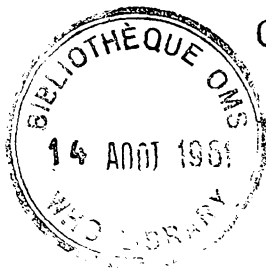


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ORGANIZATION OF CASE DETECTION IN SOME MALARIA
ERADICATION PROGRAMMES IN THE AMERICAS¹

by

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1. INTRODUCTION

In malaria eradication programmes carried out in Mexico, Guatemala, Jamaica, Trinidad, Venezuela, Colombia and Brazil much attention is being paid to perfecting case detection activity, which forms the basis of surveillance operations. The organization of case detection follows generally the recommendations in the Seventh and Eighth Reports of the WHO Expert Committee on Malaria although naturally there are individual features in different countries, reflecting the variations in development of economy, public health service, malaria eradication programme, co-operation of population in malaria eradication activities, initiative of national malariologists, etc. The aim of the present paper is to analyse the various types of organization of case detection activity in the countries visited and to find some criteria for assessment of this activity, which now becomes increasingly developed in malaria eradication programmes throughout the world.

2. TWO GROUPS OF COUNTRIES

Both categories of case detection personnel: surveillance agents or "evaluators"² (who are the staff members of NMES and carry out the active case detection) and notifiers (who are the medical practitioners or voluntary collaborators and carry out the passive case detection), exist in all countries. There are, however, significant

¹ Extract from "Report on a visiting tour to the Americas Region PASB/WHO September-December 1960" (unpublished).

² "Evaluadores" in Mexico, "Visitadores rurales tipo A" in Venezuela, "Auxiliares de evaluacion" in Guatemala.

differences in the types of notifiers in the various countries. In one group of countries (Mexico, Guatemala, Brazil and Colombia) the voluntary collaborators who are usually laymen (teachers, villagers) play an important part in passive case detection. In another group of countries (Venezuela, Jamaica, Trinidad) voluntary collaborators are not employed and the passive case detection is done only by medical and paramedical staff.

3. ORGANIZATION OF ACTIVE CASE DETECTION: NUMBER OF SURVEILLANCE AGENTS

Active case detection is carried out by surveillance agents whose principal duties are house-to-house visits in those localities which have no notification posts, supervision of work of notification posts and the treatment of suspected and confirmed malaria cases. In some countries the surveillance agents carry out routine entomological observation in addition to their other duties (Table 1). As a rule, surveillance agents collect the blood slides from persons with recent or actual history of fever during their house-to-house visits, but in Jamaica and Trinidad blood slides are also collected from patients with fever in hospitals and dispensaries. In some countries the house-to-house visits and the taking of blood slides are carried out at the end of the attack phase not only by surveillance agents but by the chiefs of spraying squads (Jamaica and Mexico).

The number of evaluators has increased greatly in all programmes during the last years (Table 2). In a harmoniously developing programme, the number of surveillance agents should depend on the phase of the programme, the population protected and the number of existing notification posts. The relation of the number of surveillance agents in countries in 1960 and the above-mentioned factors is shown in Table 3.

TABLE 1. THE DUTIES OF SURVEILLANCE AGENTS (= EVALUATORS = RURAL VISITORS)
IN SIX COUNTRIES OF THE AMERICAN REGION

| Country | House-to-house visits | Supervision of work of | | | Treatment | | Epidemiological investigations | Entomological observations |
|-------------------|-----------------------|-------------------------|--------------------------|-------------|-----------------|----|--------------------------------|----------------------------|
| | | Voluntary collaborators | Other notification posts | Presumptive | Radical or mass | | | |
| Venezuela | + | - | + | + | + | *+ | + | + |
| Guatemala | + | + | + | + | + | + | + | - |
| Mexico | + | + | + | + | + | + | + | - |
| Trinidad | + | - | + | + | + | + | + | + |
| Jamaica | + | - | + | + | + | + | + | - |
| Colombia | + | + | + | + | + | - | - | - |
| Brazil (S. Paulo) | + | + | + | + | + | + | + | + |

* Through special "type B of rural visitors"

TABLE 2. NUMBER OF EVALUATORS IN 1957-1960
(AT THE END OF THE YEAR)

| Group of countries | Country | 1957 | 1958 | 1959 | 1960 |
|--------------------|----------------------|------|------|-------|-------|
| I | Venezuela | 361 | 353 | 308 | 407 |
| | Jamaica | 26 | 16 | 32 | 63 |
| | Trinidad | 31 | 31 | 58 | 71 |
| II | Guatemala | 20 | 11 | 29 | 44 |
| | Mexico | 57 | 182 | 386 | 981 |
| | Colombia | 63 | 183 | 166 | 330 |
| | Brazil (S. Paulo) | 0 | 0 | 26 | 53 |
| | Totals | 558 | 776 | 1 005 | 1 949 |

TABLE 3. PROPORTION OF SURVEILLANCE AGENTS TO POPULATION AND NOTIFICATION POSTS EXISTING IN 1960

| Group of countries | Countries | Date total coverage spraying started | Population in original malarious area | Number of notification posts | Proportion of surveillance agents to: | | Phase of programme |
|--------------------|-------------------|--------------------------------------|---------------------------------------|------------------------------|---------------------------------------|--------------------|--|
| | | | | | Population | Notification posts | |
| I | Venezuela | 1950 | 4 720 000 | 2 262 | 1 : 11 000 | 1 : 5 | Maintenance and consolidation; small area in late attack phase |
| | Trinidad | 1958, I | 789 000 | 88 | 1 : 11 000 | 1 : 1 | Consolidation; small area in late attack phase |
| | Jamaica | 1958, I | 1 016 000 | 168 | 1 : 16 000 | 1 : 3 | Ditto |
| II | Guatemala | 1956, VIII | 1 545 000 | 1 866 | 1 : 35 000 | 1 : 42 | Late attack. |
| | Mexico | 1957, I | 18 116 000 | 35 775 | 1 : 18 000 | 1 : 36 | Late attack; small area in consolidation phase |
| | Colombia | 1958, IX | 9 000 000 | 6 746 | 1 : 27 000 | 1 : 20 | Attack; small area in late attack phase |
| | Brazil (S. Paulo) | 1958, IX | 2 200 000 | 1 614 | 1 : 41 000 | 1 : 30 | Consolidation; small area in late attack phase |

The proportion of surveillance agents to population shown in Table 3 is the very approximate average for the whole country and of course, the ratio of these agents is higher in areas under the consolidation phase than in those areas of the attack phase. For example in Jamaica the figures are as follows:

| | <u>Proportion of surveillance agents to:</u> | |
|--------------------------|--|---------------------------|
| | <u>Population</u> | <u>Notification posts</u> |
| Consolidation phase area | 1 : 10 000 | 1 : 2 |
| Attack phase area | 1 : 23 000 | 1 : 3 |

Table 3 shows that the programmes which have the highest surveillance agent rate are Trinidad, Jamaica and Venezuela, while the lowest rates occur in Guatemala and Brazil.

4. ORGANIZATION OF PASSIVE CASE DETECTION. NUMBER AND COMPOSITION OF NOTIFICATION POSTS

Passive case detection is carried out by different types of malaria notifiers, representing the "malaria notification post". There are three main types of notification posts in the Americas:

- (i) state and municipal health services (hospitals, clinics, dispensaries, public health centres, etc.);
- (ii) private medical services (hospitals, clinics, physicians); and
- (iii) voluntary collaborators (teachers, pharmacists, ordinary villagers).

As a rule, personnel of the National Malaria Eradication Service try to get the collaboration of both state and private medical services, which are usually found in the larger localities. The information posts with voluntary collaborators are first established in those larger localities without medical services. For example, in Mexico, voluntary collaborators were chosen during the first stage, in localities with populations of more than 500 inhabitants. During the second stage they were established in localities with populations of more than 300 inhabitants and the plan for 1961 foresees the selection of voluntary collaborators in all localities with more than 100 inhabitants and in a quarter of the localities of under 100 inhabitants.

In most countries, each information post is provided with a special kit containing everything necessary for the taking of blood smears and for the presumptive treatment of the patient. This is an indispensable condition of collaboration; unfortunately however, it is not the only stimulus required, for a high proportion of the notification posts so supplied are in the "non-productive" category.

Notifiers usually work on a voluntary co-operation basis, without a special fee. An exception to this rule is Venezuela where nurses in the dispensaries are paid one bolivar (US \$ 0.33) for each blood smear taken from feverish patients.

The number of notification posts is indicated in Table 3. Usually, in a locality there is only one notification post and therefore, the proportion of notification posts to localities gives a rough idea of the malarious area covered by passive case detection units. Relevant data are summarized in Table 4.

TABLE 4. NUMBER AND PROPORTION OF LOCALITIES IN ORIGINALLY MALARIOUS AREA COVERED BY NOTIFICATION POSTS IN 1960

| Group of countries | Country | Number of localities | Number of notification posts | Percentage of notification posts to localities |
|--------------------|----------------------|----------------------|------------------------------|--|
| I | Venezuela | 34 049 | 2 262 | 6.6 |
| | Jamaica | 2 899 | 168 | 5.8 |
| II | Guatemala | 9 080 | 1 866 | 20.5 |
| | Mexico | 98 700 | 35 775 | 36.2 |
| | Colombia | 27 957 | 6 746 | 24.1 |
| | Brazil (S. Paulo) | 9 533 | 1 614 | 16.9 |

As it can be seen, the coverage of localities by notification posts is much higher in the countries of the second group than in those of the first group. Reports show that in Trinidad 88 notification posts existed, but they are little for the malaria eradication programme. They are not provided with a special kit and they do not take blood samples from all fever cases; the sending of slides from patients clinically suspected of having malaria is the only actual "collaboration" they undertake.

5. PRODUCTIVITY OF SURVEILLANCE AGENTS AND NOTIFICATION POSTS

Table 5 shows the total proportion of the population of the original malarious area examined, both by active and passive methods of case detection (= "annual examination rate").

If an annual examination rate of at least 10% is to be considered as the criterion of the required coverage of the population by case detection (Eighth Report of the Expert Committee on Malaria) then only Venezuela in the last three years, Trinidad in the last two years, and Jamaica in 1960 have reached this target. Guatemala is close enough to the target, Mexico is approaching it relatively slowly, but steadily; and Colombia has just started and has still far to go.

Comparative productivity (i.e. the number of slides produced) of surveillance agents and notification posts is shown in Table 6.

As it can be seen, all the countries in the first group that reached the projected level of annual examination rate carried out the case detection almost exclusively (Trinidad), or mainly (Venezuela and Jamaica) by means of active method. While in the countries of the second group, passive case detection is used more frequently than active, especially in Guatemala, and it plays an important role in Mexico and Brazil as well. Of all the countries visited Guatemala has the largest proportion of slides produced by information posts.

The relative productivity of different types of notification posts in the various countries, with or without voluntary collaborators is illustrated by Table 7.

In Jamaica, as well as in Venezuela, public health centres are the main source of information for passive case detection. In those countries where the system of voluntary collaborators is in operation, these voluntary collaborators are producing the larger proportion of slides (Guatemala, Mexico, Colombia, Brazil). Private medical services are usually the worst collaborators everywhere, except perhaps, in Jamaica.

TABLE 5. PROPORTION (%) OF POPULATION OF THE ORIGINAL MALARIOUS AREA EXAMINED BY SURVEILLANCE AGENTS AND NOTIFIERS IN 1957-1960

| Group of countries | Country | Number of slides examined | | | | Percentage of slides to population | | | |
|--------------------|-------------------|---------------------------|---------|---------|-----------|------------------------------------|-------------|-------------|-------------|
| | | 1957 | 1958 | 1959 | 1960 | 1957 | 1958 | 1959 | 1960 |
| I | Venezuela | 319 289 | 482 436 | 503 777 | 576 310 | 6.8 | <u>10.2</u> | <u>10.7</u> | <u>12.2</u> |
| | Trinidad | - | 52 159 | 101 923 | 103 027 | - | 6.6 | <u>12.9</u> | <u>13.1</u> |
| | Jamaica | - | 39 726 | 35 765 | 184 534 | - | 3.9 | 3.5 | <u>18.1</u> |
| II | Guatemala | 25 232 | 62 119 | 108 047 | 115 311 | 1.6 | 4.0 | 7.0 | 7.5 |
| | Mexico | 175 089 | 403 663 | 821 598 | 1 212 770 | 1.0 | 2.2 | 4.5 | 6.7 |
| | Colombia | - | - | 329 268 | 376 784* | - | - | 3.6 | 4.2* |
| | Brazil (S. Paulo) | - | - | - | 89 007** | - | - | - | 4.0** |

* January/June and October, November only

** January/September only

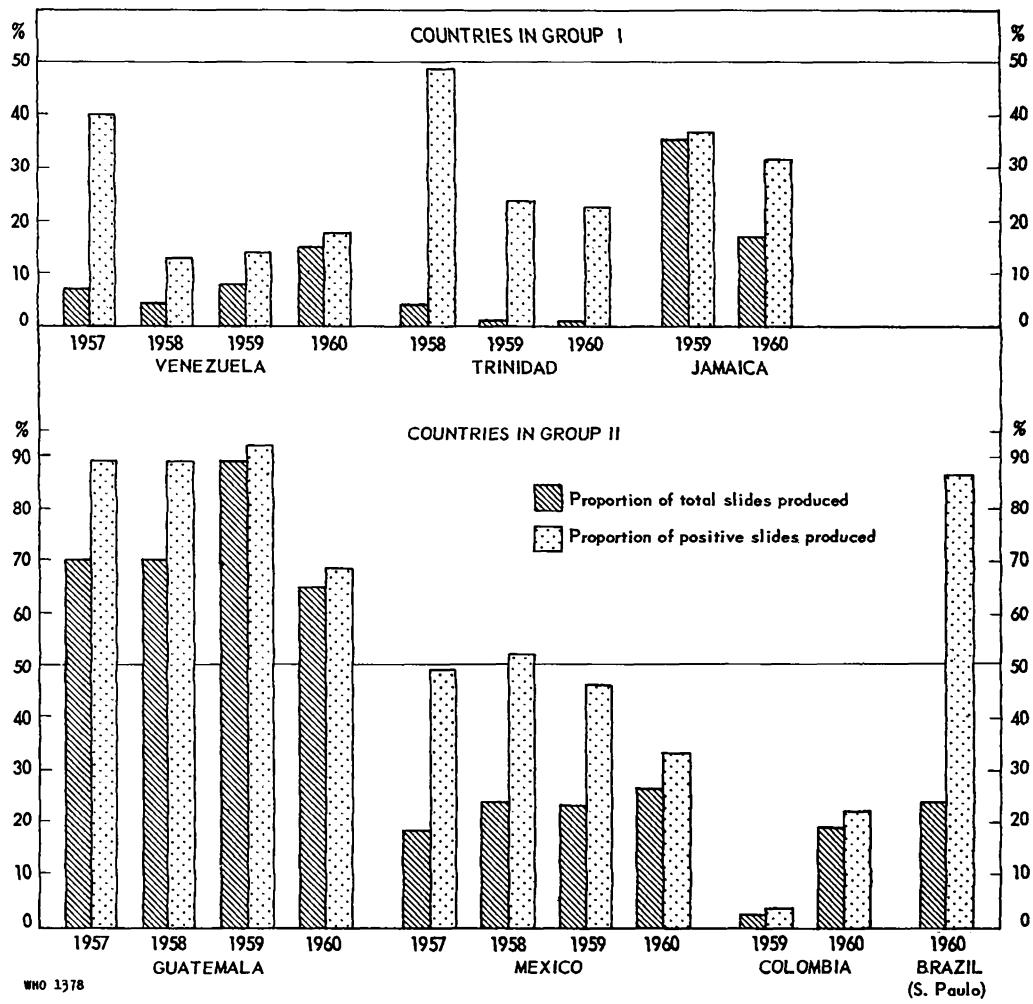
TABLE 6. NUMBER AND PERCENTAGE OF SLIDES PRODUCED BY ACTIVE AND PASSIVE CASE DETECTION AGENCIES

| Group of countries | Country | Type of case detection | 1957 | | 1958 | | 1959 | | 1960 | |
|--------------------|-----------|------------------------|--------|-------------|--------|-------------|--------|-------------|-------------|----------------|
| | | | Number | % | Number | % | Number | % | Number | % |
| I | Venezuela | Active | 297 | <u>95.2</u> | 461 | <u>95.6</u> | 463 | <u>92.1</u> | 240 | <u>85.3</u> * |
| | | Passive | 21 | 6.8 | 21 | 4.4 | 40 | 7.9 | 41 | 14.7* |
| | Trinidad | Active | - | - | 49 | <u>95.8</u> | 100 | <u>98.7</u> | 102 | <u>99.4</u> |
| | | Passive | - | - | 2 | 4.2 | 1 | 1.3 | 603 | 0.6 |
| | Jamaica | Active | - | - | - | - | 22 | <u>64.3</u> | 153 | <u>83.4</u> |
| | | Passive | - | - | - | - | 12 | <u>35.7</u> | 30 | <u>16.6</u> |
| II | Guatemala | Active | 5 | 30.0 | 18 | 29.5 | 11 | 10.7 | 39 | 34.0 |
| | | Passive | 13 | <u>70.0</u> | 43 | <u>70.5</u> | 96 | <u>89.3</u> | 76 | <u>66.0</u> |
| | Mexico | Active | 142 | 81.6 | 305 | <u>75.7</u> | 633 | 77.1 | 883 | 73.4 |
| | | Passive | 32 | <u>18.4</u> | 97 | <u>24.3</u> | 188 | 22.9 | 320 | 26.6 |
| | Colombia | Active | - | - | - | - | 323 | <u>98.3</u> | 301 | <u>80.1</u> ** |
| | | Passive | - | - | - | - | 5 | 1.7 | 74 | <u>19.9</u> ** |
| Brazil (S. Paulo) | Active | - | - | - | - | - | - | 67 | <u>76.3</u> | |
| | Passive | - | - | - | - | - | - | 21 | <u>23.7</u> | |

* January/June only

** January/July and October/November only

FIG. 1
 Percentage of total slides and positive slides produced by notification posts
 (passive case detection)



6. EFFECTIVENESS OF ACTIVE AND PASSIVE METHOD OF CASE DETECTION

The effectiveness of different methods of case detection, i.e. the numbers and proportion of positive slides produced can be seen in Table 8.

Effectiveness of active case detection is very high in all countries of the first group and in Colombia, of the second group, where the system of voluntary collaborators is still under development. In Mexico surveillance agents and notifiers are producing about the same number of positive slides and in Guatemala and São Paulo (Brazil) effectiveness of passive case detection is much higher than active case detection.

It is characteristic that the proportion of positive slides found by the passive method is as high as the proportion of slides taken by notification posts and usually even higher (figure 1). One can imagine how profitable would be the further development of this cheap and effective passive case detection in such countries as Colombia, Trinidad, Venezuela and Brazil.

7. DISCUSSION

As it has been shown a significant difference exists in the organization, productivity and effectiveness of active and passive case detection in the different countries visited. It is difficult to determine exactly the reasons for these differences. We do not know yet the origin of all the factors determining the features of the organization of case detection activity in different programmes and objective criteria of assessment of these factors. At this early stage, at least two factors should be considered in the first place:

- (i) development of public health services in country and
- (ii) development and efficacy of public health education.

It is easy to understand that the method of case detection and the type of notification post applied, depend on the development of the public health service. Indeed there is no system of voluntary collaborators in Jamaica, Trinidad and Venezuela, which are the countries with relatively well-developed health services. On the contrary, the system of voluntary collaborators plays an important role in

TABLE 7. PERCENTAGE OF SLIDES COLLECTED BY DIFFERENT TYPE OF NOTIFICATION POSTS IN SOME PROGRAMMES

| Type of notification post | Guatemala 1960 | Colombia, State of Monteria Oct. 1959-Aug. 1960 | Jamaica 1959 | Jamaica June and Aug./Dec. 1960 |
|---------------------------|-------------------|---|-----------------|------------------------------------|
| Voluntary collaborators | 70.7 | 53.8 | - | - |
| Public Health Centres | 21.6 | 36.6 | 60.2 | 74.0 |
| Hospitals | 4.7 | 7.5 | 11.1 | 12.7 |
| Private Medical Services | 3.0 | 2.1 | 28.7* | 13.3* |

* Including estate clinics

TABLE 8. NUMBER AND PERCENTAGE OF POSITIVE SLIDES PRODUCED BY ACTIVE AND PASSIVE METHODS OF CASE DETECTION

| Group of countries | Country | Type of case detection | 1957 | | 1958 | | 1959 | | 1960 | |
|----------------------|-----------|------------------------|--------|-------------|--------|-------------|--------|-------------|-------------|----------------|
| | | | Number | % | Number | % | Number | % | Number | % |
| I | Venezuela | Active | 537 | <u>59.9</u> | 984 | <u>86.5</u> | 780 | <u>85.6</u> | 530* | <u>82.5</u> |
| | | Passive | 360 | 40.1 | 154 | 13.5 | 131 | 14.4 | 112 | 17.5 |
| | Trinidad | Active | - | - | 191 | 50.8 | 74 | <u>76.3</u> | 10 | <u>76.9</u> |
| | | Passive | - | - | 185 | 49.2 | 23 | 23.7 | 3 | 23.1 |
| | Jamaica | Active | - | - | - | - | 210 | <u>62.7</u> | 91 | 67.4 |
| | | Passive | - | - | - | - | 125 | 37.3 | 44 | <u>32.6</u> |
| II | Guatemala | Active | 384 | 10.0 | 1 417 | 11.1 | 656 | 8.2 | 962 | 31.6 |
| | | Passive | 3 475 | <u>90.0</u> | 11 377 | <u>88.9</u> | 7 328 | <u>91.8</u> | 2 082 | <u>68.4</u> |
| | Mexico | Active | 2 246 | 51.2 | 1 577 | 47.8 | 1 704 | 53.2 | 2 368 | 67.0 |
| | | Passive | 2 141 | 48.8 | 1 722 | 52.2 | 1 498 | 46.8 | 1 167 | 33.0 |
| | Colombia | Active | - | - | - | - | 3 984 | <u>95.5</u> | 4 914** | <u>77.4</u> ** |
| | | Passive | - | - | - | - | 188 | 4.5 | 1 438 | 22.6 |
| Brazil (S. Paulo) | Active | - | - | - | - | - | - | 877 | 13.0 | |
| | Passive | - | - | - | - | - | - | 5 859 | <u>87.0</u> | |

* January/June only

** January/July and October/November only

Mexico, Guatemala, Colombia and Brazil (S. Paulo State) which are countries with lower standards of public health services. It is possible to assume that the passive case detection works well in Mexico and Guatemala due to permanent and effective health education. Indeed in the headquarters of both countries and in each zone office in Mexico there are special sections with trained health educators. They do a great deal of work in explaining to the people the significance of the malaria eradication programme for the country and the individual, and the importance of public co-operation. In these countries, all sectors of the population know, in general, the basic principles of the malaria eradication programme and co-operate with NMES in one way or another. One can see many examples of collaboration by teachers, village headmen and ordinary villagers, old and young, men and women. In Colombia health education has only just started and much work remains to be done. Nevertheless the headquarters of NMES understand the significance and value of health education. Recently a special film "Struggle against malaria in Colombia" was produced and it is now being shown to the public.

In Mexico and Guatemala not only voluntary collaborators, but the majority of the not very numerous medical institutions co-operate effectively in passive case detection. The picture is quite different in countries with developed health services. Here there are no voluntary collaborators and, what is more important, there is lack of co-operation by the health services in malaria case detection. Due to this lack of co-operation of medical institutions, the co-operation of population is also very poor. As a consequence, passive case detection plays either an auxiliary role (Venezuela) or is practically non-existent (Trinidad).

At present the personnel of NMES in these countries bear almost the whole responsibility for the case detection and have coped with it quite effectively. But this leaves unsolved the question of who will carry out the case detection and other vigilance activities later, in the maintenance phase.

8. CONCLUSION

- (i) An attempt was made to analyse the experience of the malaria eradication services in Mexico, Guatemala, Jamaica, Trinidad, Venezuela, Colombia and Brazil in the organization and implementation of case detection, which is the principal activity of surveillance operations.

(ii) For the proper evaluation of case detection activities in malaria eradication programmes, different rates could be applied, among which are: the proportion of the population examined for malaria parasites (= "annual examination rate"); the proportion of the notification posts to the localities of formerly malarious area; the comparative productivity and effectiveness of active and passive methods of case detection, as well as relative role of different types of notification posts in passive case detection.

(iii) It seems that according to these criteria, case detection activity is organized and carried out in the best manner in Mexico among the countries with the system of voluntary collaborators; and in Jamaica and Venezuela among the countries without a system of voluntary collaborators.

(iv) An important aspect of properly organized case detection is a good health education programme. This aspect is well organized in Mexico and Guatemala.

v. The establishment of the notification posts should be started at the beginning of the malaria eradication campaign, when it is relatively easy to persuade medical personnel and voluntary collaborators of the importance of their collaboration. This might also assist in the early introduction of the chemotherapy into the programme and thus realize the value of their work by watching the progress made in the disappearance of malaria instead of being introduced to the work during the later stages of the campaign when they can see no tangible benefits of their labours.

(vi) It would be useful to work out some definite criteria for the evaluation of the case detection activity in different conditions and at different stages of the programme. The presence of such criteria would also help evaluation teams during their work on certification of "areas where malaria eradication has been achieved".

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