SOME LESSONS FROM THE MALARIA ERADICATION CAMPAIGN

J. A. Nájera
Impact of Ross & Grassi’s discoveries

• Field testing of control initiatives
  – Limitations of scale. Differences in suitability

• Need to mobilise local resources
  – Central organisation without operational budget
  – Socioeconomic arguments centred on local impact
  – Emphasis on information and public education

• Controversy: campaign vs. development approaches
  – Successes in Panama Canal and A. gambiae in Brazil
  – Sustainability in endemic countries required continuity

• Network of antimalaria dispensaries: endemic countries
Functions of a malaria dispensary

- To provide microscopical diagnosis and appropriate treatment
- To organise information and educational activities
- To report cases and particularly abnormal situations
- To investigate clusters of cases
- To advise local authorities on control measures
- To request help from the central organisations when needed
Prophylaxie du paludisme. Protection mécanique de la gare de Bazagona, située dans le « Monte ». A droite, une délégation des propriétaires demandent au professeur Pittaluga de créer de nouveaux dispensaires antipaludiques dans la région.
The socio-economic argument

Every year:
800,000 patients
6,000 deaths
16,000,000 work days lost
at a salary of 2 pesetas
32,000,000 pesetas of lost
working capacity

Poster Central Antimalaria Commission (Spain, 1926)
Fig. 18 "MONEY OR MALARIA"—DON'T CRY "HELP," SEND CASH.

"TROPICAL LIFE" LONDON, APRIL '26.

Prevailing view before WWII

“malaria control should not be a campaign, it should be a policy, a long term program. It cannot be accomplished or maintained by spasmodic effort. It requires the adoption of a practicable program, the reasonable continuity of which will be sustained for a long term of years”

RADICAL CHANGE AFTER WW II

• DDT appeared as a control measure
  – Effective everywhere, affordable and safe
  – Needing a strong central organisation, to handle massive supplies, transport & distribution networks

• Transmission interrupted in various trials, and no return of malaria if spraying stopped, Greece 1951

• Vector resistance (Greece, 1951), seen as stimulus

• Irresistible demand for eradication campaigns
  • World Health Assembly, 1955
International economic & political argument

• Such diseases as the tropical fevers, which handicap labourers, also increase the cost of rubber, coffee, minerals, certain fruits, assorted fibres, hardwoods, oils and waxes. … Added to them is the fact that malaria is a factor that, among others, helps to predispose a community to infection with political germs that can delay and destroy freedom

• Paul F. Russell (1955) Man's Mastery of Malaria. Oxford University Press
Definition of malaria eradication

“the ending of the transmission of malaria and the elimination of the reservoir of infective cases in a campaign limited in time and carried to such a degree of perfection that when it comes to an end, there is no resumption of transmission”

WHO Malaria Expert Committee (6th report, Geneva, 1957)
### Diagram of Theoretical Sequence of Phases in Malaria Eradication Programmes

<table>
<thead>
<tr>
<th>EXECUTIVE ORGANISATION</th>
<th>NATIONAL MALARIA ERADICATION SERVICE</th>
<th>NATIONAL PUBLIC HEALTH SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHASE</td>
<td>PREPARATORY</td>
<td>ATTACK PHASE</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>Total-coverage spraying.</td>
</tr>
<tr>
<td></td>
<td>Preparation</td>
<td>(Additional chemotherapy if needed.)</td>
</tr>
<tr>
<td>OPERATIONS</td>
<td></td>
<td>CONSOLIDATION PHASE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surveillance</td>
</tr>
<tr>
<td>AMOUNT OF MALARIA</td>
<td></td>
<td>MAINTENANCE PHASE</td>
</tr>
<tr>
<td>DEGREE OF TRANSMISSION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEARS</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**Source:** WHO (1963) Terminology of Malaria and Malaria Eradication. Geneva
DECLARATION OF FAITH

• “Between malaria control and eradication there is as great a difference as between night and day. Control … is a primitive technique. Now we know exactly … the schedule of an eradication campaign which will last four or five years, followed by three years of consolidation”

   UNICEF Regional Director for the Americas to the Executive Board
Malaria eradication (World Health, 1960: Mar-Apr)

India: 390 NMEP units, each with 4 trucks, 2 jeeps, 2 pickups, 247 administrative and field workers
The six main kinds of malaria workers
(physicians, engineers, entomologists, spraymen, supervisors, microscopists
World Health, 1961, extra issue on Malaria

On retrospect it seems that malariologists traded power for leadership
World Health, 1961, extra issue on Malaria
Figure 22. Reaching remote isolated houses required efforts and risks, which could be maintained only as long as the original elan persisted in the service and its appreciation in the communities (Photo: J. Moquillaza, PAHO/WHO).
Achievements of the Global Eradication Campaign

- Important change in the global distribution of malaria
- First public health programme to aim at « total coverage »
- Set up contact with the community: voluntary collaborators
- Serious attempt to use maps throughout its activities
- Focussed the attention on the remaining problem vs. what had been achieved
Some serious problems of the campaign

- Exaggerated confidence on existing knowledge and neglect of research
- Reliance on a single measure supposed to be « cheap, effective and safe » everywhere
- Assumption that a global campaign could start without knowing what to do in Africa
- Emphasis on discipline and prevention of local deviations
- Break with the past & the general health services
- Imposition of an untested system of surveillance
- Expectation that epidemic risk would not recur after elimination
Progreso de la Campaña Global de Erradicación (1959-1968)

WHO recognises eradication may not be possible everywhere
Re-examination of the strategy (Boston, 1969)

• The 22nd World Health Assembly: “reaffirming that complete eradication of malaria from the world remains a primary task of national public health organizations, and that even in the regions where eradication does not yet seem feasible, control of malaria with the means available should be encouraged and may be regarded as a necessary and valid step towards the ultimate goal of eradication”.
WITHDRAWAL OF SUPPORT

• The acceptance of unlimited control was taken as a justification for withdrawal of support at international and national levels; later compounded with economic crises

• Programmes’ serious difficulties to adapt to control:
  – Were overloaded with unskilled labour force
  – Lack of professional cadres capable to devise new strategy
  – Isolation from research institutions and inability to collaborate
  – Failure to integrate into general health services
  – Fire-fighting strategy, with poor and overcommitted resources
  – No capacity for coping with new development projects nor for early detection or forecasting epidemic risk
RECOGNITION OF THE NEED FOR RESEARCH

• Spread of drug resistance and support of US Army to research during Vietnam war
• Establishment of TDR
• Poor impact on field control programmes

In 1985, the “Evaluation of the Malaria Programme” in India, commented that the majority of research projects had no relation to the needs of the control programme and the latter lacked “the capacity either to carry out research, to guide it, to generate issues for research based on analysis of incoming information, or to translate into operational use research carried out by other institutions”
LESSONS LEARNED FROM OUR ERRORS BY THE SMALLPOX ERADICATION CAMPAIGN

- “The smallpox programme’s success derived, in part, from lessons learned from the preceding costly failure of the malaria eradication campaign”

- Emphasise epidemiological analysis and coordination
- Encourage management flexibility
- Attract research for the solution of problems
- Stimulate staff to innovate and adapt
- Consider targets as indications of possibilities, but insisting on vigilance as the real evaluation
- Design a phased vigilance programme, through:
  - Morbidity indicators – Foci investigation – Individual cases
MALARIA CASES REPORTED FROM CENTRAL AMERICA, PANAMA AND BELIZE

Progressive abandon of DDT (resistance)  
MDA + DDT  
Attempt of integrated control since 1976  
Collapse of cotton cultivation in the Pacific coast  
Triumph of Sandinista revolution, Nicaragua  
Expansion of banana and African palm in the Atlantic coast  
Consolidation of new cultivations in the Atlantic coast  
Civil war, El Salvador (1980-92)  
Collapse of cotton cultivation in the Pacific coast  
Triumph of Sandinista revolution, Nicaragua  
Expansion of banana and African palm in the Atlantic coast  
Consolidation of new cultivations in the Atlantic coast  

El Salvador  
Guatemala  
Honduras  
Nicaragua  
Costa Rica  
Panama  
Belize
Countries certified by WHO

• **With long history of control:**
  - N. Venezuela, 1961
  - Hungary, 1964
  - Spain, 1964
  - Bulgaria, 1965
  - Taiwan, 1965
  - Cyprus, 1967
  - Poland, 1967
  - Romania, 1967
  - Netherlands, 1970
  - U. S. A., 1970
  - Puerto Rico, 1970
  - Italy, 1970
  - Cuba, 1973
  - Portugal, 1973
  - Yugoslavia, 1973
  - Australia, 1980

• **Islands with tourist oriented economy**
  - Grenada & Ca., 1962
  - St. Lucia, 1962
  - Trinidad & T., 1965
  - Dominica, 1966
  - Jamaica, 1966
  - Virgin Isls., 1970
  - Mauritius, 1973
  - Reunion, 1979

• **Other**
  - Singapore, 1982
  - Brunei Dar., 1987
MORBILIDAD Y MORTALIDAD REGISTRADA EN ITALIA (1887-1949)

Morbilidad por 1,000,000 habitantes

Mortalidad por 100,000 habitantes

DDT
In 1925 the number of dispensaries reached 250. In 1942 only 187 remained; in 1943 started the rehabilitation of dispensaries, which reached over 300 in 1950.
Frequent failure in the consolidation phase

- Surveillance system rather theoretical
- Indicators merely quantitative (API, SPR, ABER)
- Objective: to show absence of autochthonous cases
- Abandonment of the use and actualisation of maps
- Lack of coordination between parasitology & entomology
- Poor implementation of concepts such as
  - Stratification
  - Eco-epidemiological typing
Future control for elimination should:

- Obtain & sustain real community involvement/ownership
- Strengthen/re-establish strong professional cadres at the directing level, capable of guiding flexible and adaptable action
  - Encourage innovation, field testing and exchange of experience
- Integrate into the health structure & develop true surveillance
  - Be careful in the use of indicators and understand real denominators
  - Study the history of problem areas & possible external causes
  - Work with research & other agencies in acquisition of knowledge
- Prioritise epidemiological investigation
  - General stratification
  - Identification and study of problem areas
  - New and residual foci
  - Individual cases
Terminology and prevailing concepts

• Eradication campaign (military terms):
  – Campaign, attack, strategy, tactics, brigades, armamentarium, logistics

• Control programmes (police terms)
  – Vigilance, surveillance, reporting, case detection, case investigation, alarm signals, permissible levels, foci elimination

• Primary health care (national liberation movements)
  – Community mobilisation, people’s empowerment, information & education, institutional support, intersectoral collaboration
<table>
<thead>
<tr>
<th>State</th>
<th>Annual malaria deaths (×10³)</th>
<th>Total population (×10⁶)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orissa</td>
<td>51</td>
<td>38</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>Northeast states</td>
<td>16</td>
<td>41</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>20</td>
<td>66</td>
</tr>
<tr>
<td>Other states</td>
<td>86</td>
<td>904</td>
</tr>
<tr>
<td>All India</td>
<td>205</td>
<td>1100</td>
</tr>
</tbody>
</table>

Age standardised deaths per 100 000
To-day’s advantages
- Considerably improved communications for
  - transport
  - information, mapping, GIS
- Improved knowledge of control measures
- Resources

But it may be useful to remember Russell’s advice:

*Time* more than *Money* and *Continuity* more than *Perfection*, these must be the mottoes guiding malaria control in the tropics