

ERADICATION - the converse to "new & emerging" viruses.

- can we expect to eradicate some or all?
not doing very well & prospects for eradication of
virus diseases not good.

Erad. progr. & us for > 100 years -

Notably successful in veterinary medicine

Highly checkered and not altogether happy history in human medicine.
as I shall briefly describe.

May 8 1980 - Declaration - vaccination stopped

Savings = \$1000 to 2000 $\times 10^6$ each year. Net cost (total) \$100

Meetings followed -

Polio / AIDS / road accidents / hunger

Agenda dominated by zealots rather than realists

Eradication - definition

Rationale

A public health policy -
Goals need to be scientifically tenable & to reasonable prospects for success.

Why? Smallpox launched 1967 as malaria was failing.

Dubios

UNICEF support to smallpox

For this reason - ~~during the 1980's~~ ^{during the 1980's}, a member of us objected
strongly to the casual use of eradication

A new term arose "elimination" -

1988 Task Force for Child Surv.

& measles 90%

eliminate neonatal tetanus.

Will return to this

Intention - the A.M. @ very brief look at history

② Focus on 2 diseases in which erad. progr. are in progress.
polio & smallpox

③ Principles & criteria for erad. of candid etc diseases.

CANDIDATE DISEASES FOR ERADICATION

	<u>Spx</u>	<u>Polio</u>	<u>Meas</u>	<u>HepB</u>	<u>TB</u>
Immunity after recovery	+	+	+	o	o
Man the only host	+	+	+	+	o
Importance to countries	+	±	+	±	+
Vaccine					
Affordable	+	+	+	±	+
Long-term protection	+	+	+	+	o
Easily applied	+	±	+	±	+
Transmission interrupted					
Developed country	+	+	±	o	o
Developing country	+	+	±	o	o

Summary:

Eradication/elim - a serious policy - needs a serious exam. before beginning

Eradication/elimination of virus diseases - not a reasonable concept.
except for polio
possibly measles.

New & emerging infections. - Perhaps a different story

- ~~if~~ a new mutant
- ~~if~~ no animal reservoir
- ~~if~~ disease sufficiently important.

DEFINITIONS

ELIMINATION -- to get rid of; to remove

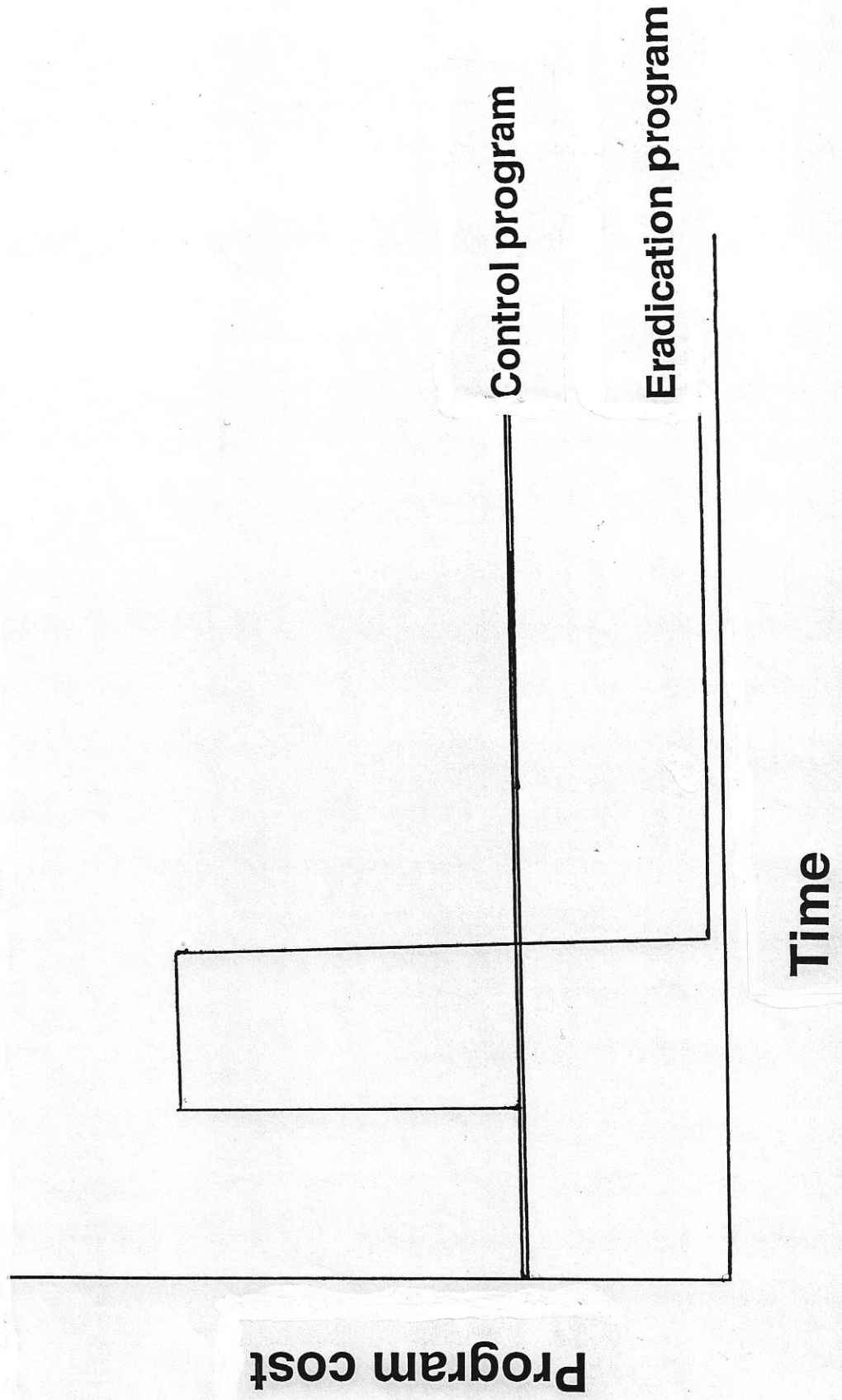
Usage : “to eliminate as a public health problem”

“to eliminate as a public health problem”

“to eliminate as a public health problem”

“to eliminate”

Rationale for eradication



A View of Eradication -- 1965 , R. Dubos

“The popular appeal and fervid ring of the word eradication is no substitute for a searching analysis of the manner in which limited supplies of resources and technical skills can best be applied for the greatest social good.”

“Even if genuine eradication of a pathogen or vector on a worldwide scale were theoretically and practically possible, the enormous effort required would probably make the attempt economically and humanly unwise”

“For many reasons, eradication programs will eventually become a curiosity item on library shelves, just as have all social utopias.”

Man Adapting by Rene Dubos (1965)

Historically - eradication substantially shaped a large proportion of intl. p.h. programs.
through the 1970's.

Historical Landmarks in Eradication

1884 - Bovine contagious pleuropneumonia

A 5 year eradication campaign

Note: specifically an eradication campaign

1890's - Eradication of veterinary diseases - U.S./ Europe

Sheep and Kindupet in Europe
Piroplasmosis etc. in U.S.

Note: All fairly recent importations
Ability to slaughter entire herds.

1909 - Rockefeller F. campaign against hookworm

Visionary - no science base. 52 countries on 6 continents
Studies in 1921 - showed this impossible.

1915 - Rockefeller F. launches yellow fever eradication

Cuba
Panama Canal.
5-10 yrs in Amer.
to rest of world.

1934 - Aedes. aegypti eradication replaces yellow fever

1939 - Anopheles gambiae eradication in Brazil - invasion from Africa

1944 - Anopheles gambiae eradication in Egypt - invasion from sub-Saharan Africa.

Points: Vector control
Belio that is a rigidly controlled militaristic structure was all that was needed
No Science

1950 - PAHO launches malaria eradication and smallpox eradication in Americas

99% malaria / 1% smallpox.

1953 - WHA rejects DG proposal for smallpox eradication

"Too complex"

1955 - Global malaria eradication campaign begins

Threat of DDT resistance. - No knowledge of how to deal with it
Concerns about vertical program.

1955-1975
Expended \$2.4 billion
Africa - 1/3 of WHO budget

1959 - Global smallpox eradication campaign launched - USSR

1967 - Global smallpox eradication actually begins

Guiding light for WHO thro 1972 -

Vector control people Super/Caravan.

Collapse of malaria program & collapse of confidence in health policy makers.

Problem elements in the malaria eradication strategy

- 1. An autonomous, wholly independent staff, reporting to the head of state is essential to success**
- 2. The technology and how to apply it is known; no further research is necessary**
- 3. A highly detailed plan applicable to all countries and meticulously executed is the key to success**
- 4. Measurements as to numbers of cases of malaria is not required until disease transmission is on the verge of interruption**

ERADICABLE VIRUS DISEASES -- CRITERIA

- 1. Long-term immunity is present on recovery from infection.**
- 2. Man is the only host; there is no natural reservoir**
- 3. The intervention (presumably a vaccine) is affordable, able to be readily applied and provides long-term protection against infection**
- 4. The disease is sufficiently important to enough countries to warrant the effort.**
- 5. Interruption of transmission has been demonstrated to be practicable in developed countries and in some developing ones.**

CANDIDATE DISEASES FOR ERADICATION

	<u>Spx</u>	<u>Polio</u>	<u>Meas</u>	<u>HepB</u>	<u>TB</u>
Immunity after recovery	+	+	+	o	o
Man the only host	+	+	+	+	o
Importance to countries	+	±	+	±	+
Vaccine					
Affordable	+	+	+	±	+
Long-term protection	+	+	+	+	o
Easily applied	+	±	+	±	+
Transmission interrupted					
Developed country	+	+	±	o	o
Developing country	+	+	±	o	o

ERADICATION OF SMALLPOX

"Eradication of smallpox can be defined as the elimination of clinical infection by variola virus. Since there is no carrier state . . . and subclinical infections are rare and since no animal reservoir . . . is known, the absence of clinically apparent human cases may be assumed to signify (the eradication of smallpox)."

WHO Smallpox Manual, 1968

SMALLPOX ERADICATION - THE STRATEGY

Objective : zero cases of smallpox

Improve immune status to deter spread

+Vaccinate 80% of population

Quality assurance - vaccine potency/stability

- coverage
- vaccine efficacy

Differing

Polio

Vaccine potency

NIDS + mapping up

Libs. -

Surveillance - Containment

- + All health units to report weekly
- + Team to investigate/contain outbreaks
- + On-going analysis of surveillance data

3 surprises - Durability of vaccine immunity
- Smallpox does not spread rapidly from place to place
- Importance of urban areas in sustaining chains of transmission.

Research program

- + Alternative methods for vaccination
- + How to improve vaccine quality
- + Epidemiology of smallpox
- + Operational approaches
- + Natural reservoir of smallpox

Program concluded:

last case - 10 apr. / 9 mos. / 16 days.