WORLD HEALTH ORGANIZATION

ORGANISATION MONDIALE DE LA SANTE

REGIONAL OFFICE FOR THE EASTERN MEDITERRANEAN

BUREAU REGIONAL DE LA MEDITERRANEE ORIENTALE

WHO INTER REGIONAL TECHNICAL MEETING ON MALARIA ERADICATION
TEHERAN, 1 - 6 MAY 1962

EM/ME-Tech.3(a)/30

19 April 1962
ENGLISH ONLY

ASYMPTOMATIC MALARIA CASES; COMPARATIVE EVALUATION OF CASE DETECTION METHODS

By

Dr. A. Mohtadi
Technical Deputy of
Malaria Eradication Organization

INTRODUCTION

Considering a malaria eradication programme, the two phases of attack and consolidation following the preparatory phase are quite important to the achievement of the eradication programme. These two phases are so correlative that one without the other does not lead to success.

The objectives of the attack phase operations are the complete interruption of transmission and the reduction of the infection rate in the people residing in the area during the years of interruption of transmission, while the target of the consolidation phase is detection and radical treatment of the cases remaining in the region.

It is obvious that the cases in this phase are mostly among the local people or those arriving from endemic areas, having a comparative immunity, no serious symptoms, and feeling well.

It is also evident that these gametocyte carriers are plentiful and more dangerous to the consolidation areas. Detection and treatment of these cases are therefore of particular consideration and the matter for our discussion.

The aim of this matter in the malaria eradication programmes, with due consideration to the disease cycle from its inoculation by the anopheles to its final phase, namely complete cure of the patient, is an investigation on the evolution of the disease in the patients and the way of detection of these cases during the disease cycle. According to studies made by experts, the disease cycle of a normal malaria case of p.vivax may be seen in Annex I. It is evident that detection of these cases, when the clinical symptoms are clear and the patient is suffering from it, is easy to detect and treat. But the importance of detecting the carrier, who does not suffer from the disease, and is named "asymptomatic carrier", is great, particularly that the distinction of these slight symptoms in the villagers is not important to them because of their occupation with agricultural and animal husbandry matters at the time.

Although the tests made in the hospitals and in the fields may not show a similar percentage the fact remains that, the possibility of the presence of carriers without symptoms, is dangerous for the area, and the population residing in an area under consolidation phase. The figures available from the malariometric surveys carried out in the town of Chalus and in the villages of Azerbaijan, as well as results of the malaria studies made in other countries such as Portugal, Nigeria, Liberia and Tanganyika show that, in the endemic and mezo-endemic areas, where the people have a comparative immunity, the malaria parasite is present in peripheral blood without any symptom and the ratio stands between 83% to 94%. In Iran, however, the infection rate is not too high as these surveys were conducted out of transmission season. The malariometric surveys carried out in 1948 by the writer, Dr. Gramiccia and Eng. Pavenela in Chalus, mostly on the 2-9 year old school children and the families of the Chalus silk factory labourers, showed that the school and kindergarten children were generally safe without any trouble on the day of examination or on the days before attending the school. Spleen enlargement amongst them was 89% and the parasite rate 8.4%. The p.falciparum rate was about 25%, comparatively higher than other species. Simultaneous with these surveys, the control programme started, by residual spraying of 2mgs. of DDT per square meter. Considering the short transmission season of 3-4 months (July, August, September and October) the result of the following years' surveys, carried out under similar previous conditions, showed that the rate of positives without symptoms decreased to 4.5% and in the next year (after two rounds of spraying) to 2.1% and then to zero with due consideration that the p.falciparum cases were almost eliminated in the first year. (Annex II).

Similar surveys and results were achieved in Azerbaijan & in other areas. In the southern region, within the propagation area of A .stephensi which has recently become resistant to DDT and DLD causing

more or less, transmission among the local people, the data obtained through surveillance or parasite survey show that the afebrile symptomless malaria cases are quite distinctive from the febrile ones. The result of the surveillance activities in Bandar Abbas and Jiroft area is shown hereunder.

Area	Total Positive	Febrile	Afebrile	p.falciparum	p.vivax	p.falciparum Febrile	p.vivax Febrile	p.falciparum Afebrile	p.vivax Afebrile	Unclassified	Percent Afebrile Positive	Percent Febrile Positive
Bandar-Abbas	301	47	243	254	35	36	210	1	31	11	84	16
Jiroft	1831	453	986	1086	501	395	629	143	192	374	68	22

The figures are extracted from Malaria Institute record and the ratio of the positive cases with fever is shown in Annex III.

A glance at these and at the similar data obtained from the Chalus area reveals that in the area where transmission occurs the percentage of positive cases without symptom is high, while in the area where transmission is interrupted this percentage is low. Therefore, in the areas under malaria eradication programmes reaching the consolidation phase after success in the attack phase, the presence of the local carrier does not have any danger for the area. But the imported cases from the endemic and hyper-endemic areas are most dangerous.

CASE DETECTION METHODS IN THE ME PROGRAMMES

The case detection methods in every country depend on the progress of the programmes from the point of view of the general situation of the country, improvement of the rural health programmes and the general educational level. In developed countries where rural health has been sufficiently improved - the people's regard to obey the instructions issued by the government authorities, the importance of the individual and public health, and the facilities available in order to reach the physician and obtain the drug - the expansion of additional programmes for case detection does not seem necessary. While, on the contrary, in the undeveloped countries, some particular plans, according to the emergency, should be executed in the areas to expedite the success of the programmes and to make it a permanent one. The existing case detection methods confirmed by WHO are as follows:

1. Active Case Detection

Active case detection comprises all activities as regards regular visits of government agents to the villages and obtaining of information on the people's health within the village limit (house to house visit), the results of which represent collection of blood slides followed by a radical treatment of positive cases detected.

2. Passive Case Detection

Passive case detection is carried out through collection of blood slides in the health and curative centres, laboratories, hospitals and by voluntary collaborators, in order to detect and report malaria cases. In other words, all the slides taken to these places may be referred to Passive Case Detection.

It is obvious that either of the two methods has some advantages or deficiencies which are dealt with hereunder.

1. Active Case Detection

Experienced educated personnel are selected for this purpose. Based on a certain programme and with the former knowledge of the people, they go to the villages,(for house to house visits)gathering information on the health of every household member, (according to the data of the public statistics and the reconnaissance carried out) and taking blood slides from febrile and suspected cases.

These activities, according to climatic and environmental conditions, should be carried out throughout the year or at least during the transmission season and for some months before or after it. Considering that the understanding and memory of the villagers may deviate the agents from detecting the cases it is better to expand these activities from the viewpoint of time, as far as possible so that daily information regarding the villagers' health could be at hand. But, since such expansion under the present conditions are not possible for most countries, these activities are carried on the weekly, biweekly and monthly basis in various countries the result of which, with due consideration to the rate of cooperation of the people, the different intervals and the quantity of the slides collected from the point of view of case detection, is shown in Annexes IV.1 and IV.2.

Mass blood collection is carried out in two types. One in the research station of Kazerun to clear out the value of the operations and the other in the consolidation areas where the positive cases are occasionally found. To gather knowledge on the real situation of the area, mass blood collections were carried out, the result of which have shown that:

a) In areas where transmission occurs the ratio of the positive cases detected during the transmission season and otherwise is not similar. The febrile positives during the transmission season are more than the afebrile cases while this is reversed out of the transmission season. Furthermore, a mass blood collection produces a higher number of positives which will enable the integration of the treatment and spraying programmes approaching a quicker objective of interrupting transmission in the area.

b) Mass blood collections do not help in the consolidation areas as there will be no positive cases.

In consolidation areas where malaria has re-appeared due to some reasons, mass blood collections are of great help in the detection of cases from the transmission in the areas and where the expansion of infection will be eliminated by the treatment of the cases. It is therefore essential to make the utmost use of this method to prevent propagation of these cases and have them detected and treated as far as possible. Annexes V, VI, VII and VIII.

2. Passive Case Detection

It is natural that every sick person will refer to the physician, dispensary, hospital and laboratory to soothe his pain. To this end, the easiest way to detect the malaria patients and to gather knowledge on the progress of the disease in different areas, the cooperation of physicians, dispensaries and health institutions will be of great help towards detection of such cases. Examples are available of such cooperation and refusal during recent years, the two of which are given hereunder.

a) The cooperation of a dispensary physician by collecting blood slides from some suspect cases in the area of Galugah of Mazanderah led the Malaria Eradication Organization to an on-time discovery of a progressive foci and prevention of the disease.

b) In the area of Anzal; the non-cooperation of a physician in collecting the blood slides from suspected cases resulted in the normal progress of the disease of which the Malaria Eradication Organization was informed after it was propagated in the area. This is due to the fact that the Malaria Eradication Organization had not received any report on the situation in the area from the dispensary.

These two examples, happened in two different places and prove the advantages and damages of cooperation and non-cooperation of such institutions. It also proves that active or passive surveillance alone is unable to prevent thoroughly the probable danger in the area. It is obvious that such cooperation - especially in areas just entering the consolidation phase, where the re-appearance of anopheline density causes danger of transmission and the detection of imported or remaining cases is of great importance - would be the best guide for the Malaria Eradication Organization. The primary value of such cooperation, because of the villagers regard to physicians and drugs, and because of the long intervals between the visits of the active surveillance, agents persuaded the Malaria Eradication Organization to strenghten the activity of collecting blood slides through the dispensaries, approaching the real value of this type of work which is named Activated Passive Surveillance. The result of these activities are shown in Annexes IX and X.

Voluntary collaboration to the Iran Malaria Eradication Programme started in 1959. The collaborators were chosen by the guidance and will of the villagers and started to work after receiving the necessary training and exercices. They collected 2903 slides out of which 8 were positive, namely 2.7% of the slides taken, which is almost equal to the percentage of the positive cases detected through active surveillance. Should this programme expand widely and every day knowledge on the people's health be obtained, further results would be achieved which should be investigated in the coming year. The results of this and other surveillance activities are shown in Annex IV.2.

With due consideration to the figures and ratio of the case detection it may be possible to comment clearly as to which of these methods should be recommended under the conditions of different countries. A glance at the difficulties and deficiencies encountered with each method may facilitate recommendation of better and clearer method or methods.

Difficulties encountered which may be present in some countries with either case detection methods mentioned above, are:

ACTIVE CASE DETECTION

This is carried out on the basis of monthly visit. Since during the interval of the visits the Malaria Eradication Organization has not got any information of the area, and knowing that:

- the villagers' intellect does not reach a stage when they can remember their sickness history of 29 days ago,

- the interval may be a parasitaemia period while the patient may not have any parasites on the day of the agent's visit,

- travellers, particularly from infected areas, may be many during this interval and the agent may not see any of them,

- the surveillance activities coincide with the season of agricultural work when the villagers mostly work in the farms, and,

- a number of the patients may have gone to the dispensaries on the day of the agent's visit.

The generalization of this method alone, will allow for the detection of all cases in the area.

Mass Blood Collection: although considered the best and most valuable method for detecting the parasite cases, particularly in the areas where complete interruption of transmission with the insecticides has been achieved, is difficult and highly expensive to be expanded throughout the year, and the extent of the people's cooperation with this programme is unknown

PASSIVE CASE DETECTION

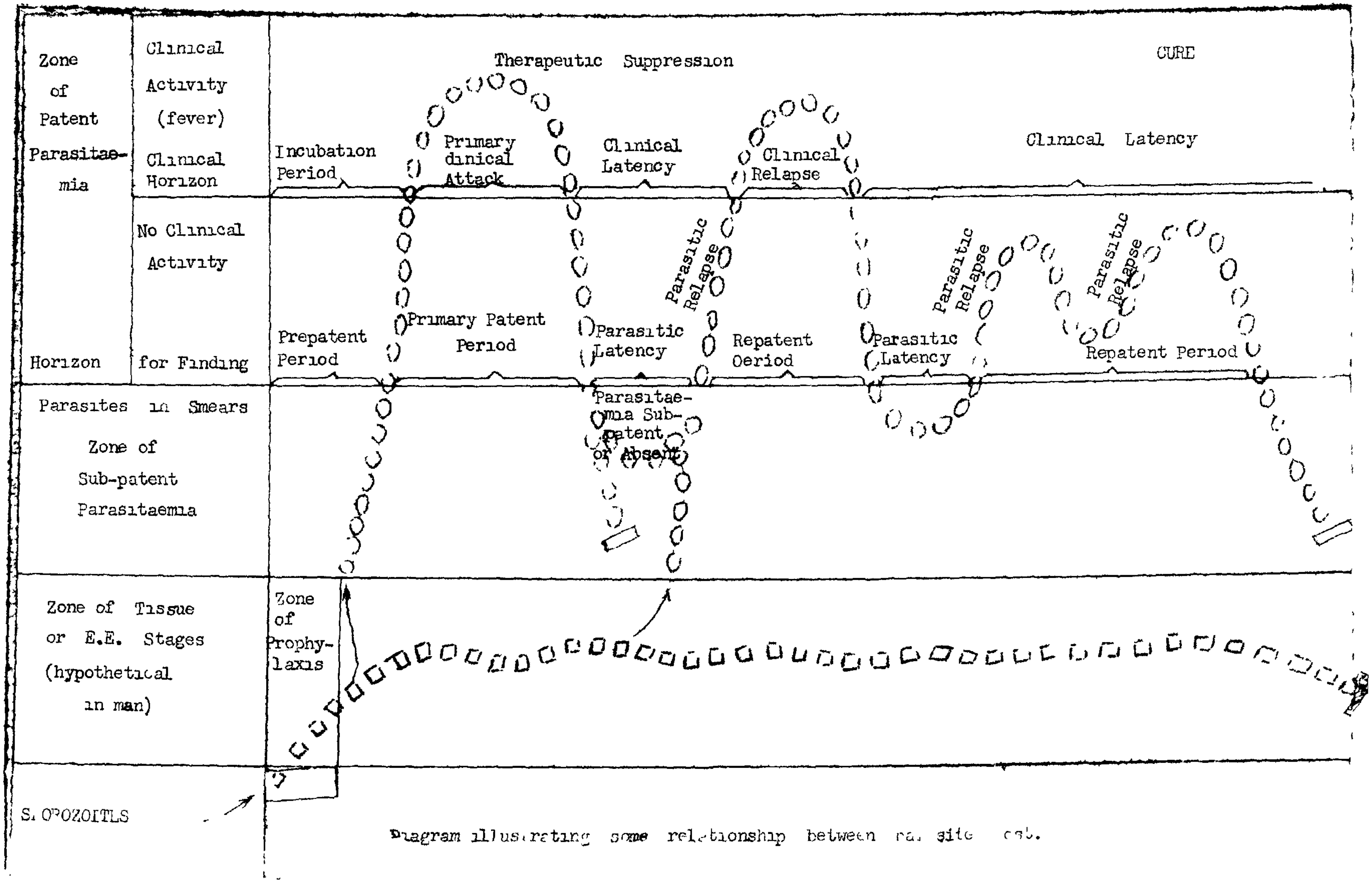
The long distance between the villages, dispensaries and health centres, absence of serious symptoms to cause the people to refer to such centres, carelessness of the physicians and of the health centre authorities to look after the patients' needs; due to their business occupations, great number of patients, and lack of time to collect blood slides, all of which are causes for non-detection of the cases, if any, through Passive Case Detection in the area. Activated passive surveillance was initiated in Iran to compensate for this. It has succeeded considerably in detecting the parasite cases as shown in Annexes IX and X. This method, of course, does not cover those individuals who do not refer to dispensaries.

Voluntary Collaboration Method is the best method of providing information on the daily circumstance of the area, control the traffic in the locality, allow the people to participate in the execution of the health programmes which are theirs, and thus allow them to detect and eliminate, by their own hands, any danger in the area. This method, however, may not be successfully applicable in the undeveloped countries because the villagers do not recognize these voluntary collaborators as real health agents for their locality. The villagers refuse any first aid from the voluntary collaborators and prefer to go to health and curative centres. The collaborators, at any rate, will be informed of the matter and will report it to the Malaria Eradication Organization.

CONCLUSION

I. In countries where rural health is sufficiently expanded, where there are no other curative centres for the patients and where the health authorities are responsible for the peoples' health, extra case detection programmes, in such areas which are under sufficient care, do not seem necessary.

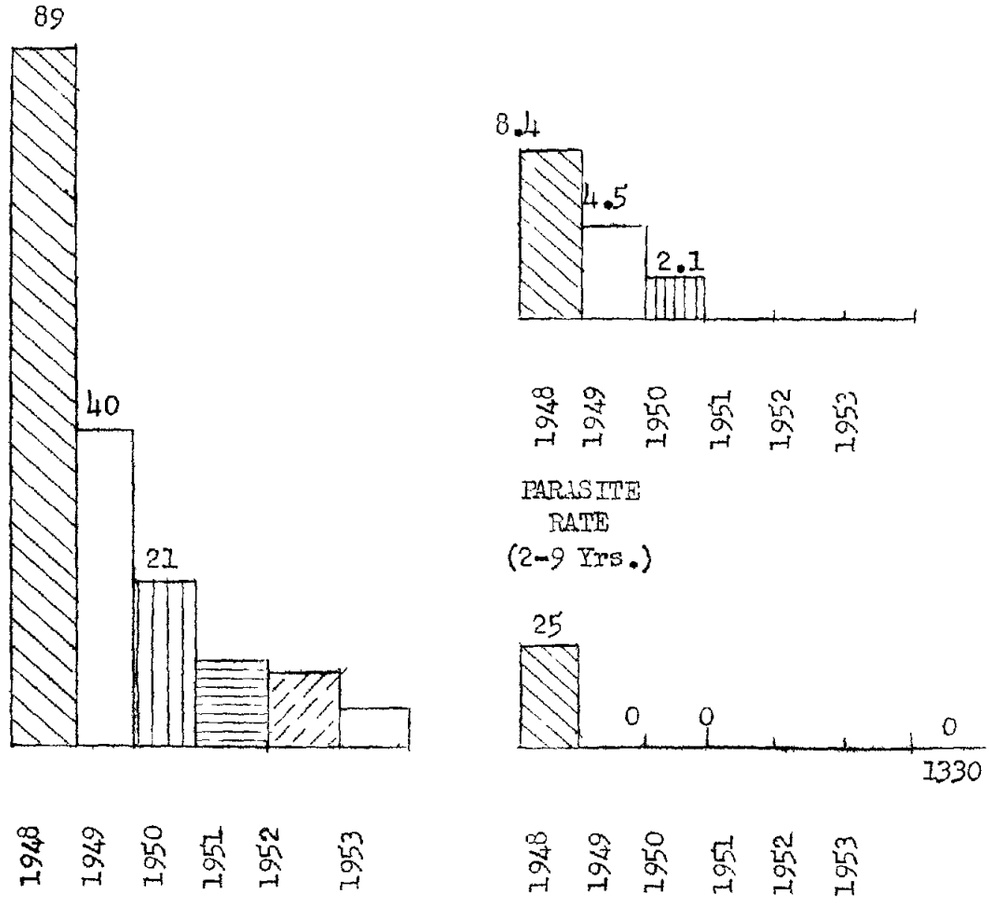
II. In countries, with low rural health and with low general knowledge, where the malaria eradication programmes have commenced and are progressing, an overall activation of the methods mentioned above should be executed in accordance with local conditions and facilities available.



S. OPOZOITLS

Diagram illustrating some relationship between ra. site csb.

MALARIOMETRIC SURVEY IN CHALUS



RESULT OF MASS BLOOD COLLECTION IN BORASJAN AREA
IN OCTOBER 1961 AND RATIO OF POSITIVE CASES WITH FEVER

Temperature	Slides Collected	Positive Cases Detected			Percentage of Positive Slides	
		V	F	M		
36 - 36.5	102	1	12	-	12%	5/5
36.5 - 37	420	-	16	-	4%	
37 - 37.5	1009	1	36	-	4%	5
37.5 - 38	48	-	5	-	10%	
38 - 38.5	29	-	7	-	0%	
38.5	91	-	7	-	35%	
Undetermined	30	-	1	-	3%	
TOTAL	1729	2	84	-		

RESULT OF ACTIVE CASE DETECTION - BORANJA AREA IN 1961

Month	Afebrile	Febrile	Positive with fever			Positive without fever			Percentage of Positives	
			V	F	M	V	F	M	Afebrile	Febrile
April										
May	-	75	-	-	-	-	-	-	-	-
June	-	87	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-
August	-	80	-	-	-	-	1	-	1.2	-
September	-	81	-	-	-	-	-	-	-	-
October	-	113	-	-	-	1	1	-	1.6	-
November	-	110	-	-	-	-	1	-	1.7	-
December	-	131	-	-	-	-	-	-	-	-
January	-	142	-	-	-	-	-	-	-	-
February										
March										
TOTAL		819				1	3			

COMPARATIVE EVALUATION OF CASE DETECTION METHODS.

Eradication Phase	Early Attack			Advance-Attack and consolidation				
	ACD		PCD	ACD		PCD		
	Active Surveillance	Mass Blood Collection		Active Surveillance	Mass Blood Collection	Vol. Col.	Passive Surveillance	APCD
Number of Slides Collected	+ 95359 ++221785 +++ 79 ++++ 819	x 1659 xx14146 xxx 4039	Not active	-907898 = 20167 ≡ 43022	. 5327 .. 1860 .: 3208 .:: 2183	2903	Not active	* 272 ** 403 *** 25890
Positive Cases Detected	+ 4937 ++ 3738 +++ 1 ++++ 4	x 88 xx 84 xxx 182		- 1439 = 516 ≡ 162	. - .. 3 .: 10 .:: 56	8		* 20 ** 43 *** 299
Positive Per 1,000 Slides	+ 51 ++ 12 +++ 12 ++++ 4/8	x 54 xx 22 xxx 45		- 1 = 25 ≡ 3/7	. - .. 1/5 .: 3 .::26	2/7		* 75 ** 305 *** 9

\+ Throughout stephensi area, 8 months activities in 1961 (April-November)

++ Throughout non-stephensi area, 8 months activities in 1961 (April-November)

+++ One round in stephensi area, 1961

++++ Throughout the year, a particular stephensi area, 1961.

x One round mass blood collection in stephensi are before suppressive drug administration.

xx Mass blood collection throughout the year in particular stephensi area.

xxx Mass blood collection throughout the year in particular area of Kazerun, 1961.

\- Eight months activities without any transmission foci, 1961 (April-November)

= Eight months activities with transmission foci, 1961 (April-November)

≡ The whole year activities with transmission foci in Mazanderan area, 1960.

. Consolidation in foci area with two years transmission interruption.

.. Consolidation in foci area with two years transmission interruption.

.: Consolidation in foci area with one year transmission interruption.

:: Consolidation in foci area with transmission.

* Result of activated passive surveillance in Chalus area, 1960.

** Result of activated passive surveillance in Chalus area, 1961.

*-** Result of activated passive surveillance in northern area, 1961.

RESULT OF MASS BLOOD COLLECTION IN 17 VILLAGES OF KAZERUN AREA IN 1961

Month	Afebrile	Febrile	Positive with fever			Positive without fever			Percentage of Positives	
			F	V	M	F	V	M	Afebrile	Febrile
April	157	4	-	-	-	-	1	-	16	0
May	99	5	-	-	-	-	2	-	2	0
June	142	23	-	-	-	-	12	-	8	0
July	318	2	-	-	-	8	6	-	5	0
August	896	11	1	-	-	3	17	-	2	9
September	632	22	-	3	-	10	30	-	7	14
October	622	57	5	7	-	12	30	-	6	21
November	636	29	2	4	-	11	22	-	5	20
December	181	19	1	1	-	3	3	-	3	10
January	168	16	-	-	-	1	1	-	1.5	0
February										
March										
TOTAL	3851	188	24			172				

RESULT OF MASS BLOOD COLLECTION IN KHOSHT AREA IN 1961

Month	Afebrile	Febrile	Positive with fever			Positive without			Percentage of Positives	
			V	F	M	V	F	M	Afebrile	Febrile
April										
May	282	-	-	-	-	10	-	-	3	-
June	378	-	-	-	-	5	-	-	1.4	-
July	591	-	-	-	-	19	-	-	3.5	-
August	512	9	-	1	-	27	-	-	C	10
September	599	48	1	1	-	9	1	-	1.7	4
October	534	50	-	3	-	1	-	-	15	4
November	558	60	-	-	-	1	-	-	1.5	
December	524	1	-	-	-	-	-	-	-	-
January										
February										
March										
TOTAL	3978	168		5			78			

COMPARATIVE EVALUATION OF CASE DETECTION METHOD IN BORASJAN AREA 1961 (AREA WITH TRANSMISSION)

Method of Case Detection	Number of Village	Population Presented	Slides Collected	Month of Survey	Positive Cases V	Positive Cases F	Total Population	Percentage of P.
Mass Blood Collection	6	1665	1649	October	3	85	1802	5.4
Parasite survey	4	1041	79	August September	1	-	1041	1.3

EM/ME-Tech.3(a)/30
Annex.VIII

RESULT OF MASS BLOOD COLLECTION IN DIFFERENT AREAS

Consolidation	Population	Slides Collected	Positive Cases Detected	Positive per thousand Slides
Consolidation in foci area by two year interruption	15500	5327	-	0
Consolidation in foci area with one year interruption	2500	1860	3	1.5
Consolidation in transmission foci	7800	3208	10	3
No Consolidation				
In Stephensi Area before suppressive drug distribution	2500	2183	56	28

RESULT OF PASSIVE CASE DETECTION BY ACTIVATED PASSIVE SURVEILLANCE IN CHALUS DISPENSARY IN 1961

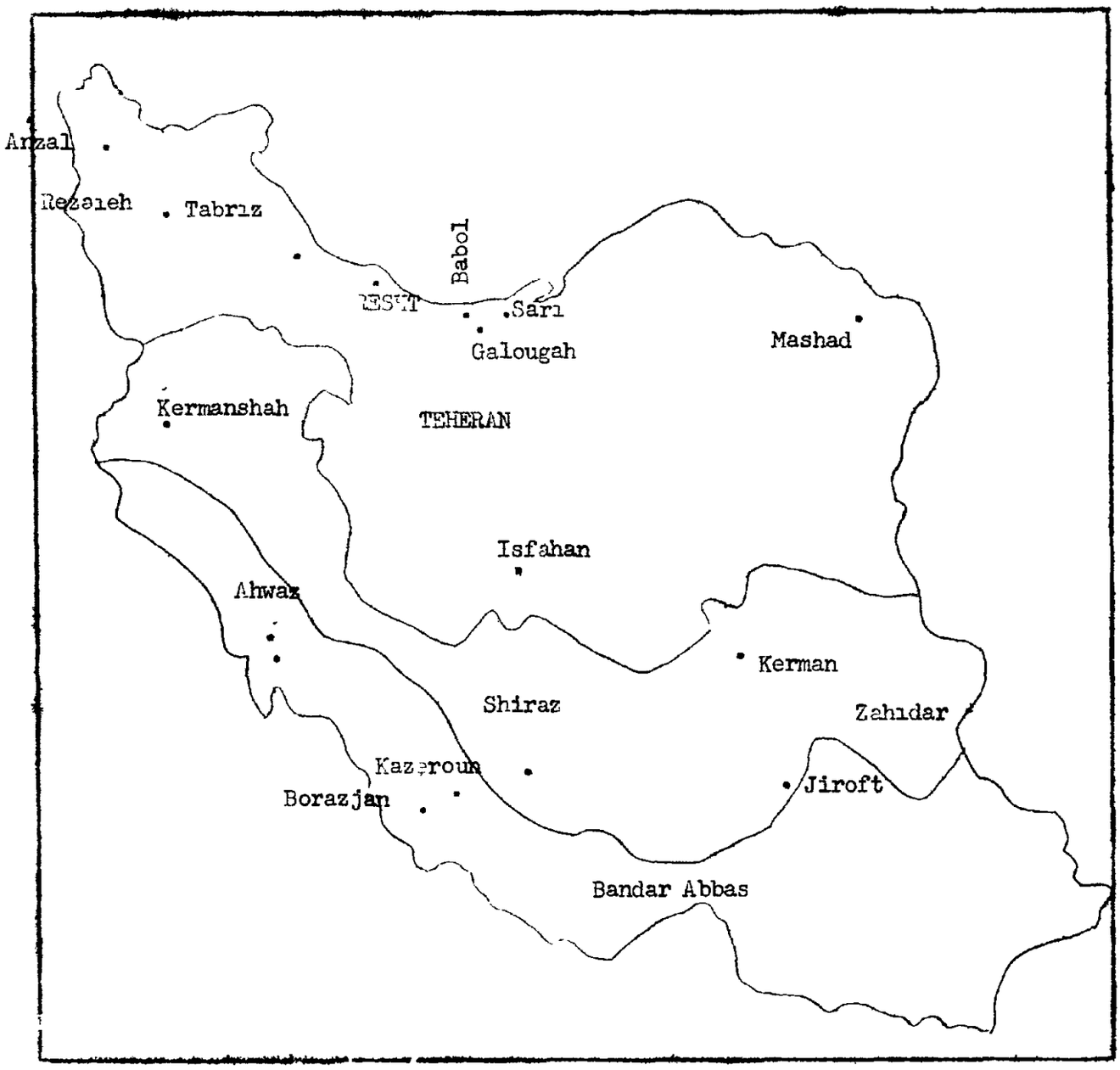
Month	Afebrile	Febrile	Positive with fever			Positive without fever			Percentage of Positives	
			V	F	M	V	F	M	Afebrile	Febrile
April	33	13	-	-	-	3	-	-	9	-
May	41	24	3	-	-	3	-	1	10	12
June	37	23	4	-	-	6	-	1	20	24
July	83	90	4	-	-	8	-	-	10	4/2
August	4	6	5	-	-	2	-	-	50	90
September	-	3	2	-	1	-	-	-	-	-
October	24	20	-	-	-	-	-	-	-	-
November										
December										
January										
February										
March										
TOTAL	222	179	19			24				

Annex.IX

Annex • X

RESULT OF PASSIVE CASE DETECTION BY ACTIVATED PASSIVE SURVEILLANCE IN CHALUS DISPENSARY IN 1960

Month	Afebrile	Febrile	Positive with fever			Positive without fever			Percentage of Positives	
			V	F	M	V	F	M	Afebrile	Febrile
April	-	18	1	-	-	-	-	-	-	5
May	3	11	1	-	-	-	-	-	-	9
June	-	9	-	-	-	-	-	-	-	-
July	16	31	6	-	-	2	-	-	12	18
August	43	22	-	-	-	5	-	-	10	-
September	45	10	1	-	-	4	-	-	10	10
October	29	22	-	-	-	-	-	-	10	0
November	26	23	-	-	-	-	-	-	0	0
December	39	8	-	-	-	-	-	-	0	0
January	42	10	-	-	-	-	-	-	0	0
February	48	25	-	-	-	-	-	-	0	0
March	43	24	-	-	-	-	-	-	0	0
TOTAL	334	213	9			11				



Map of Iran showing the area referred to in this article