

"Smallpox Eradication"

CALIF ACAD OF MED.

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ASKED FOR ~~THE~~ ADVICE - ONE THING YOU HAVE LEARNED.

- ①. } WHA Resolution
- ②. }
- ③. }

④ Oct. 26 1977 - Ali Maalin developed yox. last case in a chain of transmission extending back more than 3000 years.

Following this extensive search thro all infected areas

⑤ Reward of \$1000 → deluge of rumors ← 6 from France alone on day of announcement + San Antonio & Miami
Natl. Geog. photography -
~~transmission of virus around the world~~

⑥ 1978 Appointment of a Global Commission -

So concluded a chapter in medical history - the 1st successful campaign to eradicate a disease.

~~A number of accounts~~
~~then~~ ~~accounts~~

The chronology of ~~events~~ the history of the program has appeared now in ^{innumerable} ~~many~~ different publications ranging from the Scientific American to The Reader's Digest, from the Proc. of the Royal Society to the National Geographic. Many of you, I'm sure, have seen ~~these~~ one or more of these accounts and so, it is not my intent tonight to ~~present detail yet as respect~~

^{in detail} ~~present~~ again what might be termed ^{type} ~~the~~ a ~~sort~~ of "official history" but ^{incorporate} ~~rather~~ to ^{of adventures and misadventures} ~~provide~~ selected vignettes (which, for obvious reasons, are

not part of the "official history" but, in truth, better illustrate the vicissitudes of ^{an} international adventure than does the sanitized official version. ~~Before doing so, let me first highlight the certain of~~

~~what happened and when as a backdrop.~~
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what is it?
 1966. ^{resolved} ~~decided~~ WHA to embark on global eradication program
 10-15 million + deaths

- ⑦ Smallpox (1967) 34 countries - > 1.2 billion people + 9 improvable
- \$2.5 x 10⁶ allocated ÷ 50 = \$50 000
 - 10 year target - why?
 - Privately - skepticism - and realistically so.

⑧ The Disease - Caused by a virus, transmitted from person-to-person

⑧

⑨

⑩

⑪ Blindness

Special features distinguishing smallpox -

- ⑫
- Man - only host (not as yellow fever)
 - Transmission only during rash } - not as malaria or polio.
 - Durable immunity & recovery } Easily able to tell whether virus is present or not in area by visual inspection
 - No asymptomatic carriers } Scars provide the key.
 - Containing chain of infection - Face to face contact (sickness of 10m away)
Did not spread rapidly.
 - Vaccine - durable in memory - Not 3 yrs but > 20 yrs.

Freeze-dried / ^{unexpected} Vaccine was initially a major problem

- ⑬
- 250 x 10⁶ doses needed but vaccination being conducted in all countries
 - Two testing labs. → < 10% met accepted standards. - some no virus at all
- ⑭
- Donations - USSR - 140 x 10⁶ / yr. + others
 - Assistance to labs. - by 1973 80% produced in develop. countries

⑮ Vaccination Technique - In most of world, drop on skin & scratch.
 Wasteful of vaccine & take rates often 90%

⑮ Bifurcated needle - decision to try multiple punctures

Dip + 15 rapid strokes

1/4 as much vaccine

Training in minutes

Take rates good (blood in the sun)

Needles reusable

Question of need for cleaning skin. Tests

- ⑫ With vaccine stable at 98°F for > 30 days. - Vaccinator's equipment for one month could be fitted in shirt pocket.

STRATEGY before 1967 - Mass vaccination - 80% herd immunity
India program began in 1960. Reached 120% Major epidemic

- ⑬ Expert Committee of 1964

- ⑭ Objective - "Target Zero" - The no. vaccinated was immaterial - the objective was to reach '0'. Program measured by ability to stop

- ⑮ Schematic

- Programs in Africa - underway 1st -
- ⑯ Teams of 2 & 3 for pop. of 2.5×10^6
- Identify all possible reporting sites - hospitals, clinics, etc. & report weekly.
- Visit to markets & schools.

- ⑰ Schematic - backward & forward tracing.

Meanwhile, programs of symptomatic vaccination & vaccine was for asymptomatic.

- ⑱ Progress - 1970

34 → 17

Not 0 problems. -
CDC in 20 countries of W. Africa
Nigeria civil war
16 chimpanzee gouts.

- ⑲ 1973

Asia - • 700×10^6 densely crowded

- Techniques in Africa + S. America - little help.
- Trains, buses (no tickets) - religious festivals

Summer of 1973 - new strategy

- 120,000 searchers to search $> 100 \times 10^6$ households for one week each month

- Surveillance teams

- Assessment teams + treatment + assessment teams + they did

- 8 tons of food.

- ⑳ 1st search - U.P. -

Searches improved

Containment tighter - watchdogs

Reward for cases.

- ㉑ Pakistan / Nepal / India / B'desh

BRACKET NOT IN THE PROGRAM
JUNE 1974

- (24) last case in Bangladesh - Oct 16 1975
- (25) left "only" Ethiopia - but here every conceivable and inconceivable problem occurred. It was as tho the disease had opted for this corner of the world to wage a "last stand"
- Size is deceptive - almost exactly 3x the size of California. ^{475,000 km²}
- (26)
- 25×10^6 scattered across picturesque but inaccessible terrain
 - 750% live more than one day's walk from any accessible road
- (27)(28)
- Ethiopian concept of a road
 - Ethiopian staff of 50 + an international staff of WHO advisors from Austria, Brazil, Indonesia, Soviet Union + vols. from Japan, U.S. and Austria.
 - Prob. of language was formidable - 70 ^{different} local languages - use of 2 to 3 interpreters was not uncommon.
 - Fact that the WHO staff had English as a 2nd language didn't help Japanese mechanics + radio repairman - splendid - but little English Training in numbers.
- (29)
- Warfare in the countryside was ~~continuous~~ ^{continued a never-ending} problem - sometimes with reasonably advanced weapons and a degree of organization - periodically a team, including WHO staff, were kidnapped for days to several weeks at a time.
- (30)
- More primitive weapons were also in use.
(Ciro story - if true)
- (31)
- 1975 - shifted resources from Asia and U.S. made money available for helicopters. This added another dimension to the spirit of adventure
 - 1st blown-up a land grenade - Italians
 - 2nd ran out of gas being fuelled in + sank + broke Randolph
 - 3rd hit a bullet and ~~caused damage~~ ^{became} burned power, taking
 - Gradually, however, acceptance of the program and ~~effort~~ ^{an effort} by the people to assist and protect the smallpox staff. ~~The staff~~
- (32)(33)
- Exp. so as got to the Ogaden - the scrub desert ~~in~~ ^{in the} south, ^{where} the last cases of smallpox occurred
- evac. of team to warning
 - Somali invasion + use of tanks on both sides

34) One last chapter - Somalia -

35) Ali Maalin

Brumby

• Smallpox virus now confined to 6 laboratories - all under conditions of high security

• ^{Intentionally} Efforts to discover variola virus in nature - an animal reservoir, if you will - turned up ~~absolutely~~ nothing.

• Epi. Evidence

36) Research ^{in 1970} did uncover a new disease monkeypox - clinically indistinguishable but, by biological char. and genome ^{analysis}, a distinctly different disease.

37) 50 cases - ^{small} rainforest villages - Transmission (?) on 5 occasions.

38) ? Biological warfare.

• Slow spreading

• Vaccine reverse

• Better agents ~~and~~ any tox.

With cessation of vaccination - a saving of \$1 billion per year
Total cost per year in intl. assistance \$8 million.

~~At the time~~ In all some 700 ~~international~~ ^{from 65 countries} staff worked in program - but at one time were more than 150. ~~Most of this~~ Our own staff at HQ consisted of only 5 professional staff. ~~I want to say we weren't there but 7 day weeks and for all, travel status 60-75% of the time, we effectively doubled the staff.~~
Note. 180 000 - 150 000 N. Atl. Hq. staff.

If this was one overall ^{lesson stemming from} ~~theme~~ of this campaign, it was the message that it was possible to ^{develop} and coordinate a global program, That the ^{barriers} ~~political~~ ^{of} ~~international~~ cooperation in medicine are far more easily traversed than the political ones and that comparatively small sums of money effectively applied can ~~also~~ achieve miracles