



*May 11, 2004
AIHCE
DoD IH Forum*

***The
Industrial Hygienist's Role
In
Global Emerging Infectious Diseases***

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Global Emerging Infections

Surveillance & Response System

(DoD-GEIS)

Silver Spring, MD



OBJECTIVES

- Understand what emerging infectious diseases (EID) are.
- Appreciate why EID have become & will remain important.
- Identify roles for Industrial Hygienists in the control of EID.



VISITING THE PAST

➤ **Early 1980s**

*Love Canal
Chemical workplace exposures
Medical surveillance*

➤ **Mid 1980s** *HIV/AIDS*

➤ **1990s to the present**

*Ebola, Hot Zones
SARS, Avian Flu, Monkeypox
Anthrax & Weapons of mass destruction*



CONQUERING INFECTIOUS DISEASES

➤ **1940s**

Antibiotics

➤ **1950s**

Polio Vaccine

➤ **1970s**

*Global Eradication of Smallpox
Military Adenovirus &
Meningococcal Vaccines*



BOLD PROCLAMATIONS

1970s – 1980s

“Microbes are no longer a threat to humanity.”

“We have conquered infectious diseases.”



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*WHY WERE THE
PROCLAMATIONS WRONG?*

The Conquest of All Microbes
Is
UNREASONABLE

- The microbial world is vast and largely unknown.
- Microbes are constantly changing.



WHY WERE THE PROCLAMATIONS WRONG?

Dramatic Global Changes

- Our world has changed rapidly and dramatically since 1970.
- Global changes have increased the microbial threat to humans.

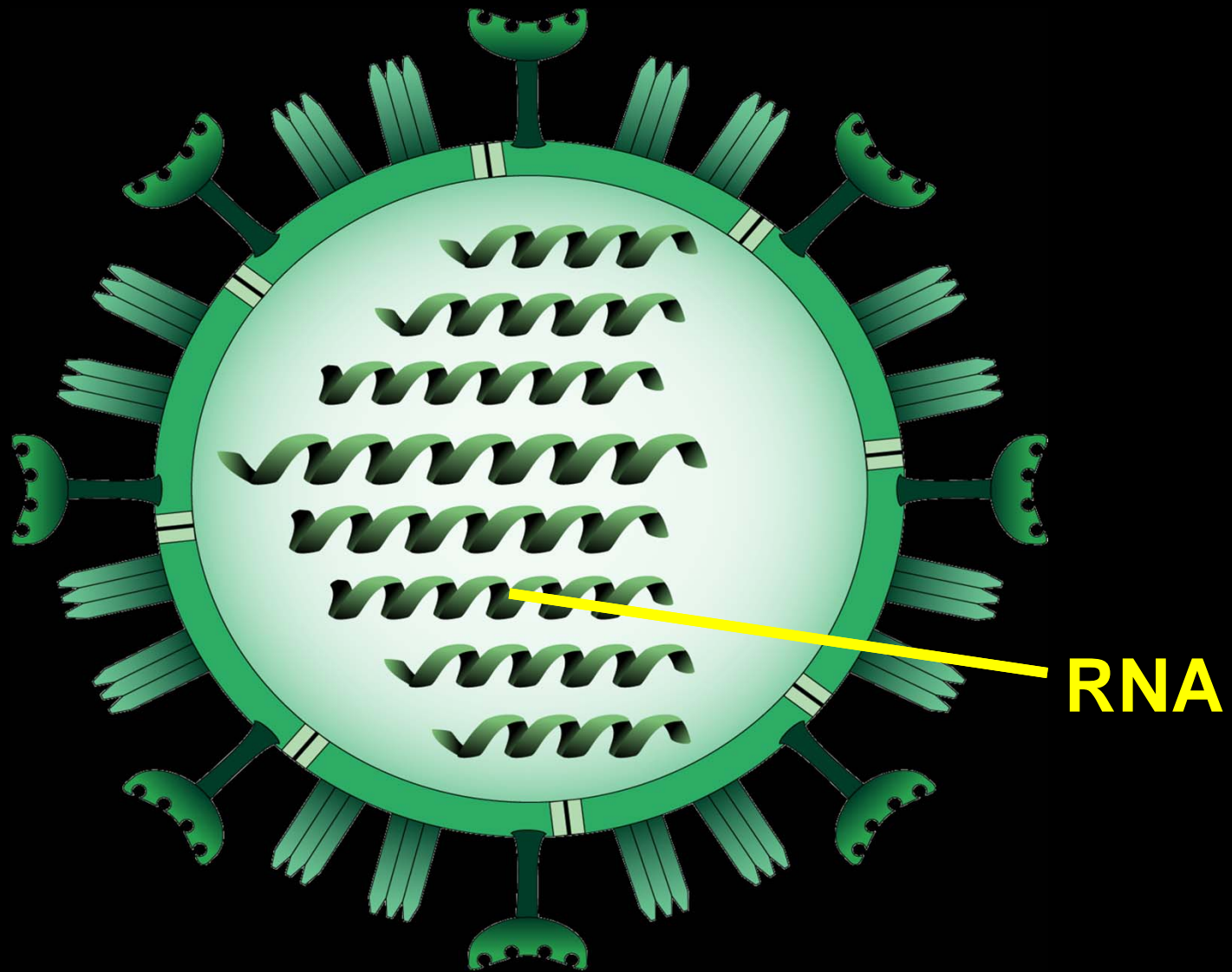


WHY WERE THE PROCLAMATIONS WRONG?

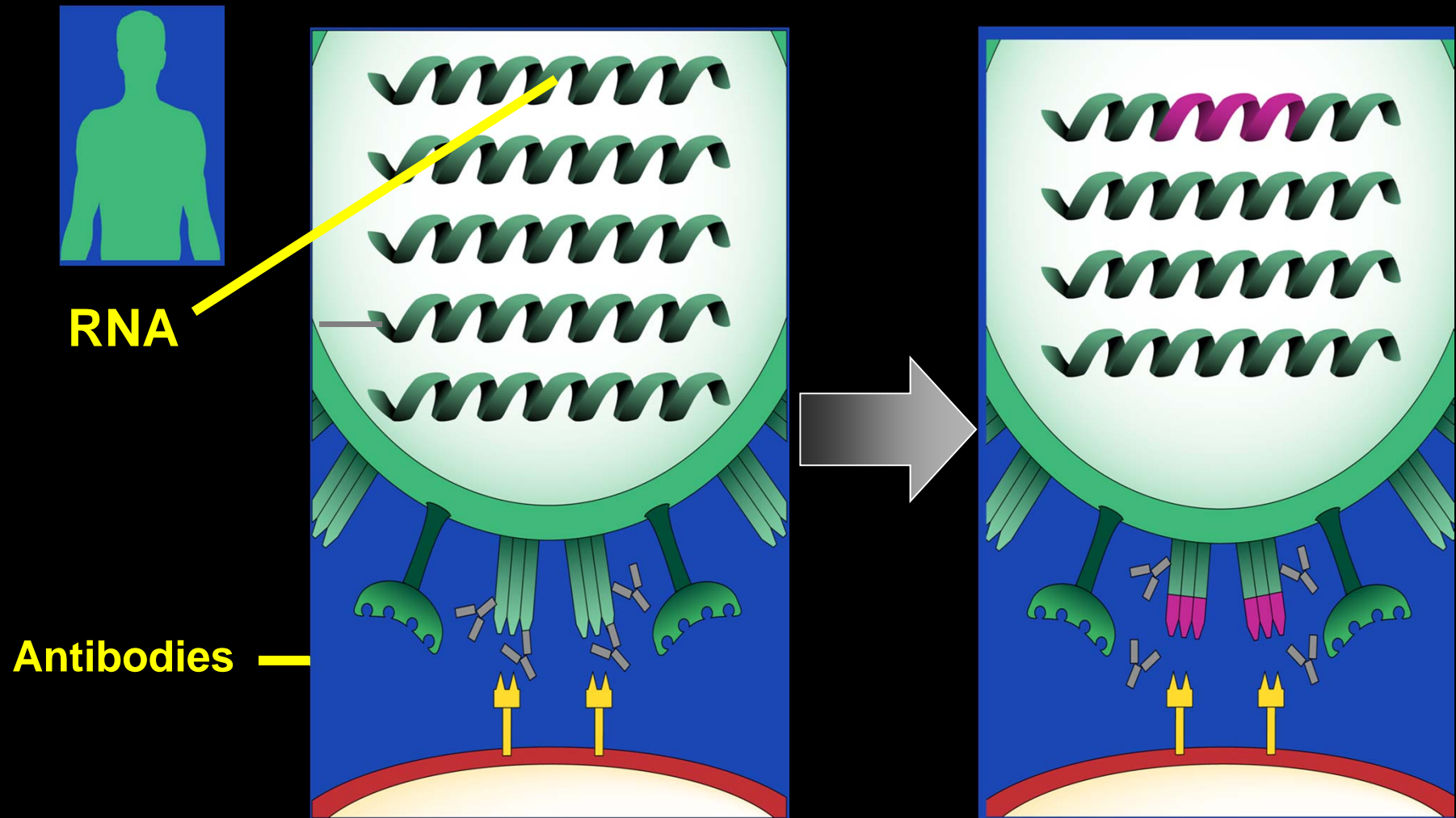
The Conquest of All Microbes Is UNREASONABLE

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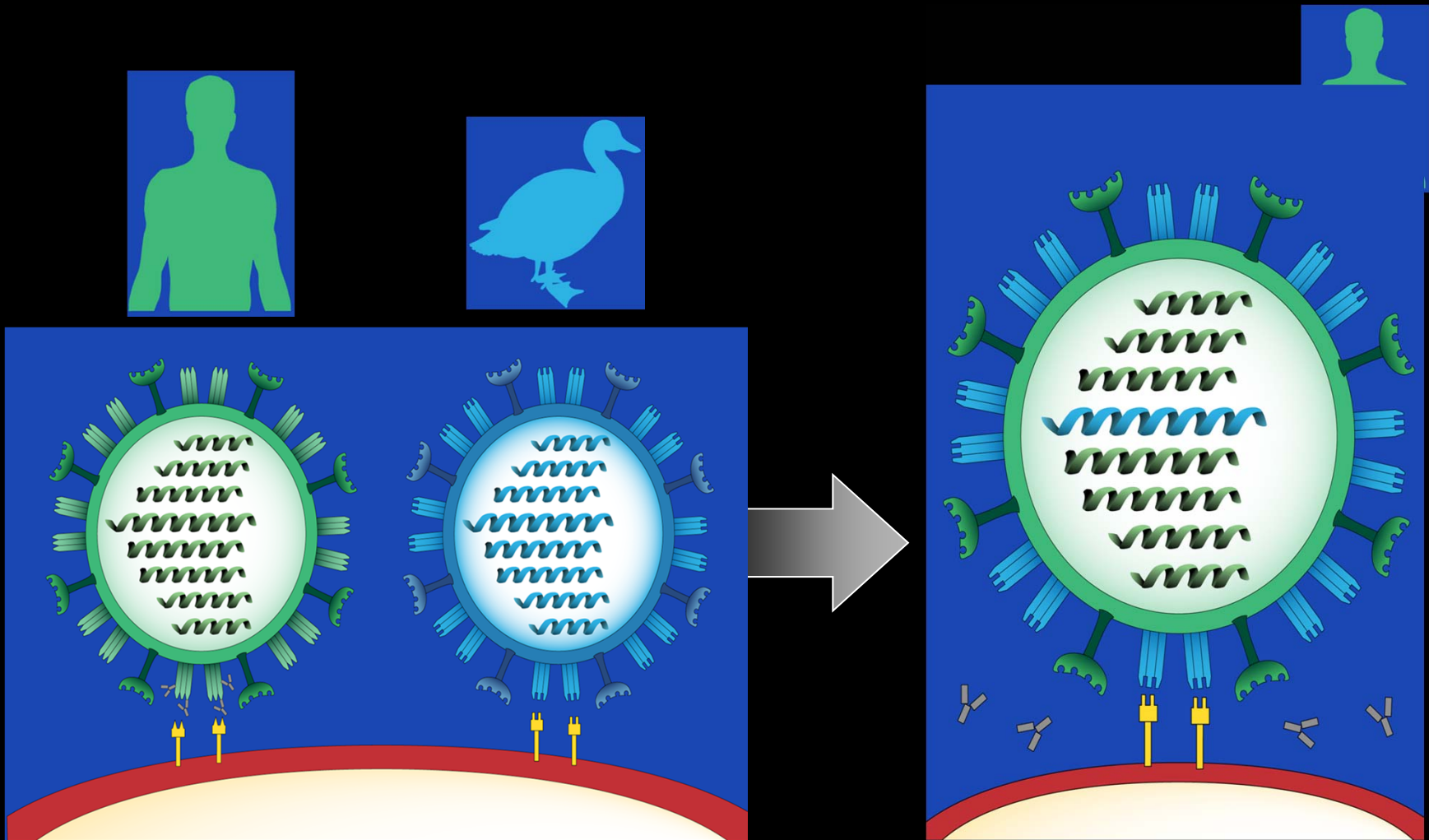
Influenza A Virus



Influenza A Antigenic Drift



Influenza A Antigenic Shift





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Major New Infectious Diseases in Each Century

Century Pathogen

11th Ergotism

12th Smallpox

13th Leprosy

14th Plague

15th Syphilis

Century Pathogen

16th Dysentery

17th Tuberculosis

18th Typhus

19th Cholera

20th HIV/AIDS

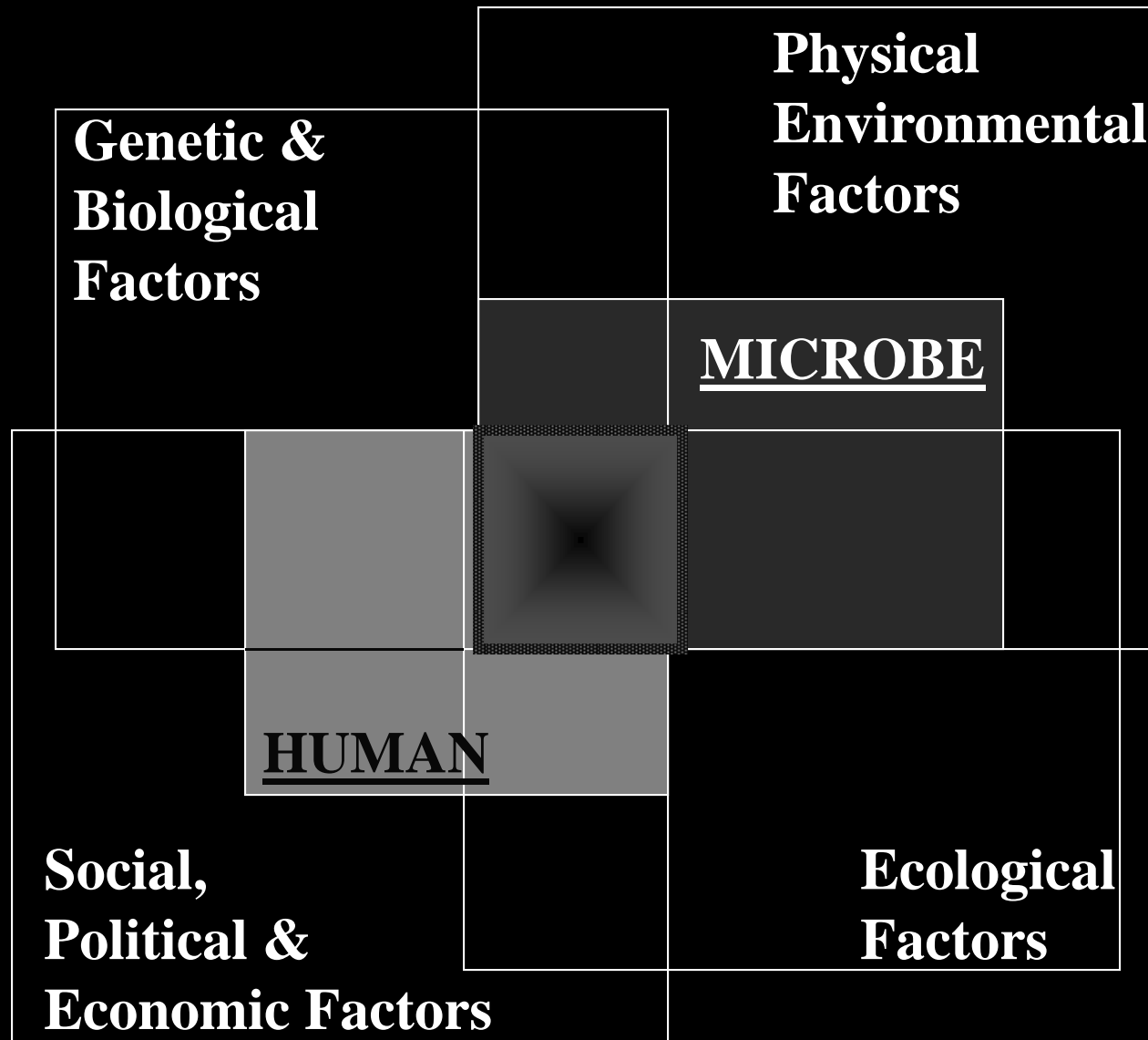
***The Eleventh Plague, A Novel of Medical Terror by
John S. Marr, MD, & John Baldwin, HarperCollins Publishers,
New York, 1998.***

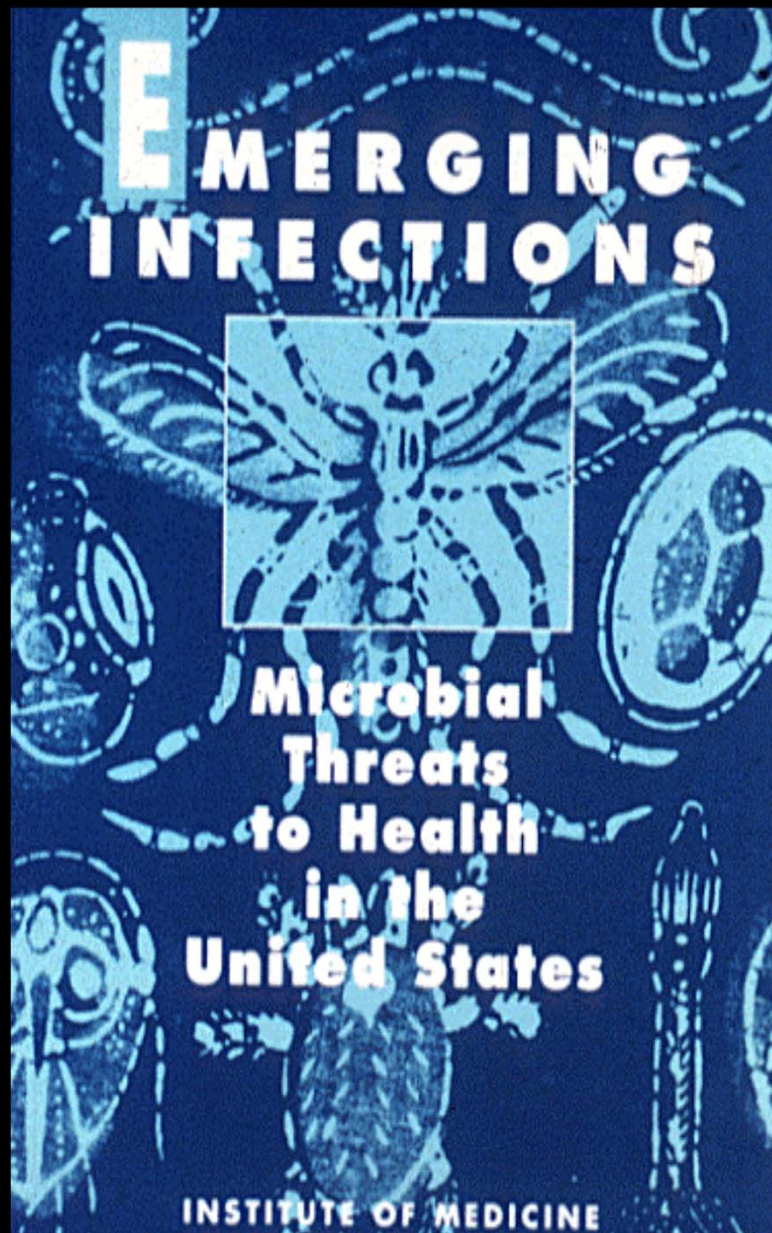


FACTORS IN THE EMERGENCE OF INFECTIOUS DISEASES

Microbial adaptation & change
Human susceptibility to infection
Climate & weather
Changing ecosystems
Economic development & land use
Human demographics & behavior
Technology & industry
International travel & commerce
Breakdown of public health measures
Poverty & social inequality
War & famine
Lack of political will
Intent to harm

FACTORS IN THE EMERGENCE OF INFECTIOUS DISEASES : THE CONVERGENCE MODEL





**The US Capacity to Address Tropical
Infectious Disease Problems
IOM, 1987**

**The Future of Public Health
IOM, 1988**

**Emerging Infections:
Microbial Threats to Health
in the U.S.
IOM, 1992**

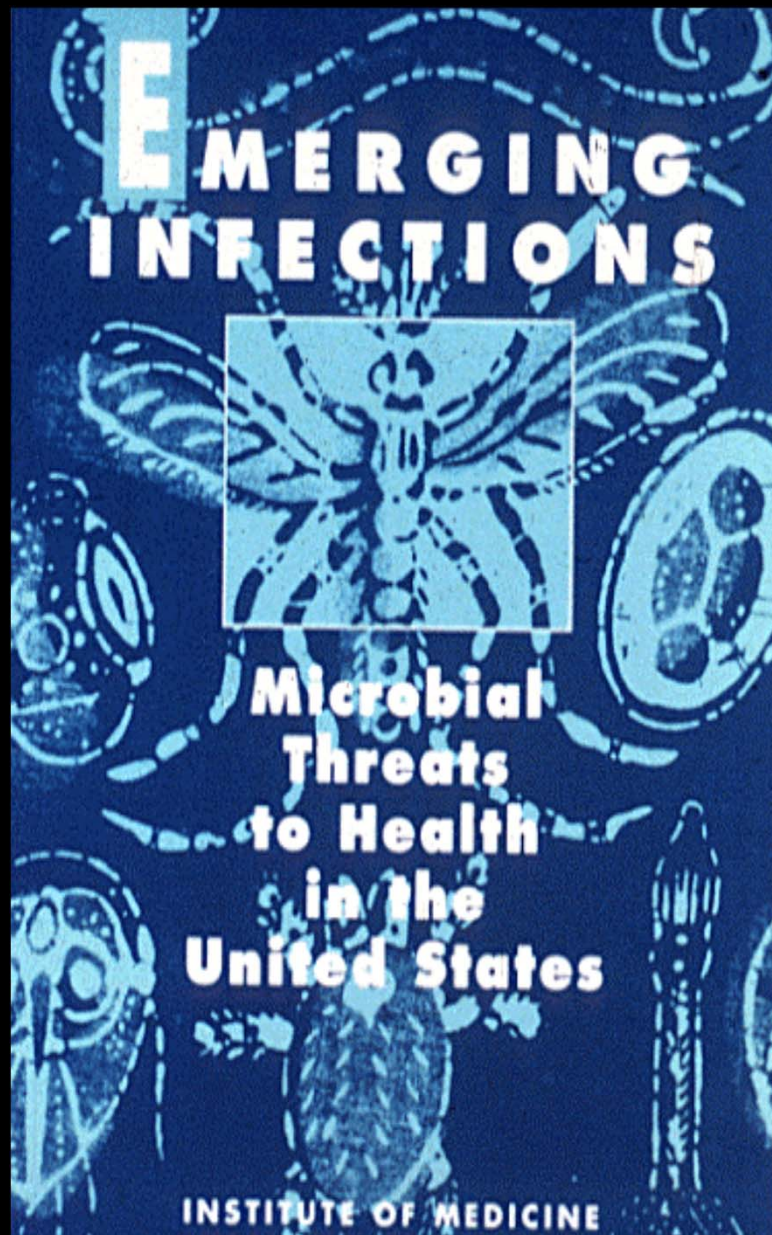
**Addressing Emerging Infectious Disease
Threats: A Prevention Strategy for the
United States CDC, 1994**

**Presidential Decision
Directive: NSTC 7, June
1996**

"I have determined that the national and international system of infectious disease surveillance, prevention, and response is inadequate to protect the health of United States citizens from emerging infectious diseases."



**President William J. Clinton
June 1996**



**Emerging Infections:
Microbial Threats to Health
in the U.S.
IOM, 1992**

*Microbial Threats to Health
IOM, 2003*



WHAT ARE EID?

Diseases caused by infectious agents, or possibly caused by infectious agents, whose incidence in humans has increased or threatens to increase. The infectious agents may be naturally occurring or intended to harm humans.

Institute of Medicine, 1992



WHY ARE EID IMPORTANT?

- The number of potential EID agents is great and largely unknown.
- The global factors that contribute to the emergence of a infectious agents are many, widespread and not expected to diminish.
- The EID threat continues and could increase.



ROLES FOR INDUSTRIAL HYGIENISTS IN THE CONTROL OF EIDs

- Agents intended to harm people.
- Health care & medical research facilities.
- The military environment.
 - Military training centers.
 - Military operations.



ROLES FOR INDUSTRIAL HYGIENISTS IN THE CONTROL OF EIDs

- Military training centers.
 - Pre 1970
 - Adenovirus & meningococcal vaccines
 - Loss of the adenovirus vaccines

- Return of adenovirus acute respiratory disease.
 - No vaccine
 - No specific drug therapy



ROLES FOR INDUSTRIAL HYGIENISTS IN THE CONTROL OF EIDs

- NOVARDIIs – Non-vaccine acute respiratory disease interventions.
 - HVAC design
 - Air filters

- Refugee evacuation by ship.



ROLES FOR INDUSTRIAL HYGIENISTS IN THE CONTROL OF EIDs

Consideration of infectious diseases in:

- Design & monitoring of all buildings.
- Design & monitoring of public carriers.
- Militarily unique situations
 - Training environments*
 - Operational environments*



Epidemic & Peace, 1918

by Alfred W. Crosby, 1976

America's Forgotten Epidemic

by Alfred W. Crosby, 2003

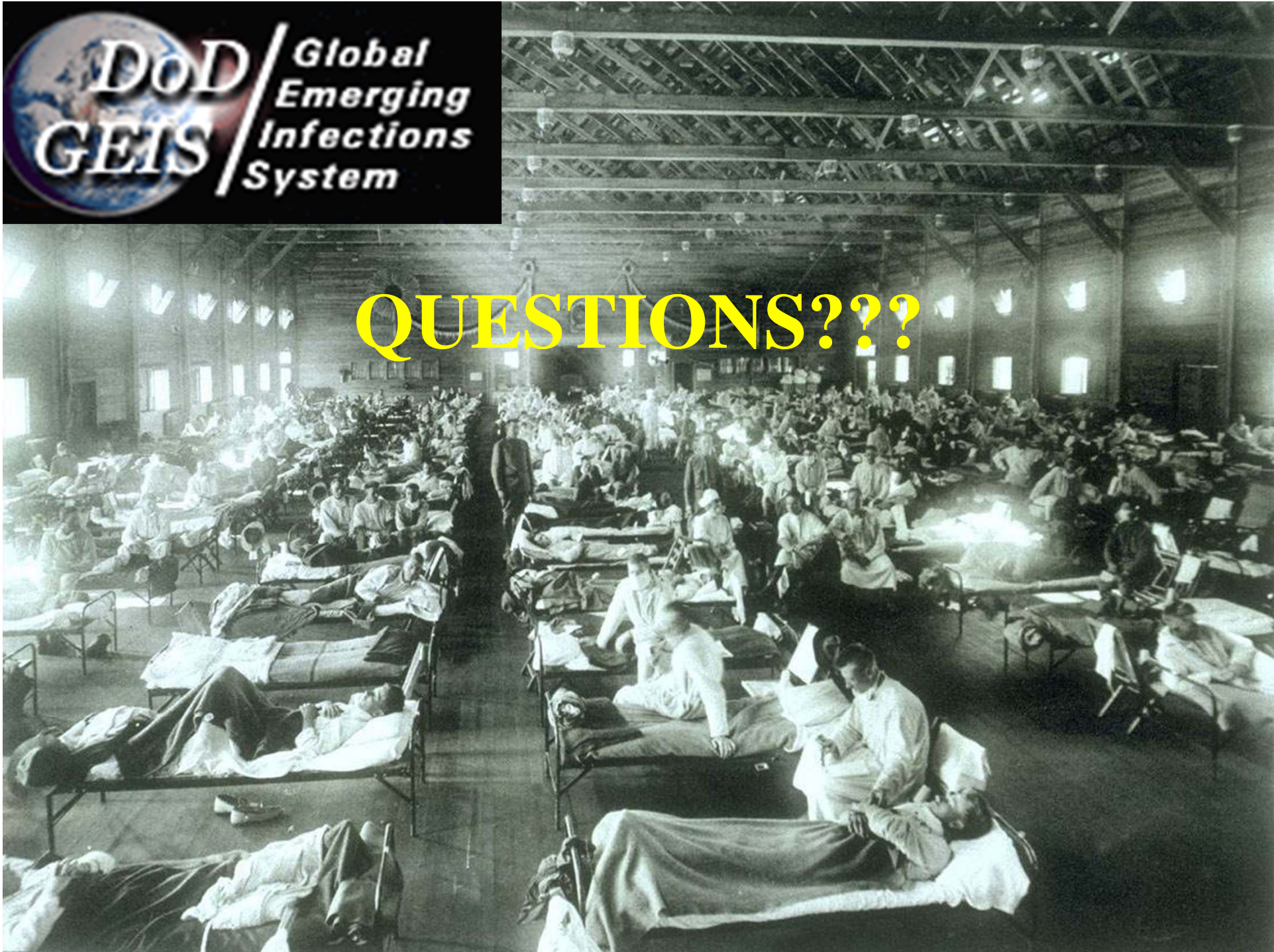
Flu

by Gina B. Kolata, 2001

Influenza 1918

PBS Home Video





QUESTIONS???