Department of Homeland Security
Science & Technology Directorate

National Center for the Study of Preparedness & Catastrophic Event Response (PACER)

Principal Investigators:
Gabor Kelen and Lynn Goldman

Advisory Board

Management Team

Executive Director:
James Scheulen

Education

Higher Education
M. Spector (FSU)

Leadership Training
S. Greenberg (JHU Ed)

Secondary Teachers
P. Watkins (MSU)

Underserved Populations
R. Rowell (MSU)

Preparedness Theory and Practice

Medical Response Capability Metrics
PI: M. McCarthy (JHU-CEPAR)

5 Dimensions of Preparedness
PI: D. Hamilton (JHU-SAIS)

Policy, Ethics, & Law
J. Hodge (JHU-SPH)

Divergent Responses of Law Enforcement Officers in the Face of a Crisis
PI: T. Adams-Fuller (Howard)

Response Networks

Surge Capacity Networks
PI: T. Kirsch (JHU-CEPAR)

Analysis, Modeling, and Simulation

Modeling and Simulation Integration Framework
PI: J. Coolahan (JH APL)

Modeling & Simulation of Complex Interactions of BT Epidemiology
PI: J. Epstein (Brookings)

Cyber Security Preparedness and Response during Catastrophic Events
PI: D. Watson (MSU)

Preparedness & Response Metrics
PI: C. Latimer (JH APL)

Executive Director:

Science, Technology, and Engineering

Situational Awareness and Decision Making
PI: C. Voss (JH APL)

Wireless Sensor Networks
PI: G. Masson (JHU-WSE)

Biosensor Fusion
PI: M. Sudit (UB) & A. Feldman (JH APL)

Biologic Detection: Diagnosis & Surveillance
PI: R. Rothman (JHU SOM)

Preparedness & Response Metrics
PI: C. Latimer (JH APL)

Situational Awareness and Decision Making
PI: C. Voss (JH APL)

Wireless Sensor Networks
PI: G. Masson (JHU-WSE)

Biosensor Fusion
PI: M. Sudit (UB) & A. Feldman (JH APL)

Biologic Detection: Diagnosis & Surveillance
PI: R. Rothman (JHU SOM)

Preparedness & Response Metrics
PI: C. Latimer (JH APL)
Scientific Basis for Medical Surge

- One of 37 associated target capabilities of the Nat Prep Goals
- HSPD 21 major focus
- Emergency Support Function 8
- IOM Major Focus
- HHS HPH JAWG Major Focus
- Recent Pronouncement by the Secretary
Current Surge Projects & Results
Science of Surge Conference

1. May 2006, San Francisco
2. G. D. Kelen, M.D. Course Director
3. Published Proceedings Nov AEMJ 2006
4. >30 publications
5. Richard Carmona—Keynote Speaker
6. Initiated Work on Surge Capacity Metrics
From the Science of Surge Conference

Projects/Research Questions
1A Guidelines for decisions
1B Behavioral responses
1C Bed availability decision making
1D Bed availability and outcomes
2A Triage protocol adequacy
2B Augmentation of triage systems
2C Communicating triage strategies
3A Leadership composition
3B Optimal decision making
3C Leadership change
3D Decision tools
4A Communication standards
4B Synchronizing communication
4C Communication failures
5A Credentialing systems
5B Evaluating workforce
5C Training models

Rothman et al. AEMJ 2006|13L1160
System\(^{(\text{Integrity})}\) * Space\(^{(\text{size} \times \text{quality})}\) * Staff\(^{(\text{numbers} \times \text{skill})}\) * Supplies\(^{(\text{volume} \times \text{quality})}\) \\
Event\(^{(\text{type} \times \text{scale} \times \text{duration})}\) * Resource\(^{(\text{demand} \times [\text{consumption} + \text{degradation}])}\)
## Components of Medical Surge Capacity

<table>
<thead>
<tr>
<th>System</th>
<th>Space</th>
<th>Staff</th>
<th>Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Facilities</td>
<td>Numbers</td>
<td>Biologics</td>
</tr>
<tr>
<td>Community Infrastructure</td>
<td>Medical Care</td>
<td>Capability/Skill Set</td>
<td>Respirators</td>
</tr>
<tr>
<td>Government</td>
<td>Storage</td>
<td>Expertise</td>
<td>PPE</td>
</tr>
<tr>
<td>Informal Networks</td>
<td>Laboratory</td>
<td>Stamina</td>
<td>Standard Supplies</td>
</tr>
<tr>
<td>Public Health</td>
<td>Mortuary</td>
<td>Psyche</td>
<td>Food and Water</td>
</tr>
<tr>
<td>Incident Command</td>
<td>Housing of Staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Levels</td>
<td>Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEIC</td>
<td>Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Co-operation</td>
<td>Capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiagency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interhealth System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications &amp; Information Flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Chain Distribution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMS/First Responders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of Operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyber Security</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Kelen & McCarthy, AEMJ: 13:1089-)
Hospital Readiness WALEX*

1. Determine Metrics for Health System Preparedness in the model

\[
\text{Planning} \times \text{System} (\text{integrity}) \times \text{Space} (\text{size} \times \text{quality}) \times \text{Staff} (\text{numbers} \times \text{skill}) \times \text{Supplies} (\text{volume} \times \text{quality}) \\
\text{Event} (\text{type} \times \text{scale} \times \text{duration}) \times \text{Resource} (\text{demand} \times [\text{consumption} + \text{degradation}])
\]

2. Special Issue in *Journal of Disaster Medicine and Public Health Emergencies*
   - *June 2009*

* Conference and Publication Funded by AHRQ
## Project 2: Hospital Preparedness

### Health System Readiness WALEX Pending Publications

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintyre, A</td>
<td>Emergency Management: Role in Preparedness</td>
</tr>
<tr>
<td>Kelen</td>
<td>Surge Capacity from Reverse Triage</td>
</tr>
<tr>
<td>Hick, J</td>
<td>Refining Surge Capacity</td>
</tr>
<tr>
<td>Hodge, J*</td>
<td>Legal Issues Related to Hospital Preparedness</td>
</tr>
<tr>
<td>Bierenbaum, F</td>
<td>Business Continuity Hospitals During Disasters</td>
</tr>
<tr>
<td>Rothman et al.</td>
<td>Laboratory Response Networks</td>
</tr>
<tr>
<td>Pines et al.</td>
<td>Public Health Syndromic Surveillance</td>
</tr>
<tr>
<td>Barbera et al.</td>
<td>Challenges of Hospital Emerg Management</td>
</tr>
<tr>
<td>McCarthy et al.</td>
<td>Health Care Emergency Management</td>
</tr>
<tr>
<td>Jenkins et al.</td>
<td>Review of existing Hosp Prep Instruments</td>
</tr>
<tr>
<td>Knebel &amp; Phillips</td>
<td>National Strategy for Health System Readiness</td>
</tr>
</tbody>
</table>
Project 3. Predicting Surge

EMCAPS

Electronic Mass Casualty Assessment And Planning Scenarios

RADIOLOGICAL
- RDD - Dirty Bomb

BIOLOGICAL
- Inhalational Anthrax
- Pneumonic Plague
- Food Contamination GI Anthrax
- Pandemic Influenza: CDC FluSurge Model

CHEMICAL
- Blister Agent - Mustard Gas
- Toxic Gas - Chlorine
- Nerve Agent - Sarin

EXPLOSIVE
- IED - Truck Bomb

Scheulen et al. AEM 2009;53:226
Predicting Work Days lost in Pandemics

Figure 1. Distribution of workdays lost across the Institution during an 8-week, 35% attack rate wave

Proportion of work days lost due to pandemic influenza, 8 week outbreak, 35% attack rate

Proportion of workdays lost

0% 2% 4% 6% 8%

1 8 15 22 29 36 43 50
Model Memorandum of Understanding Among Hospitals during Declared Emergencies

This Memorandum of Understanding (MOU) is made and entered into as of this _____ day of _______________ in the year ______, by and between

____________________________________________

____________________________________________

____________________________________________

____________________________________________

(list hospitals that are parties to the MOU)

Each of these hospitals is a party to this MOU and collectively they constitute the “Hospital Mutual Aid Network” for the purposes of this MOU.

NOW, THEREFORE, the parties agree as follows:

• General Provisions

  I.1.1 Definitions. As used in this MOU, these terms shall be defined as follows:

  (1) “Contractor” means a healthcare professional who provides healthcare services at a hospital, but is not under the direct control of the hospital and exercises independent judgment and discretion.

  (2) “Designated representative” means an individual and at least one alternative designee.
Project 6. Reverse Triage

Reverse Triage Strategy for Scarce Resources

HSPD-21  Kelen et al., Lancet 368:1984-90, 2006
Figure 1a. Potential Surge Capacity

Academic Center (N=658 total licensed study beds)

- Net surge capacity
- Routine discharge
- Unused licensed beds
- Early discharge
- Unused staffed beds

Kelen et al. DMPHP (In press)
Project 6. Reverse Triage

Figure 1a. Potential Surge Capacity
Academic Center (N=658 total licensed study beds)

Figure 1b. Potential Surge Capacity
Teaching Medical Center (N=242 total licensed study beds)

Figure 1c. Potential Surge Capacity
Community Hospital (N=170 total licensed study beds)
World Health Day 2009

Save lives. Make hospitals safe in emergencies

World Health Day 2009 focuses on the resilience and safety of health facilities and the health workers who treat those affected by emergencies. Events around the world will highlight successes, advocate for safe facility design and construction, and build momentum for widespread emergency preparedness.

April 7th, 2009
300 Million Agent Based Biothreat Modelling
PACER Projects (Domain A)

1. EMCAPS II
2. Pharmaceutical Supply Chain Management
3. Surge Metrics II
4. Legal: Changing Standards of Care
5. Estimation of National Acute Care Surge: Risk of Altered Standards of Care
6. Triage Tool for Accurate Resource Utilization
7. KHS lead situation awareness for surge
Final Note

Five Dimensions of Homeland and International Security,


Obama to Nominate Esther Brimmer of SAIS to State Department Post

By Felisa Neuringer Klubes SAIS

President Barack Obama has announced his intent to nominate Esther Brimmer, a scholar at SAIS, to serve as assistant secretary of state for international organizations. Brimmer is currently the deputy director and director of research at SAIS' Center for Transatlantic Relations and a professorial lecturer.

At the State Department, Brimmer will oversee policy relating to U.S. relations with the United Nations, and other multilateral issues. Her responsibilities will include leading a bureau with posts at U.N. organizations in seven cities: New York, Geneva, Paris, Rome, Vienna, Montreal and Nairobi.

Obama also announced the appointments of Philip H. Gordon as assistant secretary of state for European and...
“An Idea That Is Not Absurd, Has No Chance”