

On Our Watch II: Preparing the Emergency Department For Bioterrorism

Based on the meeting held on September 14, 2004
at the Chicago Marriott Downtown

Chicago, Illinois

Sponsored by the Illinois College of Emergency Physicians

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Background

Following the events of September 11, 2001, emergency health care providers have clarified the critical role of emergency health care providers and hospital Emergency Departments in the provision of healthcare in the setting of a catastrophic disaster. Exercises such as the TOPOFF 2 drill have been conducted in order to establish best practices in caring for a large number of patients whose influx into the medical system might outstrip current capacity. More work is required given the need to further prepare for various potential disaster situations and the constant level of Emergency Department overcrowding that exists in 2004.

In 2003, the Illinois College of Emergency Physicians presented “On Our Watch I: Preparing for Overcrowding and Bioterrorism in the Emergency Department” with the support of the Illinois Department of Public Health (IDPH) via a Health Resources and Services Administration (HRSA) grant. The focus of this meeting was the issue of Emergency Department capacity and overcrowding as it related to preparedness in meeting the health needs of the public in settings of increased demand. A satellite meeting addressed the potential smallpox threat and its impact on health care providers. Over 400 emergency health care providers, hospital administrators, and public health officials from Chicago and the Midwest attended these meetings. The proceedings of this meeting can be accessed at www.ferne.org under the tab “Lectures” and the title “ICEP On Our Watch”. A written executive summary of the meeting can be printed from the URL <http://www.ferne.org/Lectures/EDovercrowdbioterror.pdf>.

On Our Watch II Introduction

“On Our Watch II: Emergency Department Preparedness for Bioterrorism” is again being supported by a HRSA grant through the IDPH. This meeting updates the readiness of emergency health care providers and hospital Emergency Departments in meeting the needs of an ill or injured public in the setting of a large-scale disaster.

In the setting of a major disaster, how might emergency health care providers and hospital emergency departments provide medical care to large numbers of ill or injured patients that exceed present capacity? In a disaster so extensive that out of hospital emergency services and community infrastructure are disrupted, how will the integrity and safety of hospitals and their staff be assured?

This meeting addressed how emergency medical services might be provided in the setting of a catastrophic disaster, including that which could occur as a result of a Bioterrorism attack. Preparing for such an event involves considering unimaginable problems and asking difficult questions that as of yet have not been answered. How will such events unfold and how will patients present to the Emergency Department? How might hospitals and emergency services prepare for such a disaster, so as to allow them to continue to function, to treat the victims and protect the staff? Discussion of these issues

and vigorous planning now is crucial, given the need for enhanced homeland preparedness.

Every Emergency department and EMS system in this country must prepare and train to meet this need. This conference addresses these issues and shares responses to significant disasters in the recent past and the lessons learned therein. The goal of this discussion is to be more familiar with relevant issues and the state of the art, and to identify funding and resources to help hospitals and emergency departments prepare an effective disaster plan.

This document is distilled from the presentations at the September 14, 2004 Illinois College of Emergency Physicians symposium “On Our Watch II: Preparing the Emergency Department for Bioterrorism.” ICEP would like to thank the Illinois Department of Public Health for its support of this meeting through a HRSA Bioterrorism Preparedness Grant.

Each section of this document includes the lecture title, the speaker(s) and affiliations, and a summary of the lecture. Bullet points at the beginning of each section highlight the key learning points from each speaker’s presentation. The paragraphs that then follow provide greater detail into the content of the presentation.

This document can be obtained electronically at www.pdf.com, and audio and video materials produced from these presentations can be viewed or downloaded at www.materials.com. If you wish to obtain a CD-ROM that includes all of these materials, it may be obtained by contacting the ICEP office at www.icep.org, 630-495-6400 or 888-495-ICEP, or info@icep.org.

Welcome and Acknowledgements

Jacek Franaszek, MD, FACEP (Conference Co-Chair)

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Dr. Franaszek welcomed the audience, and thanked the speakers, the ICEP staff, and the Illinois Department of Public Health for its support of the meeting.

Potential Emergency Department Disaster Scenarios

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- Chemical, biological, radiological, nuclear, and explosive events constitute the five categories of potential terrorist threats.
- Very large numbers of ill or injured patients could overwhelm the safety infrastructure and the ability to provide emergency medical services.
- Evaluating the possible disaster scenarios and asking specific questions as to how problems might be handled will improve our emergency preparedness.
- There are extensive resources that are available to make this emergency preparedness process maximally beneficial.

Preparing for a disaster requires consideration of particular events and how their effects might compromise the delivery of emergency medical services. Domestic terrorist threats fall into five categories identified by the acronym CBRNE, according to the Office for Domestic Preparedness. These are chemical, biological, radiological, nuclear, and explosive threats. An attack could possibly result in tens of hundreds of patients or more. Such a large number of patients and the resulting anarchy would likely overwhelm the system providing emergency care.

For example, a smallpox exposure could infect tens of thousands of patients, each seeking treatment and needing quarantine. A “dirty bomb” might cause hundreds of thousands of victims and panicked patients seeking medical care. A nuclear weapon would not only produce larger numbers of victims but also destroy segments of the urban and health care infrastructures. A thermobaric weapon could cause concussive injuries in thousands of patients, each requiring evaluation for acute brain or torso trauma.

Facing such a possibility, public health officials must prepare and consider what can be done to mitigate the catastrophic effects to both patients and emergency health care providers. Proposing disaster scenarios and asking clinical and operational questions about how each might play out will increase our awareness of the issues and help us make progress in preparation. Every clinician must consider what he or she would do if suddenly faced with an overwhelming number of patients from a catastrophic event while working in a hospital Emergency Department.

Concerns that arise include how to maintain hospital security in the face of large numbers of ill or hysterical patients, patient and staff access to the ED, quarantine of infected persons, protection of health care workers, large-scale patient identification and triage, and communications. How would your hospital remain safe with 5000 anxious ill or injured people outside? How would your emergency department handle triage? Could you rely on support from the police or National Guard, and how long would you have to wait? How long before additional supplies, including pharmaceuticals, would be available? How would you handle patients with an unknown exposure? What if you didn't know they had been exposed? How will families be contacted? What if telephones fail? How would you maintain communication with other hospitals or local and federal authorities?

These and other questions need to be considered carefully. There is assistance available in the form of information resources, training programs, Internet sites, and grants. Sharing information as well as identify funding opportunities will help individual EMS systems and hospitals develop their own effective disaster plans.

This meeting will hopefully expose the attendees to these resources, so that their own efforts at developing local emergency preparedness will be optimized.

State of Illinois and City of Chicago Perspectives on Emergency Preparedness and Disaster Planning

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- Detecting unusual patterns in numbers of patients or their symptoms can forewarn problems or impending disasters.
- In a disaster plan, strategic control from IDPH directs regional “POD” hospitals, which in turn coordinate the way in which hospitals share resources and patients.
- There are funds to defray the cost of disaster preparedness and the implementation of disaster plans.
- Chicago’s Office of Emergency Management and Communications (OEMC) oversees all city emergencies and disaster event planning.

The Illinois Department of Public Health’s State-Wide Crisis Policy includes four steps: recognition of a potential crisis, identification, notification, and a plan of action. When an increased number of patients with similar symptoms are identified, or an emergency department is overwhelmed, the IDPH communicates this information to the local resource hospitals. Increasing ambulance transit times or number of diversions are also noted. EMS and medical directors at resource hospitals are responsible for communicating such irregularities in patient demographics that can foretell impending disasters. There is a chain of responsibility that extends to local county and IDPH authorities, the Illinois Poison Control Center, and then to the IDPH officer, state EMS chief, and the Illinois Emergency Management Agency duty officer. Other local health departments are then contacted to assist through their resource hospital, according to their local disaster plan.

The State Medical Disaster Plan is activated upon declaration of a disaster. Its purpose is to allow EMS and health care facilities to work together and to provide assistance when local resources are overwhelmed. Illinois’ plan one of the most advanced in the country.

The Illinois Operations Headquarters and Notification Office (IOHNO) is run by senior staff and serves as the strategic coordination center for emergency medical operations. It also provides updates to state authorities as well as the regional POD hospitals, which are the “lead” hospital in their area.

A POD hospital is a resource hospital that provides level I trauma center care and ALS care. These hospitals are typically the best prepared, and are called Tier Level I in the preparedness plan. They are the point of contact for state medical teams, investigators, and IMERT (Illinois Medical Emergency Response Team). The POD hospital is responsible for coordination of local medical response and information in a disaster, and must assess and track available beds, ventilators, and special needs such as decontamination. Other hospitals in the disaster system that provided lesser levels of care are designated as tier II and III.

In a disaster, IOHNO activates unaffected POD hospitals for needed resources and coordinates distribution of patients among all available hospitals. The IMERT team leader reports to the Incident Command at the disaster site. Response plans include the activation of the Dental Emergency Response Teams (DENT) and the Illinois Pharmacy Emergency Response Network (IPERN), which assists with medication administration.

The State Medical Disaster Plan, which was activated on 9/11/01, has conducted several major disaster exercises since then, and Illinois is considered one of the best-prepared states in the nation. The plan also provides immunity for designated personnel, who are covered from liability by Good Samaritan Immunity Law and by provisions in the EMS Act and IEMA’s Act. Reimbursement for expenses is also available through the State Disaster Relief Fund. There are many grants, from HRSA and other sources that are available to help defray costs for hospital preparedness planning, educational and training programs, and technical assistance and equipment. Past grants have been given to ICEP, MCHC, IHA and IPHCA. Dr. Whittaker encouraged suggestions and emails at suggestion@IDPH.state.il.us and stupidthings@IDPH.state.il.us.

Chicago’s Office of Emergency Management and Communications (OEMC) includes the 911 center as well as the 311 and various other non-emergency and security operations. As the focal point for preparing the city for emergencies, Chicago’s readiness initiative has created response plans for all contingencies. The city also provides training for responders and the necessary resources to conduct disaster exercises. The city officials work closely with the state, DHS and FEMA. The OEMC has a plan for dispersal of prophylactic antibiotics within a 48-hour window in the appropriate setting. It also has partnerships with the post office as well as FedEx for distribution of necessary pharmaceuticals.

Homeland Security: Insuring Emergency Medicine Department Safety Following a Significant Disaster

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- FEMA is responsible for coordinating emergency preparedness and disaster relief.
- The National Response Plan is integrated with state and local agencies disaster plans; it also promotes citizen preparedness.
- An unprecedented amount of funding has been made available for disaster preparedness efforts.

FEMA, or the Federal Emergency Management Agency, under the Department of Homeland Security, is responsible for coordinating emergency preparedness and disaster relief. The agency pursues this on two tracks: devising and funding a national plan which is coordinated at the state and local governmental level, and funding programs which promote the development of citizen preparedness in local and regional programs. The department devised the National Response Plan to integrate all federal response capabilities under a single all-hazard system for prevention, preparedness, response and recovery. The plan attempts to provide a working blueprint for roles in a disaster for officials at all levels. As part of this plan, the National Incident Management System (NIMS) unifies federal, state, and local lines of government into a coordinated effort and establishes a uniform set of responses, protocols, and procedures, as well as a common language.

In order to increase preparedness, an unprecedented amount of funding has been made available (over \$8 billion since March 2003) for education, detection equipment, radios, and more. The National Disaster Medical System operates with regional EMS personnel that can be activated to respond quickly and can be expanded to cope with the scale of the disaster. The NDMS played a key role in the preparation and assistance during the recent hurricane disasters in Florida. Additionally, \$274 million has been requested for the new Biosurveillance Program Initiative to integrate data from across the country.

According to a recent survey, only ten percent of hospitals said they would be able to handle a mass casualty event with 50 to 100 patients. This emphasizes the need for local governments, hospitals, and health care leaders to take the initiative to educate emergency health care providers and agencies. Fortunately, there is sufficient funding available to support these efforts, as well as the resources and programs to develop plans and conduct disaster drills.

Strategies for Coping with SARS in the Emergency Department: The Toronto Experience

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- The corona virus responsible for SARS was quickly identified, leading to prompt action, including quarantines, which contained the outbreak.
- A second SARS outbreak, which was quickly contained, was due to a lost epidemiological link to the disease.
- The cost of the SARS quarantine and the required changes in the provision of medical care, which disrupted every level of the health care system, cost billions of dollars.
- Universal and respiratory precautions, which were difficult to maintain and very costly, ultimately prevented a more widespread dissemination of the disease.
- The SARS crisis resulted in a significant modification of emergency department design and practice in Toronto

Dr. Ovens began by reviewing the events surrounding the initial outbreak of SARS in Guandong Province, China. The corona virus, which was later identified, had originated in the civet cat and first spread to humans in the animal handlers. When one of them fell ill and was hospitalized, it spread to the patient's health care workers. One such person, a respiratory therapist, traveled to a wedding in Hong Kong and then fell ill. Other travelers staying in nearby rooms at the same hotel were infected, including an elderly woman who flew home to Toronto where she became ill and died. Her demise was initially believed to be due to a heart attack. Her son later became ill and was hospitalized in Toronto, where the virus unwittingly spread among the family's contacts as well as some of his health care workers. Within one week, that same hospital had become overwhelmed with SARS cases. Two weeks later, because of the large number of SARS cases, a provincial emergency was declared.

The corona virus, which was responsible for the disease known as SARS, was isolated and identified about one and a half months after the first case in Toronto. The outbreak was thought to be under control and the provincial emergency was lifted about one month later. Unfortunately, more cases were subsequently discovered and were attributed to a

lost epidemiological link with the infected source patient. This second crisis was effectively contained and the outbreak resolved after several more months of work. The identification of the causative agent and dissemination of information regarding quarantine procedures and treatment occurred at very high speed, particularly compared to historical outbreaks from diseases such as Legionnaire's Disease or HIV.

As a result of the SARS outbreak, there were 44 deaths in 251 patients (17%) who were likely SARS cases, and over 25,000 people were quarantined. Additionally, many people required home isolation for SOVI (some other viral illness) after presenting with non-specific respiratory or viral symptoms. A constant challenge for health care workers was to keep up to date on the latest epidemiological links and to keep a high index of suspicion for illness in patients who had traveled to outbreak areas, in all health care workers and their families, and in patients whose illness appeared to be clustered.

The SARS epidemic virtually shut down the emergency health care system in Toronto for weeks, and its financial impact was in the billions of dollars. All outpatient and elective health care activities, as well as educational and research activities, were canceled. Hospital access was severely curtailed, and all staff wore personal protective equipment at all times throughout the hospital. Dr. Ovens noted that new cases occurred among health care workers despite "general" precautions. Prior to recognition of the magnitude and severity of the crisis, compliance was less than optimal; the number of cases was observed to increase when health care workers did not uniformly use masks.

As is the case in many other urban Emergency Departments, Toronto's EDs suffer from chronic overcrowding and delays in hospital admission. The first SARS patient, in fact, waited in the ED over 20 hours before transfer to the ICU. Moreover, because only a curtain separates many rooms in the ED, and because many ED patients received nebulizer treatments, there was quick and effective dispersion of the virus. Dr. Ovens showed how the spread of the SARS virus began with ED patients who were situated in rooms near the index case. The virus continued to spread in various hospitals and in situations where the patient's SARS infection was initially unrecognized. The declaration of a provincial emergency made implementation of strict universal and respiratory precautions mandatory. As a result, all SARS patients were eventually isolated.

Dr. Ovens described the tedious and time-consuming processes that became commonplace, such as the donning and disposing of protective equipment (gown, N95 mask, gloves, face shield/goggles, no beards) and daily screening of all employees at the beginning of each shift. Patient contact was significantly reduced. Visitors were restricted or completely prohibited. Restrictions were placed on health care workers, including limiting physical contact (no shaking hands) and many group meetings altogether. The cafeteria was closed, hallways were sealed with plastic, and employees were prohibited from working in more than one hospital. Among the staff, a culture developed that was intolerant of infractions of these rules. These and other systemic disruptions and staff challenges had a significant impact on both the day-to-day operations and the morale of the hospital staff.

As a result of the SARS outbreak, ED productivity diminished significantly. In fact, Dr. Oven surmises that most EDs were able to remain functional largely due to the voluntary avoidance of the ED by the general public and other potential patients such as nursing home residents. Patient discharges were more difficult to implement, as routine follow-up in clinics and other outpatient settings was severely curtailed or cancelled. All of these changes were workplace stressors, with perhaps the most significant being the diagnostic uncertainty of each new patient who presented and required emergency care.

As a result of the crisis, the ED at Dr. Oven's hospital was extensively modified. Curtains were eliminated and doors added, increasing negative pressure ventilation capabilities. Respiratory procedures were modified in order to reduce the aerosolizing of droplets. Patient contact and movement, as well as wait times in the ED, were reduced. Health care worker training, awareness, and behavior modification was one of the most effective means by which the outbreak was curtailed. Despite these efforts, it is thought that some of the potentially avoidable SARS transmissions during the crisis may have occurred due to poor HCW compliance in unrecognized patients and in those considered to be low-risk. This is particularly true in the setting of high-risk procedures such as intubations and bronchoscopy, where aerosolization is likely.

SARS was noted to be most contagious when the infected patients were the most critically ill. Although 83% of SARS patients did not transmit the infection to another individual, most of those who became infected did so in the hospital setting. The primary mode of transmission was believed to be large droplet contact with exposed mucous membranes. Those who were more likely to die as a result of the SARS virus were more often older or had co-morbid illnesses such as diabetes.

In conclusion, the Emergency Department is a fertile setting for the transmission of contagious diseases, and an appropriate level of preparedness at all times is the best defense against the spread of contagious diseases. ED design, staff awareness and behaviors, and patient flow are all key to limiting the spread of disease. Isolation strategies must be developed, and health care workers must be educated in their implementation. Once specific precaution plans are instituted in the setting of a disease outbreak, constant vigilance in their continued implementation over time must occur.

Clinical Experience with Monkeypox

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Certified Pediatric Nurse Practitioner
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- A recent case of monkeypox highlights the concern over professional responsibility and health care workers' duty to treat all patients, regardless of the risk associated with providing this healthcare.
- In as much as some physicians may be less willing to risk personal danger in caring for infectious patients than are others, a national dialogue on the changing role of the physician and professional values is needed.

Monkeypox virus is similar to smallpox, but it is less infectious and is rarely lethal. Monkeypox is clinically indistinguishable from smallpox, but is differentiated via polymerase chain reaction (PCR) techniques. Each pox lesion is painful and appears as "half a pearl slipped under the skin". Lesions cover the skin as well as the mucous membranes inside the mouth.

Dr. Michael Anderson was called to assist on the case of a 9-year-old girl in their hospital with known monkeypox as she started to complain of difficulty breathing. The patient had allowed her infected pet prairie dog to lick her mouth, causing the rare human infection with this virus. Her body was covered with painful lesions including her hands and feet, for which she was treated with a morphine drip. Dr. Anderson related that he called the CDC in an attempt for assistance and information, but that they were unable to offer any specific advice, ostensibly for medical-legal reasons. The patient improved without any specific therapies and was eventually discharged home.

Despite the fact that this patient survived this unique infectious disease, the experience highlighted a larger concern for the clinicians who were exposed to her: the apparent change in professional values of some practitioners toward this patient. In essence, the hospital experienced some difficulty in finding a physician willing to care for this patient.

Dr. Anderson asked several questions: Do physicians feel less professional responsibility to treat patients? Is it possible that the “physician-patient” relationship has become one more typified as a “provider-customer” relationship? Is this perceived change a trend, particularly in the face of emerging and dangerous infections?

Are younger doctors less dedicated than their older counterparts? An AMA News survey in 2004 found this to be the perception of most physicians over age 50. The reasons given for a possible change in professional attitudes included conflicts of interest, loss of personal modeling (mentoring), less sacrifice on the part of physicians, and the observation that overall, physicians know their patients less well than in the past.

Dr. Anderson argued that professional responsibility comes from competency and loyalty, and that health care professionals have both a legal and ethical obligation to treat all patients. Dr. Anderson stated that he believes that it is appropriate to have discussions about professional and ethical obligations, and that it is worthwhile to foster “profession-wide introspection” on the physicians’ role in society in 2004. This is particularly true in an age of rapidly emerging diseases, where medical professionals may be relatively unprepared to cope with the possible personal danger posed by an infectious disease outbreak.

As proof of the need for discussion, Dr. Anderson cited a recent CDC survey that states that while 80% of patients expect their primary care doctor to care for them if infected with a Bioterrorism agent, up to 80% of physicians said they would decline to have direct patient contact in the setting of an infectious disease outbreak. He also called for a policy change at the CDC regarding medical consulting and information release in order to facilitate the care of patients who require treatment following exposure to an infectious agent.

Dr. Stephanie Anderson, a pediatric nurse practitioner, also provided insight into this unique case from the perspective of the nurse health care worker. She concurred that it is important to consider how the health care workers’ attitudes towards caring for an infectious patient must be considered as a result of her experience with this pediatric patient infected with the monkeypox virus.

JCAHO Standards for Bioterrorism Preparedness and Overcrowding

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- Individual hospitals must develop their own policies regarding patient rights and procedures, and are responsible for implementing those programs, measuring their impact and monitoring compliance.
- In the setting of a disaster or an emergency, hospitals are still responsible for meeting the standards for delivering adequate care to all patients.
- Patient care should be uniform, equivalent, and well documented throughout the hospital.
- There is an emphasis on ensuring appropriate transfers between departments and from the hospital to other institutions.
- The four standards in emergency management that hospitals must meet are: hazard vulnerability analysis, ongoing staff training, conducting regular drills, and contingency plans for surge capacity.
- There is a JCAHO focus on identifying impediments to patient flow.

Dr. Altman attempted to highlight certain areas of hospital care as they relate to recent changes in JCAHO regulations, as well as to dispel a few myths regarding JCAHO. For details on his discussion, he referred interested persons to read the revised JCAHO standards.

In terms of the patient's right to treatment, each hospital must define what those rights are and develop a policy to ensure compliance within each area of the hospital. This includes a plan to meet individual and special patient needs. In the case of the ED, this might include hallway boarding, confidentiality and security issues.

The patient's right to treatment is defined by EMTALA and the Prudent Layperson standard, and JCAHO helps to enforce these laws. It is the role of hospital leadership to ensure that services are efficient and timely, in a safe and adequate environment. When patients enter the hospital or change their level of care it is important that appropriate referrals and transfers be provided. This includes defining and meeting criteria for

admission and discharge. It also mandates discharge planning to help create flexible capacity. Data must be collected that shows movement of patients is based on established criteria.

Adequate and competent staffing must be maintained at all times, and the initial care and re-assessment of patients must be documented. This includes criteria-based patient movement as well as pain management care plans. The aim is to attain a uniformity of care, such that care provided in the ED is deemed to be equivalent to that provided in an in-patient bed. The delivery of ancillary services should be collaborative and timely.

An emergency can be described as a significant event that disrupts the environment of patient treatment and services. An event might provoke, for example, a loss of utilities, or a sudden increase in demand for services. This does not, however, necessarily imply a disaster. The regulations regarding emergency management describe the standards each hospital must meet (in specific areas) and the processes involved in identifying potential emergencies and in preparing their institution for an emergency situation. The hospital's plan should link with the community command structure.

Hospitals should be aware of four major standards in emergency management: hazard vulnerability analysis (design the emergency plan), staff training and demonstration of their roles, conducting drills regularly (both hospital and community-wide), and contingency planning for an influx of infectious patients. The purpose of monitoring the hospital's handling of these situations is to shift the focus from ED overcrowding to identifying impediments to patient flow through the hospital. Elements of performance are indicators used to measure the success of specific aspects in this process. In order to show progress, it is important to identify areas not working well and to fix them.

The speaker encouraged interested persons to review the new standards, some of which are included in the conference syllabus. The process is designed as a patient-care-focused program. Scoring for the new standards started 7/1/04 and penalties will begin to be a possible outcome after 1/1/05.

ED Overcrowding: Fix It

Peter Viccellio, MD, FACEP

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- Emergency department overcrowding and increased surge capacity is in large part a problem of moving patients upstairs into the hospital once emergency care has been provided.
- When necessary, emergency department patients should be transferred to in-patient beds under a “full capacity protocol”, which allows the ED patient load to be shared among all of the in-patient units.
- This full capacity protocol allows the Emergency Department to remain open and functional despite the increase in patient volume, which leads to decreases in length of stay, and ultimately could produce additional hospital revenue.
- Implementation of the full capacity protocol is in the best interest of the patient, and it could improve perceptions regarding the hospital by the community.

There is a simple answer to increasing surge capacity in the emergency department (ED). It generates revenue rather than increasing costs, and increases safety, in that it improves nurse-patient ratios. Overcrowding in the ED is primarily a problem of moving admitted patients into the hospital in an efficient manner. This relies on effective movement of patients through the hospital, the efficient delivery of in-patient services, and timely hospital discharge. The reason for ED overcrowding is largely due to patterns and beliefs that have pervaded hospitals and their staffs for decades.

Past strategies to fix the problem have not addressed the real issue of patient flow to the Emergency Department and within the hospital. For example, ambulance diversion ultimately only affects a small portion of incoming patients, it often simply diverts patients to other overcrowded EDs, and it is for the most part a poor business decision. EMTALA and discussions of unnecessary patient visits also do not effectively address the real problem of ED overcrowding. The endless analysis of data also is often counterproductive, in that it is often aimed at assigning blame rather than an effective solution to the real problem.

Dr. Viccellio outlined the principles that justify the proposed improvements to ED patient flow that follow. First and foremost, the ED is necessary to the hospital and the community, and so it must remain open and available at all times. The proposed procedural changes are designed to benefit all patients, not just those who are treated in the ED. Essentially, patients who are dispositioned for inpatient care do not belong in the ED and thus, should be moved out of the ED ASAP. Finally, hospital EDs cannot be

asked to function under duress as a result of hospital deficiencies or those in the entire health care system.

Dr. Viccellio stated that five years of meetings changed little in their perpetually crowded ED. However, once the ED staff was able to exert some control over patient flow and moved patients upstairs from the ED, even if an inpatient bed was not yet available, his hospital became more efficient. In-patients were discharged and rooms were cleared more quickly for arriving patients.

If an emergency physician is unable to treat his or her next patient because the ED is overcrowded with admitted patients, then logically the admitted ED patients must be moved upstairs to the inpatient care units, regardless of bed availability. Other hospital departments might react that it is somehow more unsafe to move a patient onto a “full” inpatient unit, in part because the nurse-patient ratios in the ED are higher than elsewhere, or they may simply state that overcrowding is the ED’s problem. In fact, patient overcrowding should be viewed as a hospital problem, such that patient care areas outside of the ED should also be expected to be capable of accommodating extra patients as well or more easily than should the ED. Inpatient units typically have much more flexibility in floor space and staffing. They are also less crowded, less chaotic, and may actually be a safer environment for patient overflow. In most instances, transfer of a few “overflow” patients to an inpatient unit raises the nursing-patient ratio only a fraction, such that patient safety is not adversely affected. Such an approach, however, can greatly improve patient care makes in the ED by safely enhancing overall hospital capacity.

Ingrained practices and misconceptions make this type of change very difficult. The key to change is to mandate patient transfer upstairs in an efficient manner and not at the discretion of accepting personnel. Leadership must be convinced that this is the best policy because it is best for all of the hospital’s patients and not simply good for the ED staff. It should be viewed as the superior approach because it allows the ED to remain open so that new, critically ill patients can be treated in a timely manner. Success in adopting such a policy involves developing clear guidelines through interdisciplinary groups that include neutral parties, ultimately leading to the establishment of individual responsibilities and the criteria for inpatient overflow placement. These hall placement criteria in general will promote the transfer of the least ill patients first, and lists the many types of patients who are excluded from inpatient hall placement. The Full Capacity Protocol adopted by Dr. Viccellio’s hospital is initiated by the ED attending and charge nurse, who notify the bed coordinator. The bed coordinator, after approval from the medical director, then notifies the inpatient units that they soon will be assigned patients that will reside in the inpatient unit hallways.

Full Capacity Protocol implementation has expedited the discharge of patients, has improved communication between departments, and has garnered praise from hospital staff, the administration, as well as patients and hospital evaluators. It has also reduced ED patient time to disposition and overall length of stay. Similar programs have been instituted by a number of leading hospitals and recognized by the JCAHO.

Emergency Department Disaster Preparedness: The Tertiary Medical Center Perspective

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- The University of Illinois Hospital uses organizational charts and job action sheets to create a flexible plan adaptable to different types of disasters.
- Lessons from previous disasters include: (1) obtain information regarding the disaster incident prior to arrival of the first patient; (2) plan how to handle inquiries from concerned families; and (3) mobilize hospital PR personnel early to handle the media.

The University of Illinois Medical Center is a tertiary care center with a disaster plan that is modeled on the Illinois State Medical Disaster Plan and Hospital Emergency Incident Command System (HEICS). The hospital uses organizational charts and job action sheets to create a plan that is adaptable to each incident.

Activation of the plan is based on the type of incident. A biological incident, for example, in which patients may present intermittently over days to weeks, involves the infectious disease and toxicology services as well as pharmacy. An event involving chemical exposure or needing decontamination may arrive at the hospital by any means and at multiple entrances. This may necessitate a lock-down by campus police; the environmental health and safety office then coordinates decontamination efforts.

In a mass casualty/trauma incident, victims present rapidly, usually via ambulance from the scene. The disaster plan is typically activated for hours, not days. Activation of incident command occurs, with recruitment of additional staffing and facilities, and Information Technology Services and financial support is obtained. The American Red Cross Information Service is slated to assist in identifying and communicating with patients and family members at UIC and other hospitals involved in any disaster throughout the area. The media center with its public relations personnel handle the important role of controlling and disseminating information.

The UIC ED contains 31 treatment rooms, which include 2 fixed and 6 HEPA-filtered isolation rooms. Decontamination in the ED normally accommodates 6 patients per hour, but this capacity can be increased to up to 42 patients per hour. Adding treatment carts to the ED hallways and nearby meeting rooms on the ground floor, and potentially to other places within the hospital or nearby buildings increases surge capacity.

A recent disaster in Chicago highlighted three deficiencies in the implementation of UIC's disaster plan. First, inter-hospital communications were inadequate, such that the first victims arrived in the ED without the delivery of useful clinical information regarding the cause of the disaster. At 3 AM, the ED received a call from the POD hospital stating victims of pepper spray at a nightclub were being evacuated to several area hospitals. Within 15 minutes, three young adults arrived to the ED in asystole. In an attempt to obtain information, a staff person ran to the lobby's television for breaking news coverage. Only when ambulatory patients arrived later was it understood that the first victims had been crushed in a stampede to escape through locked exits. Thus, information regarding the nature of the incident prior to the first patient's arrival is absolutely essential.

A second problem involved the handling of the influx of concerned family and friends. The news of a deadly disaster in downtown Chicago brought a rush of humanity to the ED, requiring a quick security mobilization. The hospital's telephone lines were jammed with people who were desperate to know of the status of their loved ones. Many concerned family members at the university hospital did not know that patients had been taken to various hospitals across Chicago. Eventually, a list of patients' names was compiled from the receiving hospitals and a hotline was established to answer the many calls generated by concerned family members.

A third problem was the presence of cameras and media in the ED. Community leaders in front of live cameras appeared in the waiting room and confronted staff in the midst of their efforts at treating the many ED patients. The large media presence itself had the potential to cause an internal disaster. The hospital's media/PR administrators were quickly mobilized to pass on information, and an area was established where the media could conduct interviews.

In summary, a disaster response is an institutional undertaking, requiring the organized response of the hospital, the local community, and the EDs staff. Communication with various hospital and community representatives is helpful to coordinate responses and resources, which often are available in unexpected places. The immediate response is often excellent, but sustaining the response can be challenging. Any significant emergency event requires a PR representative from the hospital to handle the expected media inquiries about the incident and patient outcomes.

Emergency Department Disaster Preparedness: The Community Hospital Perspective

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- This community hospital's disaster plan accommodates relatively modest numbers of patients, utilizing call trees for additional staff activation.
- Early activation of a plan requires vigilance but results in prevented complications.
- The plan can bring assistance from neighboring hospitals as well as additional personnel from within the larger hospital system.
- The hospital also has programs to assist with the families of staff in the setting of a catastrophic disaster that utilizes staff for prolonged periods of time.

The disaster plan at this community hospital is also modeled on the Illinois State Medical Disaster Plan & Hospital Emergency Incident Command System (HEICS). Once a disaster event is identified (code yellow), the administrator notifies the ED director, manager, and nursing supervisor. Section leaders and directors for specific departments are notified (safety officer, security, nursing, PR, facilities, infection control, etc.). A command post is established. Upon activation all personnel remain on duty until relieved or an "all clear". Additional personnel can be brought in from home or recruited from other departments. Other agencies are notified when appropriate (i.e., IDPH, Poison Control Center, FBI, etc.) All entrances are guarded and restricted.

Orange is this hospital's code for a hazardous materials situation and the Decon Team becomes responsible for operation of the code. A code yellow and orange may be run simultaneously. All accumulated waste material is disposed of in appropriate containers and removed through a contracted waste hauler.

In planning for surge capacity, OLR developed a plan based on a small number of victims (6) arriving at the ED without notice. Once the plan was in place and practiced, planning for larger numbers began. The plan also needs to be flexible, since OLR is not a teaching hospital and therefore has few house staff. Department call trees for extra staff are activated as soon as possible.

Most problems occur in the first few minutes until a management plan is activated. The resource and POD hospital are notified and IMERT may be activated. A program can be

activated that brings assistance from other nearby community hospitals. Additionally, other hospitals in the Resurrection Health Care System may share personnel.

OLR has plans for services in place to assist the families of staff also, such as day care, prophylaxis for infection exposure, and security. The hospital is in the process of creating positive/negative pressure isolation rooms, as well as an alternate ED site for HazMat incident victims. Consideration in planning is also given to pediatric needs (Broselow carts were purchased) as well as the needs of the elderly, disabled and mentally impaired, for whom initial assessment, transport, and ED care can be challenging. A single hospital representative is designated to handle public relations during a disaster. All interested patients, families, visitors as well as the media and general public will be invited to participate as information is released and during official press releases.

Employees are taught to suspect possible hazardous events and think about the need to call a code by remembering the acronym RAIN: Recognize (something abnormal), Avoid (close contact), Isolate (the patient), and Notify (the appropriate supervisor).

Hospital Decontamination

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- Decontamination plans and equipment should be tailored to the threats your hospital faces, be it a terrorist event or an industrial or laboratory mishap.
- Planning should occur jointly between hospitals and local agencies.
- Decontamination must occur quickly, without staff exposure, and may be needed for hundreds of patients simultaneously.
- Personal Protective Equipment level C (simple suit and mask filter) is probably adequate for most hazardous exposures.
- Organophosphate vapors are the most common significant health care worker exposure.
- There is funding available for equipment and training in the area of hospital decontamination.

The technical issues surrounding decontamination can be daunting. Hundreds of patients may present at once and it must be determined quickly if they need decontamination. Victims will need prompt treatment and will attempt to access clean areas of the hospital in pursuit of treatment. Effective assessment and treatment without endangering staff or other patients is key.

It is imperative to prepare for this possibility because the threat exists: either from a Bioterrorism attack or weapon, or from an industrial or laboratory mishap. Joint planning between hospitals and local public safety agencies should be guided by an assessment of local threats (including industrial or community hazards), scientific evidence, and federal regulations.

Historical examples of past decon events include the sarin attack in Tokyo on March 20, 1995, which left 12 people dead and over 5000 ill. Over 500 patients were treated at the nearest hospital in the first hour. Others include the train bombings in Madrid in March 2004 and the anthrax attacks in 2001-02, the latter of which were lethal to only a few victims, but produced many people who believed they might be ill.

In 2003, JCAHO mandated emergency preparedness as a key goal. It's standards created an "environment of care" that is meant to protect patients, employees, and facilities. OSHA regulates employee safety, NIOSH certifies equipment, and these and other

agencies that oversee environmental and medical issues will fine institutions that misuse equipment, endanger employees, or contaminate the environment. Guidelines for mandatory employee training can be found at www.osha.gov/dts/osta/bestpractices/firstreceivers_hospital.pdf.

There are state and federal grants for training and drills, from HRSA and CDC (Focus D) as well as financing from manufacturers (look particularly at those in your area). Drills that involve segments of the community and receive media attention will maximize the benefits of your efforts. Every institution should conduct patient decontamination exercises, which are helpful when performed both internally and when practiced annually involving EMS providers and the police and fire departments. Practice is the best assurance that all staff will be adequately trained and protected.

Decontamination methods vary from the inexpensive and clumsy (small outdoor wading pools costing \$5000) to the expensive and efficient (large mobile trailers or dedicated rooms costing \$50,000 or more). There are not consistent standards for decon units, such that the rule is “caveat emptor”. Basic requirements of all units require that they contain contamination and runoff, protect staff, allow cleanup or disposal, and facilitate patient throughput. Also, hospitals should be capable of decontamination autonomously without the reliance on community resources that might be committed to the site of the chemical release.

Personal Protective Equipment, the garb that staff dons before any patient encounter and decon action, is graded level A (a big suit and tank of air), level B (a small suit with portable tank), level C (a small suit and an air-purifying respirator mask), and level D (no suit or mask). Predictably, the higher levels of protection are more expensive. The amount of time a worker can operate in this equipment decreases with the higher level of protection; this is due to the physical stresses of the equipment and gear as well as the limited oxygen supply.

Level C, which is the level of protection that OSHA will probably require for training and equipment standards, is adequate for most hazard situations. Level C costs about \$1000 per person to outfit, and should include filters that protect against organic vapors. Because there is no guarantee that level C is uniformly safe, hospitals in areas where there is a specific local threat may need an increased level of protection.

Universal precautions include gown, gloves, mask (upgraded to N95 HEPA filter fitted against the face for protection against plague or smallpox) and shoe covers. Radiation protection requires even less protection. Most health care worker exposures to hazardous substances are vapor, and organophosphates are the most dangerous of these exposures. Even so, Level C protection would be enough to prevent symptoms in HCWs secondary to exposure to contaminated patients.

Funding for decon training and equipment can come from many sources. Your own institution’s commitment might be obtained by convincing them that this will protect

them and that it is good publicity. Other sources are federal organizations such as HRSA or the CDC, or the DHS (since it is a public safety issue), from state and local governments, and from industry. It is important to choose staff for training that is committed and competent, that has low turnover rate, that can be present 24/7, and that spans the spectrum of hospital services (i.e., clinical, maintenance, security, etc.). Training can take place internally (in the hospital) and externally (with fire department or industrial setting), and refresher courses should be built into the system at regular (perhaps annual) intervals.

The speaker refers readers to two useful related articles:

Hick JL, Hanfling D, Burstein JL, et al. Protective Equipment for Health Care Facility Decontamination Personnel: Regulations, Risks, and Recommendations. *Ann Emerg Med* 2003; 42:3: 370-380.

Hick JL, Penn P, Hanfling D, et al. Establishing and Training Health Care Facility Decontamination Teams. *Ann Emerg Med* 2003; 42:3:381-390.

Federal Programs and Resources for Emergency Medical Services

Edward P. Sloan, MD, MPH, FACEP

- www.hhs.gov is the Health and Human Services homepage, which has multiple headings and links for information resources on many relevant subjects.
- For information on emergency preparedness and response, visit the CDC sites www.cdc.gov and www.bt.cdc.gov.
- www.ready.gov has information geared more toward lay citizens and general concerns.

There are many resources for information on and assistance in enhancing preparedness in your hospital. The Department of Health and Human Services has an overview of a wide variety of topics at www.hhs.gov listed by category and linking to myriad other sites. From here it is possible to link to NIOSH and learn how institutions should protect themselves from hazardous exposures. There are links to Medline Plus on health topics as well as news and updates on potential health threats.

Links to CDC sites give information on emergency preparedness and response (www.bt.cdc.gov) in each category such as radiation, chemical, natural disasters, etc. These sites include, for example, a primer for physicians on explosions and blast injuries. Relevant detailed information is available on topics such as how to cope with a power outage and still deliver patient care. There is also the option to register for email updates on federal preparedness and training opportunities.

Additional information is available regarding the Strategic National Stockpile, the Cities Readiness Initiative, and recent US outbreaks and incidents. Emerging Infectious Diseases is an electronic CDC journal with relevant planning and surveillance information. The CDC site also contains information on their five-year budget regarding programs for community and state emergency preparedness funding.

The National Institutes of Health web sites are also linked and have information on Biodefense and NIAID research (www.niaid.nih.gov/publications/bioterrorism.htm). There are links to HHS sites that announce grants for Bioterrorism preparedness (www.hhs.gov/news/press/2002pres/20020606b.html) and where and how the money has been allocated in the past.

Finally, there are links to another useful site, www.ready.gov that discuss how individual and their families can prepare for a potential Bioterrorism attack.

At www.hospitalconnect.com, one can find AHA policy information on hospital preparedness for mass casualties, and there are related CDC sites on Bioterrorism readiness programs for healthcare facilities. The Local Public Health Preparedness and Response Capacity Inventory is a self-assessment tool located on the CDC site.

The CDC maintains the National Electronic Disease Surveillance System, and the CDC's Annotated Bibliography for Syndromic Surveillance is useful for the clinician looking for relevant articles and information. EARS, the Early Aberration Reporting System, is an easy-to-use tool available through their website. Epi-X is a CDC site devoted to the exchange of epidemic-related information.

In conclusion, the HHS has extensive resources, and its programs can greatly enhance local efforts at Bioterrorism preparedness. Many monographs are downloadable as PDF files. The available Internet tools allow users to assess their current status of preparedness and to build a roadmap for improvement. Local preparedness information can be accessed through the ICEP website, www.icep.org.

Grant Opportunities in Emergency Medical Services and Bioterrorism Preparedness

Edward P. Sloan MD, MPH, FACEP

- Begin a search for funding at www.FirstGov.gov, which specifies the many federal divisions and agencies, and provides links to more specific sites.
- www.grants.gov lists categories of funding opportunities.
- There are many HHS funding opportunities, and the Office of Extramural research has a search engine to narrow and refine your search.
- ICEP and the AMA are also valuable sources for Bioterrorism information

A review of sites to identify grants begins at www.FirstGov.gov, a homepage for all sorts of information on the federal executive branch of government. Besides links to detailed information by department and organization, it also leads to the Department of Homeland Security and to the Office of Domestic Preparedness. Grant opportunities are listed annually in various program areas, such as the 2004 Information Technology and Evaluation Program and the 2004 Homeland Security Grant Program.

On the HHS home page there is a large category devoted to grants and funding. www.grants.gov lists opportunities in a searchable database; results appear chronologically, and searches can be refined. Each result has extensive descriptions of the grant objectives and requirements.

The CDC also has many funding opportunities, accessed from the HHS website (www.cdc.gov/funding.htm). “Grants and Cooperative Agreements” is a distinct category of funding opportunities, searchable on the Federal Business Opportunities site. The National Center for Injury Prevention and Control and the Epidemiology Program Office also have extensive websites with funding information.

The Agency for Toxic Substance and Disease Registry (ATSDR, www.atsdr.cdc.gov) is a division of HHS. Here you’ll find information on their Emergency Response Teams, HazMat Preparedness Training and Tools, and chemical terrorism information (www.atsdr.cdc.gov/2p-emergency-response.html). The site also has information on medical management for acute chemical exposures. The National Center for Environmental Health (NCEH, www.cdc.gov/nceh) also has projects that they fund that can be found with a search engine.

Through the HHS site, one can find the National Institutes of Health Office of Extramural Research (OER), which also has a search engine to help locate funding topics (<http://grants2.nih.gov/grants/guide/index.html>). A listing of its Institutes, Centers & Offices is helpful in assessing their programs and considering all possibilities. One of these sites belongs to the National Library of Medicine (www.nlm.nih.gov), another excellent source of grants and research support, geared toward health care professionals.

Included in the NIH websites is that of the National Center for Research Resources, which also is a useful source of grant and research support.

The Illinois College of Emergency Physicians (www.icep.org) is an important source of information and opportunities, updated frequently, as is the ACEP website (www.acep.org), which includes information about the Emergency Medicine Foundation, which extensively funds Emergency medicine research. Other sources closer to home include IDPH Online (www.idph.state.il.us), which has opportunities for Bioterrorism Preparedness in Illinois. The Chicago Office of Emergency Management and Communication (www.ci.chi.il.us/Emergency911) is the city's center for planning, training and assistance for everyone preparing for a disaster event. The Illinois Emergency Management Agency (www.state.il.us/iema) and the Chicago Metropolitan Healthcare Council (www.mchc.org) are also useful sources of information. The IMERT website (www.imert.org) has news and links regarding Bioterrorism preparedness and the AMA Foundation (www.ama-assn.org) supports education and research.

Lessons Learned: Potential Emergency Department Disaster Scenarios

Edward P. Sloan MD, MPH, FACEP

- Emergency health care providers must prepare for potential Bioterrorism events.
- Plans should emphasize self-sufficiency while coordinating with community resources.
- There is information and funding available to support these important efforts.

Although it is difficult to contemplate, it is certain that a disaster of some type will occur in the future, even in the absence of a Bioterrorism attack. As such, emergency preparedness must be a priority of all EMS providers and hospital emergency health care workers. Although the information presented at this symposium has demonstrated that much has been achieved since the September 11 attacks, it is obvious that there is still significant work still to be done. It is hoped this meeting will give health care providers better direction as they plan local solutions to the problem of emergency preparedness. An institutional emergency management plan must be developed and updated for every Emergency Department and every hospital. There are extensive resources available to support planning, teaching, and equipment purchase. A dynamic approach to preparation is best, one that utilizes multi-disciplinary committees that create thoughtful answers to explicit and relevant questions. An emergency management czar within each institution might best guide this process.

Systems external to the hospital must be part of each institution's plan and preparation, and the collaborative role of local, regional and state organizations should be outlined prospectively. This includes EMS providers, fire, police and the National Guard, as well as federal, state and local governments; public health departments; and other health care providers such as neighboring hospitals. Nonetheless, each hospital must create a comprehensive, specific, and flexible plan that maintains a high degree of self-sufficiency. In the setting of a Bioterrorism event, each hospital may need to creatively restrict general ED access while allowing additional support staff to arrive and leave as necessary. Plans should include the potential for triage and the delivery of limited emergency health care to take place outside of the hospital. Internal safety will necessitate the rapid disposition of admitted and discharged ED patients, a quick and effective quarantine procedure, and limited access by non-essential personnel.

The course organizers wish again to thank the IDPH, the ICEP staff, the speakers, and the attendees for their participation in this conference.