

Infection Control in an Age of Bioterror

Dr. Stephen S. Morse

A Webber Training Teleclass – April 1, 2004

Infection Control in an Age of Bioterror (... and Emerging Infectious Diseases)

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1

Why is Infection Control Important?

- Healthcare workers are among most likely to become infected
SARS 2003: Canada, >75% of those infected were HCWs (Taiwan, reported >90%)
- Other patients and visitors may also become infected
Ebola in Africa: Vast majority of cases are acquired in hospital
- Appropriate infection control precautions DO prevent transmission

2

Role of Infection Control

- Advise, provide PPE
- Train staff on PPE and personal precautions
- Maintain environmental controls
- Prevent spread to other patients, community
- Follow up to ensure no secondary transmission
- Work with other partners to carry out objectives

3

Some General Considerations

- Generally similar for bioterrorist agents as for other infectious diseases with similar transmission
- Have a plan
- Inventory PPE (personal protective equipment)
- Inventory isolation rooms (negative pressure)
- Will need to educate and train personnel (including support staff)
- If isolation required, will need to work with your Engineering Department

4

EMERGING INFECTIONS: SOME RECENT EXAMPLES

- Ebola, 1976 –
- HIV/AIDS
- Hantavirus pulmonary syndrome, 1993
- Hemolytic uremic syndrome, 1990's –
- West Nile, multistate, 1999 –
- SARS 2002 –
- Influenza (H5 avian influenza in Asia, 2004?)

5

Emerging Infectious Diseases vs. Bioterrorism

Many similarities: Most biothreat agents are naturally occurring, zoonotic (like many emerging infections)

“Fear factor”

Recognition likely to be similar (sick people in emergency room)

6

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Importance of Early Recognition

- More effectively treat those infected and prevent new cases
- Alert and educate medical community regarding clinical management
- Expedite epidemiologic and criminal investigations
- Mobilize antimicrobial and vaccine supplies
- Recruit additional resources from federal and state governments

7

Many bioterrorist agents cause an initial illness that looks like influenza (Flu)

Initial presentation of:

Anthrax
Plague
Brucellosis
Tularemia
Q Fever
Glanders
Smallpox
Viral hemorrhagic fevers

Fever
Headache
Muscle pain
Malaise = "Flu-like illness"

8

SOME EPIDEMIOLOGICAL CHARACTERISTICS

Point-source or common source outbreak

Unusual disease not endemic to the area or cannot be naturally ascribed to the setting (e.g. hemorrhagic fever)

Agent: Outbreak of anthrax, etc.

High case fatality rate

Unusual epidemiologic grouping (e.g. only adults) or geographic clustering

Respiratory or enteric transmission

Sudden onset of disease

Concurrent unusual animal deaths (many of these agents are zoonotic)

(USAMRIID),

Bioterrorism Agents: Category A, CDC

- *Variola major* (Smallpox)
- *Bacillus anthracis* (Anthrax)
- *Yersinia pestis* (Plague)
- *Francisella tularensis* (Tularemia)
- Botulinum toxin (Botulism)
- Viral hemorrhagic fevers (Filoviruses and others)

Category A Agents: Transmission & Precautions

AGENT	PERSON-TO-PERSON?	PPE PRECAUTIONS [* : + pt. isolation]
<i>Variola major</i> (Smallpox)	+	Airborne (incl. N95 or PAPR) *
Viral hemorrhagic fevers (Filoviruses and others)	+(at times)	Airborne *
<i>Yersinia pestis</i> (Plague)	+	Droplet or airborne (*)
<i>Francisella tularensis</i> (Tularemia)	-(or rarely)	Standard
<i>Bacillus anthracis</i> (Anthrax)	-	Standard
Botulinum toxin (Botulism)	-	Standard

11

Some Case Studies

- SARS
 - Importance of PPE (infection control)
 - Importance of rapidly and widely reporting the unusual!
- Anthrax 2001
 - Environmental health is important
- Smallpox preparedness
 - Was helpful with SARS: similarities in plans and procedures

12

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Some of the Challenges

- **Precautions require considerable time and effort**

Estimates: Patient with smallpox, visited twice each hour, will require 16 changes of PPE by each staff member; 2 hrs spent in changing (ref.: Grow & Rubinson 2003)

- **Hospital may quickly run out of equipment, isolation facilities**

Where to put the other patients?

- **Staffing needs**

How to handle changes of shift? Do employees go home?

13

Training is Important!

- **SARS (2003), some hospital staff became infected despite precautions**
- **Reasons unknown, but one reason may be improper removal of PPE**

14

Isolation

- **Will need for some of the Category A agents, SARS, others**
- **Require negative pressure**
- **Suitable rooms may be very limited**
- **May be possible to improvise, or portable units**
- **Special handling to protect immunosuppressed patients?**

15

What If the Hospital is a Target?

- **Example: Anthrax, 2001**
An inhalation anthrax patient in NYC was a hospital employee
- **Need to consider epidemiology**
- **May need environmental control, decontamination**

16

Preparedness Plans: Healthcare Facilities

- **Everyone needs a plan!**
- **Generic templates available (APIC)**
- **But not sufficient: Must customize**

17

Bio Events: Special Features (APIC plan as example)

- **Reporting requirements (to Health Dept.)**
- **Detection of outbreaks:**
Syndrome recognition in emergency dept.
Lab.
- **Infection control procedures/PPE**
- **Post exposure management (decon, triage, treatment resources)**
- **Samples: Transport to lab, lab security**
- **Protocols for specific agents when known**

18

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Preparedness

- Plan not enough: Must train
- And must practice
- Include your other partners
- Hospitals and other healthcare institutions: JCAHO (U.S.) requirements for drills

19

Short review on general aspects of infection control for bioterrorism

R.W. Grow and L. Rubinson (2003). The Challenge of Hospital Infection Control During a Response to Bioterrorist Attacks. *Biosecurity and Bioterrorism* 1 (no. 3):215-220.

20

Resources Available on the Web

CDC Bioterrorism Preparedness and Response:
<http://www.bt.cdc.gov>

CDC Div. of Healthcare Quality Promotion
(Hospital Infections Program)

ProMED-mail (Reports of disease outbreaks internationally):

<http://www.promedmail.org>

APIC:

<http://www.apic.org>

21

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22