Surge Capacity

Surge capacity* – the ability to expand care capabilities in response to prolonged demand

“Surge capacity encompasses potential patient beds; available space in which patients may be triaged, managed, vaccinated, decontaminated, or simply located; available personnel of all types; necessary medications, supplies and equipment; and even the legal capacity to deliver health care under situations which exceed authorized capacity.”


Trauma Surge Capacity

Encompasses all of the above, with emphasis on areas related to trauma care:
- Staff, equipment, supplies, etc… for:
  - Emergency Department
  - O.R.
  - Recovery
  - ICU
  - E.D. triage (START, SALT)
  - Blood Bank
  - Altered operative care guidelines
  - Mortuary
Scope of the problem

Terrorist Attack Archives, Terrorism Research Center
- In 2005, 758 terrorist events in 45 countries, more than half (399) were bombings
- 8019 injured, 3049 deaths
  FBI confirmed
- 324 terrorist bombings in the U.S. 1980-2001
- 21,000 bombing incidents (actual, accidental, attempted) in the U.S. 1988-1998

Scope of the problem

Earthquake risk in the U.S.
- 1600 deaths since colonial times, 60% in California
  - S.F. 1906 – 700 deaths
  - Puerto Rico 1918 – 116 deaths
  - Long Beach, Ca 1933 – 120 deaths
  - Alaska 1946 – 173 deaths
  - Alaska 1964 – 131
  - San Fernando, Ca 1971 – 64 deaths
  - Loma Prieta, Ca 1988 – 67 deaths
  - Northridge, Ca 1994 – 60 deaths

Scope of the problem

Earthquake risk in the U.S.
- Repeat of the 1906 S.F. earthquake today
  - 2000-6000 deaths
  - 6000-20,000 serious injuries
Trauma Surge Capacity

Current State of Readiness

Where are we?

Trauma Surge Capacity

Hospital and Health System Emergency Preparedness and Response in Virginia: Lessons from the past and Challenges for the Future

L. Kaplowitz, MD, Dep Commissioner, EP and Response VDOH

Testimony to House Committee on Oversight and Government Reform, May 2008

Lessons Learned: 9/11, Sniper Events of 2002

- Need for vastly improved communications among healthcare facilities and among hospitals, P.H. and First Responders
- Back-up Emergency comms for hospitals inadequate
- Need for mass fatality planning
- Need to include mental health emergency planning in all healthcare emergency planning

- Coordination of all parts of the public health and healthcare system is essential
- Cross training is key, as well as stocking of key supplies and equipment
- Any mass casualty event is likely to include a significant number of fatalities
- Need for a real time patient tracking system, that links EMS, hospitals, M.E., family assistance center

Trauma Surge planning in Va now includes:

- Placement of key supplies and medications for burn and trauma care in all hospital facilities
- Training of physicians and staff in all hospitals to provide basic trauma and burn care
- Training of EMS and hospital staff on appropriate triage during mass casualty events
- Mass fatality planning

“A coordinated trauma system is important, but there must be a well thought out trauma and healthcare surge plan to effectively respond to large scale events; trauma care provided only through designated trauma centers will not be adequate or appropriate for a mass casualty event”

- L. Kaplowitz
Trauma Surge Capacity

Hospital Emergency Surge Capacity: Not Ready for the “Predictable Surprise”

Prepared for the U.S. House Committee on Oversight and Government Reform, May 2008

Madrid Bombing

Madrid bombing was used as background for the study
- March 11, 2004, eve of major elections
- Attack on multiple commuter trains
- 177 died instantly, >2000 injured
- 966 transported to 15 hospitals
- 270 pts arrived to one Madrid hospital in 2.5 hrs
Madrid Bombing

According to the CDC

- Bombing in the U.S. like the one in Madrid is a “predictable surprise”
- 2004 Madrid bombing is an appropriate standard for assessing whether the emergency care system in the U.S. is prepared to respond to a terrorist attack

Trauma Surge Capacity

Survey presented to the Committee:

- Conducted on Level I trauma centers in 7 cities
  - NYC, LA, Wash DC, Chicago, Houston, Denver, Minneapolis
- Conducted on Tue, March 25, 2008 at 4:30pm
- Designed to determine real time capacity of the E.D. at the level I trauma centers to absorb the influx from a mass casualty event (Madrid)
- 34 of the 41 centers participated

Trauma Surge Capacity - 2008

Results:

- More than half (59%) of the E.D.s were operating above capacity
  - No available treatment space for new pt
  - Average was operating at 115% capacity
- Total # of available E.D. treatment spaces in each of the 7 cities was less than the # treated at a single Madrid hospital (270)
  - NYC had the most (56)
- In LA, 3 of 5 hospitals were on diversion
  - These 5 had 6 vacant treatment spaces available
Trauma Surge Capacity - 2008

Results:
- In Wash DC, no available E.D. beds in the 2 Level I trauma centers
  - One was operating at 286% capacity
- None of the Level I centers surveyed had enough critical care capacity available
  - In Madrid 29 critical pts arrived to one hospital
  - None of the 34 centers surveyed had this capacity
  - The average availability was 5 ICU beds
  - 6 hospitals (18%) had no ICU beds

Trauma Surge Capacity - 2008

Results:
- None of the Trauma centers had sufficient regular inpatient beds to absorb the casualties of the Madrid event
  - In Madrid, one hosp received 89 admissions
  - The average trauma center had 24 available beds

Trauma Surge Capacity

Life is full of wonderful opportunities temporarily disguised as overwhelmingly irresolvable problems
Trauma Surge Capacity

In a Moment’s Notice: Surge Capacity for Terrorist bombings
Challenges and proposed solutions
-U.S. DHHS, CDC, 2007
http://www.bt.cdc.gov/masscasualties/surgecapacity.asp

Challenges and Proposed Solutions

Report format
- Surge Capacity Challenges
  - System-wide and discipline-specific
- Surge Capacity Solutions
  - System-wide and discipline-specific
- This is a resource guide. Local needs, preferences, and capabilities may vary

System-wide Challenges
- Organization and Leadership
- Alterations in Standards of Care
- Education
- Communications
- Transportation
- Infrastructure and Capacity
  - Personnel, equipment/supplies, IT, Cost, Interoperability
Challenges and Proposed Solutions

System-wide Challenges (…cont)
- Potential Bottlenecks
  - Radiology, Critical Care, Pharmacy
- Triage
- Legal Issues

Challenges and Proposed Solutions

Discipline-specific Challenges
- EMS
  - Personal protection, decon, incident command, field triage, hospital evacuations, sustainability of operation
- E.D. Response
- Surgical and ICU Response
  - Changes in surgical practice, time of day, limited ICU beds, capacity, education

Challenges and Proposed Solutions

Discipline-specific Challenges
- Radiology Response
- Blood Bank Response
  - Disruption of supply system, transport of blood, local organization, staff who can administer
- Hospitalists’ Response
Challenges and Proposed Solutions

Discipline-specific Challenges

- Administration Response
  - Control of external environment, implementation of HICS, personnel issues, MOAs, logistics and supplies, alternate care sites, credentialing, patient tracking

Proposed solutions made by the report are

- Based on the Madrid bombings scenario
- Structured to include:
  - Goal
  - Resources required
  - Assumptions
  - Actions Steps
  - Evaluation

E.D. Proposed Solutions

- GOAL – To establish policies, procedures, didactic training, and drills to improve institutional preparedness for treating 300 injured patients for up to 72 hrs
- RESOURCES REQUIRED – Adequate staff to provide initial triage and stabilization for 300
- ASSUMPTIONS (highlights)
  - Packets for each patient prepared in advance
  - Established procedures for obtaining additional personnel, equip, supplies, etc
  - Established procedures for triage, pt identification, quick documentation
  - Established temporary disaster log
E.D. Proposed Solutions

- **ACTION STEPS (highlights)**
  - Implement and drill a hospital incident command system (HICS). Include clinical staff in the training.
  - Instruct clinical staff, especially surgeons and emergency physicians, about blast injuries and care following attacks with a radiation dispersal device.
  - Establish institutional lockdown process, drill it. Include radiation detection and decon.
  - Identify pt care supplies for a surge situation.
  - Develop a Regional Unified Command Structure...
  - Identify alternate pt care sites.

Surgical and ICU Proposed Solutions

- **GOAL** – Within 2 hrs of an event, establish incident command for the O.R. and support areas for up to 72 hrs.
- **RESOURCES REQUIRED** – Resources needed for communicating within the organization and community (e.g. sat phone, internal radios).
- **ASSUMPTIONS (highlights of 9)**
  - O.R.s are critical component, mobilize quickly.
  - O.R. capacity is fixed.
  - Clinical staff immediately available.
  - Additional staff can be called in within 2 hrs.

Surgical and ICU Proposed Solutions

- **ACTION STEPS (highlights)**
  - Identify medical leadership within surgery and anesthesiology for disaster planning.
  - Select individuals for incident command roles.
    - 7 sub steps.
  - Assure individuals who will assume an IC role are trained.
  - Identify lines of communication....
Radiology Proposed Solutions

- **GOAL** – To establish policies, procedures, and drills to improve radiologic preparedness for treating 300 injured patients for up to 72 hrs
- **RESOURCES REQUIRED** – Enough radiology personnel (radiologist, techs, support staff), equipment, and supplies to care for 300
- **ASSUMPTIONS**
  - Radiology services are critical component
  - Trauma surge may lead to bottlenecks

Radiology Proposed Solutions

- **ACTION STEPS (highlights)**
  - Develop a management plan and call list to use during a mass casualty event. Drill. Involve the radiologists…
  - E.D. should have ultrasound capability (FAST)
  - Conduct an imaging equipment survey. Have adequate amounts of portable equipment
  - Establish a protocol for augmenting pt movement and monitoring

Blood Bank Proposed Solutions

- **GOAL** – During the 1st 4 hrs, ensure that blood products can be located, processed, and administered to at least 300. Identify additional needs for up to 72 hrs
- **RESOURCES REQUIRED** – AABB documents, disaster response plan, lab personnel, transportation resources, transfusion supplies
- **ASSUMPTIONS (highlights of 6)**
  - Most difficult problems involve disruption or interference of the supply system
  - There are limited personnel with the training to administer blood products
Blood Bank Proposed Solutions

- **ACTION STEPS (highlights)**
  - Work with AABB to distribute documents to hospitals and blood collection orgs.
  - AABB has a process to educate communities about donations in times of disaster
  - Identify resources to meet local needs for collection, processing, distribution and transfusion of blood products

Hospitalists’ Proposed Solutions

- **GOAL** – Within 4 hrs of an event, deploy staff and functioning beds to treat at least 300 injured patients who require inpt and ICU care for 72 hrs

- **RESOURCES REQUIRED**
  - Public’s and health care community’s education and acceptance of the concept and need for alternate standard of care during disasters
  - Adequate staffing to support response efforts
  - Mechanism to implement crisis care guidelines
  - Mechanism to place hospitalists into “real time” roles to allocate and ration resources …

Hospitalists’ Proposed Solutions

- **ASSUMPTIONS**
  - Effective clinical response to trauma surge will require coordination and cooperation among multiple specialties
  - Hospitalists will be an integral component in identifying available beds, discharging pts, caring for pts, and providing additional support during the response
Hospitalists’ Proposed Solutions

- **ACTION STEPS**
  - Develop and disseminate crisis care guidelines
  - Convene ethics panel as necessary
  - Educate appropriate staff about the crisis care guidelines
  - Ensure that hospitalists are incorporated into the disaster response plan

Administration Proposed Solutions

- **GOAL** – To organize and support response to influx of 300 injured pts for a 72 hr period
- **ASSUMPTIONS** and **ACTION STEPS** are not trauma surge specific, and include:
  - Control of external environment
  - Activation of HICS
  - Logistics and supplies
  - Alternate care sites
  - Credentialing
  - Pt tracking
  - Identifying gaps…

Pharmacy Proposed Solutions

- **GOAL** – Within 4 hrs of an event, acquire appropriate and adequate drugs to treat 300 injured patients for 72 hrs
- **RESOURCES REQUIRED**
  - Analgesics, Anxiolytics, Antipsychotics, Antibiotics, IV fluids, Blood, Drugs for intubation, Topical burn care agents, ENT meds for perforation, Ocular meds, Tetanus toxoid
Pharmacy Proposed Solutions

- ACTION STEPS
  - Identify medical leadership and committee to address solutions
  - Inventory drugs
  - Identify gaps
  - Identify potential sources for these meds
  - Develop a plan for rationing
  - Develop a plan to rapidly acquire meds

Summary

Trauma surge planning is a subset of healthcare facility surge planning.

Trauma specific surge issues include:
  - E.D. surge (injured pts)
  - Radiology bottlenecks
  - O.R. and ICU surge planning
  - Blood banking issues
  - Pharmacy issues

Summary

Trauma surge planning also includes:
  - Use of non surgery clinicians to augment care
  - Disaster triage guidelines (START, SALT)
  - Crisis care guidelines, both operative and critical care
Summary

“A coordinated trauma system is important, but there must be a well thought out trauma and healthcare surge plan to effectively respond to large scale events; trauma care provided only through designated trauma centers will not be adequate or appropriate for a mass casualty event”

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Thank you!

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