

APL - Problems of Immunization
in the Developing Countries
11 May 1979

I appreciate this opportunity to join you in your May colloquium
and to meet with a group of scientists who are probing the most sophisticated
boundaries in physics, ^{space} communications, and other areas. My visit here last summer
was a revelation to me. ^{I came away feeling} ~~Between the APL and~~
~~the School of Hygiene, & the resources which you represent~~ areas, there are in
public health today ~~common interests~~: there are exciting avenues which we should be exploring
together. Particularly in this time in the area of environmental health - a
rapidly expanding area of priority for us and a department which ^{is in size, scope} ~~is in size, scope~~
and interdisciplinary approach stands alone in this country. ^{I would hope that there} ~~might be a suitable~~
^{opportunity}
for you and our faculty to join in a series of colloquia.

But it is not my intent today to explore this particular area
but rather to expose you to the realities and problems on another frontier
which is little understood and is, in many ways, a frontier for
American science and the industrialized world - ~~the~~ ^{problem of the} developing country -
and the problems ~~of~~ and questions awaiting solution in the most important
of the health programs which is now being undertaken - ~~immunization~~.

As a backdrop to this, I would note that the President
this year has proposed and the Senate and House have agreed to
the establishment of an "Institute for Scientific and Technological Cooperation".

Quote - Fr. Ant. Act.

Budget Structure

It would be my belief that the d - p - h - could play an ^{important} ~~key~~ role in this undertaking.

In health - prevention is the key word.

Costs of Rx prohibitive - e.g. tuberculosis. Smallpox Rx requires far more in skilled manpower.

In prevention - vaccination is a key component.

Mass application of a single agent - cost is less, less skilled manpower needed.

Barrier vs. disease is confined on an individual (mobility no problem)

Illustrate - Smallpox prog. emphasizing technical factors.

① Madi - last case -

②③④ The disease

Historic importance - Europe - Mid Ages to mid 19th cent. - death blindness.

⑤ Jenner

⑥ Congox

Problems in production and stability (2-3 days) → U.S. refrigerator.

⑦ Freeze-dried vaccine - ~~late~~ 1950's - stability

⑧ 1966 - WHA - 10 year time target

⑨ 1967 - countries

cases - 131 000 → $10-15 \times 10^6$

Problems • Quantity of vaccine
Quality of vaccine.
Manual

• Vaccination devices - scratch - ^(show) India ^(show)
Success rate - takes ; vaccine use.

⑩ Jet injector - inappropriate technology

⑪ Bifurcated needle - simplicity

⑫ Needle holder.

Elimination of skin cleaning
(12) Vaccinator kit - elegantly simplified.

Strategy - mention briefly

- (13) 1967
- (14) 1970
- (15) 1973
- (16) 1976



(17) Next step - ~~multiple~~ expanded immunization program - SIMPLE ELEMENTS OF VAC. PROGRAM. Get vaccine into arms of children. DRAW nature of diseases.

(18) VACCINES - ~~storage~~ ~~storage~~ preservation temperatures - CRITICAL
Desirable to improve vaccines - not discuss ~~smaller~~

REFRIGERATOR

1965 → same 1979 ~~Effects~~ Evaluation -

- Most front-opening
- Required electricity - irregular supply.
- Few - Kerosene - required pure Kerosene -

New approaches since 1977

- Home use of Kerosene
 - improved insulation & lower energy used.
- Chest freezer (19)
- new battery pack now with
- dirty Kerosene
- solar power (NASA Lewis Research Ctr.)

REFRIG. Boxes - Plastic Box
INDICATORS -

(20) Enzyme + chemical indicators.
? Hour glass ? benzole with time/temp. equiv. & substance melting above 8° C. Quantitation the key
Cost - < \$10 and robust.

VACCINATION DEVICES -

Most instantaneous - bifurcated needle not possible < measles.
Cost of needle + syringe - cumbersome to sterilize - ~~might do~~ ~~problem~~
Jet injectors
Atropine devices
~~Chemical~~ vs. chemical warfare.

TRANSPORT

18 experience AID vehicles.
 U.S. vehicles - spare parts test.
 Indian jeep. -
 Motorcycle + bicycle.

COMMUNICATION -

Comment on telephone
 telegraph.

radio

repair / range / background skt.

Workinghouse proposal.

Needs #1

Summary: Devices are not those needed in the industrial world.

~~To under~~

Developments over past 2 years - probably dramatic
 Simplicity, durability, reparability are key -
 Hope have awakened your interest.