? My background – NY State Response

Homeland security – threat of biological weapons

One component of [illegible] now acknowledged to be on a par with a nuclear attack in terms of devastation but far more likely. The potential of that threat is still not fully appreciated → (Bridge P).

More than bio, weapons

6

Biological Preparedness
New Challenges for the 21st Century

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Center for Biosecurity, U. of Pittsburgh Medical Center

Homeland Security Conference
Rochester, New York
July 13, 2005

- *Man's only competitors for the dominion of the planet are the viruses – and the ultimate outcome is not foreordained.*

Joshua Lederberg
Nobel Laureate, USA

The competitors are increasing

- New and emerging infections have been increasing in number
- The sources of the threat:
  - Natural mutation of microbes
  - Emergence of organisms from remote areas
  - Biological terrorism
- The threats are international

"Conquest" of the infectious diseases
1950s-70s

- Dramatic changes post WW II
  - Vaccines
  - Antibiotics
  - Nutrition
  - Housing
  - Sanitation
- Decline or elimination of many diseases in the industrialized world
  - Smallpox, diphtheria, whooping cough, tetanus, polio, measles, *et alia*

- *"One can think of the middle of the 20th century as the end of one of the most important social revolutions in history, the virtual elimination of the infectious diseases as a significant factor in social life"*

Sir Macfarland Burnet
Nobel Laureate, Australia

A cloud on the horizon

- June, 1981 – first cases of AIDS diagnosed
- April, 1984 – HIV is identified
  "the triumph of science over a dread disease"
  "a vaccine will be available in 2 years"
- 2005 -a world-wide pandemic in progress
  - 4th leading cause of death world-wide
  - No vaccine
  - No curative drug

HIV is not the only surprise

- 1989 Conference on Emerging Infections
- An illustrative additional inventory
  - SARS – from China
  - Monkeypox – from Africa
  - TSE – "mad cow" disease – from UK
  - West Nile Encephalitis – from Eurasia
- More than 30 new agents in 25 years

A serious menace -- influenza

- Influenza – 1918 – H1N1
  - Case-fatality rate - about 2 %
  - Deaths -- U.S. 550,000
    World >40,000,000
- Influenza – 2004/2005 – H5N1
  - ~97 cases/ 53 deaths

Why now?

- Growth in urban populations
  - Population of cities
    - 1975 – 5 with more than 10,000,000
    - 2004 – 20 with more than 10,000,000
      6 with more than 15,000,000
  - By 2015
    - 5 cities with more than 20,000,000 persons
    - 55% of world's population in urban areas

Why now?

- Growth in urban populations
- International travel
  - Volume
    - 18 million commercial air flights yearly
    - 1.6 billion air passengers per year
  - Remote area destinations
  - All cities less than 36 hours from others

Why now?

- Growth in urban populations
- Travel
- Growth of hospitals in endemic areas
  - Major sites for disease distribution
  - Problem of blood borne diseases
  - Development of antibiotic resistance

Why now?

- Growth in urban populations
- Travel
- Growth of hospitals in endemic areas
- Food supply
  - Internationalized
  - Industrialized
    - Animal husbandry
    - Food processors

Intentional release of biological agents

- A threat, largely ignored until 1999
  - Too difficult to grow organisms
  - Technologically difficult to disseminate
  - Not used because of a moral barrier

What has changed?

- Advances in biotechnology
  - Numbers and sophistication of laboratories
  - Information access – internet
  - Trained microbiologists
  - Aerosolization devices
- Growth of independent terrorist groups

Watershed events
Aum Shinrikyo -- Japan

- Religious cult released Sarin gas in Tokyo subway (1995)
  - Cult - previously unknown to intelligence
  - Thousands of members, well-funded
  - Tried to aerosolize anthrax and botulinum toxin throughout Tokyo at least 8 times
- *Concern – unknown, non-state sponsored organization, acting without concern for moral deterrents*

Watershed events
USSR Bioweapons Program

- A secret program – unknown until 1989
- 1992 – Ken Alibek, Deputy Director of bioweapons program, deserts
- 1995 – Full scope of program apparent
  - 60,000+ persons in 50 different labs
- *Concern – Expertise and possibly specimens now dispersed world-wide. Still a secret program*

"On May 8, 1980, WHO announced that smallpox had been eradicated..Soon after, smallpox was included in a list of biological weapons targeted for improvement in the 1981-85 Five -Year Plan...

Where other governments saw a medical victory, the Kremlin perceived a military opportunity...the military command issued an order to maintain an annual stockpile of 20 tons (of smallpox virus)."

Alibek, 1998

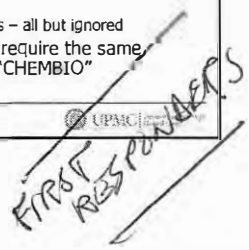
Civilian initiatives in national security
1995-99

- Presidential Decision Directive #39 –1995
- 1997 Defense Against Weapons of Mass Destruction Act
  - DoD responsible for organizing domestic preparedness
  - To train teams of first responders in 120 major cities
  - National Guard Rapid Assessment teams (RAID) for States
  - Marine Corps Incident Response Force
  - Army Technical Escort Unit
- Dept. of Justice and FBI given special funds

Initial Assumptions

not yet fully corrected

- For terrorist threats, the solution is emergency response measures
  - Police, fire, emergency staff for rescue and to deal with chemical leaks, spills, etc
    "lights and sirens"
  - DoD to do the training
  - FBI to find the bad guys
  - FEMA to deal with recovery
  - Public health and medical problems – all but ignored
- Chemical and biologic weapons require the same response– hence, a new word "CHEMBIO"



A reassessment of strategies – 1998-2001

- Center for Civilian Biodefense Strategies
  - Working group on priority (Class A) agents
  - First national symposia for medicine and public health
  - Meaningful funding of HHS – FY 2000
  - The Dark Winter exercise (June 2001)
  - The anthrax attacks (October 2001)

Biological weapons

- Biological weapons more greatly to be feared than either chemical or nuclear weapons – Colin Powell
- A contrast (See NYTimes, July 10, 2005)
  - Difficult to think of any bombing attack that caused a city to cease to function (except Dresden, Hiroshima, Nagasaki)
    -- Lynn Eden, Stanford University
  - The sustained anxiety of a bioterrorist scenario is most likely to result in societal breakdown
    --Bendedict Carey

Bioweapons of greatest concern

- Smallpox
- Anthrax
- Plague
- Tularemia
- Botulinum Toxin
- Hemorrhagic fevers
  Ebola, Marburg, etc.

Agents that, if used, could threaten the integrity of civil government

Early detection is critical but difficult

- A prevalent myth –
  There is a great deal of information potentially available if detection systems were deployed
- Possible sources ?
  - Syndromic surveillance- reports from health centers
  - Pharmacy purchases
  - Biowatch air detection devices
  - Sensors in subways or airports

What does history tell us?

- Unusual outbreaks have come to attention because of an alert physician, prompt notification, a medical investigation team
  - West Nile encephalitis
  - HIV/AIDS
  - Ebola hemorrhagic disease
  - SARS
  - Anthrax

P.H. Emergency Preparedness

Elements of Biopreparedness

- Overall professional direction and an integrated planning team in every area
- 24/7 communication and response
- Designated, trained infectious disease epidemiology team in each urban area
- Qualified laboratory for bio agents
- Plan for emergency hospitalization of 500 patients per million population
- ER isolation suites in all hospitals
- Plans for communication to public
- Plans for rapid dispersal of vaccines or drugs
- Plans for rapid expansion of personnel in emergency

- "Today's world is truly a global village, characterized by growing concentrations of people in huge cities, increasing global commerce and travel...One can safely predict that infectious diseases will continue to emerge...Depending on present policies and actions, this situation could lead to a catastrophic storm of microbial threats."

Institute of Medicine/ National Academy of Sciences Microbial Threats to Health, 2003