

Smallpox—The Disease & Vaccine

A “Guide to Issues” for CCE Educators

<<http://environmentalrisk.cornell.edu/C&ER/Smallpox>>

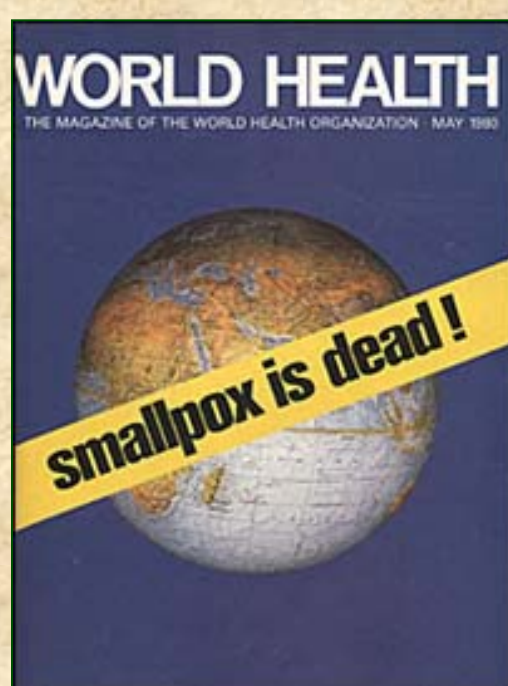
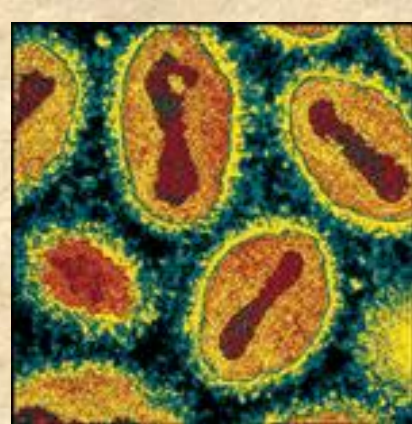


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The Disease

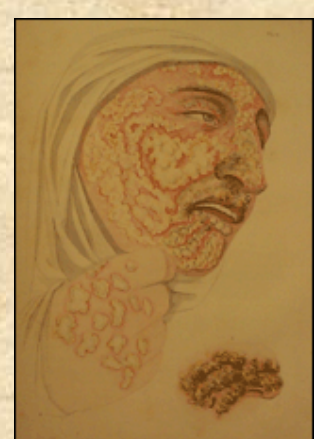
The Organism: Variola Pox Virus

- Large, brick-shaped, about size of small bacteria



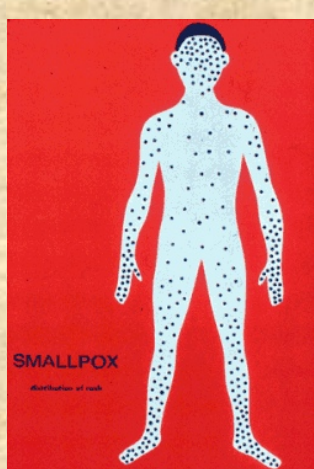
Since 1979, when a worldwide campaign succeeded in eradicating the pox, there have been no natural cases of smallpox. In recent decades children have not been vaccinated against smallpox and the immunity of adults vaccinated as children has likely worn off.

Disease Symptoms



Day 10

- Incubation: 1-2+ weeks. No symptoms. Not infective
- Pre-Eruption (days 1-3): flu-like symptoms
- Lesions, Papules, Pustules (days 4-10): increasingly infective via aerosol
- Scabbing, Crusting (days 11-14): somewhat infective until all scabs gone



However, because of its potential as a weapon of bioterrorism, smallpox has again become a topic of government and media interest and—for some—a public concern.

An abundance of social and health-related issues are raised by threat of the disease and also by risks associated with its vaccine.

The Environmental Risk Analysis Program is developing a web-based guide to help Extension Educators navigate through these potentially confusing and controversial issues.

Disease Outcomes



- Patient dead or recovered w/in month
- Historically killed 3-4 million per year
- Children & elderly most susceptible (10% of those born, died)
- Mortality rate nearly 30%
- Most survivors scarred (~ 75%), many blind

The Vaccine

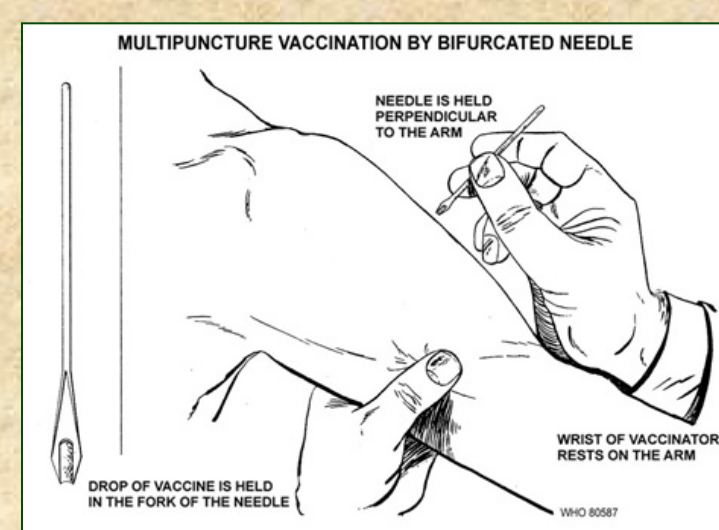
- Dr. Edward Jenner in 1796 discovered benefits of injecting people with Vaccinia virus (cowpox) as protection against smallpox
- Live vaccine—derived from fluid scraped from sores on skin of infected calves—poses its own risk of illness and contagion



Smallpox Vaccine

Experimental Design:
James Phipps, 8-year-old son of Jenner's gardener, was inoculated with cowpox, given 8 weeks to develop antibodies for resistance, & then exposed to smallpox. Success! — No infection!

Civil liberties? Medical ethics?



Community responsibility:
Vaccines among top 10 public health achievements of 20th century (CDC)

The Weapon

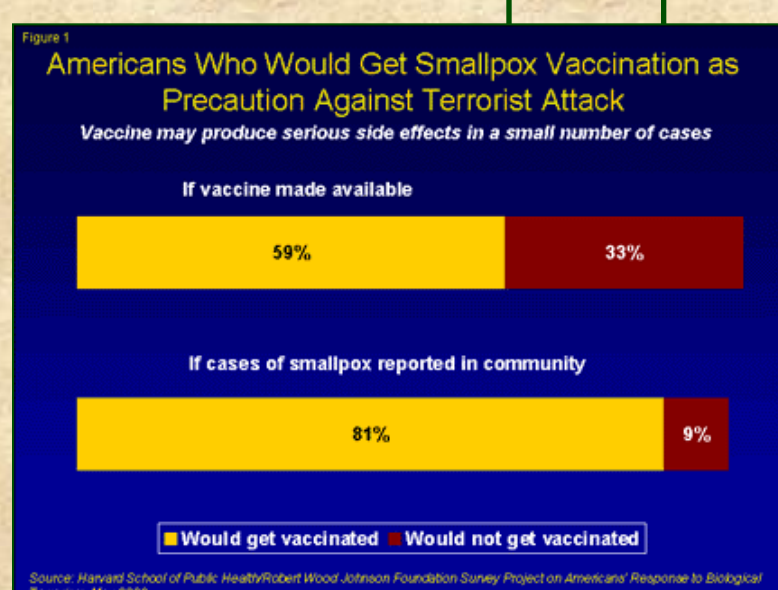
- Current attention to smallpox primarily because of threat of use in germ warfare
- Risk difficult to assess because uncertainty is huge



BioTerrorism

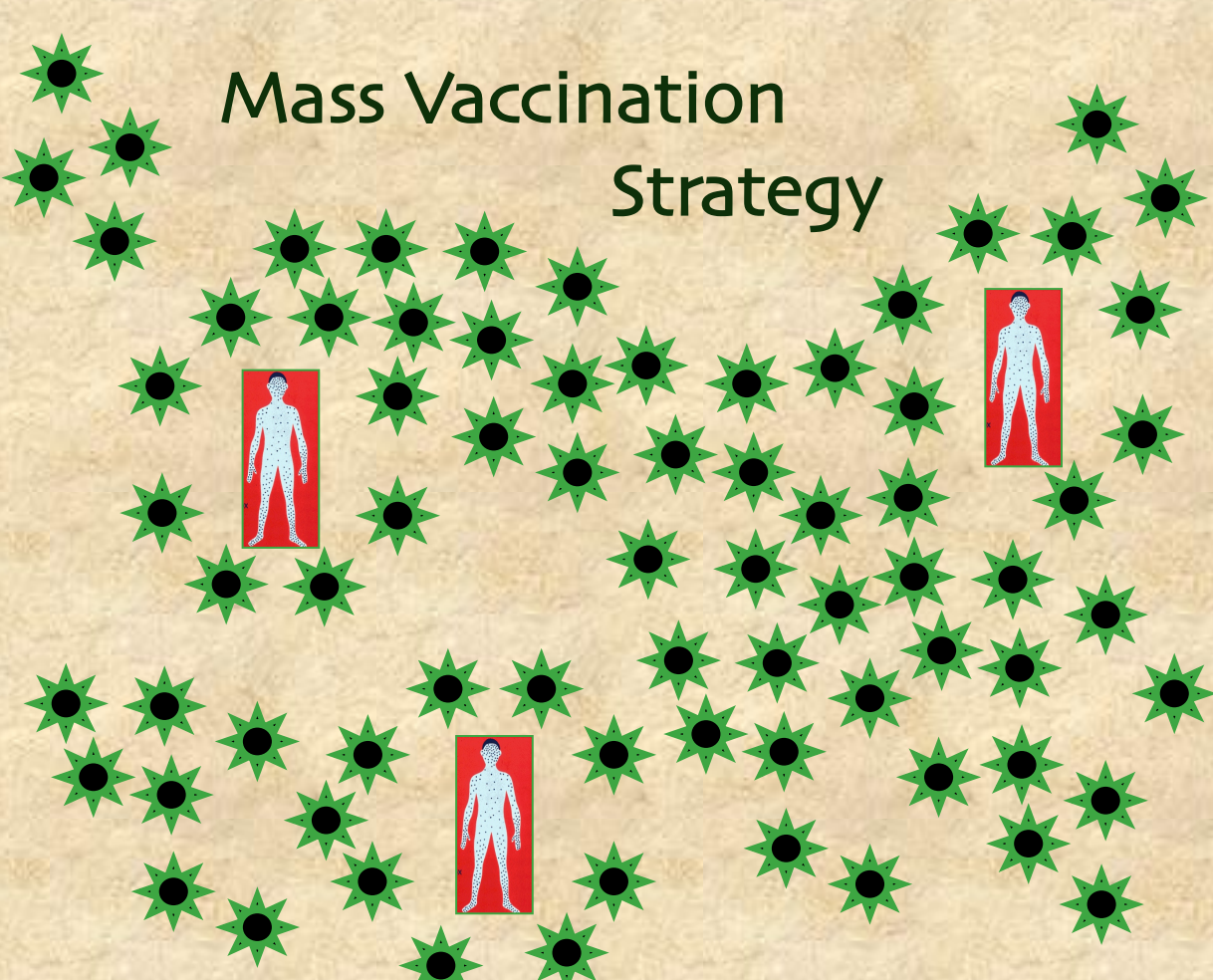
- US public does not trust any single spokesperson re: bioterrorism
- Nearly 3 in 10 African Americans believe there would be discrimination in treatment during an outbreak

(Source: Harvard Public Health NOW, June 2002)



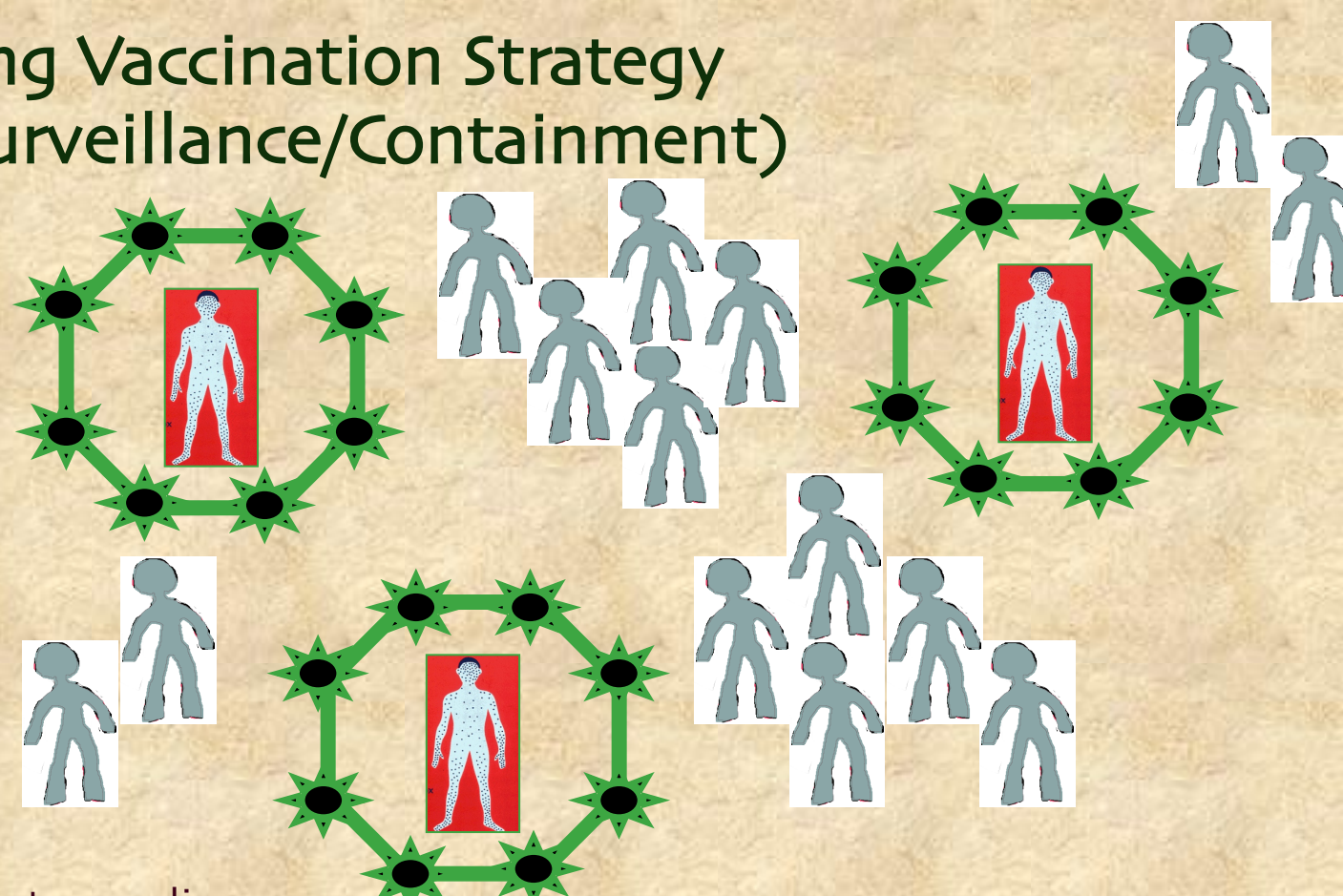
Vaccination Strategies

Mass Vaccination Strategy



As a precaution, vaccinate 80-100%, without distinguishing between those who have (or are likely to be) exposed & others.

Ring Vaccination Strategy (Surveillance/Containment)



This strategy relies on:

- surveillance to identify everyone with smallpox (who informs?),
- cooperation of the infected to identify all of their contacts who may have been exposed
- cooperation of the exposed to be vaccinated & remain under surveillance/possible quarantine,
- cooperation in maintaining segregation between exposed & unexposed individuals who have not been vaccinated,
- support of community to support livelihoods and well-being of those under quarantine.