SURGE CAPACITY:

CONVENTIONAL, CONTINGENCY, AND CRISIS CAPACITY
Surge Capacity

- Ability of a healthcare facility to rapidly provide care to a large number of incident-related patients
- Space, Staff, ‘Stuff’, Special (CO-S-TR)
- Variability in assessment of ‘surge capacity’
  - Conventional – usual standard of care
  - Contingency – minor adaptations made – usually temporary
  - Crisis – systematic changes to the standard of care
Administrative Changes to usual care

- Triage set up in lobby area
- Meals served by non-clinical staff
- Nurse educators pulled to clinical duties
- Disaster documentation forms used

Clinical Changes to usual care

- Significant reduction in documentation
- Significant changes in nurse/patient ratios
- Use of non-healthcare workers to provide basic patient care (bathe, feed)
- Cancel most/all outpatient appointments and procedures

- Vital signs checked less regularly
- Deny care to those presenting to ED with minor symptoms
- Stable ventilator patients managed on stepdown beds
- Minimal lab and x-ray testing

- Re-allocate ventilators due to shortage
- Reserve admission for severely ill
- Triage patients to alternate care sites
- Allocate limited anti-virals to select patients

Incremental changes to standard of care

Usual patient care provided

Low impact Administration changes

High-impact Clinical changes

Increasing risk of morbidity and mortality to the patient
## Surge Capacity

<table>
<thead>
<tr>
<th></th>
<th>Crisis</th>
<th>Contingency</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Space</td>
<td>• Space</td>
<td>• Space</td>
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<tr>
<td></td>
<td>• Staff</td>
<td>• Staff</td>
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<tr>
<td></td>
<td>• Stuff (supplies)</td>
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</tbody>
</table>
## Surge Capacity Example

<table>
<thead>
<tr>
<th>Metric</th>
<th>Numeric</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Operating beds - average daily census</td>
<td>400 - 380 = 20</td>
</tr>
<tr>
<td>b. Usual ‘surge discharge’ capability</td>
<td>400 x 0.15 = 60</td>
</tr>
<tr>
<td>c. Available beds to convert single to double rooms</td>
<td>20</td>
</tr>
<tr>
<td>Conventional capacity total = a + b + c</td>
<td>100</td>
</tr>
<tr>
<td>d. Procedure and post-anesthesia care beds</td>
<td>30</td>
</tr>
<tr>
<td>Contingency capacity total = a + b + c + d</td>
<td>130</td>
</tr>
<tr>
<td>e. Flat space care</td>
<td>60</td>
</tr>
<tr>
<td>Crisis capacity total = a + b + c + d + e</td>
<td>190</td>
</tr>
</tbody>
</table>
### Space Creation for a Major Incident

<table>
<thead>
<tr>
<th>Time, Hours</th>
<th>0–2</th>
<th>2–4</th>
<th>4–12</th>
<th>12–24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional care</td>
<td>Fill available staffed beds</td>
<td>Provide staff for unstaffed but available beds</td>
<td>Obtain additional beds and add to existing patient rooms</td>
<td>Cancellation of elective cases begins to have impact, but does not open new beds</td>
</tr>
<tr>
<td>Contingency care</td>
<td>Clear patients from preinduction and procedure areas and fill available beds</td>
<td>Preinduction and procedural areas fully available</td>
<td>Transfer patients from higher acuity care areas to lower acuity care areas according to facility plan (eg, from intensive care to stepdown)</td>
<td>Assessment of situation—consider mechanisms to return to conventional care and request necessary resources</td>
</tr>
<tr>
<td>Crisis care</td>
<td>Place patients in hallways or lobby areas on prestaged cots</td>
<td>Set up preplanned facility areas for austere inpatient care</td>
<td>Mobilize resources for alternate care sites</td>
<td>Begin patient transfer to alternate care sites</td>
</tr>
<tr>
<td>Evacuation*</td>
<td>Evaluate facility impact and options for patient transfer</td>
<td>Arrange local and interregional patient transfers as possible to return to at least contingency care operations and/or request necessary resources</td>
<td>Begin local and regional patient transfers</td>
<td>Begin federally facilitated patient transfer</td>
</tr>
</tbody>
</table>
## Supply Strategies

<table>
<thead>
<tr>
<th></th>
<th><strong>Conventional</strong></th>
<th><strong>Contingency</strong></th>
<th><strong>Crisis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare</td>
<td>Stockpiled supplies used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitute</td>
<td>Equivalent medications used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conserve</td>
<td>Oxygen flow rates titrated</td>
<td>Oxygen only for saturations &lt; 90%</td>
<td>Oxygen only for respiratory failure</td>
</tr>
<tr>
<td>Adapt</td>
<td></td>
<td>Anesthesia machine for mechanical ventilation</td>
<td>Bag-valve manual ventilation</td>
</tr>
<tr>
<td>Re-Use</td>
<td></td>
<td>Re-use NG tubes and ventilator circuits</td>
<td>Re-use invasive lines</td>
</tr>
<tr>
<td>Re-Allocate</td>
<td></td>
<td>Re-allocate oxygen saturation monitors, cardiac monitors from low-risk patients</td>
<td>Re-allocate ventilators</td>
</tr>
</tbody>
</table>
## Staffing Strategies

### Examples of Sources and Responsibilities for Disaster Hospital Staffing

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Source of Staff (in Possible Priority Order)</th>
<th>Example Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>Usual facility staff providing care within usual scope (although location may be atypical)</td>
<td>Staff surgeon assessing trauma patients in emergency department or providing care in postanesthesia area</td>
</tr>
</tbody>
</table>
| Contingency | Comparably trained and privileged staff from:  
- Partner hospital (potentially with a preexisting mutual aid agreement or within a health system)  
- Hospital staff from local Medical Reserve Corps | Intensive care nurses shared from partner hospital  
Burn nurses brought in from federal teams |
| Crisis | Staff not usually performing nor trained for assigned duties (in likely priority but depending on skill set):  
Other hospital staff (not credentialed or privileged for these duties)  
Outside hospital staff (not usually credentialed or privileged for these duties)  
Partner outpatient clinic staff (same health system or with mutual aid agreement)  
Outpatient clinic staff from local Medical Reserve Corps  
Licensed volunteer health care providers (must be credentialed by health care facility per their emergency credentialing/privileging standard)  
Medical reserve corps staff not currently licensed but with relevant clinical skills (retired physician or nurse, professional student)  
Lay volunteers | Critical care nurses oversee and provide direction to noncritical care nurses rather than provide primary nursing care  
Workforce extension—reduction in administrative and noncritical/nonmedical tasks |
| Crisis | Ear, nose, and throat surgeon provides postoperative care for trauma patients  
Outpatient family physician from affiliated health care system provides inpatient care  
Lay volunteers assist with basic patient hygiene and nonmedical aspects of care and monitoring  
Retired surgeon provides postoperative care | Staff surgeon assessing trauma patients in emergency department or providing care in postanesthesia area  
Intensive care nurses shared from partner hospital  
Burn nurses brought in from federal teams |

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*Medical Reserve Corps*
Inter-agency applicability

- EMS pandemic plan
  - Conventional – usual resources and response though invoke closest appropriate hospital when needed
  - Contingency – pending non-life threatening calls
    - Batched transports
    - Decline select responses or transports
    - Single agency responses on select incidents
  - Crisis – pending life-threatening calls (chest pain, short of breath, etc.)
    - Above plus broad leeway to decline responses or transports relative to hospital capacity / standard of care
    - No response to / resuscitation for cardiac arrests
Implications

- May provide a common vocabulary to:
  - Provide comparable baseline resource availability across healthcare institutions / regions
  - Provide a time and demand-phased structure for the expansion of surge capacity at an institution with built-in triggers for external assistance
  - Provide current operating picture across many institutions during an event
  - Allocate resources appropriately (e.g. one institution in contingency staffing requesting 5 burn nurses vs. another in crisis situation requesting same)
Questions?