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THE MALARIA ERADICATION PROGRAMME IN IRAQ

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1. INTRODUCTION

Malaria control operation was started in Iraq in 1946 around urban areas. Larvicidal measures were the main programme. Residual insecticidal spraying on a limited scale was introduced in 1948, covering communities with a priority in economic importance and endemicity of malaria.

In 1952, the Government requested WHO for assistance in their Malaria Control Programme, and a Malaria Control Demonstration Team was provided by WHO. Good results were obtained in the demonstration area (4 northern Liwas, Mosul, Erbil, Kirkuk and Sulaimaniya) with residual insecticidal spraying between 1953-1956. Malaria control measures in the remaining part of the country were also progressively expanded under the Government's control programme conducted through the Endemic Diseases Institute and by 1956 greater parts of the malarious area were covered to a large extent.

In 1957, the control programme was converted into an Eradication Programme with the assistance of WHO and UNICEF. The plan of operation envisages completion of the programme in 1964.

2. EPIDEMIOLOGICAL AND ENTOMOLOGICAL BACKGROUND

The original pattern of prevalence of malaria varied in the three geographically different parts of the country:

a. The mountainous northern areas, Sulaimaniya, Erbil, Kirkuk, Mosul and the northern part of Diyala Liwas have been recorded as highly malarious in all old records. An annual epidemic was regularly recorded.

b. The alluvial plains in the centre, Baghdad, Ramadi, Hilla, Kut, Diwaniya and Kerbala had unstable malaria with periodic epidemics at irregular intervals.

c. In the plains of the south with extensive marshes, Basrah, Amara and Nassiriya, severe epidemics at intervals had occurred. In the inter-epidemic periods, malaria apparently used to recede to an insignificant level over large areas. This recession gradually became incomplete and foci of high endemicity developed in recent years.

The proved vectors are as below:

A. sacharovi in the foot-hill and escarpment region.
A. superpictus in all areas of the mountainous country.
A. stephensi in the alluvial plain region.

3. RESIDUAL SPRAYING

DDT was the principal insecticide used. On discovery of resistance to DDT in A. stephensi in late 1957, Dieldrin replaced DDT in the three southern Liwas, Basrah, Amara and Nassiriya, since 1958. Areas with higher endemicity were sprayed two rounds annually, May and September. The other areas were sprayed once annually in May.

Record of spraying from 1957 to 1961:

Year	Villages protected	Population protected
1957	14,532	3,531,000
1958	9,241	2,493,000
1959	10,340	2,353,000
1960	9,336	2,060,000
1961	5,957	1,199,000

4. POPULATION UNDER DIFFERENT PHASES IN DIFFERENT YEARS

4.5 million population was initially estimated at risk, a considerable portion among whom were hypoendemic area as assessed from previous spleen parasite rates. In 1958 1.7 millions were removed from further spray protection; 2.8 millions continued in the attack phase till 1960. In 1961 a further 1.5 millions were removed from spray protection and only 1.3 millions were left in the attack phase.

Year	Attack Phase	Consolidation Phase
1957	4.5 millions	X
1958	2.8 "	1.7 millions
1959 & 1960	ditto	ditto
1961	1.3 millions	3.2 millions

As surveillance in the attack phase could not be fully developed till 1960, to guide any discontinuation of spraying on achieving interruption of malaria, population in the attack phase continued on the same level during 1958-1960.

5. ACTIVE SURVEILLANCE OPERATION

Active surveillance operation was started in mid 1958. Initially, it had covered only the population in the consolidation phase mainly. From the beginning of 1960, surveillance coverage was progressively increased and at the end of the year covered the total population under risk, both in the consolidation and attack phase.

One surveillance agent has been provided for 10,000 to 11,000 population. Three agents have been grouped under a team leader for supervision and transportation. A monthly round of visits against an advance itinerary is made.

Blood-slides are examined in 14 Liwa laboratories. Epidemiological investigation on all positive cases is done. Radical treatment as per WHO treatment schedule is carried out. One dose presumptive treatment, Chloroquine cum Daraprim, is given at the time of taking blood-film.

6. PASSIVE SURVEILLANCE OPERATION

Passive surveillance operation has not yet been fully organized. Steps towards organizing same are under active consideration.

7. ENTOMOLOGICAL RECORD

Vectors have already been referred to earlier.

After the first application of Dieldrin in 1958 against A. stephensi, above species disappeared and no collection of this species was made for nearly three years. In 1961, when Dieldrin spraying was discontinued, A. stephensi reappeared (August 1961) and continues to be present in fair density since then. The species is now resistant to Dieldrin and has a high tolerance to DDT.

The other two vectors, A. superpictus and A. sacharovi, continue to be present in a low density. No resistance to DDT has been discovered even after nearly seven years regular use of DDT.

A. pulcherimus is widely prevalent in all parts.

8. EPIDEMIOLOGICAL SITUATION AT THE END OF 1961

a. Transmission of malaria has been interrupted among 3.2 millions inhabitants in the alluvial central and southern regions. 1.7 millions among them are in the consolidation phase since 1958; the remaining 1.5 millions are in the consolidation since 1961.

b. Transmission of malaria in 1961 was confined to a limited area in the northern region - riverain tracts of the Zab river and the Rania-Tangero valley. Only about 500,000 population had continued transmission in 1961. The majority were in two Nahiyas only, Koisanjak and Rania.

Out of 813 detected cases in the country in 1961, 512 were in these two Nahiyas only. Practice of spending part of the transmission season in crop huts in the fields was the factor in incomplete spray protection.

c. Interruption of malaria is now indicated in a further 800,000 population in Mosul and Kirkuk Liwas. They will enter the consolidation phase in 1962.

9. PLAN OF ACTION IN 1962

a. 500,000 population in the areas in the northern region where continued transmission was detected in 1961 will continue to be protected with residual spraying. Active surveillance will cover them as well.

b. 4 millions will be in the consolidation phase, protected through surveillance.

10. SURVEILLANCE PROGRAMME

The country is divided in 115 surveillance sectors as below:

Liwa	No. of Sectors	Liwa	No. of Sectors
Mosul	15	Kut	8
Erbil	8	Diwaniya	12
Kirkuk	9	Diyala	7
Sulaimaniya	8	Kerbala	2
Baghdad	10	Basrah	6
Ramadi	5	Amara	7
Hilla	8	Nassiriya	10

In each sector three or four surveillance agents work under a team leader. Generally a D.P.W. has been provided to each team; some have Land Rover. In mountainous areas, animal transport is used; similarly in marshy areas boats are used.

The coverage in active surveillance monthly varies between 50% to 60% of the villages; the proportion of slides monthly is approximately 0.5% of the population.

11. RECORDS OF MALARIA CASES IN 1960 AND 1961

Liwa	1960	1961
Mosul	80	4
Sulaimaniya	452	260
Kirkuk	128	50
Erbil	379	480
Baghdad	7	-
Ramadi	21	7
Hilla	3	-
Kut	2	1
Kerbala	1	-
Diyala	6	1
Diwaniya	-	-
Basrah	7	6
Amara	1	4
Nassiriya	1	-
	1088	813

DISCUSSIONS

a. The Malaria Eradication Programme had started on a simultaneous coverage basis in 1957. 4.5 millions population were estimated as exposed to risk; a large proportion among whom were in hypo-endemic areas in the central region of the country. The population in the northern mountainous parts and the southern marshy parts were in highly malarious areas.

b. 1.7 millions population in the hypoendemic parts were put in the consolidation phase and protected only through surveillance operation after one year of attack; no renewed transmission has been discovered among them between 1959 and 1961 except a small outbreak in one focus in Ramadi Liwa where an imported malaria case caused a small localized outbreak with 22 cases.

c. In 1961, another 1.5 millions were placed in the consolidation phase after four years of attack phase.

d. In 1962, another 800,000 inhabitants will enter the consolidation phase, bringing the total in the consolidation phase to 4 millions out of an initial 4.5 millions under risk.

e. The continued transmission in some part of the mountainous northern area is due to incomplete coverage in residual spraying, resulting from the practice of temporary movement to crop huts and outdoor sleeping during summer.

f. DDT resistance was discovered in one vector, A. stephensi, which was effectively met by changing to Dieldrin. The species has disappeared after the first application of Dieldrin and was absent for nearly three years. It has reappeared in mid 1961 and has now developed resistance to Dieldrin and high tolerance to DDT. However, as the reservoir of residual infection among the local community is now negligible, no immediate risk of renewed transmission is expected unless imported infection gets root.

g. The limited area of continued transmission may need combined residual spraying and anti-malaria drugs to interrupt transmission completely.