Towards the Rout of Tuberculosis in Rhodesia

BY

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PART III

INVESTIGATION AND PLANNING

Research

Rhodesia holds an almost unique position in being a "developing" country which nevertheless has a fairly advanced health service. In other words, we have the diseases of developing countries and also the means to investigate, treat and study these. This is a milieu in which research can flourish.

Work Done to Date

Our difficulty is that few of us can spare the very considerable time required to carry out good trials and surveys. Nevertheless, doctors have not allowed the grass to grow under their feet. It is difficult in compiling an account of the work done to be sure of including everything; published work may easily be missed, and in addition much has been done, by government departments in particular, which has never been published.

Morbidity.—The incidence of tuberculosis morbidity has not been well reflected in official notification statistics until relatively recent years, but the earlier prevalence has been pinpointed from time to time by separate investigators. Earlier still, David Livingstone (quoted by *Central African Journal of Medicine*, 1955) recorded "the rarity of tuberculosis and scrofula among the indigenous population." The Silicosis Commission (1938) made a detailed survey of the incidence of tuberculosis in mines and studied its relationship to the various types of pneumoconiosis. In 1945 the National Health Service Enquiry Commission reviewed the whole position regarding tuberculosis and made recommendations. In 1959-60 a WHO team made surveys of the Coloured (people of mixed descent) and Asian population of Salisbury city and of the Mpopoma African township, Bulawayo. Since the advent of the two MMR units morbidity surveys in many areas, particularly the more developed, have become possible; the findings have been described under "Preventive Measures" above (Part II). Shee (1961) found a striking rise in the age-incidence of tuberculosis in Europeans between 1953 and 1960.

Tuberculin Sensitivity Rates.—In Southern Rhodesia a valuable and interesting guide to the progression of infection has been the incidence of tuberculin sensitivity at various places and times. Surveys of this were carried out in 1949-51 in the Northern and Midlands areas by Graham and others (Public Health Reports of the Provincial Medical Officers of Health, Southern Rhodesia) and Webster (1954) conducted a similar survey in Matabeleland in 1953. In the Midlands Rochester (1960) found 26 per cent. of children aged about seven to be Heaf-positive, this rate increasing with age to 45 per cent. at about 13. A survey covering substantially all of the African school children in the Eastern Province was done in 1954-58 (Shennan, 1960). In 1959 Wilkins reported that over 85 per cent. of adult African males and over 58 per cent. of adult African females in Salisbury were tuberculin-positive. Unfortunately tuberculin-testing of large groups is now becoming unnecessary for the successful prosecution of an anti-tuberculosis campaign, and by its omission we are

losing the incidental epidemiological information which it yields.

In a nutshell, the outcome of the morbidity and tuberculin studies has been that both incidence and infection have increased up to recent years, but that now there are some signs of a decrease in the former, particularly in the larger urban areas.

Facets of Tuberculin-Testing.—Other epidemiological studies have been done in association with the tuberculin-testing. In the Eastern Province in 1955 measurement of some 2,000 Mantoux reactions showed the presence of a fair amount of non-specific tuberculin-sensitivity (Public Health Reports of the Provincial Medical Officers of Health, Southern Rhodesia). Later in the Eastern Province survey the Heaf test was demonstrated to require old tuberculin in a dilution of 1/15 to make it equivalent to the Mantoux test with 5 TU (Shennan, 1961). Smyly and Shennan (1957) investigated the significance of the strongly-positive Mantoux reaction and concluded that a response of over 20 mm. induration meant a much greater likelihood of active tuberculosis.

BCG Vaccination.—An estimate of the efficacy of BCG in preventing subsequent tuberculosis was made in 1958 in the Eastern Province (Shennan, 1963) by following up notifications of school children, and this was found to be about 80 per cent., as in United Kingdom subjects (Medical Research Council, 1956, 1959, 1963).

Clinical Studies.—On the diagnostic side, Robinson (1962a) has analysed the social background and initial radiological state of series of patients, and Gelfand (1961) has determined the incidence of tuberculosis in a series with cervical lymphadenopathy (about 50 per cent.).

Treatment.—Treatment, in the way of *general measures*, was studied by Turnbull (1959), who found that supplementary vitamins and milk had little specific value when given with chemotherapy, but were very useful in that they made twice as high a proportion of patients return for their out-patient treatment.

Specific chemotherapy has naturally come more and more into the limelight of recent years. Turnbull (1955) did an interesting study in the early days of chemotherapy which demonstrated that it was unsatisfactory to give streptomycin twice weekly and also showed the need for prolonged drug treatment. Quantrill (1960) assessed the results of treatment and follow-up and found the relapse rate to be 10 per cent. of 118 patients. Robinson (1962b) studied the progress of patients under continuous dual-drug chemotherapy and found it to be very satisfactory. The reasons for failure of chemotherapy in a series of about 200 deaths were analysed by Shennan and Robinson (1963), who found the chief cause to be late reporting for treatment.

For the reasons mentioned earlier, *drug resistance* has occurred to varying degrees in all parts of the world. The incidence of this in Salisbury was examined by Briggs (1963), who found among other things that about 5 per cent. of untreated patients had organisms resistant to isoniazid.

As a result of the development of resistance, and now that the value of the primary drugs is established beyond question, interest has turned increasingly to *second-line drugs*. All reserve drug treatment in government and mission hospitals has, since 1961, been done according to pre-determined schedules which allow comparisons of different regimens to be made; these trials were initiated by Dr. E. Robinson and have so far shown that three-drug regimens are superior to those using only two drugs.

Recent Developments

Research has become highly specialised, and nowadays to be worthwhile a project must have weeks or months of planning and be designed by experts in the research field supported by professional statisticians. Fortunately circumstances are combining to give us a lift into this somewhat rarefied atmosphere.

The fact that we have a good supply of tuberculosis patients as well as a fairly well-developed health service has encouraged the British Medical Research Council to initiate three co-operative investigations into treatment methods with workers in this country, and we hope that this partnership may prove profitable and lead to further combined projects in the future.

We now have a university medical school in our midst and it is earnestly to be hoped that undergraduates, and perhaps also a postgraduate research institute, will make use of the immense amount of material available here and carry out field work which will be of use both to us in this country and to developing countries as a whole. A case in point is the methods of BCG vaccination, referred to earlier, whose great diversity reflects our ignorance of the best way

to set about it. Now is the time for such work to be tackled, for in a few years the whole population will have been "spoiled" by BCG vaccination; and indeed new active cases for study are rapidly becoming rarer in the readily accessible central areas. The proposed university tuberculosis laboratory will be equipped to make studies of the tubercle bacillus and other mycobacteria, which can be combined with epidemiological work to produce much valuable information.

Investigation need not be confined to large institutes and organisations. Anyone interested can undertake such work as a controlled clinical trial or a study of patient co-operation in domiciliary treatment. The only essential is to recognise that if such work is to be of lasting value it should be started only after careful planning and after advice has been sought from MRC or WHO experts, who will be very willing to assist.

The Determination of Policy

Making Use of Research

The results of the type of investigations described above give guidance as to the best ways of implementing our tuberculosis scheme; for instance, they can tell us the best secondary drug combinations or whether it is worth having miniature radiographs read by two people.

For guidance as to policy, in addition to the usual annual statistics we depend on investigations directed at Rhodesia itself. An example would be the sub-division of provincial statistics year by year to see whether the downward trend of the notification rate is general or is confined to the central areas. Again, an analysis of all patients in hospital known to have relapsed will indicate what are the most serious mistakes of therapy and management made in the past.

Finally, it is important to stand back sometimes and look at the whole picture. Perhaps a more ruthless approach is needed after all.

A Mass Campaign?

The question that needs to be asked now is: Should a more radical and impersonal use be made of our resources to achieve a quicker elimination of the tuberculosis problem in this country? Possible methods are:

(a) *A considerable increase in BCG-vaccination staff* so that the whole country can be vaccinated in a few months.

(b) The appointment of teams to carry out a country-wide *sputum-survey* campaign, thus discovering and bringing under treatment a high proportion of the infectious cases at large. This method was considered of value in areas of suspected high incidence in Britain by Erin (1960), and when used in Somaliland (WHO Tuberculosis Research Office, 1956) it showed 2.3 per cent. of persons to have positive sputa among 1,057 examined. On the other hand, the method was of little use in Nairobi (WHO/UNICEF, quoted by Erin, 1960), where all of four positive sputum cultures found among 822 persons proved to be of "atypical" mycobacteria. Andrews and Radhakrishna (1959) found that sputum survey with a single "spot" smear specimen showed up two-thirds of patients known to have a positive sputum.

The adoption of one of these methods might be at the expense of some of the more refined work that we do to-day, such as the use of secondary drugs and of surgery on drug-resistant cases. These few, and the few whom they would afterwards infect, would be sacrificed in favour of the many more who would be saved by the mass campaign.

It is unlikely that we can—or should—make such a change. In this country we have reached a point in medicine where our relationship with the patient is something personal and where it would be unethical to sacrifice an individual life for whatever purpose. Such a campaign can probably only be undertaken as an additional scheme as funds become available.

The "Rout" of Tuberculosis

No matter which way we set about it, the notification rates indicate that the defeat of tuberculosis has begun. It is important that tuberculosis control be regarded as a dynamic process; each year we should be looking out for the fall in notification rates and the reduction of the number of cases under treatment.

The term "control" is objected to by some because it suggests merely preventing an increase. On the other hand, the word "eradication," now widely coined in western countries, is inept. It means the individual detection, treatment and contact investigation of every new case of tuberculous *infection* as it occurs, by means of widespread tuberculin-testing, in a country where the disease is no longer a significant public health problem. It implies the pulling out by the roots of a tree which has already been felled to ensure that it does not grow again. We are in the

process of felling the tree and we need to be able to describe this process decisively and graphically for the benefit of the public. Perhaps, therefore, the term "rout" could be used.

SUMMARY

Research done in Southern Rhodesia in the past is listed. There are great potentialities for investigation, a fact appreciated by the British Medical Research Council, who are sponsoring co-operative projects here. It is hoped that the university college medical school will also find itself in a position to carry out much-needed field work.

The results of research are important in deciding tuberculosis policy.

In addition, massive campaigns may very well have a part to play in the liquidation of tuberculosis in this country.

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