

COLUMBIA UNIVERSITY

IN THE CITY OF NEW YORK

DEPARTMENT OF HISTORY

February 7, 2011

Donald A. Henderson
Professor Emeritus
Johns Hopkins Bloomberg School of Public Health
Department of Health Policy and Management
Pier IV Building, Suite 210
621 East Pratt Street
Baltimore, MD 21202

Dear Dr. Henderson:

I wanted to thank you again for agreeing to participate in our lecture series this summer on the history and future of pandemic threats and global public health. We have enclosed the promotional poster for the program.

As you know, The Hertog Global Strategy Initiative brings a select group of undergraduate and graduate students to New York each summer for an intensive program of collaborative research. The program begins with a two-week seminar course that hones students' research skills and tests their knowledge. Students then complete eight-week independent and collaborative research projects and reconvene in August to present their findings and participate in group exercises.

We are hoping you will encourage bright and ambitious students to apply. We believe that the program will provide a unique experience for students to learn how historical analysis can contribute to contemporary policy debates and global public health programs, and will develop new connections between scholars and policymakers. The application deadline is March 1.

Students can find additional information at <http://globalstrategy.columbia.edu> or by contacting Sydney Schwartz Gross, executive director of the Hertog Global Strategy Initiative, at globalstrategy@columbia.edu or 212-851-5916.

Please don't hesitate to contact me or Sydney if you have any additional questions. Thank you in advance for your help. I look forward to seeing you this summer.

Best,



Matthew Connelly
Professor of History

global public health & pandemic threats

potential of
Steve Morse - now organizing an effort
? Threat of histeracine ~ 1998

Smallpox: death of a disease

.... birth of a new era

D.A. Henderson, MD, MPH

Johns Hopkins University Distinguished Service Professor
Professor of Medicine and Public Health, U. of Pittsburgh

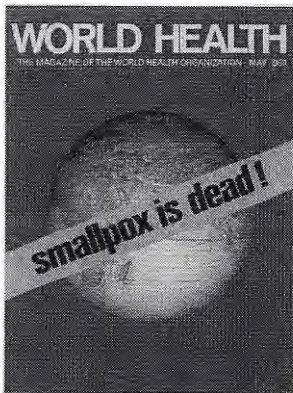
Columbia U.--Hertog Global Strategy Initiative
June 23, 2011

World Health Assembly --1980

- Declares solemnly that the world and all its peoples have won freedom from smallpox
- Smallpox vaccination should be discontinued in every country

» Thirtythird World Health Assembly, 8 May 1980

Center for Biosecurity



- "Smallpox, mankind's most feared and devastating infection (has) frequently changed the course of history itself!"

Lasker Foundation Award

- "This may well have been the greatest lifesaving achievement in the history of medicine"

Richard Preston, author

- "The campaign is a testament to the difference the global health community can make when it truly comes together for a common purpose"

Secretary of HHS Thompson

Center for Biosecurity

A challenge through the ages

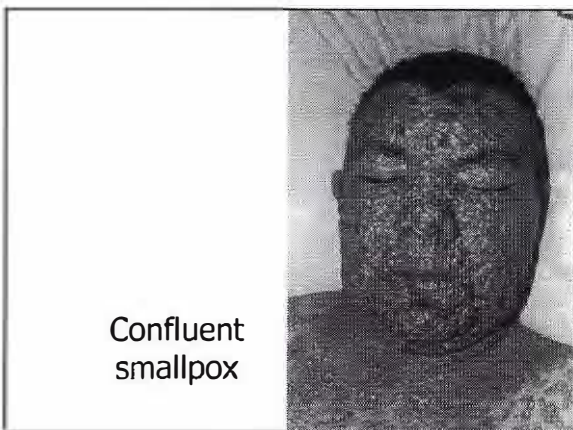
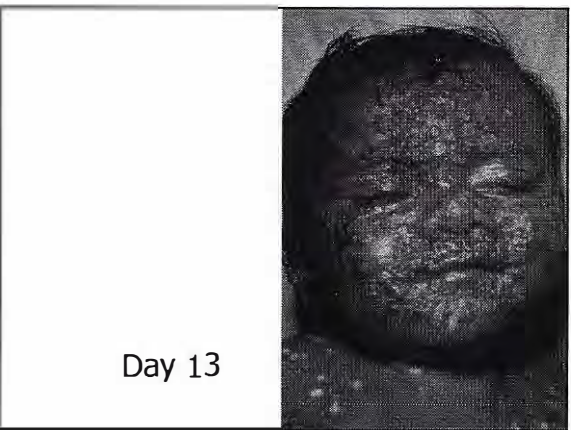
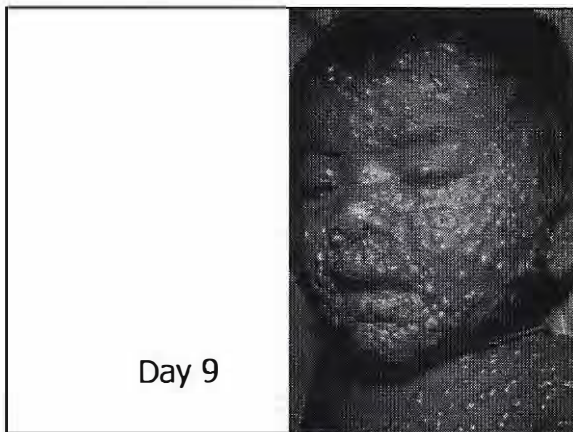
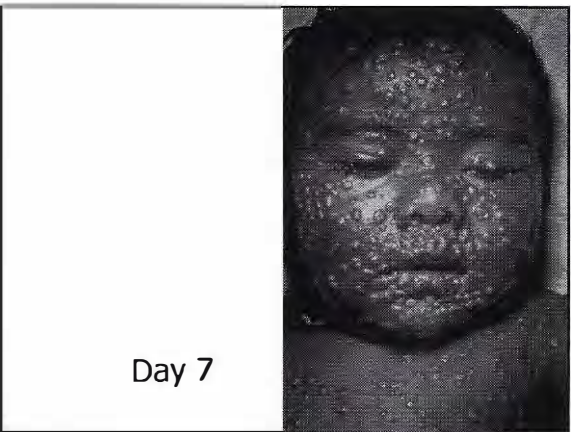
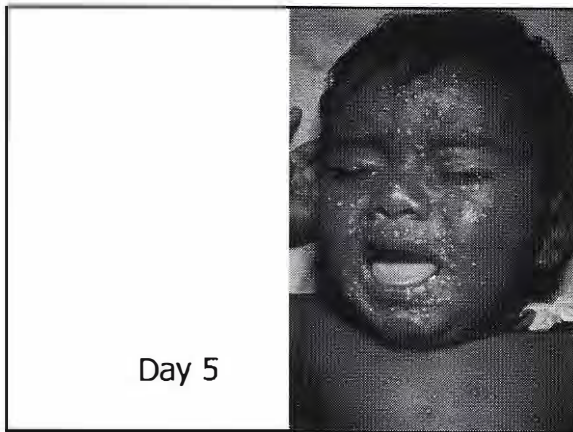
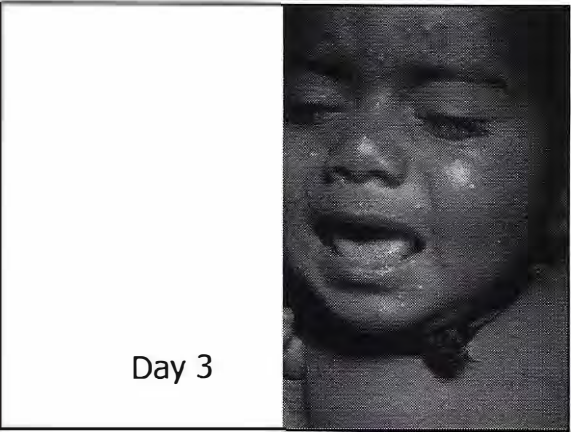
- Smallpox antedates the era of the Pharaohs
One of the greatest of pestilences throughout history
- Sole disease represented by deities in Asia and Africa
- Primary factor in the European settlement of the Americas
- A contemporary concern - 1967
> 10,000,000 cases
2,000,000 deaths
Reported from 43 countries
US required school-entry vaccination until 1972

Center for Biosecurity

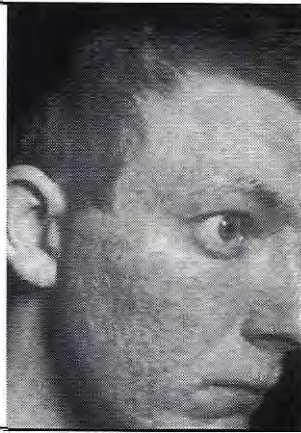
Smallpox, the disease

- Virus - face-to-face spread only during rash
- Man is the only host - no animal reservoir
Chain of infection going back more than 3500 years
- Death rate was 30%
- But permanent immunity among survivors
- A heat stable vaccine protects with one dose

Center for Biosecurity



Confluent
smallpox
(recovered)



Global eradication efforts

• Hookworm	1909-23	14 years
• Yellow fever	1915-32	17 years
• Yaws	1948-66	18 years
• Malaria	1955-73	18 years
• Smallpox	1967-80	14 years
• <i>G. worm infection</i>	1986- ?	24 years +
• <i>Poliomyelitis</i>	1988- ?	22 years +

Center for Biosecurity

Global smallpox eradication

- 1959 World Health Assembly adopts USSR proposal for a global program
- 1959 -1966
 - Strategy: mass vaccination (few complied)
 - Budget of <\$100,000 per year
 - Five staff members

Center for Biosecurity

The WHO Eradication Program

Assembly requires DG to submit a plan --1966

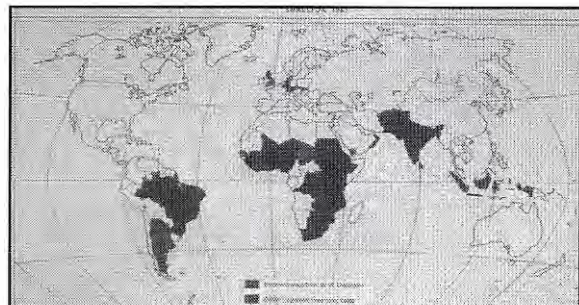
- Strategy
 - Vaccinate 80% of population
 - Surveillance and containment
- 10 year program: WHO budget ≈\$ 2.4 million/year
- Objections by delegates
 - Not feasible
 - Demand for no further increases in WHO budget
- 58 votes for acceptance; 60 voted for approval

Center for Biosecurity

Program leadership

- Director General believes program will fail (malaria eradication program collapsing)
- Demands an American serve as Director
 - The candidate declines:
 - Limited resources – <\$50,000 each for 50 countries
 - Not enough even to buy the vaccine required
 - Headquarters staff of 10 (including 3 secretaries)
 - Coordination -- 6 WHO Regional Offices and >100 Sovereign Countries

Center for Biosecurity



- = Endemic countries
- = Others with cases

Smallpox 1967

Vaccine Supply

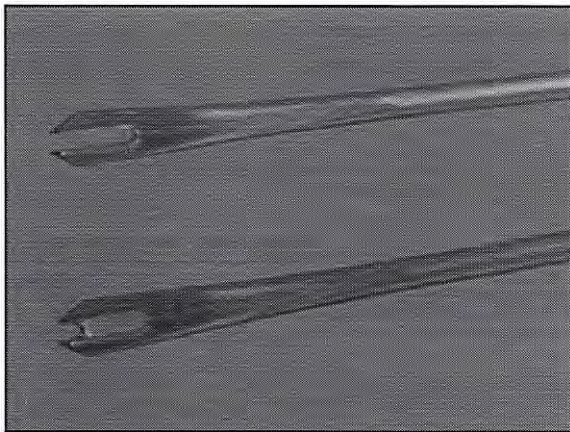
- Heat-stable, potent vaccine is essential
 - Quality control of vaccine – 10% satisfactory
 - No country to receive WHO assistance unless vaccine meets international standards
 - 42 labs producing vaccine
 - Independent international quality control
 - Labs in Netherlands and Canada
 - Development of national capacity

Center for Biosecurity

Vaccination

- Target for coverage – 80%
 - Vaccination teams and evaluation teams
- Research to find faster, better methods
 - Jet Injector gun
 - Bifurcated needle – multiple puncture method
 - One-fourth as much vaccine required
 - Training time – 15 minutes
 - Easily sterilized and reused
 - Cost – \$5 per thousand

Center for Biosecurity



Surveillance-containment strategy

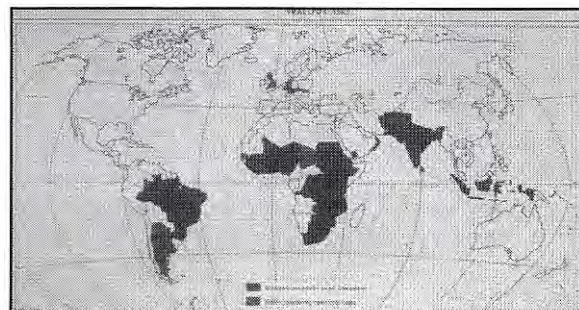
- Operational plan
 - Surveillance – weekly report from every health unit from beginning of program
 - Teams – to investigate and contain outbreaks
 - Epidemiological field research
 - The textbooks prove to be wrong
 - “Smallpox spreads like a prairie fire”
 - “Revaccination is needed every 3 to 5 years”
 - “Women in purdah can't be vaccinated”

Center for Biosecurity

Operational principles

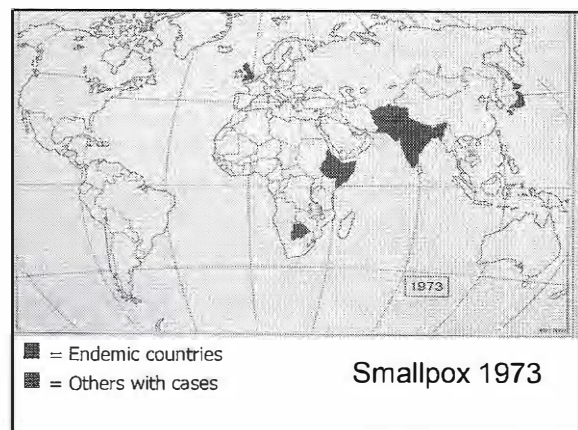
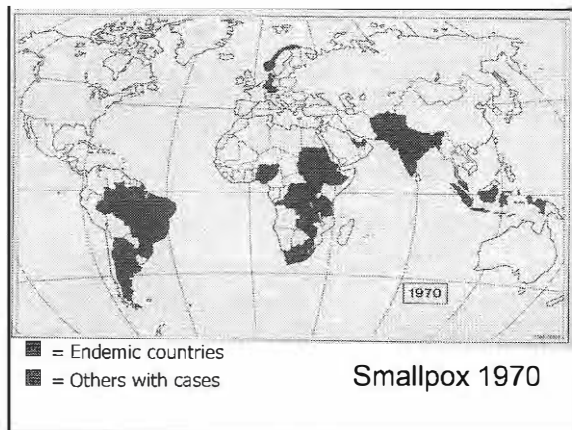
- Management
 - Adapt program to the country
 - All staff to be in the field – at least 1/3 time
 - Communicate regularly and frequently
 - Recruit for motivation and basic intelligence
- Accept “red tape” as inevitable but recognize:
 - It is sometimes better to act first and inform later
 - Exceptions to rules are always necessary

Center for Biosecurity



- = Endemic countries
- = Others with cases

Smallpox 1967



India -- the pivotal challenge
1973-75

- India - the "home of smallpox"?
 - Population - 550,000,000
 - Surveillance-containment strategy--not working
 - June 1973 - search every village > every house
 - 130,000 health staff in 10 days
 - Results of first search in October
 - Spring 1974 - the darkest days
 - Petrol crisis + strikes by airlines, railway, health staff
 - India explodes a nuclear device
 - Containment methods tightened

Center for Biosecurity



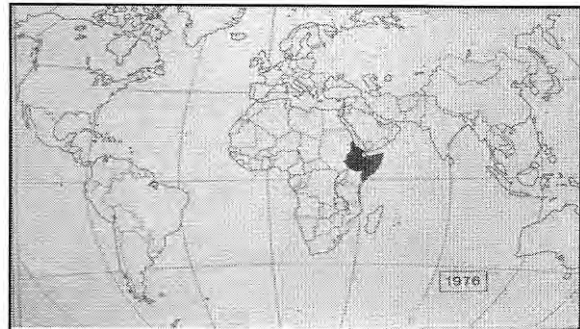
Indian Independence Day

August 15, 1975

Prime Minister Indira Ghandi

- Salutes India on its 28th Anniversary of Freedom
- Announces India's freedom from smallpox for the first time in its written history

Center for Biosecurity



■ = Endemic countries
■ = Others with cases

Smallpox 1976

The last strongholds

Ethiopia and Somalia

- Ethiopia
 - Country – twice the size of Texas
 - Largely highland – over 5000 feet
 - Health facilities for 5% of 30 million people
 - Travel largely by donkey and on foot
 - Emperor is assassinated; Marxist take-over
 - No foreign staff outside of Addis except smallpox teams
- Civil war, floods, famine, kidnapping, hostages
- Somalia – the final chapter

Center for Biosecurity



Ali Maalin - 26 October, 1977

The legacy – launch of the Vaccine Era

- The genesis
 - African vaccinators average 500/persons/day with cooperative village leadership
 - One year = 400,000 vaccinations/4 person team
 - Smallpox – the only nation-wide vaccine program in developing countries in 1967
 - Smallpox unit convenes international meeting to expand the goals - 1970

Center for Biosecurity

Expanded Program on Immunization- 1974

- A global program for vaccination for all children --smallpox, measles, DPT, polio
- Surveillance of vaccine-preventable diseases
- UNICEF and Rotary make this a high priority
- Target: 1990 – 80% coverage

Center for Biosecurity

Vaccine coverage (%) -- Americas

	1980	1990	2000	2008
DTP*	50	74	91	92
Measles	51	80	92	93
Polio*	57	75	90	92
HepatitisB*	—	—	70	88
H. influenzae*	—	—	75	90

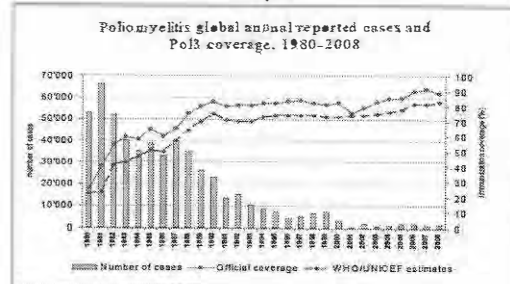
* 3 Doses

Transmission interrupted:

Polio (1991); Measles (2002); Rubella (2008)

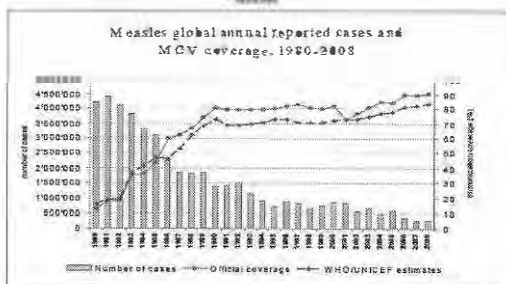
Center for Biosecurity

Polio



Center for Biosecurity

Measles



Center for Biosecurity

Important lessons learned

- Vaccines – the best cost-benefit medical intervention (World Bank study)
- Key management components–
 - Current disease reports were essential for strategy
 - Delegation of responsibility, flexibility, and meetings with field staff and village elders were invaluable
 - Reports were necessary but there is no substitute for on-site visits
- With a common goal – political differences disappear

U.S.-Soviet cooperation throughout Cold War

Center for Biosecurity

Coda

- From *Smallpox: death of a Disease*:

"We are only beginning to realize the potential of public health...It is a field begging for fresh, resourceful ideas and a new generation of professionals who are not constrained by 'knowing' what can't be done. So it was with so many who contributed so much to making smallpox eradication a possibility."

Center for Biosecurity

