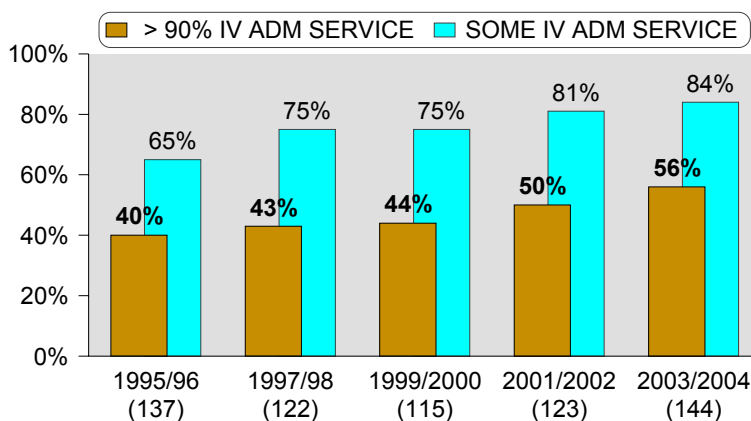
Pharmacy technicians have demonstrated they can accurately and efficiently prepare and deliver drug products. It is the responsibility of the pharmacist to ensure procedures are in place to ensure technicians can safely perform these activities. As the shortage of pharmacists continues, the scope of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

### Intravenous Admixture Services

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

- The percentage of respondents reporting the provision of IV admixture has steadily increased from 75% of all respondents in 1999/2000 to 81% in 2001/02 and 84% in 2003/04 (Figure D-6). These services were more commonly reported by teaching facilities (95%) as compared to non-teaching (77%) and by those facilities with >500 beds (100%) compared to those with 100-200 beds (71%) and 201-500 beds (82%).
- This movement is also apparent for IV admixture services offered to ≥90% of patients or patient care areas; with 56% of respondents reporting these complete services in 2003/04, compared to 50% in 2001/02 and 44% in 1999/2000.

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



Base: All respondents ( )

- Respondents providing IV admixture estimated that 47% of total IV doses administered in their facilities are prepared through the service. IV doses include a range of possible preparation from those administered in an undiluted form to those requiring dilution in a small volume in a syringe, minibag or buretrol to those requiring dilution in a large volume for continuous infusion. A definition of IV dose was not provided to respondents; therefore interpretation of this question may have varied between respondents (Table D-6).
- Within the 121 facilities where respondents reported the provision of IV admixture services, patient care areas receiving service included the OR (40%), ER (55%), Other Outpatients (74%), Critical Care (81%) and Other Inpatients (96%).
- The inclusion of antibiotics in the admixture service was reported by 92% of respondents with IV admixture programs, H2 Blockers by 64%, large volume parenterals by 56%, and inotropes by 20%. Other products (e.g. narcotics, epidurals and corticosteroids) were identified by 63% of respondents.

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

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

Base: Pharmacy departments providing complete data ( )

- The reported average production of IV admixtures by respondents providing service to ≥90% of patients was 1.07 admixtures per acute patient day, down from the reported average of 1.19 reported in 2001/02 and 1.09 reported in 1999/2000. This change could be related to a shift in survey demographics, but the increasing use of medications that require less frequent dosing may also be a contributing factor.
- The primary method of administering intermittent IV doses has not changed appreciably since the 1997/98 Annual Report; minibag use was reported by 60% (86/144) of respondents, syringe infusers by 28% (41/144) buretrol/burette by 6% (9/144) while 3% (5/144) report other methods (e.g. direct IV push). Minibag use was reported more often in Ontario (84%, 38/45), B.C. (75%, 9/12), Atlantic Canada (72%, 13/18) and the Prairies (57%, 12/21), while syringe infusers are used more often in Quebec (58%, 28/48) and to a lesser extent in the Prairies (33%, 7/12).

## Chemotherapy

- Ninety-two percent of all respondents report that IV chemotherapy is prepared and administered in their facilities. Preparation in the pharmacy department was reported by 95% (127/133) of these respondents.
- The average of reported number of chemotherapy doses in hospitals reporting that parenteral chemotherapy doses were prepared by Pharmacy was 8,351 (Table D-7).

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

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

Base: Pharmacy departments providing complete data ( )

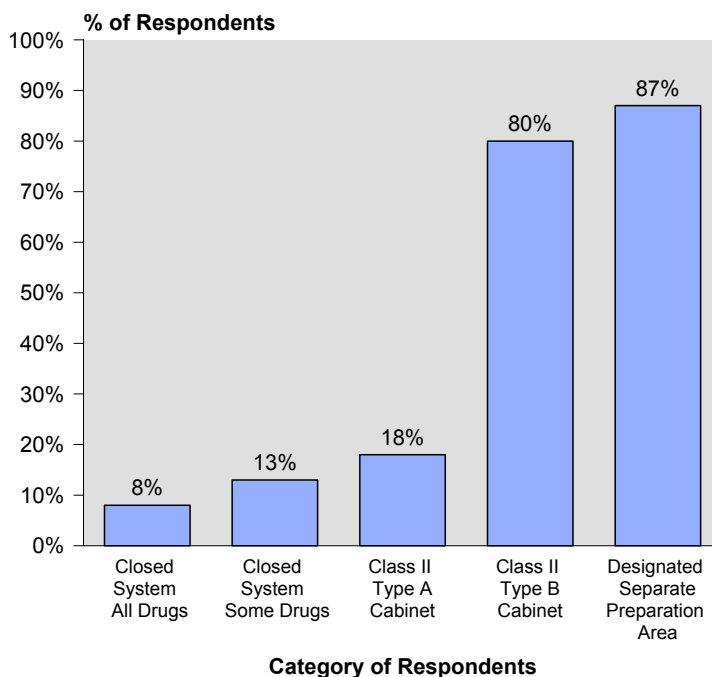
- The provision of home chemotherapy services was reported by five Quebec respondents.
- Among respondents reporting the preparation of IV chemotherapy, 95% have written policies and procedures to ensure the health and safety of employees preparing, transporting, administering and disposing cytotoxic drugs (Table D-8).

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

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

- Use of a designated separate chemotherapy preparation area was reported by 87% of respondents who indicated that Pharmacy prepared parenteral chemotherapy doses (Figure D-7).
- Among facilities reporting that Pharmacy prepared parenteral chemotherapy doses, 80% reported use of a Class II Type B Cabinet and 18% use of a Class II Type A Cabinet.

**Figure D-7. Chemotherapy Preparation Systems 2003/04**



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

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

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

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

## Ambulatory Pharmacy Services

- Twenty-four percent of respondents reported that a separate dispensary for ambulatory pharmacy services was operated at their facilities, equal to the 24% reported in the 1999/2000 survey (Table D-9). Reporting of separate ambulatory pharmacies was more prevalent in those facilities with >500 beds (47%) versus those with 100-200 beds (8%) and in teaching facilities (41%) versus non-teaching facilities (14%). Operation of separate ambulatory pharmacies was also reported more often by respondents from Ontario (44%) and the Prairies (38%) as compared to British Columbia (17%), Quebec (8%) and Atlantic Canada (6%).
- The majority of these respondents (71%, 25/35) reported the pharmacy operated the separate ambulatory dispensary, a decrease from the 82% reported in the 1999/2000 survey. Fourteen per cent (5/35) reported that they contracted out the service and 11% (4/35) indicated other means of operation (e.g. funded by outside sources but responsible for operations). Non-teaching facilities were more likely to report contracting out (25%) versus teaching facilities (9%) and teaching facilities were more likely to report that they operated the ambulatory dispensary themselves (78%) versus non-teaching facilities (58%).

**Table D-9. Ambulatory Pharmacy Services 2003/04**

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

## References

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