

sease

much more
diff. into the
many aspects

CP
Professor

ompment

8/18/08
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Novartis Foundation For Sustainable Development
29 November 2013

- Man -- the only host
- Virus spreads -- only during rash
Face-to-face contact
- Permanent immunity after recovery
- Transmission stops in remote areas
- Durable protection with one vaccination

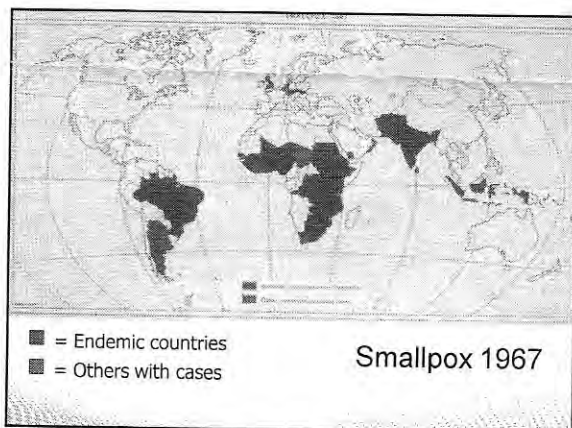
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*Hookworm	Treatment	1909-22	13
*Yellow Fever	Vector control	1915-32	17
*Yaws	Penicillin	1948-66	18
*Malaria	DDT	1955-73	18
Smallpox	Vaccine	1957-80	13
Guinea Worm	Water: Rx	1986-	27+
Poliomyelitis	Vaccine	1988-	25+
*Failed			

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- Global status of smallpox -- 1967
 - >10,000,000 cases
 - 2,000,000 deaths
 - 43 countries reported cases
- World Health Organization program
 - Budget -- \$2.4 million per year
 - Voluntary donations; national budgets
 - Headquarters staff of 10 persons
 - 4 independent WHO Regional Offices with smallpox

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- Vaccination of 80%
- Surveillance-containment
 - Report every week from each health center
 - Team to investigate and do "ring vaccination"
 - National reports of progress (at least monthly)
- Research
 - Improved vaccines, diagnostics, immunity
 - Epidemiology of smallpox in countries

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Important operational realities

- National programs
 - Designated director and WHO adviser
 - Flexible plan adapted locally and evolving
 - Involvement of community personnel
- WHO staff recruitment
 - Emphasis on motivation, youth, intelligence
 - Expectation for all staff: $> \frac{1}{2}$ of time in the field
- Communication between HQ and national program
 - Mail, travel – no internet, FAX, telephone

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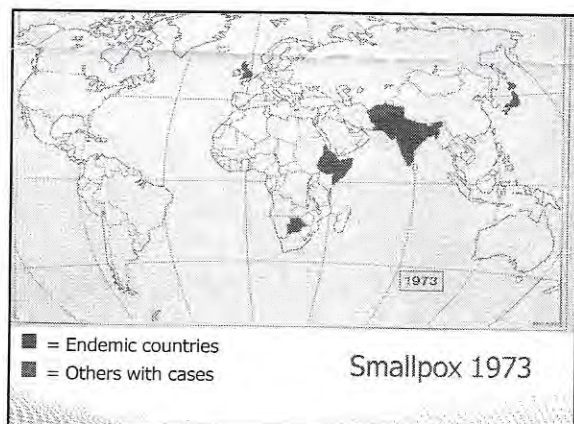
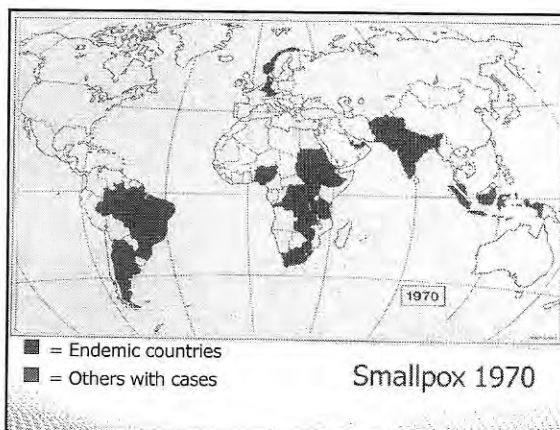
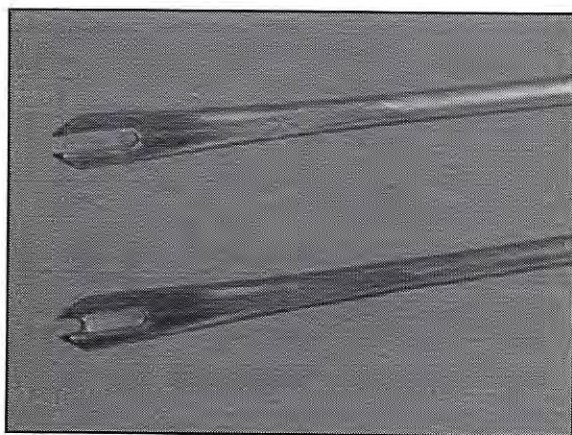
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Key implements – vaccine and needles

- Vaccine – 300 million doses per year
 - Heat stable for >30 days at 37°C ; fully potent
 - International quality control
- Needles – a new instrument for vaccination
 - Bifurcated needles
 - One-fourth as much vaccine needed
 - Training time – 15 minutes
 - Successful takes $\sim >95\%$

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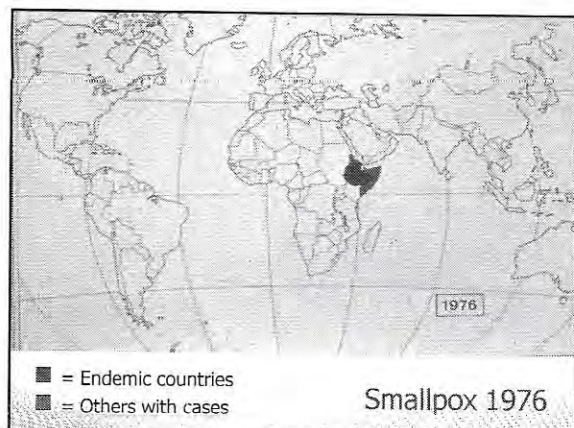


A new strategy – June 1973

- Search every village in India in 10 days
140,000 health staff
Containment teams to go to every outbreak
By the third round, every house was being visited
- Catastrophic problems Jan. to May 1974
 - Gasoline crisis
 - Railroads, airlines, health workers on strike
 - Worst floods in three decades
 - India detonates an atomic weapon – May 1974

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The last strongholds Ethiopia and Somalia

- **Ethiopia:**
 - Area: Germany, Switzerland, France combined, mostly over 5000 feet
 - Health facilities reached 5% of 30 million people
 - Travel largely by mule and on foot
- Scenario
 - Emperor is assassinated; Marxist take-over
 - No foreign staff allowed out of Addis
 - Civil war, floods, famine, kidnapping, hostages
- **Somalia: the final chapter**

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"Eradication"

- the smallpox program legacy?

- 1980 Conference – "What next do we eradicate?"
 - For smallpox, there were many favorable factors
 - Most universally feared of all diseases
 - One dose, inexpensive, heat-stable vaccine
 - Vaccine is easy to administer
 - Laboratory confirmation unnecessary
 - No carrier state; no silent infections
- 4 crises (1975-77) which might have blocked the effort
 - Civil wars in Bangladesh and Ethiopia
 - Somali refusal to cooperate; risk of Hajj pilgrimage

Antigone factor

Disease "elimination" -- a feasible goal

- The Expanded Program of Immunization
 - Begun in 1974 and now world-wide
 - Elimination in the Western Hemisphere
 - Polio – 1991; Measles – 2002; Rubella – 2009
- Penalty of a failed eradication campaign
 - In 1966, smallpox eradication decision
 - Passed in the WHAssembly by only two votes
 - Principal reason-- collapsing malaria eradication

From 1980: Keynote at Seminar on "What do we eradicate next?"
No disease now warrants a time-limited eradication commitment

