The Organisation of Tuberculosis Service in the Midlands of Rhodesia (1963-1972)

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The first Tuberculosis Officer appointed to work in liaison with the Provincial Medical Officer of Health was appointed to the Midlands Province in February 1963. Prior to this, the tuberculosis service had been provided by tuberculosis specialists, based in the major chest institutions at Mpilo Hospital and the Martin Sanitorium, Chinamora. Some considerable discussion between Dr. Robinson, then the Senior Tuberculosis Specialist in the Ministry of Health, Dr. Westwater, the Provincial Medical Officer of Health, Midlands, and Dr. Sheffield, the Director of Medical Services, resulted in the feeling that if satisfactory control of tuberculosis were to be achieved, then it was essential that this be carried out on a provincial basis and could not be entirely hospital based. No precedent was available to suggest appropriate duties for a Tuberculosis Officer based on the Provincial Medical Officer of Health's department.

Initially, attention was devoted almost entirely to the RAPT Hospital in Gwelo, and it was found that this demanded only a part of the Tuberculosis Officer's time. All hospitals in the Province were visited at regular intervals and gradually a network of outpatient clinics was built up. In addition, an initial assessment was made of the BCG status of the population during which it was found that about one-quarter of the total population had already been immunised. As half of the population was under 16 years of age, this meant that about one-half of the major risk group had been immunised. It was thought that only against a background of a sizeable number of probably immune persons could active case finding decrease the incidence of the disease at a rapid rate. The advent of a fully mobile miniature radiography unit would help to clear out the high risk groups from the mining industry and the urban concentrations of population.

At first no attempt was made to advise on the clinical management of patients in the hospitals visited. Following the publication of circulars on tuberculosis treatment and the use of transfer forms which were introduced by Dr. Robinson in Bulawayo, almost all cases were properly treated with standard triple chemotherapy and almost all of these achieved initial sputum conversion. It was evident in 1963 that the system of follow-up and tracing of absconded patients had been badly neglected. The relapse rate within five years of all treated patients, whether treatment was completed or not, was estimated to be not less than 25 per cent. and many of these remained undetected and sputum positive, possibly with resistant or partly resistant organisms for many months before they eventually returned to hospital. For example, of the 650 patients admitted to the RAPT Hospital from 1959 to 1962 inclusive, all but 50 had been lost to follow-up by 1st January, 1963, and a large proportion of that 600 had been lost before they had completed a full course of treatment.

An early start was made on a tuberculosis register. The detailed mechanics of this register are not relevant to this particular summary but the early history of this has been written in a DPH thesis, "The Eradication of Tuberculosis in Rhodesia".

Initially, a great deal of time was spent establishing liaison with the health assistants based in the country.

During the first year, it was thought that substantial progress was made towards decreasing the absconding rate from hospitals and increasing the attendances for follow-up. The regularity of medication by out-patients improved and this was expected to make it possible to treat many more patients as outpatients. With improved case finding, this became necessary because of the limited number of hospital beds. During the first year, the concept of 18 months treatment in hospital had been abandoned. This was an unrealistic policy and no hospital could keep a group of predominantly male patients in hospital continuously for 18 months while they felt extremely well for the final 12 months or more of treatment. However, as at January 1963 this was the policy of the Ministry of Health. New criteria for discharge from hospital were established, namely sputum conversion plus satisfactory x-ray status, and the absence of obvious contraindications. In passing, it was noted that the more intelligent patient was extremely critical of the mandatory 18 months in hospital, and this must have accounted for the large number of the absconsions which were occurring before 1963. The "anti-treatment" attitude of many patients' must have been in large part due to this.

During the first year, the major triad of tuberculosis control was set down quite clearly. This was: firstly, mass BCG of everything on

two legs; secondly, case finding on a very large scale; and thirdly, the establishment of a tuberculosis register with adequate follow-up whether this be follow-up for chemotherapy or follow-up for surveillance. A plea was also made for the concept of eradication to be given official approval. The monthly average notification for the Midlands Province had risen during the six years prior to the introduction of a tuberculosis register in 1963 from 37 cases per month in 1957 to 54 cases per month in 1962. It was misleading in the face of an almost constant notification rate of over 100 per 100 000 per year to speak on the one hand of "the economic consequences of a population explosion" and the other to say that "it seems likely that the tuberculosis situation is now contained."

At intervals during the year, attempts were made to elucidate the various factors responsible for inaccuracy in the number of notifications returned to Head Office for statistical purposes. The most prominent cause was obviously that the same patient was being notified more than once, usually from different hospitals after the patient had been lost for some reason from the first hospital. It became policy to examine all new notifications before inclusion in the return, and to exclude all who had been notified previously for any reason. This meant that relapses were not notified as new cases and the information on the number of relapses occurring was contained in and could be extracted from the Tuberculosis Register. The number of cases admitted to tuberculosis hospitals who proved eventually to be suffering from lung abscess, carcinoma of the bronchus or lobar pneumonia, the three commonest causes of confusion, was high, and may represent between 5 and 10 per cent. of all cases admitted. It was felt that some attempt must be made to produce annually a reliable index of progress towards eradication of tuberculosis. The obvious way to do this would be to ensure that all returns to Head Office for statistical purposes included only new active cases. It was suggested that if this could be discussed and circulated from Head Office emphasising that the annual figure for new cases arising excluding all relapses, false notifications due to wrong diagnosis, etc., were to be used as a yardstick, this would convert the present total annual cases notified into a realistic total. It was also remarked that non-indigenous patients with tuberculosis formed a very large proportion of the total, particularly in the Gatooma area.

The annual report of the Tuberculosis Officer for the Midlands Province for 1964 contains an exhaustive discussion of the whole situation and this is not suitable for extraction in any concise form. A large section of the mechanics of running a Tuberculosis Register was written by the then Provincial Health Inspector for the Victoria Province, Mr. George Woodlands. This was part of the process of clarifying our ideas and sophisticating our organisation and methods in order to get to grips with the problem area.

A report for 1965 was written in the absence of the Tuberculosis Officer (in London) by the Senior Health Assistant who had been running the Tuberculosis Register during this period. From the very beginning the Tuberculosis Register was designed to be non-doctor dependent. It seemed appropriate in a developing country where doctors are perhaps the most fickle of the staff to avoid a situation where if no Tuberculosis Officer was available the whole system fell to the ground. Initial experience showed that a Senior Health Assistant with appropriate in-service training was perfectly capable of running the tuberculosis service during the absence of the Tuberculosis Officer with minimal backup from the Provincial Medical Officer of Health, who at that time was particularly interested, and spent some time ensuring that no untoward difficulties arose. At the end of the period, it was said with some confidence that the register had continued to run satistorily during the absence of the Tuberculosis Officer.

The report for 1966 shows that the system was now in full operation and that there had been a substantial decline in the notified incidence of tuberculosis in the Midlands from 1962 to 1966. The estimated case incidence in 1962 based on the official notification figures was 175 per 100 000 per year, and the total number of cases notified was 717. In 1966, in a population which had increased by something of the order of 20 per cent., the case incidence was calculated at 98,5 per 100 000 per year, and the number of cases reported in this larger population was 504, a decrease of some 30 per cent. It may well be true that by 1966 we had reached a base line, or stable state, at which the notification rate was a realistic measure of the amount of tuberculosis in the population, and if we accept that the true base line figure is 98 or in round figures 100 per 100 000 per year, we can then trace progress from 1966 onwards against this yardstick. One of the major virtues of the register as established was that it dealt with districts separately and during the re-organisation of provincial boundaries the register was able to pass on information to pro-

vinces acquiring parts of the Midlands. Unfortunately, we were not able to obtain information on the tuberculosis state of areas which were added to the Midlands, but we were able, very easily, to put our system into operation in these newly acquired areas. The other fact observed was that the number of beds in use was beginning to fall. In 1962 a total of 530 beds were used exclusively for tuberculosis in various centres. By 1967, the number of beds had fallen to 340, a reduction of approximately 35 per cent., with the closure of the RAPT Hospital in Gwelo, (120 beds), 30 beds at Selukwe, and 30 beds at St. Patrick's Mission Hospital. By this time, Driefontein Sanatorium was becoming the major tuberculosis unit for the Midlands and Victoria Provinces. The quality of care was high. The laboratory was an integral part of the sanatorium with wide range of facilities including culture and sensitivity testing of tubercle bacteria from sputum specimens.

At the major out-patients clinics under the control of the Tuberculosis Register, 1 742 patients had been booked to attend, of whom 1 180 kept their appointments, approximately two-thirds. A review of the BCG status revealed that approximately 49 per cent. of the population had been protected with BCG.

The report for 1967 begins with the statement that the notified incidence of tuberculosis in the Midlands Province during 1967 was almost exactly half the rate for 1962, a 50 per cent. reduction in the period of five years since the Tuberculosis Register was started in January, 1963. As a result of five years' experience it was said that we continued to work with a minimum of equipment and staff and at the time of writing were threatened with complete immobilisation due to the shortage of mileage money. "The health infrastructure in the Tribal Trust Lands remains grossly inadequate and is non-existent in the European farming areas. This situation will continue as long as the output of health assistants remains at its present low level. There has been a decline in the standards of curative services outside the major centres. The medical cover of rural hospitals is minimal and continued education of paramedical staff is inadequate to compensate for the shortage of doctors. There is good evidence to suggest that until an accurate method of measuring the health disease status of the population as a whole is introduced, logical health extension is impossible. The success of the present scheme of tuberculosis control which has now been adopted by all the five provinces suggests a logical extension of this method into a much wider field of chronic endemic and infective disease, and it also suggests that this is not only practicable but desirable."

At this stage, much more detailed analyses could be made on a population basis following the updating of the census figures and we were beginning to plot the tuberculosis rate by districts — this has all been written up in the report. In 1967 the figures for the Driefontein Sanatorium showed that twice as many patients were now passing through the sanatorium and that they stayed less than half as long, and that the total cost of coping with twice as many patients was fractionally less. The out-patient clinic network had been built up to the state at which there was one out-patient clinic to about 20 000 of the population, and the maximum distance from out-patient clinics had been reduced by starting a number of new ones. This sort of network of clinics in the absence of adequate rural medical staff implies considerable expenditure on mileage. During this year, the collection of routine sputum specimens from out-patients began, and over 800 specimens of sputum were collected during the year from out-patients attending clinics. During the year, 100 000 BCG's had been done in the Midlands Province, about 15 per cent. of the population, and the overall BCG rate must by then have been over 60 per cent. Most hospitals were BCG'ing babies in the neo-natal period and the newly established network of baby clinics was doing the lost ones and the toddlers at the well baby sessions. The conclusion to this report for 1967 reads as follows: "In the last five years many things have been proved, certainly to my own satisfaction. First, that the mining industry is the major source of tuberculosis and must be dealt with; two, that tuberculosis is eradicable, and three, that the reason most public health problems exist is simply that nothing is done about them."

In 1968, 625 new cases of tuberculosis were notified as originating in the Midlands Province, and this was reflected in an increased overall incidence. It was difficult to reconcile this with the theories expressed in previous reports but if the increase in cases was analysed by district, the surprising fact emerged that the excess cases were produced from those districts in which a mass BCG campaign was done the previous year. This, it was thought, could have been due to one or other of three factors — first the publicity effect of the mass campaign; secondly, Koch's phenomena on a massive scale, and thirdly, co-incidence.

During the years from 1966 onwards, an increasingly dense network of clinics was built up in the rural areas, in particular, in the remoter areas, the bottom end of Belingwe and top end of Gokwe; these clinics were carried out by a week-long tour of a team in a land-rover. This team left Gwelo at a very early hour on Monday morning and returned at a late hour on Friday night, and they progressed from place to place doing approximately two clinics a day, ten clinics in a week, covering anything up to 650 miles. The team consisted of the Tuberculosis Officer, or alternatively the Senior Health Assistant who was responsible for running the Tuberculosis Register in his absence, a clerk and possibly a camp guard. The team carried a large supply of out-patient chemotherapy and a large number of sputum bottles. They also carried with them the appropriate section of the Register for that area. At each clinic, the cards being divided and filed according to the small clinic area, the patients were processed and at the end of the clinic, the whole of the relevant section of the Tuberculosis Register was worked over with the local Health Assistant sitting beside one so that the cards were processed individually and the whereabouts and status of each patient checked. At this stage there were about 50 out-patient clinics in the Province giving a ratio of about 1 to 15 000 and by 1974, there were to be 65 clinics at various sites. The initial method of establishing clinics in the major hospital centres where X-ray facilities and ESR facilities were available was found to be inappropriate to the needs of the population. Once it was realised that serial X-rays after the first six months of treatment showed radiological stability in the vast majority of cases, and that ESR's were notoriously unreliable, we were able to move out into the country and establish clinics in schools, on the verandahs of rural shops and even under trees.

The annual report for 1972 is in fact a summary of the work of a decade from 1963 to 1972 inclusive. During the period, steady progress had been made not only in the control of tuberculosis but in the extension of the fundamental concepts of disease control to areas other than tuberculosis. The sheet anchor of tuberculosis control remains the triple regime of chemotherapy and this, it is noted, was originally introduced to Rhodesia by Dr. Turnbull at the Martin Sanatorium. He, in his initial communication, which makes very interesting reading, estimates that he had 90 per cent. initial success and probably 90 per cent. once and for all sputum conversion. These results, we think, now compare with those obtained at Driefontein Sanatorium where we estimate that 95 per cent. of patients who enter the sanatorium with tuberculosis are converted to sputum negativity and remain so for the rest of their lives. Having taken out of the hands of the hospital service 10 years ago a clinic service which they were neither equipped or motivated to perform, it is rewarding to note that the ideas developed for the control of tuberculosis are now being fed back into the hospitals, particularly with the advent of a group of doctors to Gwelo Hospital who were able to see beyond the walls of the hospital. This has proved to be a most significant step forward and has resulted in a number of communications in the *Central African Journal of Medicine* based on the new thoughts about the provision of curative and preventive medical services and the use of an endemic Disease Register for the control of disease.

Prior to 1963, we can assume a total case rate of between 150 and 200 per 100 000 per year. In the five years, 1959 to 1963, 440 new beds for tuberculosis were commissioned. By 1st January, 1963, about 175 000 BCG immunisations had been done in the Midlands. In beginning mass blind BCG in October, 1969, the foundation of tuberculosis control had been laid and it is possible that the epidemic had passed its peak by 1963. It is salutory to think that had the new active case rate continued at the rate observed between 1958 and 1962, we would now be notifying between 1 200 and 1 600 new cases per year, instead of the present 500 or so. The population of the Midlands had increased, partly by several changes of boundary and the massive resettlement in Gokwe District and of course, in part by the relentless natural increase. The total had changed from 400 000 as at 30th June, 1962, to 807 560 as at 30th June, 1973. Detailed breakdown by age and sex groups were available for the population and the incidence of tuberculosis by districts was plotted and graphed, using these figures to show where the danger areas lay and the pattern of disease incidence. The pulmonary rate in 1962 was 165 and the non-pulmonary rate about 14. By 1972, the pulmonary rate had decreased to 57, a decrease of something of the order of 60 per cent., and the non-pulmonary rate decreased by 50 per cent. to about 7 per 100 000 per year.

We have made rapid and effective progress in the younger age group as a result of a mass

BCG and the removal of the infector pool. In addition, in providing acceptable treatment by shortening the hospital stay to the absolute minimum we have made great strides. As far as the treatment of tuberculosis and latterly leprosy is concerned, we have a most co-operative and well informed population. The importance of non-indigenous workers who constitute a formidable tracing problem once they leave their current job continues to be obvious from the tables in this report.

The number of cases originally notified and subsequently withdrawn shows a further increase. The commonest cause of withdrawal is lung abscess or inhalation pneumonia. The summary of this report reads as follows — "The new active tuberculosis case rate has fallen in the past decade by around 60 per cent. A major tuberculosis hospital has been closed and a number of smaller units abandoned. On the same principles and using the same methods, leprosy has been controlled, and the leprosy hospital emptied. New concepts for the control of a wide spectrum of relapsing or chronic diseases have been elaborated. Provincial Health Planning Committee has been brought to fruition and this basic concept will no doubt prove its value in the next decade. The use of para-medical staff in endemic disease control has been pioneered by the Tuberculosis staff. Basic research has been undertaken leading to the design of a school health service. Previously unrecognised industrial disease (in Rhodesia) has been described. Apart from all this we have designed and operated an extensive series of clinics in many varied situations, giving us access to all the hospitals and clinics, all geographical areas, chiefs' villages and schools. We even do clinics on the verandah of rural general dealers' stores. This gives us an overall view of the medical problems of the province which must be difficult to better."

This necessarily brief account would be incomplete without mention of Dr. M. L. Westwater, Mr. G. H. Woodlands, Mr. H. S. Dzapata and Mr. S. N. Karonga, who contributed between them so much of the hard work and so many of the original ideas. For my part, this essay is a sentimental journey rather than a scientific commentary.

Reference

Annual Reports of the Tuberculosis Officer, Midlands Province, 1963-1973.