Is disaster preparedness important? Why devote scarce ICU resources to preparedness activities?

- Although a disaster affecting your ICU is a low probability, if one does occur, it likely will be a high-consequence event.
- Remember, preparation does not necessarily mean that you must buy “things.” Spending money does not always equal improved response capabilities. Preparation may be limited to planning, education, and training, which are cost-effective measures.
- If you want a candid answer to these questions, ask someone who has experienced a disaster that impacted their hospital and ICU. Consider the case in Box 1-1.

Box 1-1. Case Study: A Real Tragedy

On February 20, 2003, a fire broke out in a crowded nightclub in West Warwick, Rhode Island. In less than 10 minutes, the club was engulfed in flames. More than 450 people were in the nightclub; about half were injured from burns, smoke inhalation, and trauma resulting from trampling.

Within the first hours, more than 40 critically ill patients were transported to the nearest hospital two miles away. Transportation by ambulance and private vehicle made consistent communication difficult. The 350-bed institution nearly ran out of ventilators because the majority of the initial patients needed intubation for smoke inhalation and facial burns. The pharmacy dispensed one gram of
morphine in 4 hours’ time, approximately 3 months’ supply in normal circumstances.

Although the hospital was less than 15 miles from Providence, Rhode Island, and the weather was clear, nearly 5 hours lapsed before any transfers of critically ill patients to other institutions occurred; these centers needed time to make room in their own ICUs to accommodate incoming patients. To further complicate communications, 200 family members needed to be informed of the status of their loved ones’ injuries, and emotional support needed to be provided.1

Consider the logistics of this disaster response—if one conservatively estimates that each critically ill patient received 3 L of IV fluid while at the first hospital, a total of 120 L of IV fluid was required during the first 4 hours after the event. Additionally, how many personnel were needed to provide care for 40 critically ill patients during the first few hours of resuscitation, when the patients were the most unstable? If patient transfers had been delayed due to inclement weather for a full 24 hours, the logistical strain for basic resuscitation supplies, medications, and personnel would have become a second disaster.

If a disaster occurs, what makes the greatest difference for an ICU? How do we ensure a successful response?

- Pre-event planning for ICUs is essential and is the most important variable to ensure a successful disaster medical response.
- Staff education and training are the most effective modalities to enhance ICU preparedness.
- This publication is intended as a toolkit to help critical care directors and hospital administrators review, analyze, and ameliorate potential gaps in the ability to surge critical care services expeditiously.
What is disaster medicine, and how many ICU patients (casualties) constitute a disaster?

Disaster medicine is the coordinated medical response to an unexpected disruption of the normal system of healthcare delivery. The goal of a disaster medical response is to mitigate death, disease, and further injury. Over the last decade, multiple events have repeatedly demonstrated that local critical care services may be quickly strained or overwhelmed with a minimal to moderate influx of unstable patients. Several contributing factors have been cited:

- Increased need for critical care services as our population ages, combined with decreased availability of critical care providers of all disciplines, has resulted in near-capacity occupancy of intensive care beds on a consistent basis.

- Monetary constraints have led to the elimination of healthcare services in many communities, placing further strain on those that remain.

- Hospitals do not normally maintain a surplus of critical care supplies because overstocking increases cost. Just-in-time supply processes keep stocks to a minimum and much of the durable equipment is rented rather than purchased to decrease required expenses for maintenance and storage.

- These and other factors contribute to the inability of many institutions to handle patient surges and sustain care for the unexpected critically ill and injured. Consider the case in Box 1-2.

**Box 1-2. Case Study: Bringing It Home**

You are the director of a busy ICU in Pleasant Haven, Pennsylvania. You direct an eight-bed mixed medical ICU/surgical ICU in a nontrauma hospital of 150 beds. You are staffed with 25 registered nurses and 10 respiratory therapists who work 12-hour shifts. Your only partner lives 25 miles away and is currently vacationing in Mazatlán. During your morning rounds you get a call from the emergency room director, who informs you there has been a train accident in a township 3 miles away. The only information he gives you is that a train carrying chemical products derailed in the middle of town after hitting a stalled “big rig.” Early reports from the town’s volunteer fire services state that there are “several injuries at the site, with at least one burn victim.” The onsite personnel report
fires and significant fumes at the scene. Liquid is reportedly leaking from one of the container cars. Two ambulances are en route from your facility and the emergency room director notes that he has one staff physician, two registered nurses, and one medical technician in the department. You are tasked with the leadership role in the response.

■ What do you do?
■ Where do you begin?
■ What can you expect to happen?
■ What needs to be available?
■ How can you be prepared?
■ Most importantly, what kind of strategy could you employ (now) to improve the odds of a successful disaster medical response by your ICU?

Where do I begin?

Okay—you are it. Everyone is looking to you for instructions. Is there a way to formalize the process? Can you quickly develop a plan of action? What will you do to plan to develop a continuum of care in order to respond in time? How do you set up your communications, crowd security, and flow at your facility? And, OH... NO..., you may need to care for possibly contaminated and poisoned victims. You have minutes to engage. Where do you start? Who do you need at your side? How do you get the process started?

What are some examples of critical processes to be resolved?

Some of the issues that should be effectively addressed during your planning processes include:

■ Establishing an effective control process using an incident command center structure/approach (more on that later). This includes defining the human resources assets needed and who to have “at the table” with you (for both planning purposes and for the actual disaster medical response).

■ Establishing a redundant and robust communication system using landlines, radios, cell phones, and computer technology in case one or more systems fail.
What Matters? The Role of an ICU During Disaster

- Developing a security strategy for crowd control and patient flow, parking, and triage of the worried (panicked) as well as the potentially critically ill.

- Determining if there are sufficient decontamination facilities to keep you and your staff safe.

- You need people, you need help, and you need it now!

What is surge capacity, and how is it relevant to ICU disaster medical response? Is this a planning priority?

Building surge capacity is considered in two categories: enough things and the “right” things.

**Enough Things**

- Preparedness requires you to be able to augment your resources along a continuum: from the emergency room, to the holding wards, to facilities for the walking wounded, to the acute hospital beds, and into the ICU. There are two general strategies to improve ICU surge capacity:
  - An executable plan to help decrease routine bed demand (load) in your unit
  - The ability to increase the availability of the “3 Ss” of capacity-building: “stuff, space, and staff”

- Your goal is to deploy an adequate quantity of material and personnel into the response. In this case, you need to forget business as usual. That means:
  - Discontinue elective cases and procedures that require ICU bed support—you will need those spaces and people.
  - Expedite discharges and move patients to lower levels of care or home. Send observation-only ICU patients to the acute care units. The outcomes of these patients will be minimally affected.
  - Get some help as soon as possible. At first, it is quantity you are looking for; later, your needs will be more specific. Identify the extra space and beds. Get out those recall lists. Look at surrounding affiliated facilities such as long-term care facilities or nursing homes for help. Bring additional ICU clerical staff onsite and put them to work.
The “Right” Things

Now you must address the more specialized, specific needs. During a disaster your ICU may need to provide:

- Burn care
- Trauma care
- Care for chemically contaminated or intoxicated victims
- Help with panicked and psychologically injured people

What do you have for these patients?

What is the purpose of the guidebook?

This text outlines and describes the process of creating a critical care infrastructure able to surge in capacity and capability in response to extreme or disaster situations. Beginning with the assessment of existing structure and components of an institution’s critical care services, the book guides the reader through the various components of disaster readiness. Disaster basics such as leadership, communication, and integration are reviewed and outlined. An “all-hazards” approach is used when assessing ICU vulnerability. Potential gaps in stuff, space, and staff are the basis for the next phase of constructing a prepared critical care crisis response.

Stepwise planning and prioritization in augmenting an institution’s ICU is discussed in the subsequent sections. The chapters illustrate the multifaceted approach necessary to build a well-organized and effective solution to an exigency. Topics include team building, communications, leadership, special populations, mental health considerations, and others.

The final appendices are rich in resource material, encompassing personnel education and providing useful templates and practice situation scenarios. In summary, the guidebook is a vital toolkit for disaster planners and participants.
Box 1-3. Disaster Tips: Using Preparing Your ICU for Disaster Response to Improve Disaster Medical Response in Your ICU

1. Get the team together. Determine who should be a member of the core group of vested, multiprofessional personnel who will lead critical care disaster medical response team activities. Consider the following positions/individuals for your team:
   - ICU medical director
   - ICU nurse manager
   - ICU respiratory care representative
   - ICU pharmacist
   - Hospital administrator
   - Mental health provider
   - Palliative care or ethics committee member
   - Other considerations
     - Emergency department, anesthesia, trauma, and surgery staff
     - Include all intensive care units in the institution
     - Consider pediatric providers, especially if there are no pediatric intensivists in the institution

2. All staff should learn the information provided in this guidebook.
   - Review the guidebook and how it is organized. It provides a stepwise approach.
   - The first several chapters detail specific components of the process.
   - Detailed discussions of the important concepts of communication and critical care augmentation are presented in subsequent chapters.
   - Special considerations of ethics, mental health, and pediatrics are also reviewed.
   - The appendices provide a variety of important forms, templates, case scenarios, suggestions, and resources for your use.

3. Good luck!