

# Critical Care Pharmacist Market Perceptions: Comparison of Critical Care Program Directors and Directors of Pharmacy

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## Abstract

**Background:** While hospital beds continue to decline as patients previously treated as inpatients are stabilized in ambulatory settings, the number of critical care beds available in the United States continues to rise. Growth in pharmacy student graduation, postgraduate year 2 critical care (PGY2 CC) residency programs, and positions has also increased. There is a perception that the critical care trained pharmacist market is saturated, yet this has not been evaluated since the rise in pharmacy graduates and residency programs. **Purpose:** To describe the current perception of critical care residency program directors (CC RPDs) and directors of pharmacy (DOPs) on the critical care pharmacist job market and to evaluate critical care postresidency placement and anticipated changes in PGY2 CC programs. **Methods:** Two electronic surveys were distributed from October 2015 to November 2015 through Vizient/University HealthSystem Consortium, American Society of Health-System Pharmacists (ASHP), Society of Critical Care Medicine, and American College of Clinical Pharmacy listservs to target 2 groups of respondents: CC RPDs and DOPs. Questions were based on the ASHP Pharmacy Forecast and the Pharmacy Workforce Center's Aggregate Demand Index and were intended to identify perceptions of the critical care market of the 2 groups. **Results:** Of 116 CC RPDs, there were 66 respondents (56.9% response rate). Respondents have observed an increase in applicants; however, they do not anticipate increasing the number of positions in the next 5 years. The overall perception is that there is a balance in supply and demand in the critical care trained pharmacist market. A total of 82 DOPs responded to the survey. Turnover of critical care pharmacists within respondent organizations is expected to be low. Although a majority of DOPs plan to expand residency training positions, only 9% expect to increase positions in critical care PGY2 training. Overall, DOP respondents indicated a balance of supply and demand in the critical care trained pharmacist market. In comparing RPD and DOP perceptions of the demand for critical care pharmacists, DOPs perceived demand to be higher than RPDs (mean, 3.2 vs 2.8;  $P = .032$ ). **Conclusion:** Although there is a perception of the oversupply of critical care trained pharmacists, a survey of DOPs and CC RPDs found a market with positions available, rapid hiring, stable salaries, and plans for expanded hiring of critical care trained pharmacists.

## Keywords

critical care, employment, pharmacy, pharmacy residencies, pharmacists, students, surveys

The profession of pharmacy, and health care more broadly, is experiencing an epic transition in care models toward preventive medicine, performance-based financial incentives, and unique third-party partnerships, all of which are designed to improve patient care and ensure resource sustainability. As a result, some health system pharmacy departments have shifted their focus from expanding acute care services toward increasing pharmacy presence in ambulatory settings. In a 2015 survey, the American Hospital Association reported a decrease in the number of US hospitals from 5795 in 2009 to 5686 in 2014, with an associated 29 764 total bed number decrease.<sup>1</sup> Paradoxically, the same report noted that the

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number of critical care beds increased from 67 579 to 77 809 (15%) between 2006 and 2010. The reasons for these changes are multifactorial and emphasize the increased acuity in our inpatient population. However, despite this growth, the number of pharmacists providing direct patient care in intensive care units (ICUs) has remained stagnant from the 1980s to 2006.<sup>2,3</sup> This is surprising, considering that many studies have described the positive impact that critical care pharmacists have on patient care, quality metrics, and financial goals for organizations.<sup>4-8</sup> Furthermore, the Society of Critical Care Medicine (SCCM) recognizes pharmacists as an integral part of the critical care team.<sup>9</sup>

On the supply side, the pipeline of pharmacy school graduates pursuing a career in health system pharmacy has continued to increase over the years. The Association of Colleges of Pharmacy described an increase in the number of students pursuing hospital employment or residency training in its annual Graduating Student Survey.<sup>10,11</sup> Approximately 28% (n = 2067) of students reported a plan to pursue employment as a hospital pharmacist upon graduation from their college/school of pharmacy in 2010 compared with 35% (n = 3510) in 2015. Furthermore, 23% (n = 1708) of students indicated their plan to pursue pharmacy residency upon graduation in 2010 compared with 27% (n = 2729) in 2015.

With the growing number of postgraduate year 2 critical care (PGY2 CC) residency programs in the United States, the number of employable advanced trained critical care pharmacists is increasing substantially. In 2011, there were 79 PGY2 CC programs encompassing 103 resident positions participating in the Match. This increased to 116 programs and 156 positions in 2015.<sup>12,13</sup> With the increasing supply in highly trained critical care pharmacists and pressures to expand pharmacist presence in the ambulatory setting, this project sought to evaluate the dichotomy of care needs, focusing on current trends in critical care through an assessment of critical care and health system pharmacy leaders. The primary aim of this study was to describe the current perception of critical care residency program directors (CC RPDs) and directors of pharmacy (DOPs) on the critical care pharmacist job market and to compare those perceptions. Secondary aims were to evaluate critical care postresidency placement and anticipated changes in PGY2 CC programs.

## Methods

### Survey Design and Development

Survey questions were developed independently by project members of the Professional Development and Workforce Committee (PDWC) of Vizient/University HealthSystem Consortium (UHC). Questions were structured similar to the American Society of Health-System Pharmacists (ASHP) Pharmacy Forecast<sup>14</sup> and workforce perceptions were structured similar to the Pharmacy Workforce Center's Aggregate Demand Index<sup>15</sup> to gain insight on practice and workforce

trends within critical care. These methods have been validated previously.<sup>14,15</sup> To compare perceptions, responses of high demand were given a value of 5 and responses of low demand were given a value of 1. Critical care position was defined within the survey as a pharmacist assigned to an ICU pharmacy or whose primary responsibility (>50% of time) was to critical care patients. Each question was revised through an iterative process consisting of individual review by other committee members and submission to the survey committee for final testing and approval. Reliability was ensured through a test-retest process until question responses were consistent. Questions were grouped together logically to collect organizational demographics followed by positions, hiring practices, and market perceptions. Using Qualtrics (Provo, Utah), survey questions were distributed electronically.

### Participants

The Vizient PDWC surveyed member institutions and listservs hosted by ASHP, SCCM, and the American College of Clinical Pharmacy (ACCP) to assess critical care pharmacy staff needs. Survey participants were selected based on the title of PGY2 CC RPD and DOP. Two different surveys were sent out in October 2015. The first survey, titled Critical Care Pharmacy Residency Program Directors Survey, was targeted to CC RPDs or those associated with those programs. This survey was sent to the following listservs: Vizient/UHC Residency Program Directors (focus on CC RPDs), ASHP Connect—Section of Clinical Specialists and Scientists, SCCM Critical Care Residency Program Directors, and ACCP. A second survey, the Directors of Pharmacy Survey, was targeted to respondents in DOP or pharmacy leadership roles. This survey was sent to the following listservs: Vizient/UHC Directors of Pharmacy, ASHP Connect—Pharmacy Practice Managers, and ASHP Connect—Pharmacy Leadership.

### Statistical Analysis

Data were downloaded into an electronic spreadsheet and summarized using descriptive statistics. The primary outcome of the study was to describe the perception of the demand for critical care trained pharmacists among current CC RPDs and DOPs in the United States through self-reported market perceptions. The CC RPD question number 15 and DOP question number 7 were compared using 1-way analysis of variance.

## Results

### Critical Care Pharmacy Residency Program Directors Survey

From October 6, 2015, to October 26, 2015, 66 respondents completed the CC RPD survey. In 2015, there were 116 PGY2 CC programs; this resulted in a response rate of

**Table 1.** Critical Care Pharmacy Residency Program Directors Survey Results: Interest and Positions.

	n (%) <sup>a</sup>	Mean ± SD
Over the past 5 years, how many CC residents have completed your program?		6.2 ± 3.7
2015 CC applicants	43	12.4 ± 9.3
No response (early commitment)	21 (31.8)	
No response (did not participate in Match)	2 (3.0)	
Over the past 5 years, has the number of applicants:		NA
Increased (5% more applicants)	30 (45.4)	
Stable	16 (24.2)	
Decreased (5% fewer applicants)	5 (7.6)	
Unknown (early commitment precluded Match process)	12 (18.2)	
Unknown (do not have records)	3 (4.5)	
How many PGY2 CC residents did you have during the 2014-2015 residency year?		1.5 ± 0.9
0	3 (4.5)	
1	39 (59.1)	
2	14 (21.2)	
3	8 (12.1)	
4	1 (1.5)	
5	1 (1.5)	
How many PGY2 CC residents do you plan to have during the 2015-2016 residency year?		1.5 ± 0.7
1	43 (65.2)	
2	16 (24.2)	
3	6 (9.1)	
4	1 (1.5)	
Over the next 5 years, do you plan to expand the number of CC resident positions?		NA
Yes	24 (37.5)	
No	40 (62.5)	
In the next 5 years, do you plan to develop a fellowship or PGY3 program?		NA
Yes	4 (6.3)	
No, RPD not interested	19 (30.2)	
No, department/organization not interested	15 (23.8)	
Unsure	25 (39.7)	

Note. CC = critical care; NA = not applicable; PGY2 = postgraduate year 2; PGY3 = postgraduate year 3; RPD = residency program director.

<sup>a</sup>Percentages are for individual question responses not of total survey respondents.

56.9%. The average number of ICU beds in the surveyed sample was 114.

**Applicants and positions.** The median number of graduates from each critical care residency program over the past 5 years was 5 (interquartile range, 3-8) or a median of 1 per year per program (Table 1). Survey respondents indicated that there has been an increase in applicants to residency programs, with most respondents seeing a greater than 5% increase in applicants. In contrast to this increase in applicants, most respondents (63%) do not expect the number of PGY2 CC residency program positions to expand at their institution over the next 5 years.

CC RPDs expect a stable to slight decrease in the number of positions over the next year (1.51 this year to 1.47 next year). In addition, CC RPDs were asked about their interest

in developing a fellowship or postgraduate year three (PGY3) in critical care. There was minimal interest in developing either of these programs, with only 4 of the 53 respondents indicating that they had plans to develop such a program. All 4 were at academic medical centers with an average of 155 ICU beds.

**Market perception.** CC RPDs perceive that job prospects for PGY2 critical care trained individuals continue to appear in balance with supply (Table 2). They indicated that the number of CC positions at their organizations has remained stable over the past 5 years. The large majority of PGY2 CC graduates were able to find a job working in critical care, most with an organization other than the one where they completed their PGY2 (Table 3). RPDs also believe that their

**Table 2.** Critical Care Pharmacy Residency Program Directors Survey Results: Market Perception.

	n (%) <sup>a</sup>	Mean ± SD
Over the past 5 years, CC positions at your organization have:		NA
Increased	20 (30.8)	
Remained stable	44 (67.7)	
Decreased	1 (1.5)	
How easy would it be for you or a peer to find alternative CC employment?		NA
Very easy (<1 month)	2 (3.2)	
Easy (1-3 months)	29 (46.0)	
Difficult (3-6 months)	23 (36.5)	
Very difficult (>6 months)	9 (14.3)	
What is your perception of the CC pharmacist market in your area?		NA
High demand: difficult to fill open positions	1 (1.6)	
Moderate demand: some difficulty filling open positions	18 (29.0)	
Demand is in balance with supply	17 (27.4)	
Demand is less than the available supply	20 (32.3)	
Demand is much less than the available supply	6 (9.7)	
In the past 5 years, how many CC pharmacists have left the organization (primary responsibility >50% in ICU setting)?		2.0 ± 1.9

Note. CC = critical care; ICU = intensive care unit.

<sup>a</sup>Percentages are for individual question responses not of total survey respondents.

**Table 3.** Initial Positions Following Critical Care PGY2 Training by Year.<sup>a</sup>

	2014-2015	2013-2014	2012-2013	2011-2012	2010-2011	Total
Internal position in critical care	20 (29.9%)	14 (20.9%)	19 (30.2%)	16 (27.6%)	19 (38.8%)	88
External position in critical care	35 (52.2%)	40 (59.7%)	34 (54.0%)	29 (50.0%)	22 (44.9%)	160
Internal position non-critical care	8 (11.9%)	9 (13.4%)	4 (6.3%)	3 (5.2%)	2 (4.1%)	26
External position non-critical care	3 (4.5%)	3 (4.5%)	4 (6.3%)	5 (8.6%)	4 (8.2%)	19
Fellowship/PGY3	0 (0.0%)	0 (0.0%)	1 (1.6%)	1 (1.7%)	0 (0.0%)	2
Nonpharmacy position	1 (1.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1
NA; did not have a resident	0 (0.0%)	1 (1.5%)	1 (1.6%)	4 (6.9%)	2 (4.1%)	8
Total	67	67	63	58	49	304

Note. PGY2 = postgraduate year 2; NA = not applicable; PGY3 = postgraduate year 3.

<sup>a</sup>Percentages are for individual question responses not of total survey respondents.

peers would have a moderately easy time finding new employment in critical care, with a job search taking between 1 and 6 months.

When asked about their perception of the current job market and how they would advise students who were interested in pursuing a PGY2, CC RPDs indicated that ambulatory care, emergency medicine, and hematology/oncology had the best job prospects for PGY2 training over the next 5 years, while psychiatry had the worst (Table 4).

### Directors of Pharmacy Survey

From October 6, 2015, to November 2, 2015, 82 respondents completed the DOP survey. The average bed size of participating organizations was 410 beds (range, 25-2153). The average number of full-time equivalent (FTE) inpatient

pharmacists was 39, with an average of 3.9 FTEs responsible for critical care.

**Critical care pharmacist turnover.** Turnover of critical care pharmacists was quite low according to the DOP survey, with an average of 0.95 pharmacists leaving an organization over the past 5 years. In contrast to the RPD group, the DOP group indicated that they expected an increase in critical care trained pharmacist positions, with the average expected growth over the next 5 years being 1.25 FTEs. When asked to describe their critical care pharmacist hiring practices over the past 5 years, the DOP group overwhelmingly supported hiring PGY2 CC trained pharmacists for these positions; an average of 1.4 PGY2 CC pharmacists were hired over the past 5 years, with 1.3 of these being PGY2 CC trained (Table 5).

**Table 4.** Critical Care Pharmacy Residency Program Directors Survey Results: Job Prospect Perception Following Various PGY2 Programs.<sup>a</sup>

	Mean	SD
Critical care	4.5	2.3
Ambulatory care	3.4	2.3
Emergency medicine	3.5	1.8
Administration	5.8	2.8
Infectious diseases	5.6	2.2
Internal medicine	6.2	2.5
Hematology/oncology	3.6	2.6
Pediatrics	6.6	2.1
Psychiatry	9.2	1.3
Solid organ transplant	6.7	2.7

Note. Responses were rated from 1 = best job prospects to 10 = worst job prospects. PGY2 = postgraduate year 2.

<sup>a</sup>Percentages are for individual question responses not of total survey respondents.

**Market perception.** The DOP group felt that overall inpatient pharmacist demand was in balance with supply and salaries were primarily increasing or remaining stable (Table 6). Of the 10 institutions that noted high demand, 9 were at community hospitals and 7 had fewer than 100 beds. Of the 27 institutions that noted moderate demand, 6 were academic medical centers. Infrequently, organizations have pharmacists applying for technician-level positions. There appears to be moderate demand for critical care trained individuals, with most DOPs indicating some difficulty filling critical care positions. DOPs perceived demand for critical care pharmacists to be higher than RPDs (mean, 3.2 vs 2.8;  $P = .032$ ). DOPs also felt that there was a balance of critical care training in the current market. A majority of respondents indicated that they had plans to expand their pharmacy residency program over the next 5 years, but only 9% plan to increase their critical care residency program. Those institutions looking to expand ranged in size from 75 to 1450 beds. Of the 8 institutions responding they would expand their program, 6 would be new programs (5 in community hospital and 1 in an academic medical center) and 2 would be expanding existing critical care programs (both in academic medical centers). The new programs tended to be in organizations with recent turnover in critical care pharmacists (6 of 8). The DOPs indicated a high affinity for hiring their own residents, with a majority indicating they were planning on hiring 4 or more of their current residents. The director survey also indicated that pharmacist salaries have remained stable or slightly increased over the past 5 years.

**Student training perceptions.** With the increase in clinical pharmacy practice models and an increase in colleges of pharmacy across the country, the idea of dual training tracks for pharmacy students is occasionally proposed. One track would focus on retail dispensing roles, while the other would track students into health systems and residency programs.

The 2 surveyed groups had very different thoughts on this direction of pharmacy training. A majority (54%) of the CC RPD group supported this idea, whereas only 22% of the DOP group was in support.

## Discussion

This survey sought to determine the perception of supply and demand of critical care positions in the current clinical pharmacy job market. With the consistent rise in both the number of student pharmacists pursuing postgraduate residency programs and the number of programs and positions available for critical care pharmacy training, many respondents perceived that a shortage exists in availability of critical care-focused job opportunities.

Despite this perception, which was the motivation for the current survey, current CC RPDs appear to be of the opinion that despite an increase in applications over the last 5 years, programs have limited plans for an increased number of critical care pharmacy residency positions. This may indicate that the critical care training market is well matched for the available critical care positions but is increasingly unable to meet the interests of students. Student pharmacists may need to consider pursuing other associated specialties if they are unable to match in a relatively flat PGY2 CC market.

Despite a perception of a flooded market for critical care specialized clinical pharmacists and recent surveys suggesting the stagnant nature of the critical care pharmacy job market, the surveyed individuals report a job market very much in balance. CC RPDs stated that critical care job availability within their organizations has increased or remained stable over the past 5 years. There appear to be some inconsistencies in opinions though, as CC RPDs reported the majority of their program graduates finding jobs in critical care within a short job search period but did not rank critical care as a high-ranking job prospect for future pharmacists. This could be the result of a decreasing number of CC PGY2s taking critical care positions internal to the training organization and slight rise in the number of residents who take non-critical care positions internal to the organization. With the focus on internal positions, the perception is market saturation. This is despite survey results that describe rapid filling of critical care positions and a job market that has promise for increased availability of critical care pharmacist positions over the next 5 years. It appears that despite CC RPDs' low ranking of job availability in critical care, DOPs actually plan to continue to increase the number of critical care trained pharmacists on staff. The sense of imbalance in the market that was felt by CC RPDs could also be related to the fact that after significant recent growth in residency training programs, there are indeed more critically care trained pharmacists than ever before.

Both RPDs and DOPs felt that there was adequate balance of supply and demand of critical care pharmacists, but DOPs appear to highly value the critical care pharmacist, describing them as a group that is sought after and identifying future need for more critical care positions. In fact, DOPs felt that

**Table 5.** Directors of Pharmacy Survey Results: Positions.

	n (%)	Mean ± SD
In the past 5 years, how many CC pharmacists have left the organization?		1.0 ± 1.6
In the next 5 years, how many CC positions do you estimate will become available?		1.3 ± 1.8
How many inpatient pharmacist FTE vacancies do you currently have?		1.1 ± 1.9
How many CC pharmacist FTE vacancies do you currently have?		0.1 ± 0.4
How many of your nonadministrative residents do you intend to hire?		
Do not have pharmacy residents	37 (51.4)	
0	6 (8.3)	
1-2	0 (0)	
3-4	0 (0)	
>4	29 (40.3)	
How many of your CC residents do you intend to hire?		1.0 ± 0.3
Do you plan to expand the number of pharmacy resident positions in the next 5 years?		
Yes, ≥3 new positions	10 (12.8)	
Yes, 1-2 positions	30 (38.5)	
No	38 (48.7)	
Do you plan to expand the number of CC pharmacy resident positions in the next 5 years?		
Yes, ≥2 new positions	1 (1.3)	
Yes, 1 position	7 (8.9)	
No	70 (89.7)	

Note. CC = critical care; FTE = full-time equivalent.

**Table 6.** Directors of Pharmacy Survey Results: Pharmacist Market Perception.

	N (%)
How have initial (starting) salaries for residency trained inpatient pharmacists changed at your organization?	
Increased (>\$1000/y)	28 (38.4)
Remained stable	40 (51.3)
Decreased (<\$1000/y)	5 (6.4)
Have you had any licensed pharmacists apply for technician-level positions at your organization?	
Yes	4 (5.0)
No	75 (95.0)
What is your perception regarding the market for inpatient pharmacists in your area?	
High demand: difficult to fill open positions	9 (10.7)
Moderate demand: some difficulty filling open positions	22 (26.2)
Demand is in balance with supply	21 (25.0)
Demand is less than the available supply	26 (30.9)
Demand is much less than the available supply	6 (7.1)
What is your perception regarding the market for critical care trained pharmacists in your area?	
High demand: difficult to fill open positions	10 (11.8)
Moderate demand: some difficulty filling open positions	27 (31.8)
Demand is in balance with supply	25 (29.4)
Demand is less than the available supply	16 (18.8)
Demand is much less than the available supply	7 (8.2)

there is significantly higher demand in the market place for critical care trained pharmacists than the CC RPDs. The role and scope of a critical care pharmacist was not defined in this analysis, so there may be a difference in the opinions between the CC RPDs and DOPs. DOPs indicated that critical care pharmacists could be hired for various positions, even those outside of critical care. Critical care pharmacists training may make them a preferred hire for a variety of settings. Additional review of the definition and scope of a critical care pharmacist may be necessary, as there appears to be a discrepancy in opinions.

The extreme dichotomy that existed between the groups related to potential for dual track degrees likely resulted from varying interests and areas of day-to-day practice. It is not surprising that a group of critical care-focused pharmacists would value the idea of a tracked pharmacy degree that would allow a student pharmacist to focus primarily on the clinical care of patients. DOPs may be more broadly engaged in the clinical and nonclinical experiences of patient care and not surprisingly have strong feelings against a pharmacy degree program that would limit exposure to nonclinical education.

Resident perceptions of critical care training and the job market have been infrequently examined. A survey conducted in 2012 included 45 CC PGY2 residents.<sup>16</sup> They had high rates of satisfaction with critical care training, with 91% satisfied with their program and 76% satisfied with their mentorship. Employment status immediately after training was 53.3% clinical pharmacy specialist in critical care, 22.2%

unknown, 11.1% clinical staff pharmacist in a critical care setting, 11.1% academic positions, and 2.2% clinical staff pharmacist in a non-ICU setting. This aligns with our findings for the same academic year and underscores the potential tightening in the market since this study. This study also noted that CC PGY2 residents had some of the lowest confidence and exposure in administration; this could help to explain some of the discrepancy in perceptions between the 2 groups and could offer an opportunity to realign with increased focus on administrative experiences within CC PGY2 training.

Limitations of this survey were the inability to determine the response rate for the DOP survey and the low overall number of responses. However, the response rate of nearly 60% of CC RPDs is considerable, and the results likely describe the opinion of the majority of the programs.

## Conclusion

Despite a perception of the lack of critical care pharmacy job opportunities, a survey of DOPs and CC RPDs describes a critical care pharmacy job market with availability, relatively rapid hiring patterns, and administrative plans for expansion of position availability and more opportunity for the care of critically ill patients. Opportunities for critical care trained pharmacists appear to be prevalent; however, the scope of the critical care pharmacy practice may need further analysis.

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