Coordination & Collaboration of Public Health and Health Care Facilities

Masood Athar, MD, MPH
Economics
Economic Impacts: USA

• The bioterrorist attack can range from an estimated $477.7 million per 100,000 persons exposed (brucellosis scenario) to $26.2 billion per 100,000 persons exposed (anthrax scenario).

• Rapid implementation of a post-attack prophylaxis program is the single most important means of reducing these losses.

• By using an insurance analogy, provides economic justification for preparedness.

The Economic Impact of a Bioterrorist Attack: Are Prevention and Postattack Intervention Programs Justifiable? CDC, 1997
Economic Impacts: Canada

• Economic impact of a bioterrorist attack in Canada could range from $6.4 billion/100,000 exposed to *B anthracis* to $8.6 billion/100,000 exposed

• The greatest benefits were realized when post-attack intervention was initiated before day 3 after the event.

• An investment in planning and preparedness to manage the consequences of an attack can reduce morbidity, mortality and economic costs.

<table>
<thead>
<tr>
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<th>Canada 100,000 persons exposed</th>
<th>US 100,000 persons exposed</th>
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<tr>
<td>Anthrax</td>
<td>6.4 billion</td>
<td>26.2 billion</td>
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<tr>
<td>Brucellosis</td>
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<td>477.7 million</td>
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<tr>
<td>Botulism</td>
<td>8.6 billion</td>
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Evidence-Based Planning

Cost Effective Planning
“All Hazard Planning”
Disasters

Natural
• Major outbreak
  – SARS
  – Monkey pox
  – Flu
• Hurricanes
• Earthquakes
• Blizzards
• Floods

Man made
WMD- BT (CBRNE)
– Chemical
– Biological agent
– Radiological
– Nuclear
– Explosive
Rural Vulnerability?
Equally Vulnerable

- Rural America houses many of our nation’s vulnerabilities, such as the farms and ranches that support our food supply.
- Many nuclear power facilities are potential terrorist targets and are located in rural areas.
- Rural communities, like urban communities, face multiple threats that require multiple solutions.
- Adequate emergency preparedness in rural areas is as essential as adequate urban preparedness.
“Either we are all protected or we are all at risk”

-Jeffrey Koplan, MD
Anthrax 2001

• The anthrax outbreak was not limited to large metropolitan facilities.
• Every laboratory in every small town or large city has the potential of finding the index case of an anthrax - or plague, or small pox - outbreak.
• The lesson here is that every city or locale is at risk for involvement in a BT event.

• Leach DL, Ryman DG. Biological weapons: preparing for the worst. MLO 2002;32(9):26-43.
Rural Vulnerability
Hurricane Katrina serves as a stark example of the need to ensure that surrounding rural areas have the public health capacity to assist vast numbers of displaced persons unable to return to their homes.
Asia Devastated By Quake, Tsunami
2005
Earthquake
Kashmir, Pakistan
Rural Vulnerability

Many nuclear power facilities are potential terrorist targets and are located in rural areas.
Chernobyl 1986

• Flawed reactor design that was operated with inadequately trained personnel and without proper regard for safety.
• Explosion and fire released at five percent of the radioactive reactor core into the atmosphere and downwind
• Total 56 fatalities as of 2004
  – 28 people died within four months from radiation or thermal burns
  – 19 have subsequently died
  – 9 deaths from thyroid cancer
• UN report in 2000 concluded that there is no scientific evidence of any significant radiation-related health effects to most people exposed. Confirmed in a very thorough 2005-06 study.
Sverdlovsk 1979

- Unusual anthrax epidemic Sverdlovsk Soviet Union
- Soviet officials attributed it to consumption of contaminated meat. U.S. agencies attributed it to inhalation of spores accidentally released at a military microbiology facility in the city.

- Epidemiological data:
  - most victims worked or lived in a narrow zone extending from the military facility to the southern city limit.
  - Farther south, livestock died of anthrax along the zone's extended axis.

Rural Vulnerability

Hazardous Materials Spill / Train wreck
Explosions

- Current pattern in terrorist activity
- Getting more and more lethal, technically advanced and using sophisticated methods
Madrid Train Blast 2004

177 died
>2000 injured
10 series of blast
London Blast 2005

- Killed 52
- Many were injured
- Series of blasts at subway
- Buses
Rural Preparedness
Rural Residents

Rural residents are not always within 30 miles of a hospital and not all rural counties have health departments

Rural Hospitals

- In general, hospitals in the State of Mississippi, like a number of hospitals throughout the United States, are still not adequately prepared to manage victims of terrorist attacks involving chemical or biological WMD which consequently may result in the loss of hundreds or even thousands of lives.
- Rural Health Care Facilities need enhancement.

Lack of Funding

• 91% had developed plan
• 97% have designated Bio-event Coordinator
• 47% have allocated funds
• Urban hospitals more likely to participate in regional infectious disease monitoring and provide advanced training

A Pilot Assessment of Hospital Preparedness for Bioterrorism Events. Prehospital and Disaster Medicine. 2006 Vol 21, No 6 http://pmd.medicine.wise.edu
Surge Capacity

• Surge capacity
  – 95% rural hospitals overwhelm by an incidence of 10 or more critically ill patients

• Need to improve and enhance the following capabilities
  – Communication
  – Command and control
  – Interagency cooperation and coordination

• Funding

Los Angeles County

- 43/45 Emergency Plans were surveyed
- Limited Surge Capacity 13/45 (29%) surge capacity of greater than 20 beds
- 16% Involved other agencies in their planning
- Failure to fully integrate interagency training and planning
- 42% had more than 10 Isolation rooms
- High level of availability of equipment and supplies

Hospital Disaster Preparedness in Los Angeles County
Staff Shortage

- Hospital preparedness is not only related to facility capacity, but also to adequate numbers of health care providers.
- For example:
  - nursing shortages have compromised the capacity of many rural hospitals. At some point within the last year, 69 percent of hospitals diverted patients to other hospitals due to a shortage of nurses.
  - Burn, surgical, ICU/CCU and emergency/trauma nurses will undoubtedly be needed following an BT event.
Rural Health Departments

• Rural public health departments tend to have less capacity and resources than their urban counterparts

• Rural communities, which historically have had limited public health infrastructure, small numbers of providers and volunteer emergency medical systems (EMS), are considered most vulnerable and least able to respond

Safe Heaven

- Any terrorist event carried out in an urban area might result in a massive exodus out of targeted cities and into “safer” rural areas. As a result, rural providers would be overwhelmed as fleeing sick or contaminated individuals fill their clinics and hospitals.
- Rural providers from unaffected communities may provide the critical workforce needed to assist larger cities coping with a disaster.

Mental Health

• Mental health needs
  – The Disaster Crisis Counseling Program
  – Faith-Based Initiatives would be a valuable partner in this effort

Surveillance

• Rural public health department does not have adequate surveillance capacity

• Integration of the non-urban hospitals into the regional surveillance system to ensure early identification of infectious disease outbreaks

Prehospital and Disaster Medicine, Vol 21, No 6
Training and Education

Rural providers and hospitals lack the training, resources and capacity to respond to a bioterrorism or mass casualty event.

Fragile Economy

• Rural areas are affected by weather, tourism, a fragile financial and economic base and are geographically isolated, making it difficult to support medical systems

• Sustained and in many cases enhanced funding

• http://www.astho.org/pubs/RuralPublicHealthPreparednessChallenges.pdf
Disasters

- Disasters in the communities come in all the shapes and sizes.
- Some impact a small number of people and put intense demands on the health system for a short period.
- Others may involve a large number of casualties but reach a plateau only after a latent period, placing heavy continuing demands on the health system.
Exhibit 1

Surge

Generated From Both Natural and Man-Made Events

Greatest

IMPACT

Least

Local, Regional, & State → Federal

Weapons of Mass Destruction

Hurricane

Major Flooding

Aircraft Accident

Aircraft Accident
Weapon of Mass Destruction

The spectrum of WMD demands a diverse set of response capabilities

- Explosive - needs urgent and massive medical efforts
- A communicable pathogen - requires a response that grows greater over time as the incidence of human infection increases. The resulting epidemic consumes the workforce, requiring voluminous amount of human resources and medical equipment to interrupt the disease transmission and reduce rate of mortality through disease tracking and monitoring, verification of exposure, administration of medical countermeasures where available - vaccine/medication etc and supportive care and clinical treatment
- Radiologic/Nuclear - depends upon exposure
Emergency Preparedness

Emergency preparedness in rural communities depends on

– Public Health Departments
– Hospital
– Emergency Medical Services (EMS) providers

April 2002
Office of Rural Health Policy, HRSA
EVENT

COMMUNITY AFFECTED

Children      Adults      Elderly
Hospital  ER  Doctors’ Office  Clinics

Registration or capture of the event by the system

Processing and analyzing the event by the system

Time Factor

Education & Training

Recognize the event / disease
Alert Clinicians

• The earliest human cases most likely will be detected by an office-based primary care physician or an internist.

• If clinicians wouldn't call public health, public health would not know.
Primary Care Physicians

• Recent high profile outbreaks-SARS, west Nile Virus, Monkey pox, Anthrax etc all were first identified by alert clinicians

• All primary care physicians are the front lines of public health and expected to play a significant role in detecting disease and providing patient care and prevention

• Clinicians must maintain a high index of suspicion for use of bioterrorism agents, be able to make a rapid diagnosis, and promptly initiate treatment.

N Eng J Med 350;23, June 2004
JAMA- 2006
Israel: Family Physicians

• A country with a high degree of awareness of civil defense aspects
• Both patients and primary care doctors believe that family physicians should have a major role in the case of bioterrorist attacks
• This must be seriously considered during formulation of relevant health services programs

Patient and family physician preferences for care and communication in the eventuality of anthrax terrorism
Fam. Pract., August 1, 2003; 20(4): 441 - 442
Hospital  ER  Doctors’ Office  Clinics

Education & Training

Time Factor

Recognize the event / disease

Coordination & Communication between HCS & PH

Time Factor

Reports to public health
Communication

In both the first case in Florida and the last case in Connecticut, the laboratory that initially isolated B anthracis in cultures and forwarded them to the Level B public health laboratory, found out the identity of the organism through television news reports. The top-to-bottom communication system failed.

Anthrax outbreak: Lessons Learned. CDC
Epidemiological Work-up

• Who - Person
• Where - Place
• When - Time

What it is?
Lab confirmation?
Case definition?

----Coordination-----
Epidemiological Work-up

• Epidemiological history is quite successful for case ascertainment, clinical management and infection control.

• Epidemiological histories alone were sufficient to identify the chain of SARS transmission to be traced.

N Eng J Med 350;23, June 2004
Single Case

• One case has enormous impact
• Ill physician traveled from Guangdong province to Hong Kong and triggered the pandemic

N Eng J Med 350;23, June 2004
SARS

- November 2002 Guangdong province of China which borders on Hong Kong. The first case of infection was speculated to be a farmer.
- On February 21, 2003 a Chinese doctor who had treated cases in Guangdong checked into the Hong Kong hotel Metropole and infected up to twelve other guests. He was admitted to the Hong Kong Kwong Wah Hospital and died on March 4, 2003.
- A 27-year-old infected man who stayed in Metropole and on the same floor with the Chinese doctor was admitted to Prince of Wales Hospital.
- A large number of hospital workers were infected while treating him.
- About 80% of the Hong Kong cases have been traced back to this doctor.
Surveillance

• A microbe can easily traverse great distances—*monkey pox*
  – From Ghana East Africa to USA

• Outbreak of monkey pox virus infection in humans and nonhuman animals is an important reminder to monitor surveillance programs for febrile rash illnesses designed to detect potential bioterrorism attacks with smallpox virus, which may be beneficial for detecting emerging infections

Integrated Surveillance

Integration of the non-urban hospitals into the regional surveillance system to ensure early identification of infectious disease outbreaks.
Relationships: Not adequate

...relationships between hospitals, public health departments, and other critical response entities are not adequately robust. Suggestion for enhancing linkage...

...public health officials and clinicians must move beyond relationships that too often are limited to the acquisition of surveillance data

2. New England journal of Medicine, 2001
Health Care System

Time Factor

Epidemiological Work up

Coordination & Communication

Education & Training

Prevention & control

Non-Pharmacological Isolation & Quarantine

Coordination & Communication

Public Health

Time Factor

Epidemiological Work up

Coordination & Communication

Education & Training

Prevention & control

Surveillance

Time Factor

Time Factor

Time Factor

Surveillance

Time Factor

Time Factor
Three of the six Category A biological agents/diseases (smallpox, plague, and the viral hemorrhagic fevers) are transmissible from person-to-person, and hospitals caring for patients with these diseases would need to implement aggressive infection control practices.

UK Hospitals

EDs in the UK are not prepared for emerging biological threats and bioterrorism. With current facilities and procedures it is highly likely that an infectious agent will spread to staff and other patients in any future biological incident.

*Emergency departments (EDs) in the United Kingdom (UK) are not prepared for emerging biological threats and bioterrorism. J. Infect 2006*
Non-Pharmacological Isolation & Quarantine

- Public Health
- Hospital staff
- Physicians
- Local Government and Authorities
- School System
- Law Enforcement
- Local and State Attorneys
- Etc Etc
Hospital: Essential Services

• During a severe pandemic, hospitals will be able to continue to provide essential medical services while also attending to affected patients.

• Perhaps the greatest challenge for the hospitals would be that during an event the people would expect the full spectrum of medical care available to them.
Hospital: Central role

The delivery of medical care to infected individual and the containment of disease epidemics require that hospitals occupy a central role in the community-based bioterrorism prepared planning and clinicians are to be involved at all stages of the planning.

*Doctor play role in tracking outbreak. American Medical Association: Volume 49, # 40. October 23, 2006*
---Coordination---

• Public Information?
• What is the disease?
• Opening of POD? Drug Prophylaxis/Vaccination?
• Who Should go to POD?
• Who should go to hospital/treatment center/alternate care site?
Systemic Collapse: Medical Care in the Aftermath of Hurricane Katrina

• Federal, state, and local disaster plans did not include provisions for keeping hospitals functioning during a large-scale emergency

• The National Disaster Medical System (NDMS) was ill-prepared for providing medical care to patients who needed it

• There was no coordinated system for recruiting, deploying, and managing volunteers

• Many Gulf Coast residents were separated from their medical records

*Journal of Biosecurity and Bioterrorism: Vol 4 #2, 2006 p135-146*
Challenge…

…health care facilities (HCFs) are an essential components of the emergency response system. The greatest challenge for HCFs may be the sudden presentation of large number of contaminated individuals.
To meet the challenges of bioterrorism, the practicing physician must have information that is authoritative, specific, and timely with respect to any outbreaks or suspected outbreaks of bioterrorism. Educational activities for physicians and other health care workers are important.

*Del Med J. 73(12):479-82. Dec 2001*
Communication

The lack of communication between different agencies involved in preparation for and handling of a BT event has been a common complaint throughout the anthrax situation and during follow-up and critique of preparedness drills.

Anthrax outbreak: Lessons Learned. CDC
Public Health and Hospital Preparedness

- Disease Surveillance investigation and reporting
- Isolation and Quarantine
- Surge capacity for mass casualty
- Communication with media and Public
- Laboratory Capacity
- Work for training and education capacity
- Development of Emergency Response Plan
Type of Organizations
- Public Health
  - Local/City
  - County
  - State
- Hospital
- Hospital Associations
- Doctors Office and Clinics
- Pharmacies
- Law Enforcements
- Fire Department
- National Guard
- Emergency Management agencies
- Red Cross
- Mental Health and Social

Public Health and Hospital Preparedness
- Disease Surveillance investigation and reporting
- Isolation and Quarantine
- Surge capacity for mass casualty
- Communication with media and public
- Laboratory Capacity
- Work for training and education capacity
- Development of Emergency Response Plan
Hospital Preparedness Program

- Interoperable Communications System
- Bed Tracking System
- Emergency System for the Advance Registration of Volunteer Health Professionals (ESAR-VHP)
- Fatality Management Plans
- Hospital Evacuation Plans
- Alternate Care Sites (ACS)
- Pharmaceutical Caches
- Decontamination
Cross Border Surge TTX

- Communication and exchange of information
  - Between PH and HCF
  - All the information shall be routed through Local/PH EOC/State EOC
  - To develop single point of contact on either side
  - The involvement and flow of communication between POD Hospital System, Regional EMS Coordinators and IDPH.
  - Regional ERC/Regional EMS and POD hospital Coordinators- their roles to be defined?

- Surge Capacity: bed tracking
- Common terminologies/language
- Patient transfer MOUs
Coordination

• Education and Training
  – Med Personnel
  – Community

• Communication
  – Internal
  – External

• Joint Information Releases (PIC)

• SNS

• Treatment Centers/Alt Care Site etc

• Isolation and Quarantine

• Joint Exercises
Success Factors

• Pre-existing relationship-
  – Emergency is not the time to exchange business cards
• Mutually beneficial and Cost effective
• Strong, but flexible, leadership
• A well developed facilitative process
• Institutionalized coordination Mechanism
Bioterrorism Preparedness


• Hospital leadership must be aware of the facility's capabilities and capacities, and should have plans for expansion of services to meet the surge in demand. The command center should coordinate emergency personnel teams, decontamination, security, acquisition of supplies, and notification of public health and other authorities and the media.

• JCAHO Environment of Care Standards and an "all-hazards" approach to disaster planning and management form the basis for a solid bioterrorism response plan. During preparation, education and training are imperative.

• Clinicians must maintain a high index of suspicion for use of bioterrorism agents, be able to make a rapid diagnosis, and promptly initiate empiric treatment.

• Personnel from administration, security, public relations, laboratory, pharmacy, and facilities management should be familiar with the plan, know when and how to activate it, and understand their roles in the response. A recognized incident command system should be used.
Foster Relationship

• The anthrax attacks of 2001, the outbreak of severe acute respiratory syndrome (SARS), and weapons of mass destruction tabletop exercises have made it clear that no single community can prepare fully, nor respond completely, to a large-scale bioterrorism event or any other outbreak.

• There is need to foster relationships and coordinate preparedness planning efforts at the local, state, national, and international levels.
Rural America

- Rural America is vulnerable
- Public Health and Health Care System needs strengthening
- Federal, State and Locals provide finances to achieve an adequate state of readiness
- Public Health and Health Care leaders in rural areas need to work together to assure preparedness is achieved is cost-effective
- A continuing collaboration with rural constituencies and consideration of rural circumstances in preparing for emergencies will ensure that emergency preparedness is adequately and effectively addressed in some of the most vulnerable communities in the country
Coordination, Collaboration & Integration

• During an event at some critical point hospital will require coordination, collaboration, and integration into the local and/or regional public health emergency response.

• Hospital and public health leaders together to address the preparedness and response needs of the community so that, during an event, hospitals will be able to continue to provide essential medical services while also attending to affected patients.
Thank you very much!

Photo by Ron Brown