

A national survey of emergency pharmacy practice in the United States



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Michael C. Thomas, Pharm.D., BCPS, College of Pharmacy, Western New England University, Springfield, MA.

Nicole M. Acquisto, Pharm.D., BCPS, Departments of Pharmacy and Emergency Medicine, University of Rochester Medicine, Rochester, NY.

Mary Beth Shirk, Pharm.D., BCPS, Wexner Medical Center, the Ohio State University, Columbus, OH, and College of Pharmacy, the Ohio State University, Columbus, OH.

Asad E. Patanwala, Pharm.D., BCPS, College of Pharmacy, the University of Arizona, Tucson, AZ.

Purpose. The results of a survey to characterize pharmacy practice in emergency department (ED) settings are reported.

Methods. An electronic survey was sent to all members of the American Society of Health-System Pharmacists' Emergency Medicine Connect group and the American College of Clinical Pharmacy's Emergency Medicine Practice and Research Network. Approximately 400 nontrainee pharmacy practitioners were invited to participate in the survey, which was open for 30 days. Descriptive statistics were used for all analyses.

Results. Two hundred thirty-three responses to the survey that were at least partially completed were received. After the removal of duplicate responses and null records, 187 survey responses were retained. The majority of respondents were from community hospitals (59.6%) or academic medical centers (36.1%). A pharmacist's presence in the ED of more than eight hours per day on weekdays and weekends was commonly reported (68.7% of respondents); 49.4% of institutions provided more than eight hours of coverage daily. Nearly one in three institutions (34.8%) provided no weekend ED staffing. The most frequently reported hours of coverage were during the 1 p.m.–midnight time frame. The distribution of ED pharmacist activities, by category, was as follows (data are median reported time commitments): clinical, 25% (interquartile range [IQR], 15–40%); emergency response, 15% (IQR, 10–20%); order processing, 15% (IQR, 5–25%); medication reconciliation/history-taking, 10% (IQR, 5–25%); teaching, 10% (IQR, 5–15%); administrative, 5% (IQR, 3–10%); and scholarly endeavors, 0% (IQR, 0–5%).

Conclusion. Pharmacists from academic and community EDs perform a variety of clinical, educational, and administrative activities.

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Address correspondence to Dr. Patanwala (patanwal@pharmacy.arizona.edu).

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In the United States, there has been growth in the number of pharmacists practicing in emergency department (ED) settings. A national survey documented that just 3.4% of hospitals had a pharmacist regularly assigned to the ED in 2006.¹ In 2008, the proportion of hospitals with clinical pharmacy services in the ED grew to 6.8%.¹ The most recent data available, published in 2014, demonstrated further growth, with 16.4% of hospitals indicating that they routinely assigned pharmacists to a majority of patients in the ED.² There is a positive correlation between hospital size and the likelihood

of having a pharmacist assigned to the ED. In a recent survey, only 4.3% of hospitals with less than 50 beds had pharmacists assigned to the ED; the figures were 8.1% for hospitals with 50–99 beds, 10.2% for hospitals with 100–199 beds, 20.0% for hospitals with 200–299 beds, 36.9% for hospitals with 300–399 beds, 47.8% for hospitals with 400–599 beds, and 66.0% for hospitals with 600 or more beds.³ Recent support for ED clinical pharmacy services by groups such as the American College of Emergency Physicians is an important step in the growth of this specialty area.⁴

Research has shown that pharmacists decrease the number of medication errors in ED settings.⁵⁻⁷ In a multicenter evaluation, activities that led to decreased errors included consultative activities (accounting for 51.4% of intercepted errors), such as collaboration with medical or nursing staff to make medication therapy decisions, and medication order review (accounting for 34.9% of intercepted errors).⁶ This study also demonstrated the importance of the physical presence of a pharmacist in the ED to improving patient safety. Of all intercepted medication orders with errors, nearly one in three (32.7%) were verbal medication orders.⁶ Clinical functions of pharmacists in the ED have also led to a positive financial impact through avoidance of costs that may otherwise have been incurred.⁷

No national surveys have been conducted to determine the activities pharmacists engage in while physically present in the ED since the growth of pharmacy services in this setting. A survey sent to hospitals with a pharmacy residency program found that hospitals with pharmacists practicing in the ED were more likely than hospitals without pharmacists assigned to the ED to provide ED clinical services such as medication error reporting, order clarification, medication dosing recommendations, consultative services, and participation in resuscitative efforts.⁸ National position statements and guidelines have recommended that pharmacy services be provided in EDs to ensure safe and effective medication use.^{9,10}

The American Society of Health-System Pharmacists (ASHP) supports ED pharmacy services, including direct patient care, emergency-preparedness planning, quality-improvement activities, education, research, and professional development for pharmacy students and residents.⁹ The roles and functions of ED-based pharmacists, detailed in guidelines issued by ASHP in 2011, include essential and desirable pharmacist functions.¹⁰

KEY POINTS

- There has been a shift in the activities of pharmacists in the ED from inventory management to more clinical activities and direct patient care.
- Approximately 80% of institutions with ED pharmacy services have an ED satellite pharmacy.
- Most institutions with ED pharmacy services provide coverage in the evening (70–80%) rather than the morning (30–40%), but more than a third of institutions do not provide any weekend coverage.
- Approximately 40% of pharmacists did not think that the pharmacist should focus on medication reconciliation/history-taking activities, but 80% were routinely engaged in this activity.

The purpose of the study described here was to characterize pharmacy practice in ED settings. Specifically, the objectives were to determine the times when pharmacists are physically present in EDs, to describe the qualifications of pharmacists practicing in the ED, and to describe the activities of these pharmacists.

Methods

Survey design and development. Using the ASHP Guidelines on Emergency Medicine Pharmacist Services as a framework,¹⁰ a survey was developed by four pharmacists with practice experience in both community and academic EDs. Although no formal validation was conducted, the survey was tested for errors and revised through an iterative process using e-mail and conference calls. The investigators reached consensus on the final survey before it was disseminated.

Survey questions related to ED staffing structures, pharmacist qualifications and activities, opinions on issues facing pharmacists working in the ED, and demographics were included.

To characterize ED staffing structures, each respondent was asked to describe the number of pharmacists present in the ED during a typical week (including weekends), the number of pharmacist full-time equivalents (FTEs) assigned to the ED, and the funding source for and credentials of those FTEs, as well as the presence (or absence) of a satellite pharmacy and hours of pharmacist coverage. Respondents were then asked to estimate the percentage of time ED pharmacists were engaged in each of the following activity areas: clinical activities, medication reconciliation/history-taking, emergency response, order processing, teaching, scholarly endeavors, and administrative functions. Examples of specific activities in each of those categories were provided. Furthermore, common clinical activities (bedside toxicology management, medication selection based on diagnosis, drug dosing based on organ dysfunction, drug interaction analysis, drug identification, drug compatibility investigation, monitoring of medication therapy, medication administration, medication therapy management, bedside response for high-priority patients, medication reconciliation/history-taking, disease state-targeted counseling, vaccine administration, error and adverse drug event reporting, culture and susceptibility testing follow-up) were listed, and all could be selected. Detailed questions were asked in order to better characterize which types of patients would require pharmacist bedside response, education-related activities, medication reconciliation/history-taking, order processing, and medication administration. The survey solicited opinions regarding the optimal amount of time that should be spent on administrative functions, the role of the pharmacist with regard to medication reconciliation/history-

taking, and who should be primarily responsible for medication order processing.

The final survey had 37 questions. Branching logic was only used to prevent respondents from answering subsequent questions that were not relevant. For example, if the respondent did not indicate that pharmacists were involved

with medication reconciliation/history-taking activities, he or she was not presented with a question that asked the respondent to provide details about those activities. Other instances where branching logic was used pertained to survey items on topics such as medication administration activities and the distribution of weekend coverage. Responses

to several questions were required; however, the majority of questions were optional and could be skipped. The survey was created and disseminated using an electronic survey tool (SurveyMonkey, Palo Alto, CA).

Participants. An e-mail containing the survey link and a description of the survey was sent to two listservers on January 9, 2015. One of the listservers was the ASHP Emergency Medicine Connect group; the other was the American College of Clinical Pharmacy (ACCP) Emergency Medicine (EMED) Practice and Research Network (PRN). The invitation asked for pharmacists—not trainees (residents or students)—practicing in the ED to complete the survey. A reminder e-mail was sent at the midpoint of the data collection period. The survey was closed on February 8, 2015. To prevent duplicate responses from a single site, an algorithm for selecting the survey response submitted by the most senior ED pharmacist at each site was developed. If two pharmacists with the same amount of experience completed the survey, the response with the earliest time stamp was used. The intent was to obtain one unique response from the most senior ED pharmacist at each institution. Consent was obtained before participants were presented with the survey questions. Each author's institutional review board approved the study prior to data collection.

Each participant who completed the survey had the option of being entered into a drawing for 1 of 12 \$50 gift cards for a major online retailer; those who opted in followed a hyperlink to a separate survey asking only for an e-mail address (responses to the survey were not linked to the gift card drawing or any e-mail address furnished during entry into the drawing). At the conclusion of the study period, all furnished e-mail addresses were entered into a random sequence generator; the selected respondents were notified via blind-copy e-mail and instructed to provide their name and address for gift card remittance.

Table 1. Characteristics of Emergency Departments (EDs) Represented in Survey

Characteristic	No. (%)
Hospital type (n = 164)	
Academic (affiliated with medical school)	58 (35.4)
Community	99 (60.4)
Veterans Affairs/federal government	1 (0.6)
Other	4 (2.4)
Freestanding ED	2 (1.2)
U.S. region (n = 164)	
South	63 (38.4)
Midwest	44 (26.8)
West	34 (20.7)
Northeast	23 (14.0)
Hospital bed count (n = 164)	
50–99	4 (2.4)
100–199	14 (8.5)
200–299	31 (18.9)
300–399	28 (17.1)
400–599	43 (26.2)
≥600	42 (25.6)
Not applicable ^a	2 (1.2)
ED bed count (n = 164)	
<20	8 (4.9)
20–29	16 (9.8)
30–39	26 (15.9)
40–49	23 (14.0)
50–59	33 (20.1)
60–69	16 (9.8)
70–79	16 (9.8)
80–89	7 (4.3)
90–99	3 (1.8)
≥100	16 (9.8)

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Statistical analysis. Data were downloaded into an electronic spreadsheet. All data analysis was performed using Stata 13 (StataCorp LP, College Station, TX). Data were summarized using descriptive statistics. Fisher's exact test was used to compare categorical variables of interest.

Results

General. From January 9, 2015, to February 8, 2015, 233 individuals completed some or all of the survey questions. There were 787 members of the ACCP EMED PRN and 220 members of the ASHP Connect Emergency Medicine group at the time the survey was sent; among the individuals on those lists, there were an estimated 439 pharmacy residents and students, 156 duplicate entries, and 12 individuals who were associated with an industry or an association. An attempt was made to analyze the number of unique institutions represented on the ACCP and ASHP listserver lists; however, 240 members of the ACCP EMED PRN did not list an affiliation. Therefore, the estimated survey cohort was 400. A total of 233 respondents completed some or all of the survey, for an estimated response rate of 58.3%. After excluding duplicate responses from the same institution ($n = 31$), responses with no hospital name to permit duplicate-response identification ($n = 10$), and responses from institutions with no pharmacist in the ED ($n = 5$), 187 records were retained. Data on the characteristics of respondents are presented in Table 1.

Positions. The median number of pharmacists practicing in the ED was 2.0 (interquartile range [IQR], 2.0–4.0). The median number of pharmacist FTE positions was 2.0 (IQR, 1.0–2.5). Pharmacists responding to the survey indicated that postgraduate year one (PGY1) ($n = 78$, 44.1%) or postgraduate year 2 (PGY2) ($n = 18$, 10.2%) residents in emergency medicine pharmacy, as well as PGY2 pharmacy residents in other specialties, practiced in the ED ($n = 31$, 17.5%).

Funding. Funding for pharmacist positions typically came from the pharmacy department, with 97.1% ($n = 171$) of respondents indicating at least some funding support from this source; specifically, 91.5% ($n = 161$) received 100% of funding from the pharmacy department. A minority of institutions indicated at least some funding by a school or college of pharmacy (2.8%, $n = 5$) or by an ED or emergency medicine physician group (2.8%, $n = 5$). No institution indicated full funding from an emergency medicine physician group; however, 1 respondent indicated that 80% of funding came from this source.

Education and training. Respondents were asked to indicate the proportions of pharmacists practicing in the ED who had earned a bachelor's degree in pharmacy (B.S.Pharm.), earned a doctor of pharmacy degree (Pharm.D.), completed a PGY1 residency, completed a PGY2 residency in emergency medicine or another specialty, completed a fellowship, attained board certification in pharmacotherapy or other specialty areas, or earned the designation Diplomate of the American Board of Applied Toxicology (DABAT). The proportion of institutions reporting that all pharmacists had a B.S.Pharm. was only 12.4%

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Table 1. Characteristics of Emergency Departments (EDs) Represented in Survey

Characteristic	No. (%)
Annual ED visits ($n = 153$)	
<20,000	2 (1.3)
20,000–29,999	8 (5.2)
30,000–39,999	12 (7.8)
40,000–49,999	11 (7.2)
50,000–59,999	16 (10.5)
60,000–69,999	20 (13.1)
70,000–79,999	14 (9.2)
80,000–89,999	21 (13.7)
90,000–99,999	13 (8.5)
100,000–124,999	22 (14.4)
125,000–149,999	6 (3.9)
150,000 or more	8 (5.2)
Proportion of adult patients in ED ($n = 161$)	
≤25%	8 (5.0)
26–50%	1 (0.6)
51–75%	69 (42.9)
76–100%	83 (51.6)
Emergency medicine physician residency ($n = 162$)	
Yes	81 (50)
No	81 (50)
ED satellite pharmacy ($n = 167$)	
Yes	135 (80.8)
No	32 (19.2)

^aFreestanding ED.

Table 2. Pharmacist Coverage in Emergency Departments, as Reported by Survey Respondents

Hours per Day	No. (%) Respondents		p
	Weekdays (n = 177)	Weekends (n = 176)	
None	0	62 (35.2)	... ^a
1–4	3 (1.7)	4 (2.3)	0.723
5–8	53 (30.0)	24 (13.6)	<0.001
9–12	50 (28.3)	47 (26.7)	0.812
13–16	29 (16.4)	8 (4.6)	<0.001
17–20	20 (11.3)	15 (8.5)	0.477
21–24	22 (12.4)	16 (9.1)	0.391

^aNot applicable.**Table 3.** Times When Pharmacists Are Physically Present in Emergency Departments

Shift	No. (%) Respondents		p
	Weekdays (n = 176)	Weekends (n = 113)	
Day (e.g., 6 a.m.–3 p.m.)	66 (37.5)	32 (28.3)	0.127
Midday (e.g., 9 a.m.–7 p.m.)	99 (56.3)	50 (44.3)	0.054
Swing (e.g., 1 p.m.–midnight)	120 (68.2)	92 (81.4)	0.014
Overnight (e.g., 10 p.m.–6 a.m.)	24 (13.6)	22 (19.5)	0.192

($n = 22$), whereas 81.9% of institutions reported that all pharmacists had a Pharm.D. degree. The majority of institutions (90.0%, $n = 160$) indicated that at least one pharmacist had PGY1 residency training, and 94 (53.1%) reported that all of its pharmacists had completed at least PGY1 residency training. PGY2 education was much less common, with 39 (22.0%) of the respondent institutions reporting that at least one pharmacist had completed an emergency medicine residency and 6 (3.4%) reporting that all of its pharmacists had completed advanced residency training. PGY2 training in areas other than emergency medicine was reported by 59 (33.3%) of responding institutions. Board certification in pharmacotherapy was common, with 145 (81.9%) of institutions reporting that at least one pharmacist had this credential and 62 (35.0%) report-

ing that all of their pharmacists had earned it. In contrast, a small number of institutions ($n = 13$, 7.3%) reported that at least one pharmacist had Board of Pharmacy Specialties certification in an area other than pharmacotherapy; likewise, a small number ($n = 5$, 2.8%) had pharmacists who had earned the DABAT designation.

Staffing structure. Hours of pharmacist coverage reported for weekdays and weekends are shown in Table 2. Approximately 68% of institutions provided more than eight hours of coverage during each weekday, and 49% of institutions provided more than 8 hours of coverage on weekend days. Typical coverage shifts are reported in Table 3.

The median length of time that pharmacy services had been offered in the ED was 3.0 years (IQR, 2.0–4.5 years). The total distribution of ED

pharmacy program longevity was as follows: less than 1 year, 11.0% ($n = 18$); 1–2 years, 22.6% ($n = 37$); 3–4 years, 25.0% ($n = 41$); 5–6 years, 16.5% ($n = 27$); 7–8 years, 12.2% ($n = 20$); 9–10 years, 5.5% ($n = 9$); and 11 or more years, 7.3% ($n = 12$).

Activities. Survey respondents were asked to estimate the amount of time pharmacists spent engaged in different activities. “Clinical activities” was the activity category with the greatest reported time commitment, accounting for 25% (IQR, 15–40%) of pharmacist time; these activities included pharmacotherapy consultations, drug information requests, toxicology recommendations, patient education, microbiological culture and susceptibility testing follow-up for treatment of patients, and similar activities. The next most commonly reported activities were emergency response (median pharmacist time commitment, 15%; IQR, 10–20%), defined as responding to emergencies such as medical cardiopulmonary arrest, trauma resuscitation, myocardial infarction (MI), and stroke (and similar time-dependent activities); and order processing (median time commitment, 15%; IQR, 5–25%), including order verification, order entry, medication procurement, and similar activities. Other, less common activities included medication reconciliation/history-taking activities (median time commitment, 10%; IQR, 5–25%), which were not defined specifically in the survey; teaching (median time commitment, 10%; IQR, 5–15%), which included precepting students or residents; administrative activities (median time commitment, 5%; IQR, 0–10%), which included accreditation activities, committee work, operations oversight, order set development, and similar activities; and scholarly activities (median time commitment, 0%; IQR, 0–5%), which were not defined specifically in the survey.

Clinical responsibilities. To further delineate the clinical activities performed by pharmacists in the ED setting, respondents were asked to

describe all additional activities performed by pharmacists physically present in the ED. Clinical activities reported by at least 90% of respondents included medication dose recommendations based on patient-specific factors and organ dysfunction (95.2%, $n = 159$), drug interaction analysis (94.6%, $n = 158$), drug identification (92.2%, $n = 154$), drug compatibility investigation (98.8%, $n = 165$), and bedside response for high-priority patients (97.6%, $n = 163$).

Pharmacist engagement in activities in the categories of medication selection based on diagnosis, monitoring of medication therapy, and medication therapy management was reported by 86.8%, 82.6%, and 84.4% of respondents, respectively. (Because the types of activities that might be classified as medication therapy management may not have been intuitive to respondents, an example [titration of vasoactive infusions] was provided. Examples of activities in the category of targeted disease state counseling were also provided; these included counseling patients with anticoagulation disorders, asthma, and chronic obstructive pulmonary disease.) The proportion of respondents reporting pharmacist involvement in each activity category is shown in Table 4.

A subsequent question probed respondents about institutional expectations regarding pharmacists' physical presence in the ED for responses to time-dependent emergencies (e.g., cardiopulmonary arrest [in or outside the ED], stroke, MI, trauma or burn injuries, high-priority medical events, sepsis, procedural sedation for patients in the ED). Nearly universally (99.4%, $n = 161$), survey participants reported that pharmacists responded in cases of cardiopulmonary arrest in the ED; 44.5% ($n = 77$) reported that pharmacists responded in cases involving cardiopulmonary arrest outside the ED. The survey data reflected a general expectation that pharmacists respond to other emergent or critical situations in the ED, including stroke (98.2%, $n = 159$), MI (93.2%,

$n = 151$), high-priority medical events (92.0%, $n = 149$), sepsis (83.3%, $n = 135$), trauma or burn injuries (82.7%, $n = 134$), and procedural sedation (72.2%, $n = 117$).

Educational activities. Respondents were asked about education-related activities, including providing inservices to the emergency medicine team, patient education, and precepting (pharmacy students and residents). The teaching activity most commonly reported by survey respondents (81.4%, $n = 131$) was pharmacy student precepting in advanced pharmacy practice experiences. Data on reported pharmacist involvement in various teaching activities are presented in Table 5.

Medication reconciliation history-taking activities. Medication reconciliation/history-taking activities were explored to determine if pharmacists were involved with those processes in the ED. The majority of institutions (77.8%, $n = 130$) indicated that pharmacists practicing in the ED were involved in these activities. The survey requested that respondents characterize current ED pharmacist involvement in medication reconciliation/history-taking activities, as well as their opinion of an appropriate level of involvement, according to predefined responses ranging from "routinely perform for most patients in the ED" to "other pharmacy personnel are primarily responsible" to "none." The results are shown in Table 6.

Order processing. With regard to processing of medication orders through automated dispensing cabinets (ADCs), the survey data indicated that "auto-verify" functionality was used for all medication orders at 28.3% ($n = 47$) of institutions, for targeted medication orders at 39.8% ($n = 66$) of institutions, and not at all at 31.9% ($n = 53$) of institutions. Prospective review of medication orders was performed by the pharmacist physically present in the ED the majority of the time (63.4%, $n = 97$); other reported review methods were central or inpatient pharmacist order verification

(35.3%, $n = 54$) and review by a pharmacist working in an area of the hospital other than the ED (1.3%, $n = 2$). About half of the institutions reported retrospective review of some medication orders (50.3%, $n = 84$); of those institutions, some (18.1%, $n = 30$) reported targeted retrospective review of select medication orders or classes of medications, and the remainder (32.5%, $n = 54$) reported retrospective review of orders that were not prospectively reviewed. Order processing for patients physically in the ED but with inpatient status and waiting for a bed (i.e., "boarded patients") was the primary responsibility of the pharmacist physically present in the ED at 56.4% of responding institutions ($n = 88$) and the responsibility of a central or inpatient pharmacist at 42.3% of institutions ($n = 66$); the remainder (1.3%, $n = 2$) reported that order processing in such cases was the responsibility of a pharmacist working in an area of the hospital other than the ED.

With the aim of garnering opinions about medication order processing, respondents were asked to select an order-processing scenario that they thought should be the primary responsibility of the pharmacist practicing in the ED. More than a third (37.7%, $n = 60$) felt that orders for all patients in the ED should be processed by an ED-based pharmacist, 26.4% ($n = 42$) thought orders should be processed by an ED-based pharmacist only if the patient required direct patient care by the pharmacist in the ED, and 13.2% ($n = 21$) felt that all medication orders for any patient in the ED who was not a boarded patient should be processed by an ED-based pharmacist. Similar proportions of respondents felt that an ED-based pharmacist should process orders for medications not stored in ADCs for ED patients only (10.1%, $n = 16$) or for all patients (9.4%, $n = 15$). A small minority of respondents (3.1%, $n = 5$) felt that medication order processing should not be done by the pharmacist present in the ED.

Medication administration. Nearly one in four institutions reported per-

mitting medication administration by pharmacists practicing in the ED (24.6%, $n = 41$). There were 37 respondents who answered follow-up questions on when medication ad-

ministration occurred; universally, the response option “emergent situations” (e.g., cardiopulmonary arrest) was selected. Substantial proportions of respondents reported that pharmacists

practicing in the ED administered medications during procedural sedation (29.7%, $n = 11$) and in response to nonemergent orders (18.9%, $n = 7$).

Discussion

The survey described here was the first national survey pertaining to the types of pharmacy services provided in U.S. EDs since the start of a period of rapid growth of this practice specialty. Previous surveys in this area have primarily focused on academic EDs.^{8,11} Interestingly, a majority of institutions with ED pharmacy services that responded to the survey were community hospitals rather than academic medical centers; this is reflective of the distribution of U.S. institutions in general. Also, most responses received were from larger institutions with relatively high ED patient volumes. For instance, only 5% of respondents reported less than 20 ED beds; this is likely because larger ED size and patient volume may make pharmacist positions more justifiable both clinically and financially. An unexpected finding was that a large proportion of institutions (approximately 80%) had an ED satellite pharmacy. The use of satellite pharmacies in the ED continues to be debated. One potential drawback of a satellite is the physical separation of the pharmacists, which may lead to decreased interprofessional interaction. However, the majority of pharmacists surveyed reported being involved in important clinical activities.

There appears to have been a shift in practice in the past five years, with a greater proportion of pharmacists being involved in clinical activities. For instance, in the aforementioned previous survey of academic EDs,¹¹ about 50% of institutions performed the listed clinical activities (e.g., drug information provision), and the most common activity was related to inventory management. However, our survey indicated that more than 90% of institutions were performing most clinical functions listed in the survey. Similarly, pharmacist participation

Table 4. Clinical Activities of Pharmacists in Emergency Departments

Activity Category	No. (%) Respondents ($n = 167$)
Drug compatibility investigation	165 (98.8)
Bedside response for high-priority patients	163 (97.6)
Drug dosing based on organ dysfunction	159 (95.2)
Drug interaction analysis	158 (94.6)
Drug identification	154 (92.2)
Medication selection based on diagnosis	145 (86.8)
Monitoring of medication therapy	141 (84.4)
Medication therapy management	138 (82.6)
Medication reconciliation/history-taking	130 (77.8)
Error and adverse drug event reporting	130 (77.8)
Bedside toxicology management	118 (70.7)
Targeted disease state counseling	92 (55.1)
Culture and sensitivity testing follow-up	66 (39.5)
Medication administration	60 (35.9)
Vaccine administration	10 (6.0)

Table 5. Teaching Activities of Pharmacists Practicing in Emergency Departments^a

Activity	No. (%) Respondents ($n = 161$)
Inservices/conferences	
Prehospital provider	42 (26.1)
Emergency provider	118 (73.3)
Emergency nursing staff	130 (80.8)
Pharmacy student education	
IPPE	72 (44.7)
APPE	131 (81.4)
Postgraduate pharmacist education	
PGY1 residency	122 (75.8)
PGY2 residency, emergency medicine	25 (15.5)
PGY2 residency, other	48 (29.8)
Bedside education provided to emergency medicine team	111 (68.9)

^aIPPE = introductory pharmacy practice experience, APPE = advanced pharmacy practice experience, PGY1 = postgraduate year 1, PGY2 = postgraduate year 2.

Table 6. Pharmacist Involvement in Medication Reconciliation/History-Taking Activities in Emergency Departments

Level of Involvement ^a	No. (%) Respondents		p
	Current ^b (n = 129)	Appropriate ^c (n = 166)	
Routinely perform for most patients in emergency department	6 (4.7)	5 (3.0)	0.542
Routinely target certain patient groups	39 (30.2)	35 (21.1)	0.079
Only for patients admitted to hospital	23 (17.8)	16 (9.6)	0.056
Only based on emergent need for information on critical patient	39 (30.2)	44 (26.5)	0.515
Other pharmacy personnel are primarily responsible	22 (17.1)	65 (39.2)	<0.001
None	0	1 (0.6)	... ^d

^aSurvey respondents were asked to choose one of the six predefined responses listed.

^bCurrent status, as reported by survey respondents.

^cPerceived as appropriate by survey respondents.

^dNot applicable.

in cardiopulmonary resuscitation responses was reported by 58.8% ($n = 17$) of respondents to an early survey of ED pharmacists⁸ but was reported nearly universally (97.6% of respondents) in our study; this is positive and highlights the gradual assimilation and utilization of pharmacists in direct patient care activities. Our findings are generally aligned with the overall thrust of the recommendations in the ASHP guidelines issued in 2011¹⁰: pharmacist involvement in direct patient care in EDs is essential.

Ideally, clinical pharmacy services should be provided in the ED setting 24 hours a day and seven days a week. Our results show coverage differences based on the hour of the day and the day of the week. For example, more than a third of surveyed institutions with ED pharmacy services did not provide any weekend coverage. This pattern does not follow typical patient volumes, because weekends may be particularly busy in the ED setting. However, our results show that 70–80% of institutions with pharmacist ED coverage provided evening coverage, whereas only 30–40% provided morning coverage; this is opposite to the coverage pattern in most clinical pharmacy practices, where services are more likely to be provided earlier in the day because that is when traditional patient rounding by interpro-

fessional teams occurs. However, patient rounding in the traditional sense does not occur in the ED setting, and patient volumes usually peak in the afternoon and evening hours. After-hours, when other clinical pharmacy services may be limited, the ED pharmacist is in a good position to be a resource for providers at the institution. Administrators should consider this important function when justifying ED services.

Medication reconciliation/history-taking and the role of the ED pharmacist in those activities continue to evolve as pharmacy technicians and other staff members become involved in those important functions.¹² A survey of hospital administrators suggested that pharmacists should routinely be involved in medication reconciliation, assuming primary responsibility for this activity¹³; however, 39.8% of survey respondents agreed that the pharmacist in the ED should have no role in routine medication history-taking or reconciliation and that other staff members should be responsible. Our survey found that most surveyed ED pharmacists (82.9%) were engaged in this activity, but only a small portion (4.7%) reported that pharmacists were routinely completing this activity for most patients in the ED, with the majority of that effort focused on targeted patient groups, patients who were ad-

mitted, and cases posing an emergent need for medication history-taking. It is informative that consistently, in all categories, the survey respondents indicated that pharmacist involvement in medication history-taking and reconciliation should be lessened. Thus, there appears to be a gap in the vision for transitions-of-care activities between hospital administrators and pharmacy practitioners in the ED. This is an important issue that needs to be addressed as EDs move forward in developing the role of pharmacists and determining the pharmacist activities they consider to be the most valuable for patient care.

The ASHP guidelines recommend a triage system for medication order review.¹⁰ Our results likely reflect this approach because the use of auto-verify functionality was common, the pharmacist practicing in the ED was primarily responsible for order processing for ED and boarded patients, and retrospective review of medication orders was done by about half of respondents.

Although the estimated response rate for the survey was 58.3%, its electronic distribution was limited to members of two professional pharmacy organizations' emergency medicine specialty sections. Since the two list-servers used had a number of student and resident members, it is possible

that some students and residents may have completed the survey. However, to mitigate this possibility, we invited members who were the most senior practicing pharmacists in the ED to complete the survey. Members of the ACCP and ASHP listservers do not represent all ED practitioners; therefore, the findings may not be generalizable. In addition, the reliability of the study data depends on the accuracy of data provided by the respondents. The responses could not be validated; however, the findings are generally consistent with expected results.

Conclusion

Pharmacists from academic and community EDs perform a variety of clinical, educational, and administrative activities.

Disclosures

The authors have declared no potential conflicts of interest.

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