

A Brave STEP Forward - The Singapore Tuberculosis Elimination Programme

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TB has, over the centuries, claimed more lives in the history of mankind than any other infectious disease. It continues to claim 3 million lives each year. Since the tubercle bacillus was discovered in 1882 by Robert Koch, effective means of identification, treatment, prevention and control of TB have become available; yet, today, one-third of the world's population is infected, and there are 8 million new cases each year^(1,2). What has gone wrong? Complacency on the part of the medical community, the low priority accorded by governments to the implementation of effective control measures, increased poverty, overcrowding and the HIV epidemic has led to the world-wide resurgence of this old disease; and worse, the emergence of multi-drug resistant strains. Fortunately, all is not yet lost. Following the declaration of TB as a "global health emergency" in 1993 by the World Health Organisation (WHO)⁽³⁾, a concerted effort by international organisations such as the International Union Against Tuberculosis and Lung Disease (IUATLD) and WHO has led to encouraging results in the fight against TB in countries where there have been the political will manifested as governmental allocation of resources and manpower towards TB control⁽⁴⁾.

Why is political will and government backing so important in the fight against TB? TB is as much a public health concern as it is a disease of the individual. A person may become infected at any time and place by simply breathing the same air as another with infectious TB (whether known or unknown to him; indeed the infectious case may also himself be unaware of the diagnosis). TB disease is treatable and curable with short-course chemotherapy. The progression of TB infection to disease is preventable with isoniazid chemoprophylaxis. It should, theoretically, be easy to administer the above treatments to patients, hence breaking the chain of transmission and also eliminating the pool of infected persons in the community. In reality, there is often a delay in the diagnosis of TB due to lack of public and physician awareness, with the patient spreading the tubercle bacillus in the community for some time before treatment is started. Moreover, successful treatment of TB and the prevention of emergence of drug resistance involves the correct prescription and taking of multiple drugs for at least 6 months. Human nature being what it is, many patients find

it difficult to adhere to and complete treatment. It has been shown by WHO that the most cost-effective (and indeed the only) way to ensure that patients complete treatment and achieve cure is by means of directly observed therapy - short course (DOTS), in which a health care worker watches as the patient swallows the TB medications⁽⁵⁾. To ensure every chance of success, many national programmes administer DOTS at no cost to the patient, and at a time and place convenient to the patient. This often entails the health worker going to the patients' homes, or patients being given enablers and incentives (eg. transport allowance and meal coupons) for them to turn up at the public health clinic for DOTS. Measures will also have to be taken by the public health system to trace those who fail to turn up for treatment. DOTS is, without doubt, resource- and labour-intensive, and requires commitment at every level from each individual health worker to the government policymaker for its success. Full government backing to any TB control programme is therefore crucial. Failure to do so will result in a further rise in TB rates, and the emergence of the dreaded multi-drug resistant TB, scenarios any society can ill-afford.

What is the situation in Singapore?

The TB incidence rate among Singapore residents fell steadily from 306 per 100,000 population in 1960 to 56 per 100,000 in 1987⁽⁶⁾. This may be attributed to our improved socio-economic conditions and the national TB control programme which was set up in 1957. Our TB rates have, however, remained at around 50 to 55 per 100,000 since 1987. While the rate among residents has remained stable, the number of TB cases among non-residents has increased from 178 cases in 1987 (accounting for 11 % of all new cases for that year) to 603 in 1995 (27.8% of all new cases for 1995). This may reflect in part the increasing influx of foreigners seeking employment in Singapore. Nonetheless, our incidence rate among residents of 50 to 55 per 100,000 is 5 to 10 times that of developed countries such as the USA and UK. This, and the fact that our rates have not declined in the past 10 years, is cause for concern. We believe that there is significant on-going transmission of TB in our community, and that this is due to several factors: delays in diagnosis and starting of

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treatment, failure of patients to adhere to and complete treatment (for which they may not be entirely to blame), and under-identification (and hence undertreatment) of infected contacts.

Singapore does not have major problems with poverty, homelessness or substance abuse. We have also yet to experience the full impact of the HIV epidemic. Our incidence of multi-drug resistant TB (defined as resistance to both rifampicin and isoniazid) is low, at < 1 % for new cases. These factors should all work in our favour to make it possible not only to control, but to eliminate TB in our society (elimination is defined as < 1 case per million).

To this end, the Ministry of Health has launched the Singapore Tuberculosis Elimination Programme (STEP) on World Health Day this year. The mission of STEP is to eliminate TB in Singapore through the following goals:

1. To detect all infectious TB cases
2. To cure all TB cases
3. To detect and treat all infected contacts
4. To prevent the emergence of multi-drug resistant TB

The Ministry of Health has appointed a STEP committee comprising local TB experts. The Ministry of Health will also receive advice and assistance from an International Advisory Committee. The programme has two main components, the Epidemiology and Surveillance component undertaken by the Epidemiology and Disease Control of the Ministry of Health, and the Clinical component under the TB Control Unit of the Department of Respiratory Medicine, Tan Tock Seng Hospital.

The Epidemiology and Surveillance component will be responsible for the national TB registry and for surveillance of all individual patients treated in the major treatment centres in Singapore. TB has been a notifiable disease in Singapore since 1957; however, the number of patients who successfully complete treatment each year is not known. A recent survey in Tan Tock Seng Hospital of 152 patients showed that only about 60% completed treatment (personal communication, Dr Jane Yap). Reported treatment completion rates in other countries range from 11% to 75% where there is no programme of systematic surveillance. From 1998, all centres treating TB in Singapore will be required to submit monthly reports on the treatment status of each of their patients to the Ministry of Health. This not only serves as a means of monitoring national treatment completion rates, but also to heighten each treatment centre's awareness of its own performance, so that appropriate measures may be taken at that level to achieve good treatment results. If any patient should default, and if the treatment centre is unable to recall him, the case may be referred to the Tuberculosis Control Unit for defaulter tracing.

All treatment centres will be encouraged to use

DOTS as standard practice. DOTS will be carried out at government family health clinics nationwide. The government clinic nurses will play a vital role and will undergo training in the administration of DOTS. A tight system of communication between the family health clinic administering DOTS and each treatment centre will be set in place such that no patient will be "lost" or allowed to fall through the cracks in the system. Patients in whom DOTS is not possible and who are on self-administered therapy should be prescribed fixed-drug combination preparations (ie. capsules containing two or three of the anti-TB drugs) of demonstrated bioavailability. This will prevent monotherapy and reduce the risk of the emergence of multi-drug resistant strains⁽⁷⁾.

The Clinical component of STEP is to be undertaken by the TBCU (under the Department of Respiratory Medicine, Tan Tock Seng Hospital). This will be developed into a model TB centre where, in addition to treatment of TB patients, contact tracing according to established principles and prophylactic treatment of infected contacts will be carried out. The TBCU will also work with the Training and Health Department (Ministry of Health) and the Singapore Anti-Tuberculosis Association to improve case detection and early diagnosis through public education, physician education and targeted screening of high risk groups.

Until an effective vaccine against TB is developed, and until newer drugs which allow the duration of therapy to be further shortened and simplified become available, we are left with no better alternative than DOTS to ensure that patients are cured and the spread of TB curtailed. What is needed is a comprehensive programme with government backing. This is now present in the form of STEP. With full co-operation and commitment at all levels of the programme and the community, Singapore should succeed in keeping all in this country free from this deadly scourge.

REFERENCES

1. Murray CJL, Stryblo K, Rouillon A. Tuberculosis in developing countries: burden, intervention and cost. *Bull Int Union Tuberc Lung Dis* 1990; 65:6-24.
2. Raviglione MC, Snider DE, Kochi A. Global epidemiology of tuberculosis. *JAMA* 1995; 273:220-6.
3. Anonymous. Tuberculosis: a global emergency. *World Health Forum* 1993; 14:438.
4. Frieden TR, Fujiwara PI, Washke RM, Hambury MJ. Tuberculosis in New York City: turning the tide. *N Engl J Med* 1995; 333:299-303.
5. Moore RD, Chaulk CP, Griffiths R, Cavalcante S, Chaisson RE. Cost-effectiveness of directly observed versus self-administered therapy for tuberculosis. *Am J Respir Crit Care Med* 1996 154:1013-9.
6. Communicable Disease Surveillance Report 1995. Dept of Clinical Epidemiology, Communicable Disease Centre, Tan Tock Seng Hospital.
7. Moulding T, Dutt A, Reichman LB. Fixed-dose combinations of antituberculosis medication to prevent drug resistance. *Ann Intern Med* 1995; 122:951-4.