CHAPTER TWO

ASSESSING YOUR ICU: ARE YOU READY TO RESPOND TO DISASTER?

SECTION I. PURPOSE OF THIS CHAPTER

■ Provide an outline to assess your unit’s current ability to respond to a mass casualty event.
■ Demonstrate how a hazard vulnerability analysis (HVA) is utilized to guide an institution’s preparations for a mass casualty incident.
■ Review key focus areas for the coordination of the ICU disaster response plans with the emergency department and hospital response plans.

SECTION II. KEY POINTS

■ A review of your current critical care capability is the first step in formulating a disaster response plan for your unit.
■ Following the assessment of your current capabilities, an HVA is the next step in the process of formulating an effective emergency management plan for critical care and the hospital.
■ A hospital must develop an accurate HVA that identifies the most likely disasters your facility might face. This HVA will allow for a prioritization of ICU supplies, personnel, and training required to mitigate the most likely scenarios.
■ Disaster preparedness requires that the ICU/hospital develop a realistic plan and then rehearse the plan in a realistic manner.
■ The ICU disaster plan should be integrated closely with that of the emergency department and other hospital areas.

You should use this chapter as a:

■ Guide to assessing the readiness of your ICU for disaster response
■ Resource for general concepts needed to prepare for a disaster
■ Template to optimally prepare your ICU to meet the likely disasters that you might encounter
SECTION III. FIRST THINGS FIRST

Where do I begin?

- Overcoming inertia is often the biggest problem in preparing your critical care team to respond to potential disasters. Mass casualty events are low probability events and, as such, costly disaster mitigation efforts often take a back seat to the daily demands of running a busy ICU. To overcome this inertia (and sometimes apathy) we must remind ourselves that mass casualty events are a daily occurrence worldwide.

- In order to avoid the illusion of preparedness and to be optimally prepared, we must realistically assess our unit’s current capabilities, complete an accurate hazard vulnerability analysis, develop an emergency management plan, and regularly conduct realistic drills to develop operational insight into how a mass casualty event might unfold at our institution. Joint Commission standards, professional society guidelines, and governmental regulations can all be utilized to build support for an effective disaster management plan for your unit and hospital.

Box 2-1. Action Items: How do I organize my thoughts when creating an ICU disaster response plan?

**Step 1.** Review and improve current critical care capacity (everyday needs and how to increase capacity when faced with surge) and existing disaster plans (if any). See page 13.

**Step 2.** Consider what threats you are most likely to experience and will have the greatest impact on your ICU (the HVA). See page 17.

**Step 3.** Revise your existing plan, taking into account what you have determined regarding ICU capacity and the results of your HVA. See page 20.

**Step 4.** Meet with the leaders in your emergency department and other areas in the hospital to share your plan, learn about their plans, and work together to revise plans as needed when conflict exists. See page 20.
What are the issues?

- **Inertia.** The presence of thick dusty binders labeled “ICU disaster plan” reflects institutional complacency. Many lessons have been learned about better ways to prepare for disaster, and these need to be applied through review of any existing disaster plans. Threats to your ICU and hospital may have changed over the years, and similarly the resources and capability of your hospital have likely changed. Frequent reassessment of the ICU disaster plan is required, and now is as good a time as any to make sure it is in order.

- **Turf Protection.** Invariably, ICU disaster planning will have to take into account access to critical care-like areas in the hospital that may not be traditionally under the control of the ICU leadership team, such as the post-anesthesia recovery room, operating rooms, and step-down units. You should be prepared for resistance from other teams in your hospital as your plan includes options to impact on their priority activities and their space, stuff, and staff.

- **Limited Resources.** Due to financial constraints and desire for efficiency, many hospitals are challenged to have enough staff and equipment available during even minor surges in demand that may occur in everyday activity. Disaster preparedness plans may require purchase of supplies and equipment that must be protected from use, despite temptations from day-to-day challenges.

- **Do Not Reinvent the Wheel.** Use templates for plans borrowed from other organizations rather than start from scratch. If the old plan was a poorly organized “disaster,” weigh the benefits of revising an old disaster plan versus starting a new one based on a different template.

- **Do Not Let History Repeat Itself.** Consider results from previous actual or drilled disasters within the organization to identify lessons learned. Were the hospital and ICU disaster plans revised after drills/events? If not, try to reconstruct those lessons learned and revise the old plan or take them into account when building a new plan.

**SECTION IV. VITAL CONCEPTS**

What is the space, staff, stuff approach to managing ICU capacity and capability in disaster planning?

The space, staff, stuff approach is a simplified way to break down factors determining ICU capacity and capability to allow an organized approach to planning (Box 2-2).
**Box 2-2. General Concepts: Space, Staff, Stuff in ICU Disaster Planning**

**Space**: Refers to where you will treat critically ill patients in the hospital, including areas outside of the ICU that can be modified to allow care for critically ill patients.

**Staff**: Refers to the human resources required to care for patients during a disaster event.

**Stuff**: Refers to the equipment and supplies required to manage critically ill patients during a disaster.

- **Space** refers to where you will treat critically ill patients in the hospital, including areas outside of the ICU that can be modified to allow care for critically ill patients. You should also be aware of adjacent areas (physically or functionally adjacent) that may have an impact on the flow into and out of the ICU, such as triage areas that will be a frequent source of patient intake or wards for patients who will receive palliative care when critical care is not appropriate.

- **Staff** refers to the human resources required to care for patients during a disaster event. In addition to your usual ICU staff, your ICU may require supplementary assistance from other healthcare providers in the hospital or community. Usual ICU staffing ratios will typically be impossible to maintain during a disaster, and personnel less experienced in critical care may be needed to augment critical care staff, with the necessary supervision provided. Prior and just-in-time training of supporting staff should be considered, and a roster of staff outside the ICU with helpful competencies should be created and maintained.

- **Stuff** refers to the equipment and supplies required to manage critically ill patients during a disaster. This may include equipment such as cardiac monitors, mechanical ventilators, noninvasive ventilation units, IV pumps, medications, medical gases, and other material. Common mistakes include failure to consider disposable or support items (eg, sufficient ventilator circuits to treat the expected number of patients).
What is an HVA?

Box 2-3. General Concepts: Hazard Vulnerability Analysis in ICU Disaster Planning

Hazard vulnerability analysis (HVA) refers to a process that identifies the probability and effects of disasters that your institution might face.

A community’s risk from a specific disaster is directly related to probability and the magnitude of the event and inversely proportional to its preparation for such an event.

- An HVA is a process that identifies the probability and effects of disasters that your institution might face.
- Every community faces a unique selection of natural, technological, human, and hazardous material risks that reflect that community’s unique local environment. For example, a community in the Midwest located near a large chemical plant will need to prioritize their disaster planning differently than a community located on the hurricane-prone eastern coast of Florida.
- A community’s risk from a specific disaster is directly related to probability and the magnitude of the event and inversely proportional to its preparation for such an event.
- A current, thorough, and accurate HVA allows a hospital to prioritize planning, mitigation, response, and recovery efforts directed at the most likely disasters.

SECTION V. BUILDING A PLAN

What are the specific steps to build an effective ICU disaster response plan?

Step 1. Review current plans to improve critical care capacity (to meet usual and unusual surges in demand) and existing disaster plans (if any). You should address the following elements in this plan:
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- **Space**
  - What is the current capacity of your ICU(s)? Average number of occupied beds? Medical-surgical mix? What percent of surgical cases are elective? Are the units open or closed?
  - Surge capacity: Can additional ICU beds be added within the existing ICU?
  - What other hospital spaces might be utilized for the provision of critical care during a mass casualty event (postanesthesia care unit, step-down units, wards, dialysis center, emergency department, etc)?
  - Where would you provide critical care if the current space was unusable (e.g., fire)?

- **Staff**
  - What is the experience level of your staff regarding disaster response? Previous disaster experience? Evaluate the surgical versus medical experience of your staff.
  - Has your unit leadership identified a pool of personnel to augment ICU staff during a crisis? Consider healthcare professionals with critical care experience working within the institution, such as staff from cardiac, medical, surgical, and neurosurgical departments, as well as the emergency department, urgent care/walk-in clinics, or other off-campus sites affiliated with the hospital. A secondary pool may be found in recently retired personnel, faculty, medical students, and students from local healthcare schools.
  - Has a system been put in place that establishes call and backup responsibility for the staff with well-developed and rehearsed scenarios for call-in?
  - What are the factors that would limit the availability of your current staff during a mass casualty incident?

**Box 2-4. Disaster Tips: Staff Availability**

“Purposeful absenteeism” can result from issues such as child care, eldercare, pet care, fear of contracting illness, etc. What current programs are in place that would mitigate these factors?
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■ Stuff (Supplies and Equipment)
  - What critical supplies do you require to manage day-to-day operations? How many days of reserve supplies are readily available in the event of a disruption of the supply chain?
  - Do you have strategies in place to access additional equipment or supplies in the event of a surge in demand (eg, contracts to meet surge in demand, hospital-based stockpiles, etc)? Does your staff know how to obtain these supplies?

  Box 2-5. Disaster Tips: Stuff Strategy
  Many hospitals most often rely on preexisting contracts with vendors or government agencies to provide “just-in-time” additional equipment or supplies in the event of a surge in demand.

  These strategies are generally not effective in a regional or larger-scale crisis because all area hospitals will be trying to access external sources of additional equipment and supplies at the same time.

  Each ICU and hospital MUST have a plan to resupply for a period of time without reliance on external groups or vendors, including state, regional, or federal resources.

  - What lack of supplies and equipment will limit your ability to provide care to larger-than-usual numbers of patients? Ventilators? Oxygen? Electricity?
  - Do you have plans to support your staff in the event of disruption of basic support services (eg, food, water, sleeping accommodations)?

■ Communications

  Box 2-6. Communication Advice: Communicating With Staff
  Pagers, home telephone numbers, and cell phone numbers may help, but services may be disrupted in the event of a large-scale external disaster.

  Consider e-mail, social media strategies (Facebook, Twitter, etc), link with local media to help with announcements to staff.

  - How do you advise your staff in and outside of the hospital about the status of a disaster event?
- Is there an organized system for communicating the need to recall staff? Has the plan been updated and tested on a regular basis?

- How would your ICU leadership team integrate communications with hospital public relations, incident management team, or other stakeholders?

### Training

- Have you incorporated disaster response training into your annual staff training plan? Is your staff familiar with the current disaster response plan for your facility and community?

- What cross-training programs are in place to augment critical care skill sets and additional staff support (Table 2-1)?

#### Table 2-1. Advance Training for Staff to Assist in Critical Care

<table>
<thead>
<tr>
<th>Examples</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental Critical Care Support (FCCS) course</td>
<td>Ability to organize a course based on schedules</td>
<td>Decay of knowledge over time if not practiced/refreshed</td>
</tr>
<tr>
<td>Pediatric Fundamental Critical Care Support (PFCCS) course</td>
<td>Select willing and interested staff members</td>
<td>Generic approach to deal with all hazards rather than specific problem/crisis</td>
</tr>
</tbody>
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#### Just-in-time Training Options

<table>
<thead>
<tr>
<th>Timing</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use when required just before or during a disaster event.</td>
<td>Can be adapted to current crisis</td>
<td>Leadership/educators likely engaged in other activities</td>
</tr>
<tr>
<td></td>
<td>Recent, so won’t be forgotten</td>
<td>Organization likely to be difficult</td>
</tr>
<tr>
<td></td>
<td>Support for financial and time commitments from stakeholders given imminent crisis</td>
<td>Draw on time when staff already required for clinical roles</td>
</tr>
</tbody>
</table>
Step 2. Consider what threats you are most likely to experience and/or will have the greatest impact on your ICU (the HVA).

Why conduct an HVA?

- Having an organized approach to prioritizing planning for disaster makes sense. The HVA takes into account two elements of risk—the likelihood of an event happening and the potential consequences of the event. Resources should be dedicated to preparedness for events that are likely and events that will have high impact on the ability to deliver critical care in your institution.

- Example of risk matrix is depicted in Figure 2-1.

- Multiplying the likelihood score by the impact score gives the risk index. Ranking of potential events using the risk index will help prioritize disaster preparedness efforts.

My state/region/town/hospital has conducted an HVA already. Do I need to do it again?

- The likely answer is yes. Unless specific critical care requirements (and process input) have been incorporated into prior HVAs, the unique requirements to providing critical care have likely not been adequately represented. At the very least, you should review current HVA results to ensure that they take into account the critical care perspective. To illustrate, consider an event that could scare the population into believing they might be turned into zombies (say, a planned TV movie that pretends to be a newscast). Such an event may overwhelm psychiatric services but will not likely impact on critical care. Weighting of preparedness efforts would differ between mental health and critical care services in deciding how to train staff, prepare supplies, and plan for space.

Who should be involved in preparing an HVA relevant to critical care?

- Involvement of hospital staff familiar with prior local efforts to determine the likelihood of events could help eliminate duplication of prior effort. Predictions of likelihood may be borrowed from prior HVA analyses if they are recent and community circumstances have not changed. Hospital risk management staff would be possible contacts with external organizations in the absence of an identified hospital disaster liaison. Local or regional emergency preparedness staff may also be helpful in providing scenario likelihood assessments.
- A multidisciplinary perspective should be taken into account in determining the group to decide the impact of these events. The group should include critical care physicians, nurses, respiratory therapy personnel, pharmacy, and others.

**Figure 2-1. Risk Matrix For Use When Conducting an HVA**

What should be the main focus while conducting an ICU-specific HVA?

- Emergency preparedness officials can calculate the likelihood of different event scenarios based on extensive research and connections with organizations and partners. This is likely beyond the scope and resources of a hospital ICU team.
Community or regional HVA efforts should lead to mitigation strategies to reduce the likelihood of events through preventive efforts. A hospital ICU team is unlikely to influence the likelihood of many events that occur beyond the walls of the hospital. However, the likelihood (risk) of hospital-induced events (e.g., outbreaks of infectious disease, failure of physical infrastructure, release of radiological or chemical substances) may be influenced by the ICU team advocating within the hospital. The team performing the HVA assessment should try to identify events with modifiable risk when possible—prevention of an event is preferable to dealing with the aftermath of an event.

Most of the efforts of an ICU-specific HVA should focus on identifying the potential impact on critical care services of different events and identify mitigation strategies to reduce this impact (note that this is different than reducing the likelihood of an event actually occurring). The assessment of this impact should take into account the capacity of the ICU to respond to an event and the ability to augment response capacity and/or recover to normal function, given the nature of the event.

Are there definitions to help score the likelihood of an event?

- An influenza pandemic seems to occur every 10 to 30 years; therefore, it is an occasional risk. An unusual pandemic may occur less frequently (say, every 30 to 100 years). The potential severity of an event may lead to overestimation or underestimation of event likelihood; therefore, be cautious in describing the event in question.

<table>
<thead>
<tr>
<th>Table 2-2. Predicting the Likelihood of a Disaster Event</th>
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<tbody>
<tr>
<td><strong>Frequent or very likely</strong></td>
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<tr>
<td><strong>Moderate or likely</strong></td>
</tr>
<tr>
<td><strong>Occasional, slight chance</strong></td>
</tr>
<tr>
<td><strong>Unlikely, improbably</strong></td>
</tr>
<tr>
<td><strong>Highly unlikely, rare event</strong></td>
</tr>
<tr>
<td><strong>Very rare event</strong></td>
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</table>
Step 3. Revise your existing plan, taking into account what you have determined regarding ICU capacity and the results of your HVA.

- Do the existing disaster plans take into account the most likely and most severe disaster scenarios? Are there unique needs related to specific events (e.g., atropine supplies for a chemical event related to the pesticide factory nearby) that haven’t been taken into account? If the current or developing plan does not prepare for these priority scenarios, then it’s time to go back and revise them.
- Look for opportunities to reduce the likelihood of hospital-related events that can be prevented through better planning and safer practices.
- Look for opportunities to mitigate the risk of impact on critical care services through improved planning for space, staff, and stuff relevant to the key event scenarios identified through the HVA.

Step 4. Meet with the leaders in your emergency department and other areas in the hospital to share your plan, learn about their plans, and revise plans as needed when and where conflict exists.

- How do you identify the important stakeholders to involve in ICU disaster plan development and overall preparedness efforts?
  - Individuals who can add to your planning efforts by bringing to the table the following assets: knowledge, resources, existing relationships, and authority to approve plans.
  - Individuals who will likely be stripped of resources due to planning efforts, stockpiling, or a disaster event. Can you work with them in advance to mitigate potential opposition to your plans?
  - Groups within or outside the hospital with whom to collaborate to make our planning efforts more efficient (e.g., shared stockpile of equipment or supplies with another local hospital)
- How do I engage these stakeholders to ensure support for our plan?
  - Review the HVA results. Ensure that stakeholders understand the likelihood and potential impact of events on critical care services and what that may mean to their ability to meet their priorities.
- Expect that many stakeholders will not understand the impact of surge on critical care. Review the current state of ICU resource availability (often already near capacity) and the current plans/limitations to augment ICU capacity given day-to-day surges in demand.

- Clearly explain how the required resources will augment critical care capacity to better serve the rest of the hospital, your community, and others. People outside of the ICU team may be asking themselves, “What’s in it for me/us?” Make sure you answer that frequently unspoken question.

- Use of external standards can be helpful in encouraging other groups to support your plan. Potential impact on hospital rating or accreditation can be a helpful motivator to build support.

SECTION VI. IMPLEMENTING THE PLAN

■ Ensure that you identify who in the hospital needs to review and approve the plan. In many cases, the plan should be presented to major leadership groups within the hospital (e.g., medical advisory committee, hospital senior management team).

■ Make sure the plan clearly indicates triggers for various events and strategies to differentiate between day-to-day stressors and major disaster events.

■ Indicate how often the plan needs to be reviewed and revised. In addition to regular reassessment, review the plan after any events affect your hospital, or other organizations, to determine if lessons learned from the event should be incorporated into the plan.

■ Consider how the plan should be made available to staff for review. Printed copies may be useful in the event of infrastructure failure; however, electronic copies are more easily updated in the event of change and they can be viewed remotely.

■ Develop an accompanying strategy for familiarizing your team with the ICU disaster plan. Most hospital committees look favorably on an education plan accompanying any new policies and procedures, so ensure this is included with submission to any relevant approving committees or groups within the hospital.

■ Incorporate a process for evaluating the effectiveness of the plan. Have a clear strategy for tracking successes and failures of the plan during drills and events. Conduct after-event reviews for a critique of the plan. Envision what an effective plan implementation would look like. Can you quantify it?
SECTION VII. SUMMARY

- Remember the key steps in assessing your state of readiness for a disaster affecting your ICU, as highlighted in Box 2-1.

- Use space, staff, stuff as an initial approach to breaking down the otherwise daunting task of assessing your current state of readiness. Other chapters in this publication will provide more detailed strategies and examples to help assess the adequacy of your current ICU disaster plan and help you improve the relevant sections.

SUGGESTED READINGS


