THE PRINCIPLES AND PRACTICE OF YAWS CONTROL

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With the use of such a powerful and satisfactory drug as procaine penicillin in aluminium monostearate (P.A.M.) in the mass treatment of yaws, it may be useful to consider the principles and practice of yaws control based upon present knowledge. The realization of these possibilities is largely due to the work of the national and international staffs carrying out the W.H.O./U.N.I.C.E.F. Treponemal-disease Control Programmes.

The Principles of Yaws Control

I. Decision to Undertake the Anti-Yaws Campaign

This indicates that those in executive positions realize or have been convinced of the necessity for such a campaign. The purpose of the campaign will be the eradication of yaws from the community, not merely its reduction to some ill-defined low endemic level. The technique of the campaign must be adequate, scientifically sound, and economical. The campaign is a public health measure applied to the community and not a curative measure applied to the individual.

II. Decision to Undertake Activities After the Campaign Itself has Subsided

Experience in many parts of the world (Harding, 1949) has shown that this is, in practice, as important as the planning of the campaign itself if lasting benefit is to result. Failure to undertake post-campaign measures has often led to a return of the yaws incidence to the level preceding the control measures.

III. Planning and Execution of the Campaign Itself

These have become matters of skilful organization and careful supervision.

(i) A complete census of the whole population is made by the civil administrative authorities.

(ii) A medical survey of the whole population is then carried out so that all patients with infectious yaws and all persons likely to develop infectious yaws, especially during the next year, are recognized. This last group includes (1) all who have not yet had yaws but who have been in contact with infectious patients either in the household, village, school, or more remotely—the importance of these regions of contact varies with age (Soetopo and Wasito, 1953); and (2) all those in the latent secondary stage. The latent secondary stage is that in which a patient, who has had yaws, has no clinical manifestations at the time, has a positive Wassermann, Kahn, and other similar serological reaction in his serum, and has had no tertiary destructive lesions. At present this stage can be defined but not directly recognized.

(iii) Adequate treatment is given at the time of recognition on the survey to all patients in the above categories. A single intramuscular injection that will result in serological reversal is ideal.

If it once be recognized that it is a public health measure that is being carried out, there is no reason why, as a separate but concurrent measure, patients with other lesions due to yaws, or even other diseases, should not be treated. Such action must not jeopardize the success of the preventive measure that is planned to treat all

infectious and potentially infectious patients so that the source of infection will be eradicated and thus transmission stopped. A wider range of treatment, especially in areas where other treatment facilities are not readily available, may help to gain the co-operation of the people and thus facilitate the work of the campaign. In all large campaigns there might be certain areas where investigations are carried out with the purpose of improving the effectiveness of the campaign itself.

IV. Post-campaign Activities

These comprise: (i) At the very start of the campaign the establishment of rural dispensaries or small treatment centres to be staffed by trained medical auxiliaries under medical supervision. At these centres free treatment would be available for all yaws patients and perhaps some other diseases. Members of the staff, after the mass treatment, would make tours of inspection of the related villages to recognize and treat infectious yaws; cases of other diseases would probably be referred to the treatment centre. As the breadth of the work expands and more diseases are brought under control the therapeutic activities of these centres would become less important and the preventive ones more important, so that they may more appropriately be called "prevention centres." "Health centres" may be preferred by some, but a rather special meaning has become attached to these larger, more urban, and more complicated establishments, while "rural centres" may be suggested by others, but no non-urban population likes to be called "rural."

(ii) Measures to recognize and treat, and thus prevent, the reintroduction of the infection into the population from other areas, and also recognize and treat any patients who have developed infectious lesions since the mass treatment. These measures may involve some form of rapid survey of the whole population and treatment at three- to six-monthly or longer intervals and especially itinerant medical auxiliaries. There might well come a time when contacts of the few cases of yaws that are found would be sought.

(iii) The undertaking of further control measures against the next most important disease for which there is effective treatment available which can be given by the staff of the prevention centre. The high incidence of an endemic disease before a campaign may make its effective treatment numerically impossible at a small rural treatment centre. However, after effective mass treatment it should be easily dealt with at a prevention centre.

The need for post-campaign activities was first realized and demonstrated by Harding (1949) in Sierra Leone, but these were not fully described in his paper as published.

In his few reprints he added a typescript insertion. With the permission of his widow, who worked with him in the field, this is being published here. The addition by the late Dr. R. D. Harding follows the "Conclusion" on page 365 of his article:

"Though not strictly connected with yaws, the possibilities of carrying out other medical activities in rural areas in conjunction with a yaws campaign may be briefly outlined by indicating ancillary work actually done during 1946. By the end of that year seven dispensaries had been designed and their attendants trained to treat most ailments and the diseases endemic in their localities as well as sleeping sickness and yaws, while seven less ambitious dispensaries were designed to treat only sleeping sickness, yaws, wounds, ulcers, scabies, malaria, bilharzia, ankylostomiasis, ascariasis, and amoebic dysentery. Two maternity centres were built in areas where the chiefs and people were favourably disposed to this innovation and suitable girls were available for training as midwives. (The lady doctor and sisters of Segbwema Methodist Mission Hospital, situated in the vicinity, very kindly undertook their training.) On the health side, the nuclei of two new chiefdom headquarters villages were laid out and their construction supervised, to replace the old villages consisting of dirty and crowded huddles of huts. Wells were dug and springs impounded to provide an alternative water supply to the foul puddles previously used. Citrus, guava, pawpaw, and other fruit trees provided by the Agricultural De-

partment were planted round the dispensaries in the hope that in course of time the villagers would learn to appreciate these fruits and cultivate them themselves.

"During the year 40,250 cases of all kinds were treated at the yaws dispensaries. Of these 10,400 were yaws, 1,530 sleeping sickness, 700 bilharzia, 580 hookworm, 1,760 ascariis, and 660 amoebic dysentery. There were 260 confinements in the wards of the maternity centres (one of which only opened in October), and there were 3,300 antenatal and 4,700 baby clinic attendances. 74,000 people were examined by touring teams. The entire European staff comprised three medical officers for half the year and two for the remainder, but one of these was engaged for nearly the whole year on a special trypanosomiasis investigation. The overall cost, including salaries, equipment, buildings, transport, etc., but possibly excluding drugs and dressings for diseases other than sleeping sickness and yaws, was under £10,000. These activities would not have been possible without the confidence which the successful treatment of sleeping sickness and yaws had engendered, and the close contact between populace and staff arising from the mobile character of the campaign.

"The possibility of mass treatment or control of other endemic diseases by mobile teams was carefully considered, particularly gonorrhoea and bilharzia. Gonorrhoea is extremely prevalent, but apart from difficulties of accurate diagnosis, the prohibitive cost of penicillin on the one hand and the inadvisability of handing out sulphonamide tablets for patients to take home on the other made the project of mass attack on this disease quite impracticable; the end-result of an attempt at mass treatment would almost certainly have been a local trade in sulphonamides, demoralization of attendants, and the development of resistant strains of gonococci, without any marked or lasting lowering of the incidence of the disease. A study of the local epidemiology of bilharzia, which in one locality affected 75% of the population, would have been undertaken if the staff position had allowed, but it would no doubt have taken several years to evolve suitable methods of control over a wide region, and the money and personnel required would greatly exceed that necessary for controlling sleeping sickness or yaws over the same area. It therefore seemed better to concentrate available resources on those improvements in general sanitation and midwifery which were possible in the immediate vicinity of the dispensaries, together with the treatment there of those endemic diseases readily diagnosable and curable by attendants trained for the purpose and proficient in the use of the microscope and the syringe."

This principle, that an anti-yaws campaign must be made the means of improving rural health services, was more recently stressed at the First International Symposium on Yaws Control in Bangkok in March, 1952, by Troupin *et al.* (1953).

The Practice of Yaws Control

The application of the above principles may be briefly discussed under the same headings.

I. Decision to Undertake the Anti-Yaws Campaign

In many countries in the past, it is possible that the numerical, medical, or economic importance of yaws may not have been fully realized at executive headquarters, since it is a disease of the more remote rural areas. It may also have been realized that, although a few injections or arsenical or bismuth preparations might work temporary wonders, their effect as a rapid public health measure was poor. However, in some areas in the past relatively casual but widespread treatment with bismuth has, after some years, apparently resulted in a very considerable numerical decrease in yaws. Again, the populations of yaws endemic areas are usually undeveloped and have often not understood the importance of the disease to themselves and the need for more continued treatment than might appear obvious to them. It will be generally agreed that in all countries in which yaws is endemic there also occur several other diseases more important as causes of sickness and death. These may include malnutrition, tuberculosis, malaria, and schistosomiasis. All these factors militate against the initiation of anti-yaws campaigns. With the realization of the immediate effects and ultimate possibilities of successful yaws control by mass treatment with P.A.M., there is much greater encouragement to undertake these measures.

II. Decision to Undertake Post-campaign Activities

Unless the vital importance of these activities is realized at the start of the anti-yaws campaign they will not be included in the planning. Thus the purpose of the campaign will be lowered, with loss of inspiration to those engaged in it. Even if these post-campaign activities are later undertaken continuity may be lost. The interest and confidence of workers and populations may be weakened and ultimate success gravely jeopardized. Although the immediate purpose of the anti-yaws campaign is the eradication of yaws the ultimate purpose of the campaign must be the gradual but steady and secure improvement of the rural health services. When one step is approaching successful completion the next in importance that is within the financial resources of the community is started; thus each improvement gained is maintained with certainty.

III. Planning and Execution of the Campaign Itself

(i) *Preparation of the Census.*—This has now become a routine civil administrative process of well-established practice.

(ii) *Survey.*—Unless a survey is carried out there is no way of assessing either the need for the campaign or its success. It is, of course, upon the findings of the survey that the mass treatment is based; all the population must be examined so that all infectious and potentially infectious yaws patients can be treated. Research may reveal some technique, such as an intradermal test with specific antigens, which will make possible the recognition of the latent secondary stage. As anti-yaws mass therapy becomes better established it may be practicable to search for other diseases in the same survey.

In countries where the rural population lives mostly in large villages or small villages close together, surveys can best be made by arranging for the authorities concerned to have the inhabitants gather at a suitable place at a certain time. In Indonesia, where this is done, it has been shown that one simply trained local medical auxiliary can examine over 750 persons each week. Those suffering from yaws are directed to a near-by established clinic (Soetopo and Wasito, 1953).

Where, however, the villages are small and scattered or where the population live in widely dispersed houses this method is impracticable and house-to-house visits must be made. Guimarães (1953), of the Instituto Oswaldo Cruz, when working in the Baixade Fluminense, near Rio de Janeiro, used local persons, chosen for their intelligence and initiative, to make the house-to-house survey and to refer patients to the yaws treatment centre. This employment was part-time, and payment was made according to the number of patients found. However, the payment per patient was raised as the campaign progressed in an area and the number of patients greatly decreased. Since these persons relied largely upon their usual occupations for their living they naturally made their house-to-house inspections "after hours," which is the time most country folk are at home. Only local people could have found the houses. Perhaps in village communities in which the incidence of yaws is low house-to-house surveys would be the method of choice. The co-operation of the population and their leaders is essential throughout the campaign. This is possible only if the purpose of the campaign is understood and the campaign desired. This has been shown in combating African trypanosomiasis in places where the population has learnt its deadly nature. It is equally important that those engaged in the campaign itself should understand the outlook of the population and that there should be mutual sympathy.

(iii) *Treatment.*—This, ideally, would be a single intramuscular injection of a cheap, effective, and non-toxic drug. This would go far to win the co-operation of the population. There must be as little trespass upon the time of the population as possible. Their occupations may be mainly agricultural, but at many seasons of the year they will have

little time to spare to attend survey-treatment gatherings. In Yugoslavia mass treatment against epidemic syphilis is available in villages at any reasonable time throughout the day, so that the patients' activities are interfered with as little as possible.

The Committee on Venereal Diseases and Treponematoses, at the 4th session in London, July/August, 1952, recommended that "in mass campaigns against non-venereal treponematoses the minimal dosage for early infectious lesions in adults be no less than 1.2 mega units of P.A.M. [of approved standard] and proportionally less for children; that this dose be given in one injection and that the preventive (or 'abortive') dose for contacts be no less than one-half of that used in the early infectious stages of the established disease."

The staff of the prevention centre should be carefully selected from the local people and suitably trained under the same conditions of buildings, equipment, and supplies as they will have in the final appointment. This employment of local people—under, of course, some medical supervision—has in many countries been completely satisfactory. It is economical, and as nearly as possible ensures a contented staff. Their influence for good health can far exceed that due to their official duties.

Until some means of detecting the latent secondary stage has been evolved, one of three expedients might be used. Treatment might be given to: (a) all who have had active secondary lesions during the previous five years (Saunders, 1937); (b) all of the population under 18–20 years of age, which will include 80–90% of persons likely to suffer infectious relapses; (c) all children at schools and in the 2–6-year age group who have yaws or have a history of having had yaws (these may comprise 80% of the scholars in some endemic areas). This action would cover many "contacts" of the disease. Contacts outside these ranges would not be very important.

IV. Post-campaign Activities

(i) The establishment of rural dispensaries suitably located to serve the population—the prevention centres already referred to—may well be regarded as the most important achievement of the anti-yaws campaign. Perhaps it would not be extravagant to say that their establishment during the campaign is the first step, to which the campaign itself was only the way. The importance of these rural dispensaries with itinerant staff, which was clearly demonstrated by Harding (1949), cannot be overemphasized, and until their importance is realized much money and effort in anti-yaws work may still be wasted. Of course, if other established static units are already present they would become the centre of the development.

(ii) Prevention of the reintroduction of the disease into an area in which yaws had been controlled could best be achieved by extending the range of anti-yaws campaigns as widely as necessary. It should be regarded as absolutely essential to the success of any mass-treatment campaign that effective case searching and treatment facilities remain in the field, so that the few cases which are certain to occur during the following year may be dealt with. There is not, and probably will never be, any drug which in mass use will produce cure in all patients.

(iii) The carrying out of further control measures against other diseases that can be diagnosed and treated by the staff is the logical sequence of the stabilization of the campaign results and the rural dispensaries. All through these progressive achievements the education of the population in preventive matters would be taking place, even without the intentional efforts that would be made at every opportunity. There is an urgent need for the discovery of some educational technique which could be applied to health and other problems among undeveloped people. It is probable that the purpose of such a technique would be to create in the people a strong desire for the improvement that is intended. The late Dr. Harding's notes, published above, show what can be done and what should be planned for.

Summary

For a long time yet the sequence of census, survey, and treatment of yaws will be required. Procaine penicillin or some other depot preparation will, with difficulty, be improved upon. The importance of recognizing cases in the latent secondary stage of the infection must be emphasized; some way to doing this is urgently needed.

An anti-yaws campaign is only a means to an end, and that end is the gradual and stable development of improved rural health services. This alone can justify the efforts required to carry out an effective anti-yaws campaign. Such a campaign, in areas where yaws is endemic, is probably the best first step in the improvement of rural health services.

The work of the World Health Organization and the United Nations International Children's Emergency Fund in assisting treponematoses control work in various countries is of great importance, and is an encouragement for the future. Reynolds *et al.* (1951) discuss the ways this help can be most effectively applied.

Professor G. Macdonald, of the London School of Hygiene and Tropical Medicine, saw this article before publication and has made the following pertinent comments:

"I am convinced that the general principle is sound. The extension of such work depends on what is wanted. If what is wanted is to start a rural public health service, there is no doubt that the best way of doing so is through measures which are immediately obvious to the population as beneficial, and of course yaws is one of the more prominent examples. Credit earned by this such work could be used to persuade people not to accept other obviously less useful work. If I were starting such a scheme I would want a curative measure, such as yaws treatment of this nature, and also an environmental measure. Quite the best example of the latter is the application of residual insecticides in houses, which is appreciated at once for the effect on fleas and flies and later for that on malaria. I would therefore start with a yaws campaign and a residual insecticide campaign as initial steps towards a rural health centre service which undertook environmental and curative work. The approach, in the paper, to the curative side of it seems ideal."

This combined attack is being carried out by W.H.O. in Liberia.

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According to a report of the Committee on Child Health of the Scottish Health Services Council, only about 50% of mothers attend with their infants where child welfare clinics are provided. This is a matter of concern, although the report records a great improvement in child health in recent years. The importance of instruction in breast feeding and mothercraft is stressed. Every effort should be made to underline the value of immunization against certain infectious diseases. Recommendations are made regarding the management of premature infants: the report considers that breast-milk should be available to all infants in hospital, and that milk banks should be established where necessary. The report (*Child Health*) is published by the Department of Health for Scotland and is available at H.M. Stationery Office, price 9d.