

“This is not a Drill—Evacuate the Building Now!”

Disaster Preparedness at the Outpatient Surgery Department: An Experiential Lesson

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Abstract: This article describes an actual disaster that took place at an outpatient surgical center. Reported are the context of the disaster, the potential dangers, the unprepared reactions of the staff, and the following leadership shown by the staff nurses and clinical nurse specialist in response to the disaster. Described is the didactic education they created, with a tabletop evacuation drill and a hands-on exercise presented to the whole multidisciplinary staff. Participants were given a pre- and posteducation survey to assess the effectiveness of the training. Results showed that staff felt far more confident and prepared to deal with a disaster and evacuation after the didactic education combined with the hands-on exercises. Our findings suggest that a training that uses minimal time, space, and resources can significantly improve confidence and preparedness in staff. Also identified was the need for changes in our existing policy to be modeled on logistics that correspond with an actual disaster and evacuation.

KEY WORDS: Disaster training, Disaster preparedness, explosion, hospital evacuation, staff nurse leadership

WHAT HAPPENED?

On a Wednesday in July 2018 at approximately 2:30 p.m., an oxygen tank exploded in the rear of our outpatient surgery building. This building, “Building 1,” together with the adjacent building, “Building 2,” comprise a satellite compound of outpatient services and are situated about 1 mile away from the main hospital campus. Building 1 houses medical imaging, physical and occupational medicine, and gastroenterology on the first floor and

the Outpatient Surgery Department (OSD) on the second floor. At the time of the explosion, there were staff, patients, and visitors in the building, including patients in various phases of sedation, anesthesia, and surgery. Although a disaster and evacuation preparedness plan (“Fire and Evacuation Plan: Outpatient Building 1”) had been written and made available to staff in the past, on this day, the plan was neither initiated nor followed in the total building evacuation that ensued.

Staff working in the OSD heard the “boom” and felt the shake of the explosion. At that moment, no one on the second floor knew what happened. We would not know until after both Buildings 1 and 2 had been completely evacuated, and surrounding roads and a major interstate nearby had been closed to traffic. Staff wondered aloud if there had been an accident or an earthquake or, perhaps, if it was nothing to be concerned about. At that time, there were several patients in the preoperative suites, five patients undergoing invasive procedures or surgery, and several patients in the recovery room.

The Evacuation Plan stated that the assistant nurse managers were to order evacuation after consultation with main hospital emergency response team (ERT) and then assume Floor Warden roles. There had been no actual disaster simulation in the building for 10 years. Thus, two assistant managers, unfamiliar with the expectations, responded by leaving the building to assess the situation, assumed other duties, and did not return. The Floor Warden role is to initiate the ERT, provide leadership, and direct all staff. The Floor Warden also works with the building engineer to coordinate logistics, at least until the ERT assumes command. No one, however, assumed the Floor Warden or any other clear leadership role. About 5 minutes after the boom and shake, an overhead intercom announcement was made to immediately

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evacuate the building. It was unknown for weeks afterward who made the decision to evacuate and whose voice it was on the intercom. Of note, the intercom was not audible in operating rooms, individual offices, locker rooms, or procedure rooms, but it was loud and clear in the recovery room, the preoperative suites, and all public areas.

In the meantime, the nursing staff had no information about what actually happened, and almost every nurse was busy with a primary care assignment to patients in various stages of anesthesia and sedation. No one was available to consolidate patient assignments and evacuation roles for the staff. Surgeons were instructed by circulating nurses and the anesthesiologist-in-charge to close and evacuate patients and themselves. No one was specifically available to transport nonambulatory patients. The elevators were in use, with no elevator monitor, and we were told later that we were not supposed to use the elevator at all.

The hospital ERT was unaware of the explosion and heard about it when the emergency department picked up the alert on a 911 police scanner. Emergency department personnel alerted the administration, which called the ERT and the hospital safety officer and opened a command center. This was approximately 20 minutes after the event. By that time, police, fire fighters, and ambulances were already responding. The ERT began arriving on the scene, and law enforcement and fire fighters closed the buildings and shut down the surrounding roads and the freeway. The engineer turned off all potentially exploding gases to the building. Patients needing assistance were removed by ambulance, bus, and private cars.

Of note, and for future planning, it was unclear who was working that day in which departments and which rooms, as there are many offices on both floors of both buildings. When the fire department personnel arrived and worked to clear the building, an employee was found in a locked office, wearing headphones, making phone calls to future patients. She had no idea that an incident had occurred or that the building was being evacuated and locked down.

All procedures were successfully closed, and all patients were evacuated safely. All staff and visitors left the building. It was found that the explosion occurred outside the rear delivery entrance to the building, because of a gas delivery incident. Fire fighters extinguished a small landscape fire that had started outside at the scene of the explosion near the gas truck. All of our nurses and staff survived the day but were significantly shook up. We were determined that this type of unpreparedness would never happen again.

WHAT THEN?

One week after the evacuation, the buildings reopened and the OSD and hospital managers and the hospital safety officer held a debriefing for all staff of the OSD who had been working that Wednesday. After the debrief, a group of nurses formed an ad hoc committee (the Disaster Preparedness Committee) to address the events of that day. Their stated goal and scope was “propose an organized approach to educating staff regarding the appropriate first response to any emergency at our building, as it relates to all departments and staff of the OSD, including surrounding offices and public areas.” The department’s clinical nurse specialist joined the committee to support the education portion of the committee’s goals.

The Nursing Disaster Preparedness Committee met several times to identify what problems had occurred that day and potential solutions. The facility nurse researcher was asked to review the literature to find recommendations. After several months, members of the committee felt ready to hold an educational session and tabletop drill for the OSD. Late in the fall of 2018, the committee also submitted a report and proposal to management, suggesting changes in the Evacuation Plan and strongly recommending that staff be educated and drilled on a regular basis as a supplement to the annual safety education staff receive via computer module.

Background/Literature Review

In the past two decades, our world has been fraught with disasters, both natural and manmade. From September 11, 2001, to the recent Corona virus, it seems to have become the new normal. Just in the last 3 years, we have had disasters hit close to home here in Northern California. Although maybe not on the caliber of 9-11, it has been devastating to our community, nonetheless. We have had two wildfires rip through our county: the first in 2017 and next in 2019. In between, we had a liquid oxygen tank explosion at our facility in the summer of 2018. Each of these events required evacuation of our hospital.

In light of all these recent disasters around the globe, there has been a call to ensure hospitals are prepared to respond (Fung, Loke, & Lai, 2008). An emergency medical chief, Matthew Powers (2007), states, “Disaster education and evaluation must be a priority. Ongoing training, including participation in competency-based drills, should increase staff competence and decrease our vulnerability.” In response to our recent emergencies and resulting evacuations, it was determined we needed to prepare ourselves better for the next one. An article by Hsu et al. (2004) reviewed the existing literature on the

effectiveness of hospital disaster drills. They found that “hospital disaster drills are effective in allowing hospital employees to become familiar with disaster procedures, identify problems in different components of response and provide the opportunity to apply lessons learned to disaster response” (Hsu et al., 2004). A study by Cicero et al. (2009) suggested that participants prefer hands-on drills and exercises to further the classroom/didactic learning, rather than additional didactic training. The study by Behar, Upperman, Ramirez, Dorey, and Nager (2008) concluded, “The addition of the tabletop exercises to a standard didactic lecture may increase a learner’s sense of knowledge and comfort with disaster topics, which may in turn lead to increased staff participation in the event of an actual disaster.” In a study by Chi, Chao, Chuang, Tsai, and Tsai (2001), the addition of tabletop exercises to their current disaster training was beneficial for some key components of their disaster management system.

METHODS

A decision was made to hold a drill during work hours to simulate a disaster such as we had. There were five parts to the exercise that was a result of the ad hoc committee’s work.

First, participants were given a brief, anonymous, and voluntary preeducation survey based on the work of Hart et al. (2018) and Al Thobaity, Williams, and Plummer (2016) to assess baseline knowledge of evacuation protocols, gather information about formal staff education on

disasters by the medical center organization, and measure comfort and confidence of staff regarding roles during a disaster or evacuation. Survey is depicted in Figure 1.

Next, we created an educational session for didactic training on disaster preparedness and response. This was done in PowerPoint format. The presentation explained our objectives, the scope of the plan, a list of both existing and new resources, staff roles and responsibilities, and relocation zones in the event of a building evacuation. A document was created called “Disaster Preparedness: Resources, Roles, Responsibilities, & Routes,” which we distributed to all attendees and posted in our shared computer drive.

The scope of the didactic training included only the Outpatient Surgery Department on the 2nd floor of Building 1. The content focused on our unique roles as primary caregivers of patients in various stages of anesthesia, the potential complications of clearing the operating rooms and transporting multiple people down stairways. We introduced a revised toolkit for on-site first responders and leadership, such as prominent role identification cards with a list of duties on the reverse of each card, clipboards with OR and staff schedules, and backpack first aid kits.

We instituted a new attendance board in the department hallway for those with closed-door offices for personnel to state who is present in the building each day (see Figure 2). We showed specific devices for transporting immobile patients and made clear the guidelines for getting patients down the stairs, as the elevator is off-limits.

Pre (and Post) Disaster Drill Survey questions (participants answer 1-5 from strongly disagree to strongly agree)

1. I know how to facilitate and perform patient transport effectively and safely during a disaster.
2. I am able to identify and communicate important information immediately to appropriate authorities.
3. I know where to find resources and supplies required to provide care in a disaster.
4. I know my assignment or how to get my assignment during a disaster.
5. I know how to ensure patients and staff are appropriately tracked during a disaster.
6. I know where the designated meeting places are outside my facility and I can distinguish which one to go to depending on the disaster location.
7. I know how to prioritize patients for evacuation.
8. I have had education on roles during a disaster.
9. I have had appropriate organizational support for responding to a disaster.
10. I have participated in mock disaster drill on a regular basis.
11. I know how to identify the process for stopping a surgical case or procedure and know where to find the resources/supplies to do so.

FIGURE 1. Pretest and posttest survey questions.

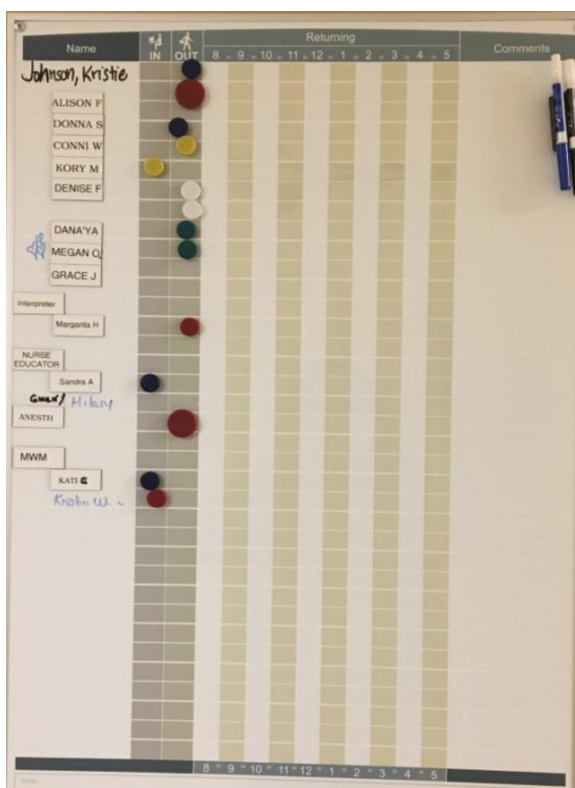


FIGURE 2. Attendance whiteboard for office staff.

We spent time developing and identifying roles of staff who are on duty during open hours; that is, there is always a nurse manager and a building engineer present. We did a deep dive into the roles people would take during a disaster. We discussed how and when they are assigned and by whom. We needed floor wardens, searchers (who check every potentially occupied space in the building and then clear that space with a yellow stick-on note), evacuation assistants, stairwell monitors, elevator monitors, and transporters. We clarified who would be responsible to step away from their patient care role and assume another position and how that would be done. We delineated specific responsibilities of the operating room staff, such as the OR techs, surgeons, and anesthesiologists. We taught the relocation zones and created a relocation zone leader role where patients, families, visitors, and other staff would be moved, and an employee is present to help with information and guidance.

Third, we created a simulation to enact. We laid down an overhead map (to scale) of the OSD on Floor 2 and the relocation zone outside. We used this as the base for a role-play scenario. We used miniature figures to serve as patients and staff. We conducted a hypothetical disaster and repeated the program multiple times

during the day in small groups, usually between three and 10 people, attempting to train everyone working in our department. Participants, using the figurines and working together as a team, evacuated the outpatient surgery area based on the scenario. The hypothetical disaster was based very closely on the events of July 2018. The two authors facilitated the role play to recreate how the evacuation should have taken place and would take place in the future.

The simulation began with what to do in the immediate aftermath of an announced building evacuation when patients are present. Using a scale map of the building, exterior common areas, and parking areas and manipulating the figurines, we practiced an evacuation from the operating rooms, procedure rooms, perioperative units, and waiting rooms to relocation zones outside the building.

Fourth, we split into two groups to quickly show assembly, usage, and disassembly of the two evacuation chairs we have on our floor at OSD. This was hands-on, using volunteers from each group to act as transporters or patients and practice moving the “patient” down a flight of stairs.

Fifth and finally, after the staff completed the didactic training and simulation drill, we asked again about readiness and confidence to face a disaster. We used the same instrument as presented in Figure 1. The entire exercise from start to finish took 30–45 minutes, depending on the size of the group.

RESULTS

In this project, we measured the knowledge and level of confidence in staff before and then again after the

Table 1: Presurvey and Postsurvey Questions: Statistical Values

Questions	Pre	Post	t Test, p Value
Patient transport	3.1	4.4	.0001
Communication with authorities	3.9	4.3	.1019
Finding resources and supplies	2.9	4.3	.0001
Knowledge of assignment	3.1	4.4	<.0001
Track patients and staff	2.5	4.1	<.0001
Meeting places	2.7	4.5	.0001
Prioritizing patients	3.5	4.5	.0002
Education re: roles	2.9	4.5	<.0001
Organizational support	2.5	4.1	<.0001
Regular participation in drills	2.1	3.6	.0015
Stopping a case	2.4	3.6	.0020

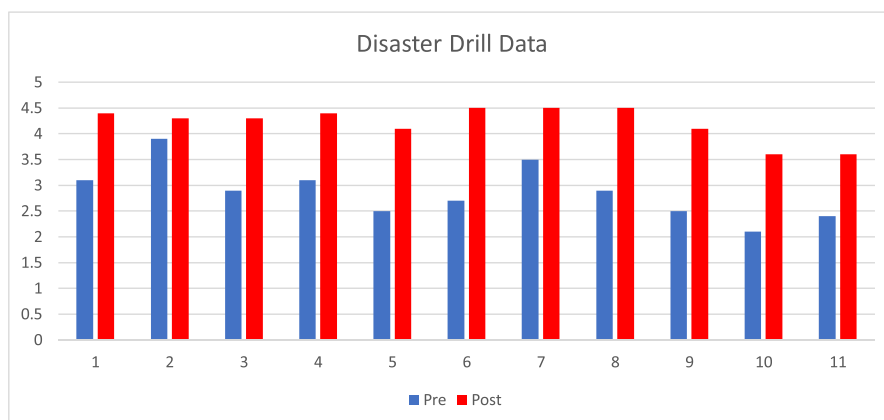


FIGURE 3. Pretest and posttest bar graph by question.

education and practicum. We received an institutional review board waiver, and consent to participate was given by joining the group disaster drill. We created a questionnaire adapted from Hart et al. (2018) and Al Thobaity et al. (2016). There were 11 questions. The same questions were used before and after the drill. Forty staff, namely, nurses, technical and support staff, managers, and physicians, participated in the pretest and posttest. Data were entered into a spread sheet, and *t* tests for similar groups were used for analysis (see Table 1).

Analysis of the preeducation and posteducation surveys showed a significant change in all but one question, which was high to begin with and stayed high.

Per the data results, staff felt more confident and prepared to deal with a disaster after 30 minutes of didactic and tabletop education (see Figure 3, bar graph).

DISCUSSION

Disaster preparedness is optimal when we systematically use a combination of didactic education and hands-on disaster exercises. This training can be done using a short PowerPoint presentation and a tabletop demonstration that uses minimal time, space, and resources. In our study, 30 minutes of lecture and practicum combined was sufficient to produce significant improvement in confidence and preparedness in clinical staff. The posteducation surveys are clear: The intervention, including analysis of existing policy, making changes to that policy based on experience with an actual evacuation, and a tabletop drill closely modeled on that experience using changes proposed by the Disaster Preparedness Committee, was highly effective and produced statistically significant improvement in staff perception of knowledge and confidence.

CONCLUSIONS

1. Healthcare workers should be familiar with any evacuation policy in existence for their workplace and the roles of each staff member.
2. Existing policy must be tested using, at minimum, a tabletop drill with a hypothetical scenario.
3. Weaknesses and flaws in existing policy must be identified and changed as appropriate based on practical experience and input from drill participants.
4. Drills must be scheduled regularly so that staff maintains awareness, knowledge, and confidence (Behar et al., 2008, p. 195: "Our interventions... raised scores that remained significantly above baseline out as far as 6 months after the interventions....")
5. The "4 Ps": Patients, providers, payers, and policy makers—all demonstrably benefit from formal and regular intervention. Moreover, the intervention itself, once established and integrated into workplace education, not only is inexpensive as far as time and resources but also may save patients, workers, and any other responders from harm or injury.
6. During the literature search, there was an identified lack of information on guidelines for emergency closure of an open body cavity when an evacuation of the OR is necessary. No policy was located from the professional organizations. This is an area in need of further research and development.

References

- Al Thobaity, A., Williams, B., & Plummer, V. (2016). A new scale for disaster nursing core competencies: Development and psychometric testing. *Australas Emerg Nurs J*, 19(1), 11–19.
- Behar, S., Upperman, J. S., Ramirez, M., Dorey, F., & Nager, A. (2008). Training medical staff for pediatric disaster victims: A comparison of different teaching methods. *Am J Disaster Med*, 3(4), 189–199.

- Chi, C. H., Chao, W. H., Chuang, C. C., Tsai, M. C., & Tsai, L. M. (2001). Emergency medical technicians' disaster training by tabletop exercise. *Am J Emerg Med*, 19(5), 433-436.
- Cicero, M. X., Blake, E., Gallant, N., Chen, L., Esposito, L., Guerrero, M., & Baum, C. R. (2009). Impact of an educational intervention on residents' knowledge of pediatric disaster medicine. *Pediatr Emerg Care*, 25(7), 447-451.
- Cincinnati Children's Hospital Medical Center. (n.d.). Efficacy of disaster exercises to augment hospital staff education in disaster preparedness. Retrieved from <http://www.cincinnatichildrens.org/svs/alpha/h/health-policy/best.htm>
- Eriksson, K. (2009). Knowledge transfer between preparedness and emergency response: A case study. *Disaster Prevention and Management*, 9(2), 162-169.
- Fung, O. W., Loke, A. Y., & Lai, C. K. (2008). Disaster preparedness among Hong Kong nurses. *J Adv Nurs*, 62(6), 698-703.
- Hart, A., Femino, M., Sears, B., Wolberg, A., Cook, C. H., & Gupta, A. (2018). Have you "CORED" lately? A comprehensive operating room evacuation drill. *Am J Disaster Med*, 13(4), 239-252.
- Hsu, E. B., Jenckes, M. W., Catlett, C. L., Robinson, K. A., Feuerstein, C., Cosgrove, S. E., Green, G. B., & Bass, E. B. (2004). Effectiveness of hospital staff mass-casualty incident training methods: A systematic literature review. *Prehosp Disaster Med*, 19(3), 191-199.
- Powers, M. (2007). Evaluation of hospital-based disaster education. *Journal of Emergency Nursing*, 33, 79-82.
- Weber, N. M. (2018). When disaster strikes: A training intervention to improve nurses' confidence and preparedness for the surge. *Evidence-Based Practice Project Reports*, 114. Retrieved from <https://scholar.valpo.edu/ebpr/114/>

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