How to Surge in Catastrophe

The Big Picture:
Components of Surge

9th Annual Emergency Management Higher Education Conference

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Objectives

- Define Healthcare Surge Capacity.
- Identify and Validate Planning Assumptions in Surge Capacity.
- List Appropriate Actions that will Improve Preparedness for Mass Casualty Management.
Surge Capacity

- Prepared for What?
- What is Surge Capacity?
- To What End?
  - How Much is Enough?
  - How Fast Do You Need It?
- Where Do You Get it?
- How Do You Maintain Capability?
- How Do You Link With Other Resources?
Sorting Fact From Fiction

Defining the issues
Surge

Webster dictionary definition:

To rise *suddenly* to an excessive or abnormal value
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 which exceed author...


Healthcare (only?) focus
Hospital Capacity is a Major Player…

But, Only One Part of the Solution

DC Population:
- Census: 750,000
- Actual: 2,000,000?

Hospitals:
- Staffed beds: 2,904 (non fed)

Non-hospital capacity:
- Clinic and medical office?
- Home health?
- Pharmacy?
- In home care?
The Education Challenge: Moving From What We *Think* to What We *Know*

Seasonal Influenza
- Globally: 250,000 to 500,000 deaths each year
- In the United States each year:
  - 36,000 deaths
  - >200,000 hospitalizations
  - $37.5 billion in economic costs from influenza and pneumonia

Pandemic Influenza
- 30% of the population affected
- An ever-present threat
Planning Assumptions: Influenza Pandemic
US Population 2005: 295,507,000

- 50% of ill persons will seek medical care
- Hospitalization and deaths will depend on the virulence of the virus

<table>
<thead>
<tr>
<th></th>
<th>Moderate (1957-like)</th>
<th>Severe (1918-like)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness</td>
<td>90 million (30%)</td>
<td>90 million (30%)</td>
</tr>
<tr>
<td>Outpatient medical care</td>
<td>45 million (50%)</td>
<td>45 million (50%)</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>865,000 (4 x seasonal)</td>
<td>9,900,000 (50 x seasonal)</td>
</tr>
<tr>
<td>ICU care</td>
<td>128,750</td>
<td>1,485,000</td>
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<tr>
<td>Mechanical ventilation</td>
<td>64,875</td>
<td>745,500</td>
</tr>
<tr>
<td>Deaths</td>
<td>209,000</td>
<td>1,903,000</td>
</tr>
</tbody>
</table>

Source: CDC
# Influenza in Context

15 leading causes of death in 2002

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of death (Based on the ICD-10 Classification of Diseases, Tenth Revision)</th>
<th>Number of Deaths</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>All causes</td>
<td>2,444,930</td>
<td>840.4</td>
</tr>
<tr>
<td>1</td>
<td>Diseases of heart</td>
<td>684,462</td>
<td>235.4</td>
</tr>
<tr>
<td>2</td>
<td>Malignant neoplasms</td>
<td>554,643</td>
<td>190.7</td>
</tr>
<tr>
<td>3</td>
<td>Cerebrovascular diseases</td>
<td>157,803</td>
<td>54.3</td>
</tr>
<tr>
<td>4</td>
<td>Chronic lower respiratory diseases</td>
<td>126,128</td>
<td>43.4</td>
</tr>
<tr>
<td>5</td>
<td>Accidents (unintentional injuries)</td>
<td>105,695</td>
<td>36.3</td>
</tr>
<tr>
<td>6</td>
<td>Diabetes mellitus</td>
<td>73,965</td>
<td>25.4</td>
</tr>
<tr>
<td>7</td>
<td>Influenza and pneumonia</td>
<td>64,847</td>
<td>22.3</td>
</tr>
<tr>
<td>8</td>
<td>Alzheimer’s disease</td>
<td>63,343</td>
<td>21.8</td>
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<tr>
<td>9</td>
<td>Nephritis, nephrotic syndrome and nephrosis</td>
<td>42,536</td>
<td>14.6</td>
</tr>
<tr>
<td>10</td>
<td>Septicemia</td>
<td>34,243</td>
<td>11.8</td>
</tr>
<tr>
<td>11</td>
<td>Intentional self-harm (suicide)</td>
<td>30,642</td>
<td>10.5</td>
</tr>
<tr>
<td>12</td>
<td>Chronic liver disease and cirrhosis</td>
<td>27,201</td>
<td>9.4</td>
</tr>
<tr>
<td>13</td>
<td>Essential (primary) hypertension and hypertensive renal disease</td>
<td>21,841</td>
<td>7.5</td>
</tr>
<tr>
<td>14</td>
<td>Parkinson’s disease</td>
<td>17,898</td>
<td>6.2</td>
</tr>
<tr>
<td>15</td>
<td>Pneumonitis due to solids and liquids</td>
<td>17,457</td>
<td>6.0</td>
</tr>
<tr>
<td>...</td>
<td>All other causes</td>
<td>421,226</td>
<td>144.8</td>
</tr>
</tbody>
</table>

[Moderate pandemic: 209,000](http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_15.pdf)

[Severe pandemic: 1,903,000](http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_15.pdf)
Reality Based Planning

- Validate planning assumptions
  - Resources will be limited
  - Realistic expectation of who can be saved

- Identify the “manageable loss”: Those who can be saved given the limited resources

- Move from individual care to population based management
  - best outcomes for greatest number of people
  - Requires a change in triage protocols
Health and Medical Surge

Event

Pre-Incident Capability

Local Medical Response

Federal Medical Support (?)

Surge Needs

Operational Response Level

2  8  16  24  32  40  48  56  64  72 hrs

Adapted from SBCCOM Biological Warfare Improved Response Program
Health and Medical Surge

Pre-Incident Capability

Operational Response Level

Local Medical Response

Surge Needs

Extended Event

Federal Medical Support (?) dispersed across nation

72 hr → days → months
Pandemic Influenza 1918

Death Rates in the U.S. by Month
(per 1,000 population)

Death Rate (per 1,000 population)


1911 - 1917  1918
Total Human Impact

THI Profile (Anthrax)

- Potentially exposed
- Fatalities
- Admitted
Macro View: Surge Resources

Health and Medical Communities (descriptive terms)

- Pre-Hospital (EMS)
- **Hospital**
- Non-hospital Healthcare
- Non-healthcare Health and Medical services
- External Support to Health and Medical

Current HRSA program focus is hospital based:
National Bioterrorism Hospital Preparedness Program

- Clinical providers
- Physician offices
- Clinics
- Home health & hospice
- Nursing homes

- Laboratory
- Radiology
- Pharmacy
- Occupational health
- Epidemiology
- Preventive health

- Transportation
- Security
- Food & water
- Electricity
- Essential services
Surge Capacity

Functional areas beyond “Healthcare Organizations”:

- Broad Incident Management Structure
- Communication Systems
- Non-hospital healthcare
  - Physician and clinic capability
  - Home health
  - Allied health
  - Hospice
- Stress Management
- Preventive Medicine/Epidemiology
- Laboratory
- Mortuary Affairs
- Logistics
- Transportation
- Veterinary / Dental
Changing Paradigms

Medical roles in Preparedness and Response:

• Define needs
• Establish priorities
• Coordinate resources
• Establish process to align and allocate or “triage” critical assets*

* The Practice of Community Emergency Public Health (Burkle)
Balanced Logistics Approach

- Hospitals
- Clinics/procedure facilities
- Mobile (tents & trucks)
- Buildings of Opportunity

**Stuff**
- Supplies and Equipment
- 72 hour expendable supplies

**Structure**

**Staff**
- Link existing personnel
- Volunteer Coordination

MUST be Coordinated and Balanced across ALL domains
Educational Challenge

- Link validated concepts to training objectives
- Shift the status quo paradigm to actionable solutions in surge capacity
- Define impact of stovepiped solutions on other functional areas
- Establish metrics to measure progress
Surge Capacity:

From Concept to Operational Capability
CONCEPT of OPERATIONS
Immediate Impact

- Observable: instant impact
- Symmetrical: focal event
- Linear: event-driven response
- First responders are public safety agencies – EMS, fire, law enforcement
- Health ~ “secondary responder”
  “primary receiver”

‘GROUND ZERO’

Source: Toby Clairmont
CONCEPT of OPERATIONS

Obscure Event

- No observable ‘event’
- Asymmetrical: insidious emergence
- Non-linear: multi-focal event driven process
- First responders are primary care physicians, nurses, and Emergency Departments
- Traditional responders may be in a support role
- SARS best recent management experience

‘GROUND ZERO’

Source: Toby Clairmont
Balanced Logistics

- Stuff
  - Hospitals
  - Clinics/procedure facilities
  - Mobile (tents & trucks)
  - Buildings of Opportunity

- Structure

- Staff
  - Supplies and Equipment
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MUST be Coordinated and Balanced across ALL domains
Logistics Management Challenges

MUST be Coordinated and Balanced across ALL domains

SYSTEM

Platform to synchronize Policy and Logistics

The Critical Link
Surge Resources

- Federal Assets
- Non-med Support
- Non-traditional facilities
- Acute Care Centers
- Traditional 1st Responders
- Consistent Policy
- Training Exercising
- Equipment Supplies
- Clinicians Volunteers
- Mobile Response Units
- Regional Hospital assets
- Non-hospital Healthcare
- Regional Public Health
Integration
The Missing Link

Regional HUB
Synchronization

Federal Assets
Traditional 1st Responders
Non-med Support
Non-traditional facilities
Acute Care Centers
Equipment Supplies
Regional Hospital assets
Non-hospital Healthcare
Training Exercising
Regional Public Health
Clinicians Volunteers
Mobile Response Units
Modular / Phased Surge Capacity
Immediate and Sustained Capability

Phase I: Optimize within community
- Existing healthcare assets
  - Clinics
  - Physician offices, etc
- Rochester area total beds: 2969
  - Thompson Health 301 beds
  - Rochester General 526 beds
  - Strong: 710 beds

Phase II: Rapid Response Units
- Buildings of opportunity
- 500 patient triage external to hospital
- 50 patient minimal care
- 8 patient critical care
- Isolation / quarantine capable
- Mobile—can deploy anywhere in region
- 1000+ in minimal or holding capacity

Phase III: More with Less
- Buildings of opportunity
- Gymnasiums, hotels, convention centers, etc

Phase IV: Federal assets
- Strategic National Stockpile
- Federal assets

Training
Exercising
Sync HUB
Operational Hub

Tactical Operations and Training Coordination Center

Field operated facility responsible for:

- Situational awareness
- Link regional policy and resources
- Develop and maintain strategic alliances
- Facilitate and integrate
- Communicate and reinforce
- Respond as staff advisors to medical incident commander
Implementation: Phased Project
Immediate ➔ Sustainable ➔ Long term
Surge Capacity

- Provide capability for an event *today*

- Initial response: Flexible, modular, and mobile to supplement healthcare surge at *any location*

- Modular (building blocks):
  - responsive to *any event* as needed
  - Functionally packed equipment, all inclusive
  - Only deploy what is needed (sustainable cost effectiveness)

- Assess as it develops to improve long range capability

- Provide platform to facilitate synchronization
Issues for Discussion

- Appropriate resources (stuff, staff, and structure) as event evolves
- Synchronization of policies and procedures
- Integrating resources across jurisdictional boundaries
- Measures of effectiveness
Surge Capacity

Life is full of wonderful opportunities temporarily disguised as overwhelmingly irresolvable problems.