

# 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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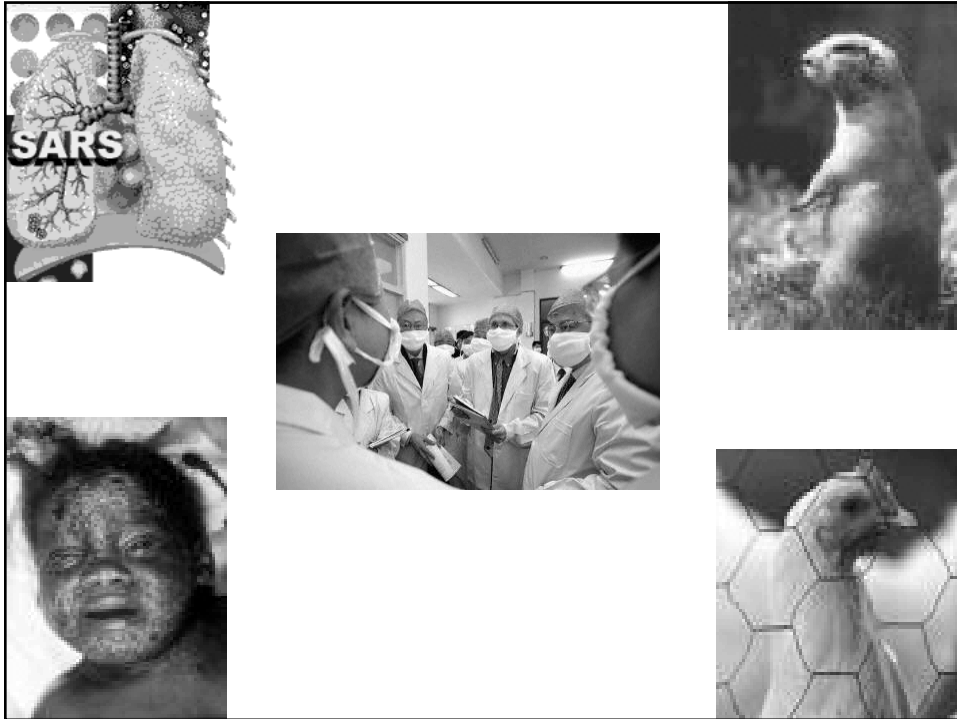
## Acknowledgement

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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”

911



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## 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

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## 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



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## 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

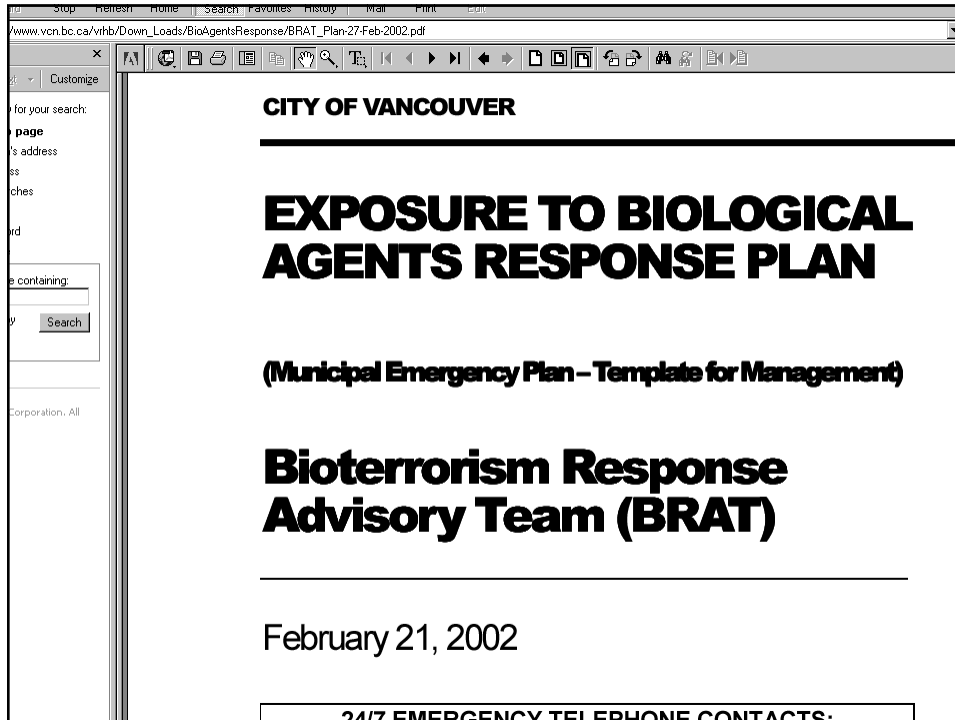
## Guiding Principles for “the Plan”

- 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

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## 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

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## 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



## SARS epidemic reveals sickness in health system

The fever about the SARS epidemic distracts us from a more serious question – the health of our health system.

Only about 8,400 cases have occurred in the whole world, two-thirds of those in China. Worldwide, the SARS infection rate is minuscule, the death rate among confirmed SARS patients is still under 10 per cent.

Few diseases of any kind, let alone communicable diseases, have rates that low.

Yet SARS – and the fear fomented by the mass media – has captured public hysteria.

I was on a Toronto bus after the first SARS panic there. At one stop, a young man got up to leave the bus. He coughed. The crowd at the exit door parted like the Red Sea before Moses. People pulled their collars up, covered their faces, turned their backs.

The World Health Organization has now declared that the worldwide epidemic is "over its peak." That may be an overly-optimistic assessment. Taiwan and Toronto have both experienced a new cluster of cases.

The latest outbreak hit a private hospital in Whitby, just east of Toronto. A dozen dialysis patients developed SARS symptoms.

A spokesperson for the Lakeridge Health Centre explained that they were not sure that all the preventive measures required for the public health system applied to them.



J. M. TAYLOR  
*Sharp Edges*

So much for the benefits of privatization.

Ontario premier Ernie Eves has reluctantly appointed Justice Archie Campbell to investigate the handling of the SARS epidemic. Why, for example, did some hospitals instruct their nursing staff not to comply with full precautionary procedures?

In Toronto's prestigious Mount Sinai Hospital, this resulted in effective closure of the maternity ward, putting five infants, mothers and about 100 staff into quarantine.

And why was the health system in B.C. able to contain the disease – despite being the main entry point for visitors from Asia – but the health system in Ontario was not?

I suspect this difference reflects that fact that the ideological budget-slashers have had eight years to wreak havoc in Ontario, but only two in B.C.

Significantly, SARS afflicts mainly those who are already in poor health. They're often elderly, in poor physical condition because of physical injuries or respiratory problems. Like the Whitby dialysis patients, they may have weakened immune systems.

Or else they are health-care workers. In North York General Hospital, 31 of the 33 SARS patients are medical staff. Of the 216 probable cases listed for the Toronto area, 159 are health care workers.

Health care workers are vulnerable because they're bone-weary. Many have worked double shifts, or more, when their replacements failed to show up – perhaps sick, or perhaps doing double shifts themselves in other hospitals.

Their vulnerability suggests a sick health care system. Indeed, an article in the Canadian Medical Association Journal calls it "a public health system that is on the ropes."

I see it as a direct result of treating health care like a business. The people who run the system believe that they can apply the same principles that work for an auto parts plant, a lumber mill, or a retail toy warehouse to health care.

So you have "just in time" inventories. You have just enough workers to match the raw materials coming in, to produce the desired output of oil pumps, two-by-fours, or Tickle-Me-Elmos.

Following that principle, health-care managers try to make sure that

their hospitals have absolutely no more nurses, beds, or facilities than they need.

If they work it right, a hospital's "input" would directly match its "output" – just like an auto assembly line. There would be no empty wards, no unused operating rooms, no staff with nothing to do.

In search of this goal, Ontario paid millions in severance to get rid of 25,000 nurses. It cut back on hospital beds. It shuttled from hospital to hospital, wherever beds are available, taking infection with them.

Emergency rooms are chronically overcrowded. Patients are stacked together in halls. One 77-year-old man with heart problems spent 12 hours in an emergency room next to a suspected SARS patient. Both later died.

The goal of business efficiency sounds laudable. Except that health care is not a business. It's a service – a ministry to the public. There has to be enough slack in the system to handle emergencies.

Toronto's medical officer of health, Sheila Basur, calls it "surge capacity." She told CBC that it has been "systematically stripped from the system as we have restructured hospitals (and) health care systems. . . . The ability to respond to an unforeseen crisis is dramatically reduced when we have already cut ourselves to the bone."

Consider a pair of parallels. Firefighters have to be available to fight fires. That requires idle time.

If every firefighter is kept busy every minute of every shift, who's going to be available when your kitchen goes up in flames?

If a burglar breaks into your house and you phone 911 for police assistance, do you want to be told to take a number and wait your turn? The whole point of having police and firefighters is to have them available when they're needed. That's the only efficiency that matters.

In Ontario's SARS crisis, nursing staff were already pushed to their limits. And suddenly, they had to find extra time for extra procedures, ranging from added paperwork to covering themselves repeatedly with face masks, double gloves, plastic gowns. . . .

Ontario Health Minister Tony Clements professed astonishment that 50 per cent of Ontario's nurses were now working part-time shifts in two or more separate hospitals.

Part-time employment allows administrators to cut benefit packages. Worn-out and susceptible health-care workers are a symptom of a sick health-care system.

And the crisis will happen again, when a new virus arrives. New safety procedures, new tests, and new vaccines will not cure the sickness in the mind-set that runs our health care system.

Jim Taylor is an Okanagan Centre author and freelance journalist. His column appears Sunday. He can be reached at [jmt@scablelan.net](mailto:jmt@scablelan.net).

April 15/04

## 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

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## 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

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## 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

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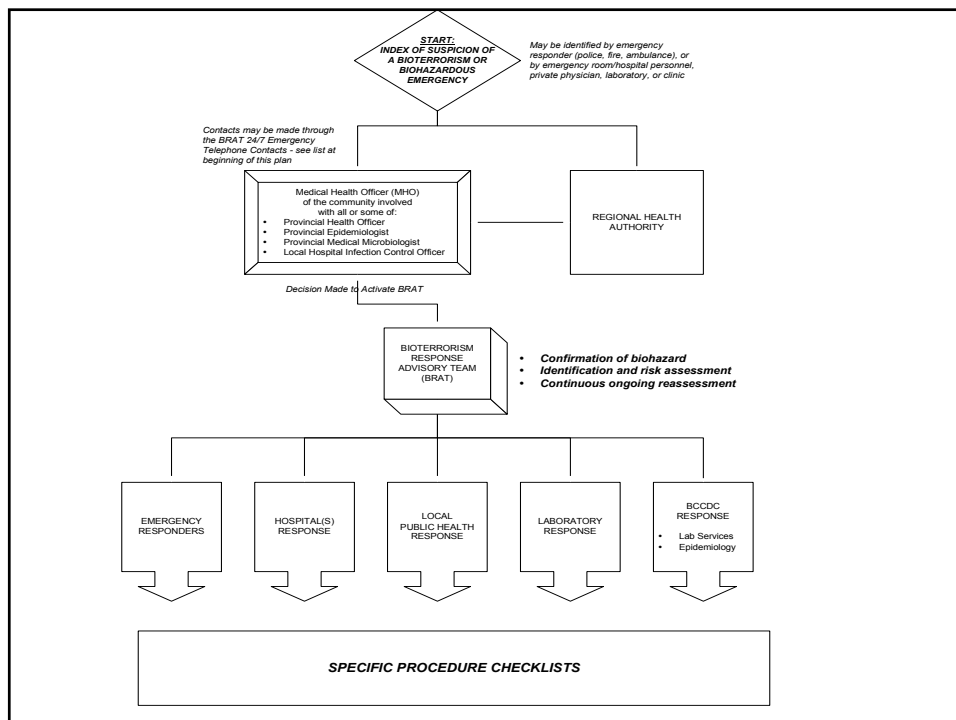
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## Response: THE REGIONAL PLAN

Contains

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



## **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**

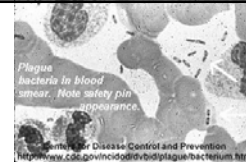
- ☞ **Wanted to be responsible to our own institution when initially there may not be central organization**
- ☞ **Plan covers biological agent exposure rather than just bioterrorism events**
- ☞ **Needed to make the plan fit with the region's**
- ☞ **Wanted to build on existing structures and protocols 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**



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## Single suspect case

<b>Stage 1 Pt en route to hospital</b>	<ul style="list-style-type: none"><li>➢ Nursing Coordinator alerts ER Dr. and calls Infect Control</li><li>➢ If pt is stable, leave in ambulance and assess</li><li>➢ If unstable, immediately isolate in single/neg pressure room</li><li>➢ If exposure suspicion remains, alert BRAT team</li><li>➢ Prepare for further cases, assess exposed</li><li>➢ Hospital fan-out activated and Unusual Communicable Disease protocol used</li></ul>
<b>Pt already on ward</b>	<ul style="list-style-type: none"><li>➢ Nursing coordinator alerts Infect Control</li><li>➢ Door closed and entry restricted until assessment made</li><li>➢ If suspicion remains, BRAT notified</li><li>➢ Prepare for further cases, assess exposed</li><li>➢ Hospital fan-out activated and Unusual Communicable Disease protocol used</li></ul>

## 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

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## 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**

### 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 disembarkation route  
Soap, sponges and scissors  
Disposable blankets, sheets and slippers  
201, 4 ft wide plastic, 2500 sq. ft  
1 dozen large surgical drapes  
12 rolls 2" wide masking tape  
6 rolls 2" wide duct tape  
50 ft rope  
Portable screens  
1 roll white examination paper  
2 rolls yellow precautions tape  
1 dozen biohazard signs/restricted area signs  
12 poles for ropes  
Industrial particulate masks/gloves (P100 or butyl rubber hoods?) zip up suits?  
Portable screens
- 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 disembarkation 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 "precautions.
- 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	Duct Tape
Masking Tape	1 roll 3 ml, 4 ft. wide plastic
3 - 5 gallon containers	3 - large garbage cans
2 rolls examining bed paper	2 dozen large plastic garbage cans
3 dozen large biohazard bags	hypoallergenic soap
Pink soap	25 soft brushes
2 pair heavy duty scissors	5 pair rubber boots
Disposable blankets and sheets and slippers	3 dozen patient status sheets
1 direct reading sign in/sign out sheet	50 feet rope and 12 poles
- 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)

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## 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...




## Personal Observations...

Need to incorporate surveillance for unusual communicable diseases or clusters of “usual” infections e.g.s Pneumonias, Influenza, rashes into your routine

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**Vancouver Coastal Health**  
Promoting wellness. Ensuring care.

Medical Microbiology  
& Infection Control  
Vancouver Hospital

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

October 21, 2003

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Recent or *worsening* respiratory illness with any of the following

- Abnormal chest xray or CT Scan and/or
- Cough and/or
- Shortness of breath, difficulty breathing?

**AND INFECTION SUSPECTED**

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**OR**

Fever > 38°C AND Rash  
AND INFECTION SUSPECTED

→ No → Body Substance Precautions

↓ Yes ↓

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**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 Microbiologist on call.
- Flag 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 and food trays handled routinely.

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*Infection Control is in your hands—keep them clean*

File Edit Patient Session Navigate Help

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**Review Patient Demographics**

Patient Information	Demographic	Care Provider
Last Name: [REDACTED] MR First: [REDACTED] MI: DOB: [REDACTED] Sex: M PHN: [REDACTED] Soc Ins #: [REDACTED] Birth Name: [REDACTED] Maiden Name: [REDACTED] <input type="checkbox"/> Registration Update Alias? Date of BC Residence: 25Nov1956 Date at Current Address: 1-Jul1994 Permanent Home Address Street: [REDACTED] City: URNC Prov: BC Postal Code: USY 2A1 Country: [REDACTED] Day Phone: [REDACTED] Night Phone: [REDACTED]	Marital: S Religion: HK Disability: [REDACTED] Language: <hr/> Previous Address 1 Street: [REDACTED] City: [REDACTED] Prov: [REDACTED] Postal Code: [REDACTED] <hr/> Temporary Address Street: [REDACTED] City: [REDACTED] Prov: [REDACTED] Postal Code: [REDACTED] Phone: [REDACTED]	Family Prov: [REDACTED] Specialty Prov 1: [REDACTED] Specialty Prov 2: [REDACTED] Referring Agency: [REDACTED] Unregistered Referral Last Name: [REDACTED] First Name: [REDACTED] MI: [REDACTED] <hr/> Flags Foundation: N UR: Debt: [REDACTED] Program: [REDACTED] Do Not Announce? IFD: A Adv Directive: [REDACTED]
Comment: INFO PREV/EHS Alert Information Alert: Comment: AIRBORNE ISOLATION for Chickenpox (29-Mar-04) NEC Folder: [REDACTED] * Richmond use only Alt. Patient No: [REDACTED] RHS HRN: [REDACTED] *		

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BBD	M	R	N	NAME	S	E	ADMIT	T	SERV	TM	ATTN	MD	REL	L	TEMP	F	CHIEF COMPLAINT
					X		DATE						R	LOCATN			D
128820-1					C	M	28Mar04	I	RSP							A	PNEUMONIA-ASTHMA
9A310-1					J	M	26Mar04	I	GE							A	CROHN'S DISEASE
T202-2					K	M	6Mar04	I	TB				Z			A	PNEUMONIA
T203-2					S	F	18Mar04	I	TB							A	QUERY TUBERCULOSIS

Still has wet vesicles

End of Report [ADT934SH]

## 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

## 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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## References

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