The Sixteenth Annual Conference

ABSTRACTS OF INVITED PRESENTATIONS

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Eradication of Disease through Vaccination: The 35th Anniversary of the Last Case of Smallpox

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Objective: Understand the factors that were responsible for the eradication of smallpox and the relevance of the most salient, current, and contemplated initiatives for the eradication of other infectious diseases.

Abstract: In January 1967, the World Health Organization (WHO) with its member countries commenced a 10 year program of global smallpox eradication intended to interrupt transmission of the virus by December 31, 1976. It missed that target, but only by 10 months and 26 days. However, a year later, two additional cases occurred, in September 1978, in Birmingham, England, as a result of a laboratory mishap. No other cases have subsequently been identified. Thus, this year, the world celebrates the 35th year without a smallpox case.
The program of smallpox eradication was launched under less than auspicious conditions. WHO's only eradication program-for malaria-was in its 13th year but it was foundering. A proposal to undertake smallpox eradication was opposed by many delegates and by the Director General on the grounds that the concept of disease eradication was not tenable and the costs were too great. Some five years later, malaria eradication was 'ropped as a goal.

Meanwhile, as smallpox eradication was being certified, many former smallpox staff, both national and international, began or joined national "Expanded Programs of Immunization" which had been launched during the course of the smallpox eradication program. The vaccines initially included measles and polio, along with DTP (diphtheria, tetanus, pertussis). Gradually, other vaccines were selectively added; in some countries numbering ten or more. Meanwhile, a belief in eradication as a feasible public health program objective lay dormant for nearly a decade until, in 1986, WHO embarked upon a Guinea worm disease eradication program and, in 1988, a polio eradication program. They were targeted to accomplish their objectives by 2000. Both have made extraordinary progress but both are struggling with endemic foci in areas locked in civil conflict. Efforts to launch a global measles eradication effort have been endorsed and successful in two WHO regions but have yet to be accepted elsewhere, including Europe. Meanwhile, eradication enthusiasts with a special interest in a particular disease have been emerging with increasing frequency. Individual programs are now identified that are intended to eradicate trachoma, leprosy, lymphatic filariasis, and sleeping sickness (African trypanosomiasis). Several of these, in theory, could perhaps be eradicated, as could measles, but there is a substantial gap between theories of the possible and the practical realities of execution, as those engaged in the polio and Guinea worm eradication programs will testify. The virtues of launching a special eradication campaign, with the attendant publicity and pleas for funds, need to be weighed against possible repercussions of credibility and disillusionment associated with failure – as malariologists will agree.

References:

1. Fenner F, Henderson DA, Arita I, et al. Lessons and Benefits, Chapter 31 in *Smallpox and its Eradication.* Geneva: World Health Organization, 1988. p.1345-1370. Available: https://extranet.who.int/iris/restricted/bitstream/10665/39485/1/9241561106.pdf. Accessed March 6, 2013.
2. Maurice J. New WHO plan targets the demise of sleeping sickness. Lancet. 2013 Jan 5; 381(9860):13-4.

birth 1946 72 Notes MLA lecture

COMMENTS - "Eradication of Disease through Vacc. - 30th Anniversary of the last case"

Determination

35 yrs.

~~7:25 982~~ 1974 ~~1978~~ EPI

8:30 1081 1992 Myeddnus to (?) (problems)

SAT 1177

explosive epidemics - 50% of its health (?) What would 20 years bring?

NE India - epicenter

Most cases in ≥20 years ~~[illegible]~~

· 6000 - 8000 cases / month

world-wide news coverage · [Role as head of a recommendation in US - tip of the hat to Mike Lane

14 international grs

6 international staff · [The fight for AIDS Vaccine.

[illegible] 20000 + 50000 · [Smallpox to EPI not eradication

cases per month

· The future Wai 50 [illegible]

15.2 Population (75) UP - 97 Bihar 62 159 × 10^6 people

March - July 20000 - 50000 cases / mo.

15.16 Personnel June 25.

(only # in Oct 73)

May 1977

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ARM TO ARM - variations → (1) Growth on calves (syphilis problem → calves.
(1) Earliest - calves led door to door
(2) 1864 - people brought to vaccination center (SLIDE)
(3) Liquid vaccine - vaccine pulp. + capillary tubes + glycerolated. / & kill bacteria but destroyed virus if lengthier prep. Vaccine stuck to the skin / Could be kept refrigerated for long periods at -20° C.
↓
Single dose or up to 20 doses.
Take rates of 20% or less. if 2 to 4 insertions.

(4) Air-dried vaccine - Jenner sent vaccine on threads or between glass slides.
↳ FRENCH (Camus & Fasquelle) ~~1917~~ 1909 Vaccine Dry Lister Powder - dried over H_2SO_4 - successful in >75% of vaccinees after storage for 12 months but heavily contaminated and was not easy to use for commercial production.
10 × 10⁶ doses ~~sent~~ sent annually to French colonies 1920-1940 produced at Paris Vaccine Institute)
FREEZE-DRYING BEGAN (H₂O sublimated water from liquid to gas) Packed in tubes under a vacuum
1948 WHO Study Group - 1st meeting report of French work.
1950 ~~[illegible]~~ Fred Soper - eradication in Americas. Asked Mich. State HD labs to develop this commercially.
Lister Institute + shelf-drier
1953 full production could begin
1958 Intl. standards adopted → 1965 (Revised)
Bacterial count originally up to 1000 /ml. ; Seed lot system
1959 Minimum titer of 5 × 10⁷ pfu. adopted internationally
+ tested in eggs rather than (rabbits). ~~[illegible]~~ Δ stability std. → Kept by U.S. until 1971!
Others used eggs.
No international quality control -

VACCINE USE (541+)

Est. need 300 × 10⁶ DONATIONS THRO WHO 25-50 × 10⁶ / yr.
Testing slow & primitive Only 59 of 78 reported ~~[illegible]~~ producers - 11 dif. manu. of vaccine drying equip.
At least 17 different vaccinia virus strains in use. Most produced in 100+ dose containers
Quality control - 31/59 meet WHO potency standards; Δ stability satisfactory in < 20%

→

1967 < 10% of vaccine in use met accepted international standards. Need to [illegible] QUAL CONTROL
Samples submitted by 1200 labs. informing vaccination supply donated to Program –
22/35 batches did not meet potency req.;
March 1968 mtg of vaccine producers UNICEF + EDWARDS F.D.
(REQUIRED) all vaccine provided to countries actively engaged with WHO in S.E. had to meet international standards.

ERAD. OF SPX
1. VACCINE
Most important – adeq. supply of fully potent vaccine that meets intl. standards — e.g. [illegible] [illegible]
2. SURVEILLANCE –
Enumeration and characterization of cases.

3. On-going interactive research program field + laboratory

4. MANAGEMENT

5. FLEXIBILITY in strategy, in research.