

Statu - May 2010 - 30 yr
P&T, Lorus

Smallpox: Death of a Disease

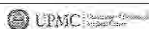
An ancient scourge -- an historic victory

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Oberlin College—23 September 2010

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Outline

- Smallpox – the disease
- Eradication -- the concept
- Targeting smallpox - 1950-66
- From 10 million to 0 – 1967-80
- The legacy

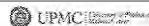
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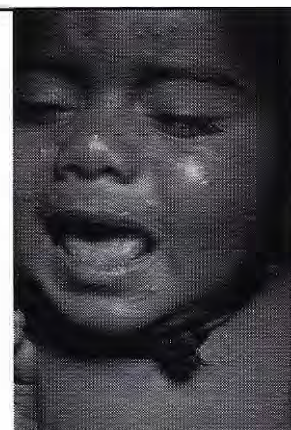
Smallpox, the disease

- Virus – spread only during rash; face-to-face
- Man is the only host
 - Chain of infection extending back 3500+ years
 - Only disease with deities in Asia and Africa
- Death rate = 30%
 - But permanent immunity among survivors
- A highly stable vaccine protects with one dose

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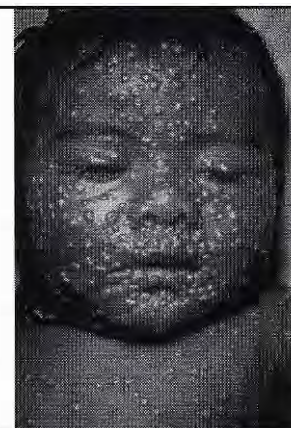
Day 3

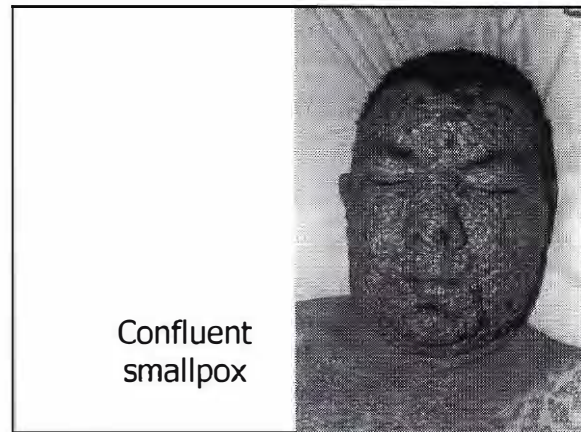


Day 5



Day 7

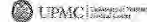




Global eradication programs		
• Hookworm	1909-23	14 years
• Yellow fever	1915-32	17 years
• Yaws	1948-66	18 years
• Malaria	1955-73	18 years

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Smallpox Eradication
World Health Assembly--decides
• A USSR proposal -- 1959
• Assembly requests action -- Director General to submit a plan
• 10 year plan presented -- 1966 Objections by delegates Not feasible Demand for no further increases in WHO budget
• 58 votes for approval; 60 voted "yes"

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Program leadership

- Director General believes program will fail (malaria eradication collapsing)
- Demands an American serve as Director
 - The candidate declines:
 - Responsibilities for new CDC African program
 - Limited resources - <\$50,000 each for 50 countries
 - Not enough even to buy the vaccine required

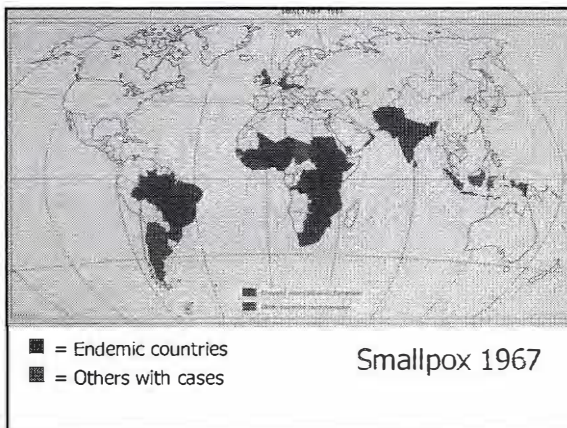
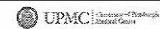
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The Challenge

- Status of smallpox – 1967
 - >10,000,000 cases
 - 2,000,000 deaths
 - 43 countries reported cases
- Program staff
 - Headquarters – 4 medical, 2 admin, 3 secretaries
 - Regions – one each in 4 WHO Regions
 - International staff – never more than 150

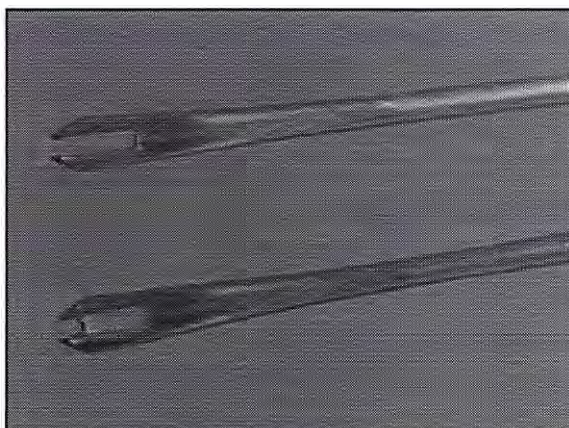
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Vaccine and vaccination

- Vaccine production – 200 million doses/yr
- Research to find faster, better methods
 - Jet injector gun
 - Bifurcated needle for multiple puncture
 - One vaccine vial vaccinates 100 instead of 25
 - Technique easy to teach
 - Needles are easily sterilized and reusable
 - Cost -- \$5 per thousand
- Quality control of vaccination

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Surveillance-containment strategy

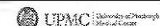
- Surveillance-containment
 - Surveillance – weekly report from every health unit
 - Teams – to investigate and contain outbreaks

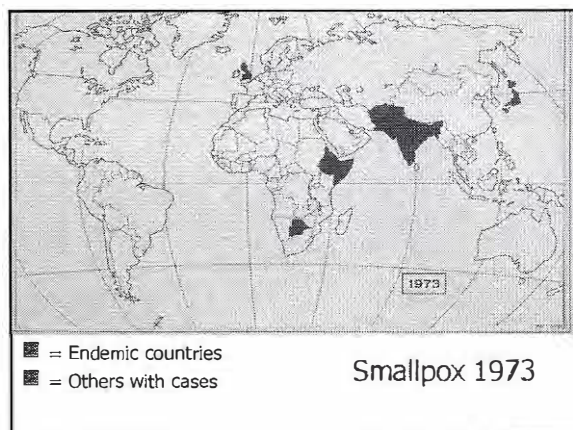
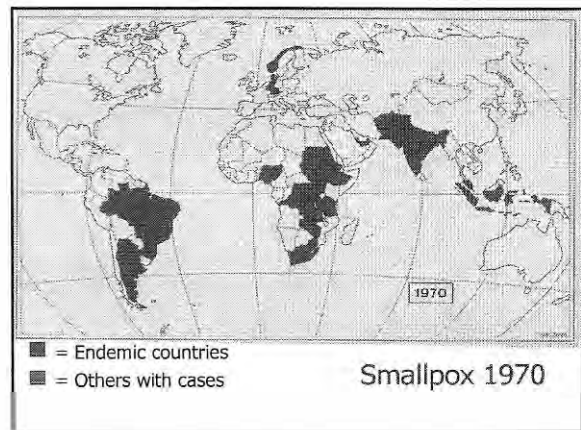
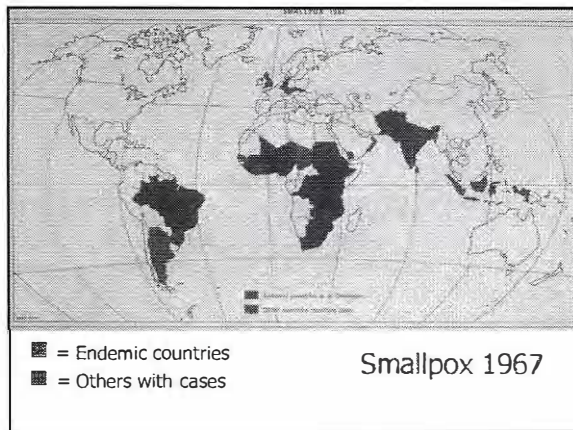
Epidemiological research on smallpox

The textbooks prove to be wrong

- "Smallpox spreads like a prairie fire"
- "Revaccination is needed every 3 to 5 years"
- "Smallpox virus is very stable in nature"

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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 – October
 - Spring 1974 – the darkest days
 - Gas crisis + strikes by airlines, railway, health staff
 - India explodes a nuclear device

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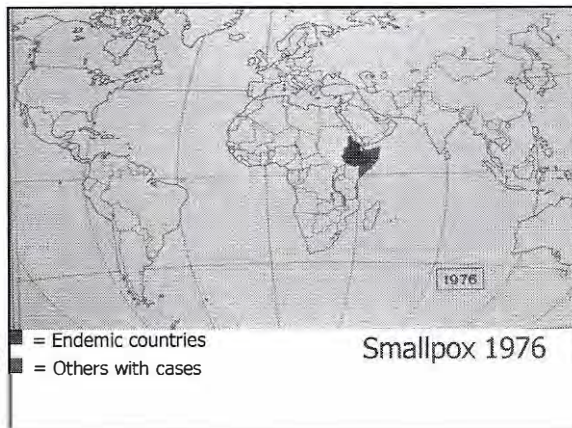
Indian Independence Day August 15, 1975

Prime Minister Indira Gandhi

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

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The last strongholds

Ethiopia and Somalia

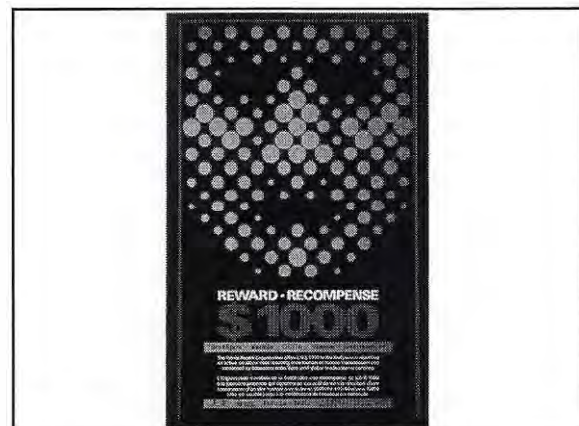
- Ethiopia
 - Country – twice the size of Texas
 - Largely highland – over 5000 feet
 - Health facilities serve 5% of 30 million people
 - Travel largely by donkey and on foot
- Emperor is assassinated; Marxist take-over
 - No foreign staff outside of Addis except smallpox
 - Teams kidnapped
 - Helicopter held for ransom
- Somalia – the final chapter

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Ali Maalin - 26 October, 1977

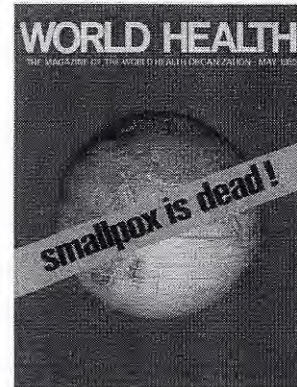
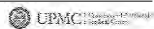


World Health Assembly --1980

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

• *Thirty-third World Health Assembly, 8 May 1980*

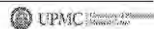
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The Smallpox legacy – expanded horizons

- Expanded Program on Immunization - 1974
A global program to vaccinate all children vs. smallpox, measles, DPT, polio
Surveillance of vaccine-preventable diseases
Target: 1990 – 80% coverage: achieved
- Eradication -- Americas
 - Polio -- 1991
 - Measles – 1996
 - German measles – 2008
- The dawn of the vaccine era

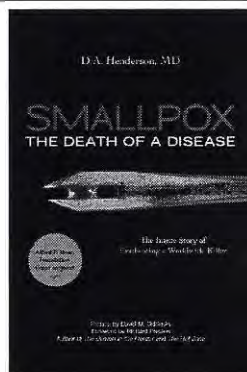
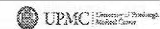
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- We are only beginning to realize the potential of public health. It is a field begging for fresh, resourceful ideas and a new generation of professionals who are not constrained by "knowing" what can't be done. So it was with those who made smallpox eradication a reality. It is their stories and mine which are the heart of the book, *Death of a Disease*

Published: June 2009, Prometheus books

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