

Pharmacy emergency preparedness training as a PGY2 longitudinal rotation

Kristin Griebe, PharmD, BCCCP

Department of Pharmacy Services
Henry Ford Hospital
Detroit, MI

Christine Jiang, PharmD, BCPS

Department of Pharmacy Services
Henry Ford Hospital
Detroit, MI

Long To, PharmD, BCCCP

Department of Pharmacy Services
Henry Ford Hospital
Detroit, MI

Michael Peters, RPh, BCCCP, BCPS

Department of Pharmacy Services
Henry Ford Hospital
Detroit, MI

Nancy C. MacDonald, PharmD, BCPS, FASHP

Department of Pharmacy Services
Henry Ford Hospital
Detroit, MI

nmacdon1@hfhs.org

Disclosures: The authors have declared no potential conflicts of interest.

Keywords: disaster planning, emergency preparedness, mass casualty, pharmacy residencies

Existing emergency preparedness publications describe training for midlevel nurse manager and physician residency programs, including emergency medicine.¹⁻³ These programs identified emergency preparedness training as an important element for these clinicians and increased staff comfort and knowledge of various emergencies. Pharmacists also have a key role in preparing for and responding to emergencies, as seen in previous mass casualty events and the recent 2019 coronavirus disease 2019 (COVID-19) pandemic. Emergency management leaders at the local, state, regional, and federal levels rely on pharmacists to maintain medication supplies and pharmacy services during these events. Health-system pharmacists are responsible for the mitigation of and preparation for as well as response to these emergencies. The American Society of Health-System Pharmacists (ASHP) has published various documents that outline the pharmacist's role in planning for emergency preparedness, sustaining pharmacy services during emergencies, responding to disasters and managing a surge in patients.⁴⁻¹⁰ The recommendations from the ASHP Practice Advancement Initiative (PAI) 2030¹¹ also suggest that pharmacists participate in and assume key roles on emergency response teams, further reinforcing the hospital and health-system pharmacist's role in emergency preparedness and management.

Emergency preparedness training requires pharmacists to understand the 4 phases of disaster management (mitigation, preparedness, response, and recovery) to prepare for mass casualty and pandemic events. Additionally, pharmacists should understand regulatory requirements related to emergency management to ensure that hospitals meet elements of performance required for certification. Emergency preparedness training for future pharmacists is incorporated into the goals and objectives for some residency programs, including critical care and pharmacotherapy.^{12,13} However, the objectives tied to emergency preparedness are not required (Box 1), and consequently, not all of these programs formally

teach and evaluate these objectives. During the residency programs that occurred between 2017 and 2020, critical care programs evaluated the elective emergency preparedness objectives less than 7% of the time and pharmacotherapy programs less than 25% of the time (McCreadie S, McCreadie Group, Inc., personal communication, August 7, 2020). Although there are ASHP practice management standards, PAI recommendations, guidelines for health-system pharmacists, and training goals and objectives related to emergency preparedness, literature that describes training to achieve these residency goals and objectives is lacking.

The longitudinal emergency preparedness rotation for the critical care program was developed at the Henry Ford Hospital in Detroit, MI, in 2010, and the rotation was later incorporated into the pharmacotherapy program in 2017. Since incorporation of the rotation into these programs, 9 critical care and 3 pharmacotherapy residents have participated in the rotation. Before the start of each new residency year, the pharmacy department emergency preparedness coordinator and both residency program directors review and update the rotation activities to ensure that they achieve residency objectives and focus on key emergency management principles. This article provides an example of how postgraduate year 2 (PGY2) critical care and pharmacotherapy residency programs can design a longitudinal rotation to achieve ASHP residency objectives.

Rotation description. The emergency preparedness rotation is a required longitudinal rotation for both the critical care and pharmacotherapy residents at the Henry Ford Hospital. The residents work under the guidance of the pharmacy's emergency preparedness coordinator. The coordinator oversees the department's emergency preparedness of the 4 phases of disaster management (mitigation, preparedness, response,

and recovery) for internal and external emergencies. This includes regularly updating departmental emergency preparedness policies and procedures, performing pharmacy department drills, evaluating staff response to drills and real emergencies, and providing staff education. The coordinator is a member of the institution's emergency management committee and the state's regional healthcare coalition. Both residents become members and actively participate in these hospital and regional meetings. Quarterly evaluations are used to assess each resident's progress and achievement of related goals and objectives.

Emergency preparedness activities. The residents perform the activities for the pharmacy department, hospital and/or health system, region, and state, and they teach all phases of disaster management (Table 1). The pharmacy department activities include reviewing and updating the departmental emergency preparedness policies and procedures, performing pharmacy drills, and educating pharmacy team members. The residents also assist in performing a hazard vulnerability assessment for the pharmacy department. This assessment is used to proactively identify potential hazards to the department, the severity of the impact, and the resources needed during emergencies. The information is then used to update the departmental policies and procedures and to develop staff education.

The residents plan and perform drills for the pharmacy department. The coordinator identifies drill content based on after-action reports from previous emergencies, areas for improvement from recent hazard vulnerability assessments, regulatory requirements, and pharmacy staff input. The residents identify relevant procedures and policies related to the drill, conduct staff education sessions during biweekly staff huddles, perform drills for each shift, identify improvements needed, conduct follow-up staff education sessions, and complete after-action reports.

The residents learn the importance of a multidisciplinary, collaborative approach to planning by participating in the institution's emergency management committee. This interdisciplinary committee includes nursing, medical, pharmacy, security, environmental services, hospital administration, quality, facilities, radiology, and communications personnel. The residents participate in monthly meetings to discuss hospital, health-system, local, and national threats; mass casualty events; public health events; and general hospital emergency preparedness for these events. As members of this committee, they help complete a hospital hazards vulnerability assessment and plan hospital exercises to evaluate employee response. They also serve as the pharmacy representatives for hospital tabletop exercises, in which members of the committee verbally describe their department role and responsibility in responding to the event. Such exercises help identify policy or procedure gaps that can be addressed before exercise implementation. Through this local committee, the residents gain an understanding of the pharmacy's role in preparing for mass casualty events and other system vulnerabilities as well as the pharmacist's role on the institution's multidisciplinary committee.

Lastly, the residents participate in the regional emergency management committee to understand and contribute to risk mitigation and planning on a much broader scale. The Michigan Region 2 South (R2S) Coalition is a multidisciplinary team with representatives from 35 hospitals, 92 emergency medical services (EMS) agencies, 4 EMS medical control authorities, and 4 health departments within the southeastern region of Michigan. This committee is responsible for ensuring regional readiness and providing support for public health emergencies. The residents participate in tabletop exercises and an annual statewide Strategic National Stockpile ordering exercise, in which hospitals are given a mock mass

casualty scenario and are required to order additional supplies and medications using the online portal. Following this exercise, the residents complete and submit an after-action report. This exercise teaches the residents about the pharmacist's role in responding to mass casualty events. Their completed after-action report is used to support the Joint Commission regulatory requirements for hospital emergency preparedness exercises.¹⁴

Emergency management training certifications. The residents are required to complete training certifications that further describe the emergency management cycle (Box 1). They attend a Basic Disaster Life Support class, which is offered for free from the R2S Coalition. Using interactive case scenarios and discussions, the course teaches participants to identify, triage, and manage public health emergencies and disasters. After completing the course, residents are better prepared to manage a broad range of events. They also complete online training for 2 independent study classes through the Federal Emergency Management Agency website. The Introduction to the Incident Command System class is a basic class for individuals involved with emergency planning, response, and recovery. The class provides an overview of the incident command center principles, structure, and staff roles and outlines the incident command center relationship to the National Incident Management System. The Introduction to the National Incident Management System class explains how to manage resources and communicate during an incident and includes a description of common emergency management models. These classes provide the residents a more formal training, further preparing them for leadership roles in emergencies.

Resident role during hospital downtime and the COVID-19 pandemic. This rotation requires residents to participate in any real hospital or health-system emergencies. In the 2019-2020 residency year, the hospital had 2 actual events that required a significant

pharmacy response. The hospital experienced a 12-hour network downtime with limited access to the electronic medical record, email, and phones. This resulted in activation of the hospital and pharmacy department emergency policies and procedures. The residents helped redesign the inpatient pharmacy medication distribution service to maintain services, completed an after-action report for central pharmacy, and developed interventions to improve response to future internal emergencies. They also developed tools for the inpatient pharmacy staff to manage the emergency and staff reassignments in the future. The other significant event was the COVID-19 pandemic, in which the surge in patients and increased patient acuity have resulted in a significant increase in medications required for mechanical ventilation, including sedatives and neuromuscular blocking agents. The residents submitted the hospital's Strategic National Stockpile electronic request for these medications. Additionally, the critical care resident helped the multidisciplinary team revise the intensive care unit pain, agitation, and delirium guidelines for patients who are mechanically ventilated to provide alternative treatment options if first-line therapies could not sustain the large number of severely ill patients. These real-time events have brought the rotation activities to life by requiring the residents to respond quickly, redesign hospital pharmacy services, request medications from the Strategic National Stockpile, and develop alternative treatment options to sustain care. After evaluating the lessons learned from these real events, it was determined that the rotation activities were heavily designed around exercises and should have more clearly defined activities and roles for the residents during actual emergencies. Moving forward, their required activities during an actual emergency will include participating in the pharmacy incident command center, revising medication guidelines and/or policies, and designing the reallocation and structure of clinical and operational pharmacy services.

Feedback about the rotation. Feedback provided by the residents at the end of each year is used to improve the rotation activities for the following year. Most updates have centered around a streamlined role in pharmacy department exercises and actual emergencies. Residents also felt it would be helpful to have a suggested timeframe in which each activity should be completed to help them manage their time in a longitudinal rotation. When critical care residents who performed their residencies between 2010 and 2015 were surveyed, they recommended prospective candidates seek PGY2 critical care residencies with emergency preparedness activities. This recommendation suggests that these residency goals and objectives should be mandatory for critical care residency programs.

Emergency preparedness role after completion of residency training. Trainees who were hired to work at the hospital after graduation continue to have a role in the department's emergency preparedness planning and staff education. They mentor the residents in planning and executing pharmacy drills and serve as experts in the department. During the aforementioned network downtime event, these pharmacists took leadership roles to ensure department downtime procedures were implemented appropriately. They also helped complete the after-action report and design emergency preparedness tools to support redesigned clinical and operational services. During the pandemic surge, they helped manage critically ill patients, optimize medication therapy for patients with COVID-19, redesign critical care pharmacy services to support an increase in critical care patients, and modify medication protocols. Previous emergency preparedness training helped these pharmacists understand the rapidly changing environment and the need to continually reassess where pharmacy services were needed the most to sustain optimal care.

Summary. There are gaps in emergency preparedness training for health-system pharmacists, as evidenced by the low percent of critical care and pharmacotherapy residency programs that evaluate elective emergency preparedness objectives. Recent mass casualty events, including the COVID-19 pandemic, heighten the need for this training and involvement. Participating in the emergency preparedness longitudinal rotation creates an opportunity for the critical care and pharmacotherapy residents to learn the pharmacist's roles and responsibilities and to achieve residency objectives. After completing this longitudinal experience, residents are equipped with the skills necessary to apply the 4 phases of disaster management (mitigation, preparedness, response, and recovery) to mass casualty and public health emergencies as well as to ensure pharmacy services are sustained during such events. Other residency programs can use this longitudinal rotation as an example of how to achieve emergency preparedness goals and objectives. It can also be used as a guide to design emergency preparedness training for pharmacy staff as pharmacists advance their roles on emergency response teams.

References

1. Jacobs-Wingo JL, Schlegelmilch J, Berliner M, et al. Emergency preparedness training for hospital nursing staff, New York City, 2012-2016. *J Nurs Scholarsh*. 2019;51(1):81-87. doi:10.1111/jnu.12425
2. Uddin SG, Barnett DJ, Parker CL, et al. Emergency preparedness: addressing a residency training gap. *Acad Med*. 2008;83(3):298-304. doi:10.1097/ACM.0b013e3181637edc
3. Walker AD, Fusco N, Tsau J, Ganti L. Development of an interactive curriculum and trainee-specific preparedness plan for emergency medicine residents. *Int J Emerg Med*. 2020;13(1):37. doi:10.1186/s12245-020-00295-9
4. American Society of Health-System Pharmacists. ASHP statement on the role of health-system pharmacists in emergency preparedness. *Am J Health-Syst Pharm*. 2003;60(19):1993-1995. doi:10.1093/ajhp/60.19.1993
5. American Society of Health-System Pharmacists. ASHP statement on pharmacy services to the emergency department. *Am J Health-Syst Pharm*. 2008;65(24):2380-2383. doi:10.2146/ajhp080417
6. American Society of Health-System Pharmacists. ASHP guidelines: minimum standard for pharmacies in hospitals. *Am J Health-Syst Pharm*. 2013;70(18):1619-1630. doi:10.2146/sp130001
7. Bell C, Daniel S. Pharmacist leader's role in hospital emergency preparedness planning. *Hosp Pharm*. 2014;49(4):398-404. doi:10.1310/hjp4904-398

8. Pincock LL, Montello MJ, Tarosky MJ, et al. Pharmacist readiness roles for emergency preparedness. *Am J Health Syst Pharm*. 2011;68(7):620-623.
doi:10.2146/ajhp090659
9. American Society of Health-System Pharmacists. Patient surge management during a pandemic: toolkit for hospital and health system pharmacy. Published June 2020. Accessed May 28, 2020. www.ashp.org/-/media/assets/pharmacy-practice/resource-centers/Coronavirus/docs/Health-System-Pharmacy-Surge-Toolkit.ashx
10. American Society of Health-System Pharmacists. ASHP COVID-19 pandemic assessment tool for health-system pharmacy departments. Published 2020. Accessed May 28, 2020. https://www.ashp.org/-/media/assets/pharmacy-practice/resource-centers/Coronavirus/docs/ASHP_COVID19_AssessmentTool.ashx?loc=ashphero3-covid19assessmenttool-03182020
11. American Society of Health-System Pharmacists. Practice advancement initiative 2030. Published 2010. Accessed May 13, 2020. www.ashp.org/Pharmacy-Practice/PAI/
12. American Society of Health-System Pharmacists. Required competency areas, goals, and objectives for postgraduate year two (PGY2) critical care pharmacy residencies. Published 2016. Accessed May 13, 2020. www.ashp.org/-/media/assets/professional-development/residencies/docs/pgy2-newly-approved-critical-care-pharmacy-2016
13. American Society of Health-System Pharmacists. Required competency areas, goals, and objectives for postgraduate year two (PGY2) pharmacotherapy residencies. Published 2017. Accessed May 13, 2020. www.ashp.org/-

/media/assets/professional-development/residencies/docs/pgy2-pharmacotherapy-2017.ashx

14. The Joint Commission. Emergency management. Accessed May 26, 2020.

<https://jointcommission.org/en/resources/patient-safety-topics/emergency-management/>

Accepted Manuscript

Table 1. Emergency Preparedness Activities^{12,13}

Required Activities ^a	Associated Critical Care Goal or Objective ^b	Associated Pharmacotherapy Goal or Objective ^b
Departmental		
Update all pharmacy department EP policy and procedures	E3.1.2	Not required
Provide in-services to pharmacy staff regarding EP updates, as appropriate	E3.1.3	R2.1.5
Perform EP drills: <ul style="list-style-type: none"> • Access regional coalition website and order emergency supplies for pharmacy department participation in the statewide exercise • Design and implement pharmacy-specific drills for each shift • Submit completed after action report 	E3.1.3	E6.1.2
Participate in real pharmacy department emergency events and submit a completed after-action report	E3.1.4	E6.1.2
Hospital or Health System		
Understand the hospital hazards vulnerabilities assessment	E3.1.2	R2.1.5
Attend and participate in the hospital emergency management meeting	E3.1.2	E6.1.2
Participate in the department's emergency response planning for a hospital or health-system event	E3.1.4	E6.1.2
Region or State		
Attend and participate in the Region 2 South Coalition meetings	E3.1.2	R2.1.5
Certifications		
Complete FEMA Independent Study Course and Exam (www.training.fema.gov): <ul style="list-style-type: none"> • IS-100.C: Introduction to Incident Command System • IS-700: An Introduction to the National Incident Command Complete Basic Disaster Life Support Training and Exam	E3.1.2	R2.1.5

Abbreviations: EP, emergency preparedness; FEMA, Federal Emergency Management Agency.

Box 1. Critical Care and Pharmacotherapy Residency Emergency Preparedness Goals and Objectives^{12, 13}

Critical Care

Goal E3.1: Participate in the planning and implementation of plans for the management of mass casualty events.

Objective E3.1.2: Participate in the development or revision of the critical care pharmacy elements of organizational plans for the management of mass casualty events.

Objective E3.1.3: Exercise skill in the delivery of staff training as specified in the organization's emergency preparedness plan.

Objective E3.1.4: If needed, provide services and programs as specified in the organization's emergency preparedness plan.

Goal E3.1: Participate in the planning and implementation of plans for the management of mass casualty events.

Objective E3.1.2: Participate in the development or revision of the critical care pharmacy elements of organizational plans for the management of mass casualty events.

Objective E3.1.3: Exercise skill in the delivery of staff training as specified in the organization's emergency preparedness plan.

Pharmacotherapy

Goal R2.1: Demonstrate ability to manage formulary and medication-use processes, as applicable to the organization.

Objective R2.1.5: Explain the pharmacotherapy specialist's role in the development of emergency protocols for public health disasters (eg, natural disaster, bioterrorism, epidemic).

Goal E6.1: Design and deliver programs that contribute to the public health efforts.

Objective E6.1.2: Contributes to organizational procedures for emergency preparedness.

Criteria: Participates in the development or revision of organizational plans for emergency preparedness.

Goal R2.1: Demonstrate ability to manage formulary and medication-use processes, as applicable to the organization.

Objective R2.1.5: Explain the pharmacotherapy specialist's role in the development of emergency protocols for public health disasters (eg, natural disaster, bioterrorism, epidemic).

Goal E6.1: Design and deliver programs that contribute to the public health efforts.