

Resident scholar - Ch. for Proc - Ctr. founded 8 yrs ago as a Hopkins Ctr
 Sr. Advisor to Socy of HHS for PHSP - stemming from
 Wido - Spex - 11 yrs - out of a job
 Hopkins - 14 yrs -
 W.N. - Life Sci. Adv. to the Proc - in ADIT

The Future of Public Health

Warrenton Conference

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Professor of Medicine and Public Health
University of Pittsburgh

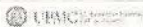
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Future of Public Health

- "What are the key public health issues we should be thinking about that are not getting the attention they deserve?"

(due, in whole or in part, to the degree of international attention paid to H5N1)

- What are the key issues that affect the health of the public and deserve added attention?

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A number 2 potential effects of a magnitude that challenges life on earth as we know it

An abbreviated agenda

- Population growth on a planet with finite resources
 - Maternal and infant mortality
 - Migrant populations
- Global warming
 - Changes in global ecology of disease
- Water resources
- Water pollution and toxic wastes

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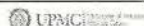
An abbreviated agenda – part II

- Food and nutrition
- Education and equality for women
- HIV- AIDS
- New and emerging infections, including deliberate use of biological agents

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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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K-11

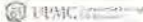
"Conquest" of the infectious diseases
1950s-70s

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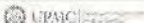
- *"One can think of the middle of the 20th century as the end of one of the most important social revolutions in history, the virtual elimination of the infectious diseases as a significant factor in social life"*

Sir Macfarland Burnet
Nobel Laureate, Australia, 1962

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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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HIV is not the only surprise

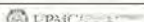
- 1989 Conference on Emerging Infections
- An illustrative additional inventory
 - SARS – from Asia
 - Monkeypox – from Africa
 - TSE – "mad cow" - CJDisease – UK
 - *H5N1 influenza* – from Asia
- More than 30 new agents in 25 years

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Why the concern about H5N1

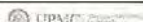
- Unprecedented behavior of a flu strain with massive deaths in poultry and 50% death rate in humans
- Influenza – 1918 – H1N1
 - Case fatality rate – about 2%
 - Deaths

U.S.	675,000
World	> 50,000,000
- Influenza – 2004-2006
 - >200 cases, about 100 deaths

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Status – April 2006

- Infected wild fowl, chickens, ducks, turkeys
 - Asia
 - Most of Europe
 - Africa
- Human cases – contacts of birds (a few patients)
 - Asia and Africa
- Massive slaughter of fowl in infected areas
- Embargo on fowl from infected areas
- Autumn – the beginning of the flu season

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Prospects for the U.S.

- Avian H5N1 – a virtual certainty
 - Migratory birds
 - Bird smugglers
- Pet animals – probable but limited
 - Cats
- Humans – the question
 - Can it be slowed or stopped?

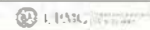
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Influenza Outbreaks



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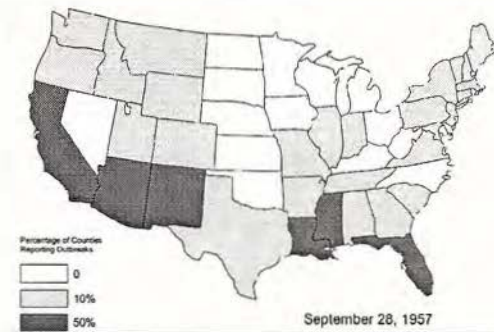
Influenza Outbreaks



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Influenza Outbreaks



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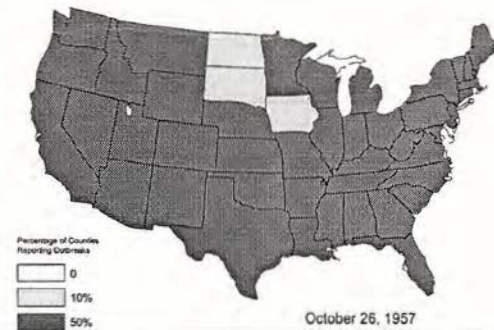
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Influenza Outbreaks



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Status of preparations

- Vaccine
 - Problems in production
 - Antigenicity of experimental H5N1 vaccines
 - Use of adjuvants
- Antiviral agents
 - Tamiflu
- Provisions for quarantine
- Provisions for patient care

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New events of concern

A new case of CJDisease from blood transfusion

Patient developed disease 8 years after a blood transfusion from a patient who did not develop symptoms until 20 months after donating blood

UK Health Protection Agency 02/09/06

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Another recent discovery

- Human disease related to vesiviruses
 - Virus genus originally believed primarily to be in marine environment; later was found to be prevalent in cattle and hogs in some areas
- Blood from 700 blood donors in Western US
 - 12% with antibodies
 - Patients with liver damage – 27%
 - Dialysis patients with hepatitis not due to hepatitis types A through E – 47%

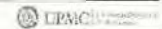
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Why now?

- 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

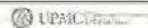
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Why now?

- 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

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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

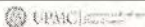
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Why now?

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

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Intentional release of biological agents

- A threat, largely ignored until 1998
 - Too difficult to grow organisms
 - Technologically difficult to disseminate
 - Not used because of a moral barrier

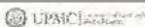
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Changes in capabilities

- Rapidly growing numbers and sophistication of laboratories in many countries
- Growing numbers of trained biologists
- Information access – internet
- Growth of independent terrorist groups

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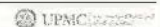


Globalization, Biosecurity, and the Future of the Life Sciences

Board on Global Health, Institute of Medicine and the National Research Council

National Academies Press, 2006

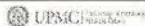
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Age of Biology

- New technologies are emerging and developing at an exponential rate
 - Genomics, microarrays, proteomics, structural biology, bioregulators, microencapsulation, aerosol dispersion
- iii. – 10 years ago-smallpox virus sequenced today – 10 plant and animal genomes and 100 microbial genomes, yearly

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- “The global technology landscape is shifting so dramatically and so rapidly that it was simply not possible for this Committee – or any committee – to devise a formal risk assessment.
- The future of any list “would likely be measured in months, not years”

JOM-NRC Report, 2006

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Role of public health and biology in policy formulation

- National Security Council
- Office of Science and Technology Policy
- Department of Homeland Security

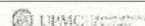
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Strengthening National Security

- Recommendation 3 (of 5) –IOM-NRC
“The committee recommends strengthening and enhancing the scientific and technical expertise across the security communities”
 - 1) Creation of an independent and permanently staffed Biological Sciences Advisory Group
 - 2) Expand the number of analysts in the security community with professional training in life sciences and technology
 - 3) National security community should develop stronger relationships with the non-government science and technology communities

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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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