Response to Biological Emergencies
Dr Elizabeth Bryce
A Webber Training Teleclass – April 15, 2004

HOSPITAL DISASTER PLANNING: UNUSUAL COMMUNICABLE DISEASES
“It Could happen to you”

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What’s a Disaster Anyway?

- “a natural or human-caused event, occurring with or without warning, causing or threatening death, injury or disease, damage to property, infrastructure or the environment, which exceeds the ability of the affected society to cope using only its own resources”
Types of Disasters

- Natural: tornado, earthquake, flood, snowstorm, biological
- Man-made: War, political upheaval, bioterrorism
- Usually need to be declared in a legal sense to release government and international resources

The hospital role in emergency management

- Must address four specific phases of disaster management
  Mitigation: id’s a potential emergency and lessens the severity. Supports the perceived vulnerable areas w/i the hospital
  Preparedness: builds the hospital’s capacity to manage an emergency
  Response: control the negative effects of an emergency
  Recovery: restores essential services and normal operations
Common Elements

• Patient Care
• Treatment issues; decontamination, prophylaxis, therapy
• Protection of staff
• Specimen transport and diagnosis
• Local, provincial, federal co-ordination
• Bed availability
• Lines of responsibility
• Traffic control, security and triage
• Communication and media management
• Water, sewage, utilities
• Morgue capability

Mitigation

• Hazards: predictable to insidious
• hazard analysis: do in a way that integrates with overall disaster plan
• Consider: security, utility failures, weather, structural disasters, infections
• various tools available: e.g. JCAHO
• integrate with regional plan
More on Preparedness

Priorities in health care
- education
- creating a single, integrated response system
- analyzing community and provincial preparedness
- ensure medical/public health surveillance system functions well
- evaluate issues related to national supplies and their distribution
- evaluate funding policies that may hamper ability to “scale up” - e.g. bed and ER capacity
Plan Development: General guiding principles

The hospital role in any disaster management plan is to:
• continue caring for current inpatients
• protect hospital staff
• respond to the disaster appropriately

Focus of this presentation is on disasters of a biological nature

Guiding Principles for “the Plan”

• Link it to existing regional and hospital plans
• Take into account current resources
• Allow for early and “generous” alerts
• Permit continued function of the hospital.
  (Importance of backup systems where possible)
• Keep as simple as possible but as comprehensive as necessary
Link it to existing plans

Most institutions already have a disaster response plan that contains

- command structure (ICS generally)
- management of critical supplies/transport/pt tracking/back-up facilities/staffing
- intra and interfacility communication
Link to existing plans…. 

• Some have an Unusual Communicable Disease Response Protocol that contains:
  • case identification, early recognition of signs and symptoms
  • infection control and laboratory precautions
  • ward management

(e.g. 1997 Canadian Contingency Plan for VHF and Pandemic Influenza):

• Most hospitals have a hazardous spill procedure

Take into account current Resources

• Unrealistic to assume that additional monies will become available to support training, special equipment purchases, updated communication systems on an ongoing basis - deal with what you’ve got

• Know what your hospital is capable of doing and how far it can increase its normal capacity

• Look beyond individual borders when allocating resources
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Permit early and “generous” alerts

- A biological incident may initially have vague symptomatology
- Determine your threshold for initiating an alert
- A low threshold for getting a second opinion is desirable
- Any one should be able to initiate the process of consultation
Permit the continued functioning of the hospital

- A biological incident may evolve very rapidly and/or tax the system over an extended period of time
- Want to keep the acute care aspect of hospitals functioning as smoothly as possible
- Need to assess your facility for handling a large volume of patients acutely and over time
- Need a backup strategy when hospital is at capacity

Keep as simple as possible and comprehensive as necessary

- Ensure preparedness template is readable and accessible
- Link it with existing templates to minimize additional training and avoid confusion
- Use the same infrastructure wherever possible
- Make it “look” the same as existing templates. Use tear out sheets, checklists, FAQs
- Coordinate your plan with that of your community or region
Job Action Sheet for the ICP

- Surveillance and Epidemiology
- Notification/link to local public health
- Co-ordination of isolation procedures
- Determining the need or priorities for PPE
- IC policy and procedure review/updates as required
- Education/training of staff, visitors, volunteers
- Communication with regional infection control network and coordination of efforts
- Coordination of discharge/transfer of patients currently in negative pressure or single rooms
- Assist in procurement/prioritization of antibiotics, antitoxins, vaccines
- Assist in accessing updated staff contact information

The Vancouver Experience

- Following the 1998 APEC conference in Vancouver, a working group was formed to develop response strategies for exposures to biological agents.
- Under the auspices of Medical Health Officer, the original BRAT team was formed:

  🏤 Vancouver Richmond Health Board,
  🏤 B.C. Centre for Disease Control,
  🏤 Vancouver Hospital and Health Sciences Centre,
  🏤 B.C. Ambulance Services
  🏤 Women’s and Children’s Hospital
Response: THE REGIONAL PLAN

Contains

- Indicators that signal a potential or actual biological event
- Organizational responsibilities and lines of authority
- Rapid Response Protocols
- Access to BRAT for consultation

Start:

INDEX OF SUSPICION OF A BIOTERRORISM OR BIOHAZARDOUS EMERGENCY

Medical Health Officer (MHO) of the community involved

- Provincial Health Officer
- Provincial Epidemiologist
- Provincial Medical Microbiologist
- Local Hospital Infection Control Officer

REGIONAL HEALTH AUTHORITY

Decision Made to Activate BRAT

EMERGENCY RESPONDERS

HOSPITAL(E) RESPONSE

LOCAL PUBLIC HEALTH RESPONSE

LABORATORY RESPONSE

REACT RESPONSE

SPECIFIC PROCEDURE CHECKLISTS
Biological Response Advisory Team (BRAT)

- The regional expert team, on call 24/7 to assist in ID and management of cases of exposure to biological agents.
- Provincial Health Officer
- Deputy Provincial Health Officer
- Provincial Medical Microbiologist
- Vancouver General Hospital Medical Microbiologist
- E-Comm
- Provincial Emergency Program (PEP)

Background to VGH Response Plan

- Wanted to be responsible to our own institution when initially there may not be central organization.
- Plan covers biological agent exposure rather than just bioterrorism events.
- Needed to make the plan fit with the region’s.
- Wanted to build on existing structures and protocols so based on the generic hospital disaster response plan.
The Hospital-Regional Interface

Responsibility for the maintenance of plan rests with Medical Microbiology and the Disaster Response Management Program.

Based on the rationale that there are potentially multiple entry points for exposed patients in the hospital system.

Key to the process is that ER staff recognize symptoms of biological contamination and know the immediate response activities if suspicious of biological exposure.

Cannot always tell biochemical from biological exposure in first few hours.

The Scenarios

Hospital must ensure that the ER is kept free of contamination and is able to provide services not related to the incident.

The hospital response addresses:

- **A single patient** suspected of exposure to a biological agent. Patient is either en route to the hospital or on a hospital ward.
- **Multiple cases** arriving at the hospital spaced over time.
- **Multiple cases** arriving at the hospital simultaneously.

Remember that majority of diseases will not be spread person to person and standard precautions will be effective. Exceptions - smallpox, plague, viral hemorrhagic fevers.
Single suspect case

<table>
<thead>
<tr>
<th>Stage 1 Pt en route to hospital</th>
<th>Nursing Coordinator alerts ER Dr. and calls Infect Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>If pt is stable, leave in ambulance and assess</td>
</tr>
<tr>
<td></td>
<td>If unstable, immediately isolate in single/neg pressure room</td>
</tr>
<tr>
<td></td>
<td>If exposure suspicion remains, alert BRAT team</td>
</tr>
<tr>
<td></td>
<td>Prepare for further cases, assess exposed</td>
</tr>
<tr>
<td></td>
<td>Hospital fan-out activated and Unusual Communicable Disease protocol used</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pt already on ward</th>
<th>Nursing coordinator alerts Infect Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Door closed and entry restricted until assessment made</td>
</tr>
<tr>
<td></td>
<td>If suspicion remains, BRAT notified</td>
</tr>
<tr>
<td></td>
<td>Prepare for further cases, assess exposed</td>
</tr>
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</table>

Multiple cases over time

One of the more likely scenarios with spread in community and the hospital having likely occurred by the time of first recognition

Need to have a triage system in place to prevent cases slipping through the net and a process to do a ward to ward review if necessary.

- Infection Control contacted for initial assessment
- If suspicious, notify BRAT, MHO and consult as necessary ASAP
- Still suspicious - activate hospital plan and use Unusual Communicable Disease protocol
- Cohort and isolate cases, cohort relatives
- Restrict entry, assign staff to patients
- Prepare for further cases and establish triage system
Multiple cases arriving at once

- Most dramatic and hopefully least likely.
- Need to leave the Emergency Room functioning; triage occurs outside the department.
- May be difficult to identify type of event initially
- Decontamination may be required  NOTE: HAZMAT to be called in if available
- **BUT** still need a Disaster Plan specifically to deal with multiple cases. Duties should be clearly defined. Tear out check lists with assigned duties helpful
- Consider the following for large triage/decontamination area:
  - Separate Air handling system
  - Drains in Floor/ Water access
  - Accessible to ER, Supplies, Sterile core
  - Controlled access, ability to process large numbers of cases
  - Ability to close area without significantly affecting normal hospital operations

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**CHECKLIST #1: PREPARING THE ISOLATION AREA: Security Services**

- Clear the Isolation Area (outside of the morgue in the Emergency parking lot), of vehicles and unnecessary equipment.
- Set-up the waiting area in the ambulance bay for ambulatory patients.
- Direct family/friends to the Family Waiting Area.
- Retrieve supplies marked Isolation Area Supplies from the Disaster Supplies cupboard in ER.

**Isolation Area Supplies**

- Map of isolation area and decontamination scale
- Soap, sponges and a sheet
- Impervious gown, sheet and caplets
- 1000 ml bags, with 10 ml and 100 ml
- Two pair of gloves
- 2 sets of isolation gown and mask
- 1 roll of 2" yellow tape
- 1 roll of 2" white tape
- 6 rolls of 2" duck tape
- 6 rolls of 2" white tape
- 6 rolls of 2" duct tape
- 50 ft rope
- Portable screens
- Portable screens
- 1 roll of precautions paper
- 1 roll of precautionary tape
- 1 dozen biohazard signs/restricted area signs
- 2 pairs of disposable surgical gloves (rubber or latex)
- 2 pairs of disposable shoe covers
- Industrial particulate mask/gloves (P100 or butyl rubber?)

- Close Isolation Area to unauthorised personnel.
- If no water access notify plumbing to connect hoses outside the morgue and hook up to faucets ASAP.
- Keep ambulance bay entrance and exit clear including street, using police assistance if necessary. Clear the route from ambulance decontamination to the Isolation Area.
- Place biohazard precautions sign on outside doors and windows of Isolation Area.
- Establish and maintain a contamination control barrier to demarcate boundaries of the contaminated area using yellow tape marked contaminants.
- A “contamination control barrier”, usually indicated by a rope or red line, demarcates the boundaries of the contaminated area. Supplies entering this area must be passed across these lines.
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**CHECKLIST # 2: SET-UP OF ISOLATION/DECONTAMINATION AREA**

- It is preferred that "contaminated" casualties do not come into the Emergency Room.
- There is a complete biological hazard set up and decontamination unit in ER and the morgue in the Disaster Supplies Cupboard labelled Biological Hazard Exposure Kit
- **Biological Hazard - Set-up**
  - Decontamination Instruction Sheet
  - Masking Tape
  - 3 - 5 gallon containers
  - 2 rolls examining bed paper
  - 3 dozen large biohazard bags
  - Pink soap
  - 2 pair heavy duty scissors
  - Disposable blankets and sheets and slippers
  - 1 direct reading sign in/sign out sheet

- **Set-up screens to segregate patients by sex and ensure privacy**
- **Direct Facilities Protection Services to:**
  - drape the decontamination room, if required
  - ensure all hoses/sprays and dictating equipment are operational
  - Ensure all precautions signage is in place.
- **Assign an Emergency Nurse and Area Supply Technician to stand at inner entrance to Isolation/Decontamination Area**
- **Seal off pneumatic tube system**

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Recovery

- Often part of the response process
- Includes Review of plan
- Revisions as necessary (document control very important)
- Retest (paper exercise)
Personal Observations

• Pandemic Influenza planning very similar to that shown
  – Pre-Pandemic (mitigation and preparedness)
  – Pandemic (Response and Recovery actions)
  – Post Pandemic (Recovery, Review, Revise)

• Must consider vaccination/abx distribution clinics
  - may be a lot harder than we think!

• Loss of infrastructure is going to happen; mitigation, mitigation …

• **Don’t underestimate your resource need!**

• Fear and anxiety are major factors…

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Personal Observations…

Need to incorporate surveillance for unusual communicable diseases or clusters of “usual” infections e.g.s Pneumonias, Influenza, rashes into your routine
Recent or recovering respiratory illness with any of the following
• Abnormal chest X-ray or CT Scan and/or
• Cough and/or
• Shortness of breath, difficulty breathing?
AND INFECTION SUSPECTED

Yes

No

Fever > 38°C AND Rash
AND INFECTION SUSPECTED

Yes

No

Body Substances Precautions

Medical Microbiology & Infection Control
Vancouver Hospital

ACUTE CARE ALGORITHM FOR THE IMMEDIATE MANAGEMENT OF RESPIRATORY AND/OR FEBRILE ILLNESS NOT YET DIAGNOSED

Recent or worsening respiratory illness with any of the following
• Abnormal chest X-ray or CT Scan and/or
• Cough and/or
• Shortness of breath, difficulty breathing?
AND INFECTION SUSPECTED

OR

Yes

TRIAGE OR ADMITTING NURSE OR DOCTOR
• Request a negative pressure room through Admitting.
• Separate any symptomatic visitors from staff.

ADMITTING
• Arrange for a negative pressure room if requested by doctor or RN. If negative pressure room not available (e.g. CCU), use a single room and keep the door closed.
• Notify Infection Control/Medical Microbiology on call.
• Tag chart as “A” (Airborne disease) in the IFD box located on the PCIS-demographics screen.

PATIENT
• Admitted to a private room with bathroom facilities, negative pressure, door closed.
• Patient to wear N95 mask or equivalent when transported outside of room.
• Patient to practice regular hand hygiene.

STAFF AND VISITORS
• Symptomatic visitors restricted from visiting.
• N95 or equivalent mask, protective eyewear.
• Isolation gown and gloves.
• Strict hand hygiene before contact, after task completed and as barriers are removed.
• Sign contact sheet with local/phone number.

EQUIPMENT AND CLEANING
• Equipment cleaned with buffered bleach or manufacturer's recommended disinfectant.
• Minimal supplies in room; discard after discharge or send with patient on transfer/discharge.
• Terminal clean after discharge.
• Linen and garbage go in regular receptacles.

No Body Substance Precautions

Fever > 38°C AND Rash
AND INFECTION SUSPECTED

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Yes

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Personal observations....

- Foster your ties with Public Health
- Know your key Logistics personnel, your Disaster Response Co-ordinator, ER/ICU managers, key contact people
- Buy-in from administration at the start is crucial
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Take Home Points

• Need to identify all potentially exposed or infectious individuals extremely important
• A coordinated response with the region required following accidental or planned exposure to biological agents
• Templates for management must be flexible with multiple entry points for potential exposures of an unknown nature
• Bottom line: must individualize your plan and involve key players right from the beginning

Final Note

“It is by presence of mind in untried emergencies that the native metal of a man is tested”
Abraham Lincoln, 1864

“Those who prepared for all the emergencies of life beforehand may equip themselves at the expense of joy”

EM Forster
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- Strategies for Pandemics and Disasters. Infection Control Toolkit Series APIC
- A plague on your city: observations from TOPOFF Clin Inf Dis 2001;32:436-445
- City of Vancouver Exposure to Biological Agents Response Plan (Municipal Emergency Plan - Template for Management) www.vch.bc.ca/vrhb/vrhb_documents.htm
- Bioterrorism Readiness Plan: A template for Healthcare Facilities www.apic.org plus lots of other material under “Information Resources”
- California Hospital Bioterrorism Response Planning Guide. California Department of Health Services 10/05/2001

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