

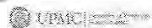
New Infectious Disease Challenges for the 21st Century

D.A. Henderson, MD, MPH

Center for Biosecurity, U. of Pittsburgh Medical Center
Professor of Medicine, University of Pittsburgh
Johns Hopkins University Distinguished Service Professor

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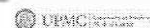
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- *Man's only competitors for the dominion of the planet are the viruses – and the ultimate outcome is not foreordained.*

Joshua Lederberg
Nobel Laureate, USA

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These 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

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"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*

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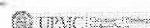
A cloud on the horizon

- 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

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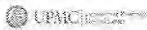
- *"One can think of the middle of the 20th century as the end of one of the most important social revolutions in history, the virtual elimination of the infectious diseases as a significant factor in social life"*

Sir Macfarland Burnet
Nobel Laureate, Australia, 1962

What has changed?

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

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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*

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Watershed events USSR Bioweapons Program

- A secret program – unknown until 1989
- 1992 – Ken Alibek, Deputy Director of bioweapons program, defects
- 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*

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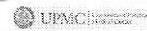


"On May 8, 1980, WHO announced that smallpox had been eradicated..Soon after, smallpox was included in a list of biological weapons targeted for improvement in the 1981-85 Five -Year Plan...

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

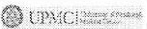
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A recurrent menace – influenza today – the greatest threat of all

- Influenza – 1918 – H1N1
 - Case-fatality rate - about 2 %
 - Deaths -- U.S. 675,000
 - World >50,000,000
- Influenza – 2004/2005 – H5N1
 - >100 cases/ 53 deaths
 - *More lethal than any epidemic pathogen*

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Status – October 19

- Infected wild fowl, chickens, ducks, turkeys
 - China, Vietnam, Cambodia, Indonesia, Japan, Korea, Thailand
 - Russia, Romania, Bulgaria, Greece, Macedonia
- No human cases yet outside of Asia
- Massive slaughter of fowl in infected areas
- Embargo on fowl from infected areas
- Autumn – the beginning of the flu season

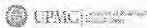
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U.S. Measures to cope

- Vaccine the most important
 - H3N2 vaccine – 90 million+ doses available
 - H5N1 vaccine - 0 doses in 04/05 season
 - Studies to produce large quantities for 05/06
 - Need vaccine strain after human spread begins
 - Tamiflu, other antivirals
 - Very limited supplies available
 - No certainty it will work in treatment

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Active steps this year

- Vaccination with H3N2
- Hospital planning over metropolitan area
 - How to care for tens of thousands
 - Central control for monitoring bed availability
 - Stop elective surgery
 - How many patients if more patients per room
 - How to staff hospital when many illnesses
- Role of quarantine -- none

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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

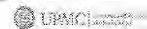
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Initial Assumptions not yet fully corrected

- 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”

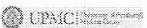
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A reassessment of strategies – 1998-2001

- 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)
 - Office of Public Health Emergency Preparedness— (November 2001)

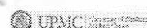
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The agenda for the future

- Greatly strengthened network of international cooperation and communication
 - Cooperative international centers for epidemiology and laboratory diagnosis in all countries
 - A far more generously supported WHO effort to orchestrate the many national initiatives
- A focused research and development program

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- "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*

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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

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