Decision Analysis in the Face of a Public Health Emergency

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PUBLIC HEALTH RESEARCH DURING DISASTERS
PLENARY SESSION 1: OVERVIEW OF CASE STUDIES DEMONSTRATING HEALTH RESEARCH NEEDS, ACTIONS, AND LESSONS LEARNED
JUNE 12, 2014 (2:30PM-5:00PM)
The Foundations of Disaster Research

- A “community” subset?
- The “community”?
- The afflicted institution(s)?
- The investigator (CV, prestige, funding, etc.)?
- The investigators’ affiliations?
- A research community/consortium ($, prestige)?
- The municipal/state/federal government?
- Private entities (interested in technological solutions or mere market assessment)?
What is the community? Do we really know?

- A three way partnership must exist among the stakeholders of the community to achieve success.
- The people who live in the space, the government officials and subject experts.
- All have a stake in a trustworthy system that withstands disasters.
- For a community to be resilient, all must believe in the validity of decisions.
- Each event must balance all the stakeholders concerns:
  - Ethical
  - Legal
  - Practical
  - Organizational
  - Social
  - Clinical
Questions for stakeholders

In the setting of fixed research resources, in a disaster, do we spend money, time, effort to

1. Salvage existing research (cell lines, animals, specialty chemicals and antibodies, equipment, labs) affected by the disaster?
2. Initiate new research regarding the disaster?

If you have no IRB, no human capital, and no electronic infrastructure due to the disaster, how do you even begin to initiate and operationalize a “research proposal” in the traditional sense?

Off-site IRB/vetting/resources?
Are the providers and investigators in a hospital and university part of the community?

- In participatory action research, study team members share roles as participants and investigators.
- In the absence of preexisting trust among the various stakeholders, the governing bodies of a city, state, or nation and the medical community will not be supported.
- It is impossible to gain the public’s trust in the midst of a public health emergency, if that is the first personal meeting.

Are the actions of the communities based on societal need or scientific, political and economic considerations?
Outcomes among buprenorphine-naloxone primary care patients after Hurricane Sandy

Babak Tofghi¹,²,³*, Ellie Grossman², Arthur R Williams¹,³, Rana Biary⁴, John Rotrosen³ and Joshua D Lee¹,²,³

Conclusions: The findings highlight the relative adaptability of public sector office-based buprenorphine treatment during and after a significant natural disaster. Only minimal increases in self-reported substance use were reported despite many disruptions to regular buprenorphine supplies and previous daily doses. Informal supplies of substitute buprenorphine from family and friends was common. Remote telephone refill support and a temporary back-up location that provided written prescription refills and medication dispensing for uninsured patients enabled some patients to maintain an adequate medication supply. Such adaptive strategies to ensure medication maintenance continuity pre/post natural disasters likely minimize poor treatment outcomes.

COMMENT: Investigators deeply involved in the continuity of care of their patients in their community.
COMMENT: These rapid studies were only possible due to School of Medicine faculty and fellows embedded in public health infrastructure with joint institutional appointments/commitments.
Mechanisms for Rapid Dissemination of Experiential Learning in Disaster?

Emergent Communication Networks During Disaster: An App for That

Larissa K. Laskowski, Giselle Cruz and Silas W. Smith

Disaster Medicine and Public Health Preparedness / FirstView Article / June 2013, pp 1 - 2
DOI: 10.1017/dmp.2013.12, Published online: 23 April 2013

COMMENTS:

▪ “Rapid” by most standards, the traditional peer review process impeded speedy publication
▪ Should there be “disaster” standard for publication rigor, methodology, response rate, “control group”. Is this analogous to disaster standards of care???
▪ Should the “public good” of disaster research demand open access?? If so, who funds this?
▪ Who is the “author” – the investigator or the participants?
▪ Do disciplines not traditionally associated with healthcare delivery achieve larger importance in face of disaster (engineering tolerance/materials science, water a sanitary engineering, etc.) and can they be co-supported?
The Ecology of Medical Care
The Monthly Prevalence of Illness in a Community


Institute of Medicine—The New York Academy of Medicine Forum on Medical and Public Health Preparedness For Catastrophic Events, November 16, 2012, New York City

- To plan collaborative research during Sandy.
- Many of the actors from hospitals involved were “too busy” with the storm to attend.
- “many staff were counseled not to attend.”
- Essential parties had poor attendance—absent or evasive.

There were tensions at every level.

- The medical community providing care—at distant sites without obvious logic, thought they were abandoning patients.
- Local patients and communities felt they were abandoned.

There was a prohibition of communication with the press and exceptional difficulty in openly discussing any issues relating to total damage, strategy, evacuation and reopening.
Dollars and Nonsense?

Hospital Logistics

EM Attendings from BHC/HHC; NYULMC & VAMC

RTC: Regional Trauma Center
SH: Specialty Hospital
SNF: Skilled Nursing Facility

NYU School of Medicine
NYU Langone Medical Center
## The Closure of Three Hospitals
### November 1, 2012

<table>
<thead>
<tr>
<th></th>
<th>BHC</th>
<th>NYU</th>
<th>VAMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient Beds</td>
<td>912 (829)</td>
<td>829? (DOH)</td>
<td>147</td>
</tr>
<tr>
<td>Outpatient Visits (Annual)</td>
<td>&gt;500K</td>
<td>Private Practice</td>
<td>&gt;250K</td>
</tr>
<tr>
<td>ED Visits Annual</td>
<td>&gt;110K</td>
<td>&gt;45K</td>
<td>14.5K</td>
</tr>
<tr>
<td>ED Visits Per Day</td>
<td>~300</td>
<td>~125</td>
<td>~60</td>
</tr>
<tr>
<td>House staff (total)</td>
<td>~450</td>
<td>~450</td>
<td>(156)</td>
</tr>
<tr>
<td>Patients Evacuated</td>
<td>736</td>
<td>298</td>
<td>132</td>
</tr>
<tr>
<td>Ambulance Runs/Day</td>
<td>~100</td>
<td>~40</td>
<td>~20</td>
</tr>
</tbody>
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Decision Analysis

Why do Hospitals, Emergency Departments and Ambulatory Care Units exist?

- For a “near perfect” representation of the norm?
- Or to meet the needs of the community?
- Most decisions were made in an “evidence free manner”.
- These decisions were not comprehensible for several stakeholder groups—and many were not involved.

While these issues were debated, healthcare clinical deficits continued or were exacerbated.
What did hospital closures mean?

- Each hospital had 24hr/7days/week “greeters” sending people elsewhere
- Ambulances stood by—ready to transport people away
- Unanticipated Healthcare Imprinting
  - Many elderly or compromised patients returned, frequently waiting for “the hospital to open”
  - Many stopped calling 911 for fear of not being brought to “their institution”
  - “I’ve been here my whole life…”
  - “I was born here…”
  - “My records are here…”
  - “I am in the Coumadin clinic…”
  - “My Mandarin speaking psychiatrist…”
Decision Analysis

Universality of Need

- Can a City/State respond to a disaster without total integration of the health care system?
- How difficult was it to evacuate the hospitals, transfer the impoverished?
- Where were the staff (RN, MD, Clerks) sent?
  - private to private
  - public to public
  - veterans to veterans
  - relevance to patients?
Comparison of Emergency Department Census at Bellevue and Beth Israel
Decision Analysis

Downsizing, closures, evacuations
Open an Urgent Care Service?
Open a free standing ED?

The almost universal response was what if?

- Local hospital staff/administration
- Central hospital administration
- City and State governmental leadership
- Balance between
  - Those who can function with uncertainty—dynamic, leadership: “Improvise, Adapt, Overcome”
  - Those who have authority are accustomed to highly intelligent systems management: population health in equilibrium
- The tension and lack of effective communications among these groups led to administrative paralysis
Heisenberg’s Principle (1926)  
“uncertainty is unavoidably introduced into the measured qualities by the measurement itself.”

My experience in January 2013

<table>
<thead>
<tr>
<th>NYU Tisch</th>
<th>Bellevue</th>
<th>Manhattan VA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital OPENED</strong></td>
<td><strong>Hospital CLOSED</strong></td>
<td><strong>Hospital CLOSED</strong></td>
</tr>
<tr>
<td>E 34th Street</td>
<td>E 30th Street</td>
<td>E 26th Street</td>
</tr>
<tr>
<td><strong>ED CLOSED</strong></td>
<td><strong>ED OPENED</strong></td>
<td><strong>ED CLOSED</strong></td>
</tr>
<tr>
<td>1st Avenue</td>
<td>1st Avenue</td>
<td>1st Avenue</td>
</tr>
</tbody>
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NYU School of Medicine  
NYU Langone Medical Center
Decision Analysis

- What kind of Subject Matter Expertise is necessary?
- Who has the authority in a large group of diversified hospitals for integrated universal management?
- Who can assume the authority—outside the hospitals, cities and states—to allow for diminishing the local fears of legal and regulatory constraints? Or loss of finances?
Decision Analysis

❖ What organizing principles are available to a community?
❖ How often do the hospitals and systems practice together?
❖ The public health authority
  ▪ How strong and receptive is the OEM?
  ▪ How much disaster experience do the leaders have?
  ▪ How much disaster organizational memory exists?
  ▪ How much honest data sharing takes place?
  ▪ The Joint Commission addresses hardening of infrastructure but does not address prevention or mitigation prior to an event—only recently is there a suggestion of an evaluation of “community performance”?
  ▪ Who will courageously initiate spending dollars today necessary to prepare for survival tomorrow?
Interhospital Collaboration

- Numerous joint preparedness ventures among NYC public, private, VA administration hospitals for generations.
- and private/public – PCC, OCME faculty
- University and hospital affiliations move faculty and residents back and forth among hospitals.
- They do strengthen intellectual collaboration.
- The barriers to financial collaboration and harmonization appear insurmountable.
- Hospitals do not want to be involved in studies. Fear of dissemination limited whether to agree to publish or not?
- Hostage to real or perceived HIPPA and HITECH concerns
- Concerns about vulnerability of ethics, the law and safety.
- I realize we do not have universal health care but what have we done to assure medical humanism when our system is not designed to respond to a disaster with staff, stuff, structure, and space to meet a community’s needs?
The Community Resiliency Quotient

The potential for resiliency is inversely related to:
- Poverty
- Age

And directly correlated with:
The extent and strength of the Social and Technological networks
- A community resiliency metric is meaningless for a single human being.
- It depends on the individual’s social determinants
- Disasters consume health services in non traditional manners
- Where do people go with no bridges/tunnels? Electronically dependent? Dialysis dependent?
OUR PROJECT: HHS/ASPR—The impact of a major adverse climate event on health system care and development of disaster response and resilience based metrics

To study:

- the comparative effectiveness of adaptive options
- the decision making necessary for the entire health community
Public Health Emergency
Major Adverse Climate Event (MACE)

- Study of Emergency Medical Services
- Determine how to maintain acute care and EMS with continuity

**Objective:**

**The Hospital Dataset—Performance and Operation Metrics**
- Prestorm / storm / poststorm
- Compare benchmarks before and after the event

**EMS Dataset:**
- Call type
- Pickup time
- Trauma call type
- Turnaround time (Hospital)
Often no formal linkage between EMS—Hospitals

- Non-FDNY EMS—Private Ambulances
- Linking datasets EMS run sheets, hospital charts
- No common medical record number
- No access to unifying number such as SS #
- Data research design demands de-identification
- Patients brought to ED
- Track patient types
- Follow EMS code / ED entry code
- As patients moved through the system, they were lost; absence of the ability to get the final diagnosis for each patient is common
- Phenomenal delays among collaborating institutions in IRB approval, access to data, and data transfer.
Action Research Process

Clarifying a Shared Vision for Success

Using Informed Team Action Planning

Articulating Theories of Action

Analyzing Data Collaboratively

Acting Purposefully While Collecting Data
ACTION: Public Health Emergency Research

Establish a broader public health emergency response research network locally and nationally.

- Initiate continuous meaningful relationships at all levels focusing the leadership development on community shared education and science
- Collaboration
- Discussions
- Innovation
- Technology
- Data sharing for immediate and long-term collaboration
- Define critical research needs, priorities and obstacles
  - What constitutes “relevant research”?
  - Who decides this?
- What do “embedded researchers” in disaster response look like – do they also assist in response?
(c1850) Virchow: “medical education does not exist to provide students with a way of making a living, but to ensure the health of the community.”

(c2014) Goldfrank: “Health care should not exist to provide health care systems with a way of making a profit, but to ensure the health of the community.”
<table>
<thead>
<tr>
<th>SITE</th>
<th>PHASE</th>
<th>Immediate</th>
<th>Intermediate</th>
<th>Longterm</th>
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<tbody>
<tr>
<td>Ambulatory Care</td>
<td></td>
<td>• Utilize local staff to establish fusion ambulatory and urgent care site</td>
<td>● Reestablish essential primary care clinics with expanded hours</td>
<td>● Continue to enhance primary care with expanded hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Reestablish focused specialty care</td>
<td></td>
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<tr>
<td>Emergency (ED)</td>
<td></td>
<td>24 hrs/day/7 days per week in easily accessible community site with follow up and hospital transfer relationships</td>
<td>● Maintain 24 hrs/day/7 day/week urgent care service in alternative space or prior ED until hospital is opened with primary care followup and hospital transfer assured</td>
<td>Depending whether site is available to perform emergency care and the hospital is functional:</td>
</tr>
<tr>
<td>Care</td>
<td></td>
<td></td>
<td></td>
<td>● Establish free standing ED with variable ambulance capacity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>● Or standard open access ED</td>
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<tr>
<td>End Results</td>
<td></td>
<td>● Initiates resiliency, community health and public health needs</td>
<td>● Reestablishes community primary care—and access to urgent care pending hospital opening</td>
<td>● Expands local capacity for ambulatory and emergency care to near normal with or without hospital</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Focus on essential needs of the highly vulnerable</td>
<td>● Enhances resiliency efforts emphasizing unmet needs of vulnerable</td>
<td>● Enhance medical resources to assist on going resiliency needs</td>
</tr>
</tbody>
</table>

**How do we study the effectiveness while simultaneously responding?**
The public health emergency (PHE) is only in small part emergency medicine research.
The ED is the safety net for the acutely ill and injured and an area for research during a PHE.
Public health emergencies are population health emergencies requiring the broadest vision of integrated basic and applied research.
We need to do more—a familiar tale of lessons learned, after action reports whitewashed and abandoned followed by recurring misadventures

“Nonetheless he knew that the tale he had to tell could not be one of a final victory. It could be only the record of what had had to be done, and what assuredly would have to be done again in the never ending fight against [suffering and death]...by all who, while unable to be saints, but refusing to bow down to pestilences, strive their utmost to be healers.”

The Plague by Albert Camus, 1947
Initiate and Support a National Public Health Emergencies Research Network

The Department of Health and Human Services should lead a national multistate, multicity and multicenter focused research effort to facilitate understanding of public health emergencies related to natural events associated with weather and climate change, as well as epidemics and terrorist acts. Where logical, this collaboration should be a global as well as a national research network of excellence that when developed and implemented would improve preparedness and response.

- Identify and prioritize research questions and suggested possible well designed studies.
- Provide priority funding to support laboratory, clinical, public health and social science studies of public health emergencies not adequately currently addressed.
- Develop rigorous evidence based research protocols and implementation plans for effectively executed studies in anticipation of, in the midst of, and after an emergency.
