

LYON intro
March, 2005

As a global community, we are coming to recognize that we are beginning to face wholly unexpected, hitherto unrecognized challenges posed by infectious microbial agents. We can say with confidence that more can be expected and with greater frequency.

At the same time, the tidal wave of advances in biotechnology offer real hope for dealing with the world's most serious and intractable acute and infectious chronic diseases – tuberculosis, leprosy, HIV, gastric ulcers, some types of cancer and heart disease. With rapidly growing numbers of laboratories and trained scientists able to manipulate organisms as never before, we can readily foresee many new products – agents to effect miraculous cures and agents which many be used for malicious purposes.

During the early 1990s, I had the pleasure of serving the late Dr. Alan Bromley as Science Advisor to President Bush I. Bromley, a physicist and former Dean at Yale University, often expressed to me his conviction that the prior 50 years had been an era when physics was the preeminent science, opening up all manner of horizons for application – from space exploration to nuclear medicine to atomic weapons. He foresaw for the 21st century that biology would assume this preeminent role with all that implies both positively and negatively. And we are witnessing that reality today.

And yet, conferences such as this, which examine the challenges posed by biology in the 21st century have been few indeed. Why? In this brief introduction, I shall try to place this in a broader, historical perspective to remind you of the contextual framework for the discussions over the next two days.

International Cooperation to Confront New and Old Diseases

D.A. Henderson, MD, MPH

International Conference on Biosafety and Biorisks

Lyon, France
2 March 2005

Euphoria in the 20th Century

- "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

- What next should be eradicated?

"Conquest" of infectious disease in industrialized countries

- Dramatic changes post 1950
 - Vaccines
 - Antibiotics
 - Nutrition
 - Housing
 - Sanitation
- Decline or elimination of many diseases
 - Smallpox, diphtheria, whooping cough, tetanus, polio, measles, *et alia*

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 partial new inventory
 - SARS – from Asia
 - Monkeypox – from Africa
 - Anthrax – from ?
 - TSE – "mad cow" disease
 - H5N1 influenza – from Asia
- More than 30 new agents in 25 years

Origins of new microbes

- Sources of new and potential challenges
 - Natural mutation of microbes SARS
 - Emergence from remote areas monkeypox
 - Laboratory-produced plague, anthrax
 - Deliberate release anthrax
- Threats can arise in any country and can threaten nations across the world

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
 - More than 1 billion air passengers
 - Remote area destinations
 - All cities less than 36 hours from all 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 – Feed lots, processing

Intentional release of Bioagents

- A threat, largely ignored until 1995
 - Too difficult to grow organisms
 - Technologically difficult to disseminate
 - Not used because of a moral barrier

What has changed?

- Advances in biotechnology
 - Knowledge base
 - Numbers of laboratories
 - Numbers of trained microbiologists
 - Information access – e.g. internet
 - Aerosolization devices
- Growth of independent terrorist groups

James Schrieber, PhD - 2/1/04

1992 BW Comments

Watershed developments

- 1995 - Aum Shinrikyo (Japan) releases sarin gas, anthrax and botulinum toxin
- 1995 - Iraq official papers reveal a bioweapons program since 1980s
- 1992 - President Yeltsin acknowledges Soviet biological weapons 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."

Alibek, 1998

Former Vice Minister of Health Burgasov acknowledges that open air trials using aerosols of smallpox virus were conducted on Voz Island in 1971

The Agenda for the Future

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

- "No responsible assessment of microbial threats to health in the 21st century could end without a call to action. The magnitude and urgency of the problem demand renewed concern and commitment. We have not done enough - in our own defense or in the defense of others."

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

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

Joshua Lederberg

There is much to discuss.
There are important actions to be taken.
Solutions are needed.
The hour is late.