

a 61941



1 May 1961

ORIGINAL: ENGLISH

Supplement to WHO/Mal/292

CONTENTS

	<u>Page</u>
1. Editorial	2
2. Health Education Workshop	3
3. Side-effects of Antimalarial Drugs	4
4. The Economic Aspects of Malaria Eradication	8
5. Dieldrin Poisoning in Man	9
6. Co-ordination between French Guiana and Surinam	11
7. Bulk Water Containers	12
8. Reviews	13
9. The Bright Side	15

1. EDITORIAL

In order to save distribution costs, it has been decided to combine our monthly Malaria Information (Mal/Inform) with the WHO/Mal series. Malaria Information will now be issued as a supplement to WHO/Mals but will continue to be produced at approximately monthly intervals.

The function of these two documents is not the same.

The WHO/Mal series is intended:

- (a) to acquaint WHO staff, national institutes and individual research and public health workers with the changing trends in malaria research and the progress of malaria eradication by means of summaries of some relevant problems;
- (b) to distribute to the groups mentioned above those field reports and other communications which are of particular interest but which would not normally be printed in a WHO publication;
- (c) to make available some papers which will eventually appear in print but which, on account of their immediate interest or importance, deserve to be known without undue delay.

The Supplement to WHO/Mal, like its preceding Mal/Inform series, will contain articles with a less scientific and more operational approach of interest to health officers, technicians and sanitarians as well as to more specialized staff. The articles are usually extracted from the large number of reports and documents which are received by the Division of Malaria Eradication at Headquarters and are selected if it is considered that they deserve wider circulation than the original is likely to be given.

Authors alone are responsible for views expressed in signed articles. Unsigned papers which are usually produced by the Division of Malaria Eradication, similarly to the published documents of the Expert Committees, do not necessarily express the official views of the Organization but take into consideration the developing policies and programmes.

2. HEALTH EDUCATION WORKSHOP

In Jamaica an interesting course was held at the end of September 1960, at the West Indies School of Public Health, for Public Health Inspectors assigned to the Malaria Eradication Programme, under the combined direction of the staff of the Bureau of Health Education of the Government of Jamaica, the International Co-operation Administration Consultant in Health Education to the Ministry of Health, Jamaica, and the World Health Organization Consultant in Health Education to the Malaria Eradication Programme, Jamaica, for the purpose of providing training in the principles, methods and techniques of health education as applied to malaria eradication, to develop simple inexpensive teaching aids and to formulate plans for malaria education activities in the respective parishes.

The three-day workshop for the sixteen Public Health Inspectors was the first intensive training session in health education to be given to malaria eradication personnel in Jamaica.

The main purpose of the workshop was to help the inspectors to carry out health educational activities to meet various needs related to malaria eradication in their respective parishes (the administrative districts or divisions in Jamaica). The programme for the workshop was based on problems observed in field work or reported by the inspectors in a questionnaire distributed some time before the workshop was held.

The workshop opened with a symposium in which the leaders in the Jamaica Malaria Eradication Programme and the WHO Project Leader gave short talks on the progress of the campaign to date and indicated ways in which health education could help the Jamaica programme at present. Group work centred around practical problems such as how to plan a meeting for leaders in the parish for the purpose of interpreting the malaria eradication programme and obtaining their co-operation; how to plan a one-day session for in-service training of notifiers, foremen and spraymen to instil into them their educational responsibilities; how to approach the householder and how to conduct the interviews.

To date there has been a dearth of teaching aids available to malaria eradication personnel to use in health educational activities in Jamaica and to help to meet this situation nearly a day was spent in the preparation of teaching aids such as flip charts and sets of flash cards. Scripts had to be pre-tested and the time required for making these aids had to be determined in advance. Each inspector made either a flip chart or flash card.

During the three-day period, each inspector worked on a plan for health education in malaria eradication for his parish. It is considered that these plans will serve as a basis for the beginnings of parish-wide activities and will be further discussed by the health education consultant during field visits when conferences at parish levels will be held.

At the end of the workshop each Public Health Inspector was able to take home with him a plan for health education in malaria eradication for his parish, a broad-sheet on malaria eradication and a flip chart or a set of flash cards on the Malaria Eradication Programme in Jamaica, and it has been arranged for each parish Health Department to receive a film strip projector and film strips on spraying and on evaluation and a flannelgraph on malaria eradication for use of their personnel.

An item for health education had been included in the Malaria Eradication Programme budget and this covered the cost of health education supplies, the equipment and the per diem for the inspectors.

The great interest of the inspectors was maintained throughout the conference and it met with a most enthusiastic response.

[Courses on these lines could well be adopted in other countries carrying out malaria eradication programmes - Editor]

3. SIDE-EFFECTS OF ANTIMALARIAL DRUGS

Attention was directed, at a Technical Meeting on Chemotherapy held in Geneva in November 1960, to the importance of side-effects of antimalarial drugs and to methods of testing primaquine sensitivity.

The practical importance of mild side-effects must not be underestimated in mass drug administration. Although it was agreed that with chloroquine, amodiaquine, proguanil and pyrimethamine, side-effects are seldom observed when the drugs are used at the recommended dosages, nevertheless, some attention should be drawn to the fact that many drugs and particularly the bitter tablets of 4-aminoquinolines may produce nausea, abdominal pain and vomiting, especially in children and when given on an empty stomach. Accidental poisoning of children with pyrimethamine can easily be avoided if elementary precautions are taken to prevent this occurrence.

An important, newly-reported side-effect of chloroquine is the possibility of retinopathy when several hundred milligrams of this drug are given daily for protracted periods for treatment of rheumatoid arthritis. Fortunately, such amounts far exceed the doses necessary in any antimalarial treatment. Nevertheless, it would be advisable to remember this observation in planning prolonged mass treatment programmes which lack strict medical supervision or adjustment of the dose according to the individual body weights of the subjects.

The group devoted special attention to the side-effects of 8-aminoquinolines (primaquine and quinocide) because these drugs may cause an acute intravascular haemolysis in certain primaquine-sensitive individuals, particularly among the darker-skinned peoples of the world. There is ample evidence that when given at the recommended dosage, 8-aminoquinolines seldom give rise to symptoms of toxicity. Investigations carried out in the United States of America and in Romania showed that some subjects may be able to tolerate very high doses of primaquine without any discernible toxic symptoms. Usually when repeated daily dosages are high (30 mg of base) toxic manifestations may include nausea, dusky cyanosis due to methaemoglobinaemia, abdominal pains and general weakness. There may be marked effects on the formed elements of the blood and the bone marrow, followed by haemolysis and subsequent passage of dark urine. Since methaemoglobinaemia is usually more severe in individuals who are not susceptible to haemolysis than in those who are hypersusceptible, this symptom cannot be considered a prodrome of acute haemolysis. Moderate cyanosis causes no disability, but severe cyanosis indicates the need to withdraw daily primaquine treatment; passage of dark urine is a signal for immediate cessation of treatment.

It appears that the hazards of primaquine are less than has heretofore been thought. In racial and ethnic groups not susceptible to haemolysis by primaquine, serious symptoms have not occurred with daily doses less than 45 mg of primaquine unless the drug has been administered to acutely ill individuals suffering from serious systemic diseases (active forms of rheumatoid arthritis, lupus erythematosus) characterized by a tendency to granulocytopenia.

Primaquine should not be given to subjects receiving at the same time drugs capable of depressing the myeloid elements of the marrow. Mepacrine enhances the toxic effect of primaquine by preventing its metabolic degradation.

The incidence of primaquine sensitivity characterized by acute but self-limited haemolytic reactions is higher in some racial groups and may reach 10-40% of the population. Primaquine-sensitive Caucasians residing in the Mediterranean area (Sardinians, Greeks, Sephardic Jews, Arabs, Iranians) may experience more severe haemolytic reactions than do primaquine-sensitive Africans or Indians. In susceptible individuals primaquine is haemolytic at all dosages, but the haemolysis is usually too slight to be of clinical significance unless the daily adult dose of 15 mg of primaquine base or the once weekly dose of 60 mg base are exceeded. Moreover the haemolytic effect of normal daily doses is self-limited since the younger erythrocytes are relatively resistant to the action of the drug. For the same reason in malarious areas the haemolytic reaction in primaquine-sensitive individuals is mitigated by the presence of anaemia. The acute haemolytic reaction to the drug may be dangerous in debilitated individuals or those who suffer from renal insufficiency.

The use of modern haematologic techniques for the study of primaquine sensitivity has led to the discovery of an inherited metabolic defect. Erythrocytes of individuals with this defect are sensitive to haemolysis by 8-aminoquinolines. Primaquine-sensitive red blood cells have been found deficient in glucose-6-phosphate dehydrogenase (G-6-P.D.), an enzyme involved in the oxydative metabolism of glucose via the pentose-phosphate pathway. This deficiency is reflected in a lowered level of the reduced glutathione in the red blood cells and an instability of the glutathione in the presence of certain substances such as a number of aromatic amino

compounds, including primaquine and other 8-aminoquinolines. The red cell defect conducive to primaquine sensitivity is genetically determined and transmitted, probably as a sex-linked gene with partial dominance. The diagnosis of primaquine sensitivity is generally possible by means of biochemical tests.

Some of the simpler tests are of value only when applied to homozygous males, i.e. individuals in whom the genetically transmitted tendency to haemolysis after ingestion of primaquine is fully expressed. Tests for determining the frequency of the G-6-P.D. deficiency in heterozygous females or in mixed populations are more complicated but a "methaemoglobin reduction test" has recently been adapted for field use.

It is possible to dissociate partly the haemolytic reaction from the therapeutic action of primaquine by giving the drug at weekly intervals. In a field trial carried out on nearly 100 males, of whom nearly 15% were primaquine-sensitive individuals with full expression of the haemolytic trait, the administration of 45 mg of primaquine base with 300 mg of chloroquine base over eight weeks did not result in demonstrable toxic effects.

A recent report from Ghana indicated that the combination of amodiaquine and primaquine given once a week for five weeks to one hundred African children, of whom approximately 25% had the G-6-P.D. deficiency trait, produced no evidence of significant toxic effects. Eight of the treated children positive for the G-6-P.D. deficiency trait who were given between 15 and 30 mg of primaquine base once a week for five weeks showed no haemolysis and only minor changes in haemoglobin and haematocrit values were observed.

The meeting agreed that primaquine, whether in once weekly doses of 45 mg or in daily doses of 15 mg, should not be administered without supervision, but this supervision need not be medical.

Data available from the Soviet Union on the side-effects of the standard regimen of quinocide given to a population with a presumably low incidence of specific sensitivity indicate that this drug produced only a small number of side-effects. There is some evidence that quinocide given in association with proguanil, cycloquine or pyrimethamine is less well tolerated, especially with the latter drug.

4. THE ECONOMIC ASPECTS OF MALARIA ERADICATION

It would be of considerable assistance to malariologists and public health administrators were they able in the presentation of their plans for malaria eradication to their governments to show the tangible economic benefits of successful eradication alongside the estimated costs of such a campaign. In the past such information has been rarely available. If Resolution XVI of the XII Directing Council Meeting of the Pan American Health Organization held in Havana, Cuba, in August 1960 is fully implemented, valuable information of the economic losses suffered by malarious countries in the Americas will become accessible.

RESOLUTION XVI

Economic Aspects of Malaria Eradication

The Directing Council

Taking into account the unfavourable effects on the countries' economies of the prevalence of malaria;

Considering that the technical and economic measures that should be taken by the Governments require, for the fullest achievement of their purposes, a better knowledge of the problems of malaria in each country; and

Considering that the lack of knowledge by economists constitutes a gap that must be filled in order to break the vicious cycle of poverty and illness,

RESOLVES:

1. To suggest to Member Governments that, in their respective economic plans, recognition be given to the importance of the eradication of malaria in their territories and its significance for improvement in the standard of living, especially that of rural people who live in areas having a high incidence of this disease.
2. To request the Pan American Sanitary Bureau to study, insofar as the budgetary limitations permit, the possibility of devising methods for the evaluation, by the Member Governments of the economic and social significance implicit in the speedy elimination of malaria.

3. To recommend that the Member Governments consider the possibility of extending such evaluation services to include all the programmes conducted by their respective public health administrations.

The Director of the Pan American Health Organization comments that measures relating to paragraph 2 of Resolution XVI, for which funds have been obtained, are already being planned. The Pan American Health Organization has made a grant of \$ 9500 to the Bureau of Public Health Economics of the University of Michigan, supplementing a grant of \$ 95 000 from the National Institutes of Health, to help finance a three-year study of the economic implications of malaria eradication.

The Pan American Health Organization is to advise the University on areas suitable for field study.

5. DIELDRIN POISONING IN MAN

In Mal/Inform/48 of 20 August 1959 we drew attention to a report by Dr Wayland Hayes Jr. on the "Toxicity of dieldrin to man". The report was issued as WHO/Insecticides/89 and WHO/Mal/215, and appeared later in the Bulletin of the World Health Organization, 1959, 20, 891. Another important paper, issued by the Committee on Toxicology of the American Medical Association, is entitled "Occupational dieldrin poisoning"; it was published in the Association's Journal on 30 April 1960, Vol. 172, pp. 2077-2080. Interested readers who have not seen this report might wish to ask Dr Bernard E. Conley, Secretary of the Committee on Toxicology, to spare them a reprint of it. While a full summary cannot be given here, a few practical points may be mentioned.

Diagnosis. There is as yet no satisfactory laboratory method for measuring dieldrin absorption. Clinical diagnosis is aided by the history. Mild intoxication is suggested by symptoms such as headache, blurred vision, dizziness, slight involuntary muscular movements, sweating, sleeplessness or bad dreams and general malaise. These symptoms are accentuated in more severe cases, especially the involuntary muscular movements, which may then involve whole groups of muscles and even cause the patient to fall down, with or without momentary loss of consciousness. Epileptiform convulsions are seen in the most severe (non-fatal) cases; they recur

at about half-hourly intervals unless prompt treatment is instituted. Sometimes they are followed by a coma.

Treatment. Obviously, if the skin is contaminated, it must be washed at once with soap and water. Gastric lavage and saline purges are given if dieldrin has been ingested. Oils and fats promote absorption of dieldrin and are therefore contraindicated. Barbiturates, especially the long-acting phenobarbital, should be given in the biggest dosage which can be tolerated without sleeping for more than the usual length of time. This treatment, which helps to prevent the onset of convulsions, is combined with measures to protect the patient from external stimuli. The further treatment is supportive. In chronic poisoning, where the diagnosis is based on the knowledge of exposure to dieldrin and the absence of a previous history of convulsions in a patient who is showing some of the above symptoms together with nervousness and perhaps loss of weight, the treatment is similar. The patient is removed from all contact with dieldrin; he should receive supportive treatment together with barbiturates to control his central nervous system.

Chronicity, and an acute fatality. The conclusion drawn from a number of cases of occupational dieldrin poisoning, which are described briefly, is that the condition in man tends to be chronic. There exists, however, one type of poisoning seen in experimental animals and characterized by complete refusal of food, rapid weight loss and convulsions, which, if not treated, is uniformly fatal; this type, under certain conditions, could probably occur in man. The paper ends with what is believed to be the first full report of a fatal human case. A female child, nine months old, was found to have put her face into some loose insecticide powder lying on a piece of paper. The powder, which the father had been using in his garden, contained 4 per cent. dieldrin. Although the mother washed the child's face and rinsed out her mouth as soon as she discovered what had happened, this did not prevent the child from becoming unconscious with dyspnoea, cyanosis and convulsions about six hours later. After fourteen hours of therapy with phenobarbital, etc., the convulsions stopped, but the unconsciousness continued, the dyspnoea grew worse, and death occurred twenty hours after exposure to the insecticide. The autopsy showed hypostatic pulmonary congestion, small foci of hepatic necrosis, and oedema of the renal tubular epithelium.

A paper on the measurement of the exposure of workers to pesticides prepared by Durham and Wolfe of the Technology Branch of the Communicable Disease Centre in the United States of America will be published in the near future in the Bulletin of WHO - Editor's remark

6. CO-ORDINATION BETWEEN FRENCH GUIANA AND SURINAM

On 8 and 9 March 1960 a meeting was held at St. Laurent between representatives of the National Malaria Eradication Services of French Guiana and Surinam. PASB/WHO and ICA were also represented. The first two items on the agenda were concerned with the present status of malaria eradication in the two countries. The third was devoted to the co-ordination of efforts in the spraying and evaluation operations of the two Services, particularly along the frontier. The following note summarizes the third item.

There is a good deal of movement across the Marowijne River which forms the frontier. The population on both sides belongs to the same ethnic group, and it is common for people to live on one side and possess agricultural land on the other. There are also some islands which are visited from both sides and whose ownership by one country or the other has not been defined. Some of these islands may not even have been visited by the Malaria Services.

Two suggestions were made at the meeting. One was the establishment of a team composed of spraying-squads from both Services to spray the houses on both sides of the river. The other was that each country should organize its own team, which would spray all the houses on its own land, no matter to whom they belonged; the islands would be assigned to either one team or the other. Although the first suggestion - that of a combined team - seemed to be ideal, it could not be adopted because of linguistic and administrative difficulties. It was decided to put the second plan into action; this was discussed in detail and agreement was reached on the following points:

- (a) each Service would prepare a precise map and list of all houses found on its own side. Inquiries were to be made from the inhabitants on both sides, particularly as regards agricultural camps whose position and ownership were in doubt. Information would be exchanged;
- (b) spraying-schedules would be synchronized, each side proceeding at almost the same speed along the two river-banks. Since there are fewer villages and houses to spray on the French side, Surinam undertook to increase its own spraying staff so as to keep pace with its neighbour;

(c) regular meetings between the team-leaders, with authority to cross the frontier for the exchange of information and the fixing of spraying-schedules, would be arranged;

(d) not only the spraying-cycles but the insecticides used on both sides should be the same. Hitherto French Guiana had been using DDT and Surinam dieldrin, both in annual cycles. It was agreed that PAHO/WHO should in future be asked to recommend both the period of cycle and the insecticide to be used; DDT twice-yearly or dieldrin once-yearly both seemed acceptable, but the local custom of lighting fires indoors in the evenings, with the resultant coverage of the sprayed walls by soot, was an argument in favour of twice-yearly sprayings;

(e) outboard motors used on boats on the Marowijne River should be of the same model, so that the teams on both sides could help one another in repairs and maintenance;

(f) information on epidemiological evaluation would be exchanged through the chiefs of the spraying teams; regular reports would also be exchanged.

7. BULK WATER CONTAINERS

In certain areas where spraying cycles are in full operation during the dry season, the shortage of water in villages can be a very serious problem and in these rather exceptional circumstances, the provision of water for the spraying campaign by the villagers is an impossible burden to insist on.

Various types of containers have been tried and in some areas the "Camel" trailer tank of 200 Imp. gallons (910 litres) capacity has proved successful, but in other areas it has been found to be insufficiently robust for work in rough country.

Mr F. A. Christal, WHO Sanitarian with the Malaria Eradication Training Centre in Ethiopia, has recently reported on his experience with a portable rubber tank in a WHO Malaria Pilot Project.

The tank which was received in March 1959, was used for four months in the more arid Eastern Zone of the Pilot Project. When full, it measures 80 in. by 42 in. by

18 in. (203 cm x 107 cm x 46 cm) and has a capacity of 170 Imp. gallons (760 litres) weighing some 1760 lbs (800 kg); empty it can be folded up into very little space.

For operational purposes, the tank is placed flat on the back of a truck and filled through the one inch (2.5 cm) inlet in the centre of the top of the tank. There is an outlet at one end. When full, the tank is secured by ropes to the truck body through the stout handling straps which are placed at the four corners of the top of the tank.

The tank is stated to have been of great service during the spraying operations in the Pilot Project. Being of thick rubber with vulcanized joints, it has withstood very rough usage which included carrying up to twenty labourers with their spraying equipment in the same truck without puncturing.

While its low cost (US\$ 150), durability and ease of use make this piece of equipment an attractive one for malaria eradication programmes, it should be only introduced where its need has been proved and not be ordered just as a piece of equipment which might be useful.

8. REVIEWS

- (i) Manual for Processing and Examination of Blood Slides in Malaria Eradication Programmes; WHO/MEM/2; World Health Organization, Division of Malaria Eradication, Geneva, Switzerland, December 1960 English and French editions, roneotyped

This manual is the second in the WHO/Malaria Eradication Manuals (the first, WHO/MEM/1 "Guide Lines for the Use of Medicated Salt (Pinotti's Method) in Malaria Eradication Programmes" was issued in October 1960 and mentioned in Mal/Inform/69 of 1 February 1961).

In his introduction, the editor emphasizes the essential part played by microscopic examination of blood films in malaria eradication programmes in all their phases, though especially in the consolidation phase when the microscopist becomes one of the key figures in the evaluation.

It has been calculated that during the next few years the annual examination of blood slides in malaria eradication programmes will reach 45 million and about 4000 microscopists will be required for this task.

The purpose of this manual is to guide the microscopist in the use of methods, which experience has shown, give the best results in practice. It has 95 pages of text with a further 25 pages of annexes; there are 24 black and white illustration plates and ten pages of suggested proforma for laboratory records. The chapters deal with the staff and laboratory, the microscope, microscopic slides, preparation of blood films, staining, technique of examination, the appearances and enumeration of parasites, training, organization and reporting.

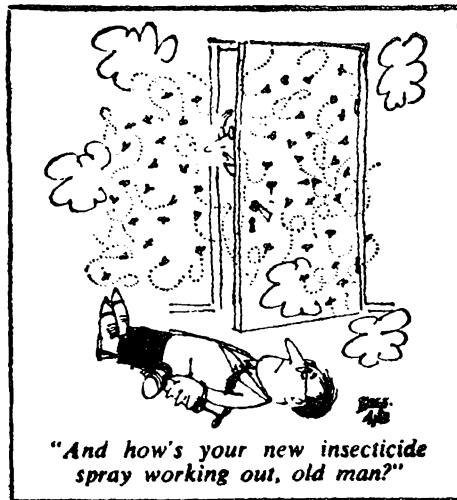
Copies of this manual have been issued to Regional Offices for distribution to projects. The editor of the manual would appreciate any comments, observations or corrections from readers.

- (ii) Malaria Yearbook No. 2; AFRO/MAL/7
World Health Organization, Regional Office for Africa, Brazzaville,
Republic of the Congo, December 1960
English and French editions, roneotyped

In September 1959, the Regional Office for Africa issued their first Malaria Eradication Yearbook. This year's edition has been increased by over 100 pages and is a large volume of 378 pages and 42 pages of annexes and appendices. There are ten maps of various aspects of the African continent and 19 country maps.

This yearbook is a valuable basic reference work on malaria eradication programmes in the African continent south of the Sahara. It is divided into three parts, the first giving a general picture of the programme and problems of eradication in the continent; the second part details the organization of the national malaria programmes and the participation of international and bilateral agencies. The third part, which occupies the bulk of the yearbook, gives a country by country evaluation of field operations, including in considerable detail the geography, climate, communications, economy, administrative structure, social conditions, and prevalent diseases. It covers the epidemiology of malaria, the organization of the national malaria service, the progress in their malaria eradication campaigns and gives an up-to-date summary of the present situation and the future trends of the campaigns.

9. THE BRIGHT SIDE



At last an effective adulticide!

(with apologies and acknowledgement
to "New Scientist" London)