

care and getting successful tuberculosis treatment. Both males and females are infected, progress to disease, and die due to tuberculosis. Whereas males and females share many beliefs and attitudes to tuberculosis, there are considerable differences with regard to stigma and its social consequences.³ Not only the individuals but also the whole family may suffer from social stigma and its negative consequences, which are harsher for the female family members. Stigma may lead to delays for both sexes in seeking care, but more so for females if the physical, geographical, and economic access to health care is limited. The social structure of many societies in developing countries today relies on women having a double or triple workload—ie, taking care of the family and home, doing agricultural work, and perhaps also doing waged work. The impact of tuberculosis in women is thus severe not only on their families but also on the development of society through loss of workforce, ruined families, and orphaned children.

The WHO is forcefully promoting the brand-name strategy of directly observed therapy short-course (DOTS). “Supervised swallowing” or directly observed therapy (DOT), where health workers or trained volunteers watch the patient take his or her treatment, is one of the five elements of the DOTS strategy. The DOT element means that the patient has to visit the health worker or vice versa. Both these alternatives may impact differently on women and men and may be difficult for women—who have little extra time and poor economic resources—to comply with. This alienating and authoritarian approach may further undermine the status of women and their chances of receiving tuberculosis treatment. DOT may be less

effective for women as suggested by a recent randomised controlled trial of DOT versus self-supervised tuberculosis treatment.⁷

Tuberculosis control is a gender issue that has been neglected by the tuberculosis-control programmes. “Gender” refers not only to the physiological differences between sexes but also to the variety of behaviours, expectations, and roles that exist within a social, economic, and cultural context. A gender-based approach to tuberculosis control will assist in understanding not only the biological and cultural differences between the sexes but also the structural violence leading to poverty, grossly inadequate health care resources, and increased risk of tuberculosis and death.³

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Children and tuberculosis: protecting the next generation?

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Attitudes to childhood tuberculosis are determined by whether one is a clinician or a health administrator attempting to control tuberculosis. In developed communities tuberculosis occurs mainly in older adults; in developing communities tuberculosis occurs at all ages, albeit with differing manifestations. In developing communities a high disease incidence is encountered in young children. A large proportion of the population is aged less than 15 years and as many as 40% of tuberculosis notifications may be children;¹ tuberculosis may be responsible for 10% or more of childhood hospital admissions and 10% or more of hospital deaths.² Furthermore, with an annual risk of infection of 2–3%, close to 40% of the population may be infected by age 15 years.

The figure illustrates schematically the age-related population pyramids in the process of infection (B) and disease development (C). The figure also shows, by way of contrast, the shape of the broad-based population pyramid

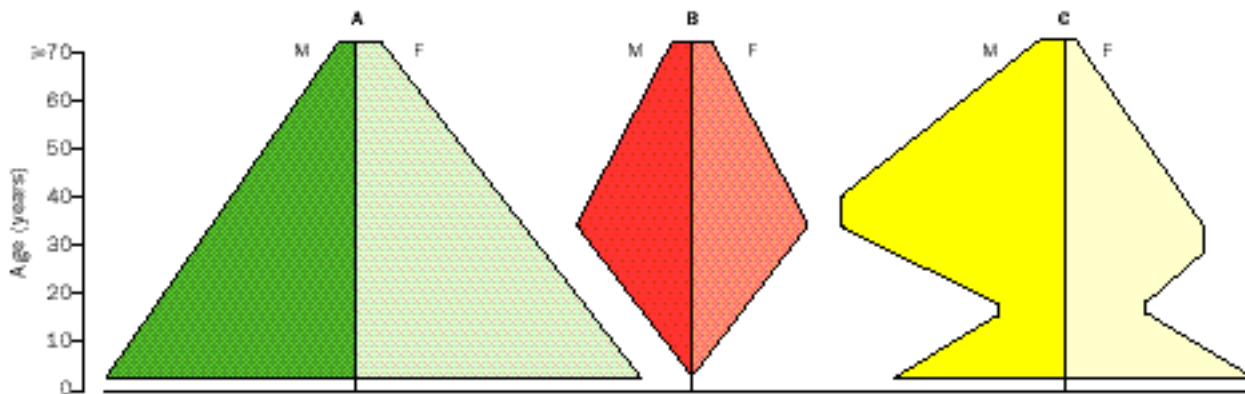
in a hypothetical developing community (A). The high incidence of disease among the relatively small population of infected infants is noteworthy as is the rapid rise in incidence among teenagers. While those concerned with tuberculosis control will focus upon patients with cavitating disease who are spreading infection, the clinician will be concerned with the varying manifestations of disease occurring from infancy through to adolescence.

Against this background and with HIV-seroprevalence rates among the sexually active population approaching 30% in much of sub-Saharan Africa, what opportunities exist for protecting the next generation against the ravages of tuberculosis?

First, it is unlikely that a new vaccine or new antituberculosis agents will become available in the foreseeable future. In the absence of any better vaccine BCG vaccination of newborn babies should continue and may offer protection against disseminated disease. Even in developing communities a significant proportion of adult-type disease may arise from lymphohaematogenous dissemination to the lung apices, and later endogenous reactivation rather than recent infection.³ Adolescent BCG vaccination may therefore theoretically help prevent adult-type pulmonary tuberculosis in the older adolescent. If this

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Shape of hypothetical population pyramids in a developing community

Total (A) and tuberculosis-infected (B) populations, and population with tuberculous disease (C; different scale to A and B) for males (M) and females (F)

is the case, BCG vaccination may be particularly valuable in communities where HIV infection and AIDS are spreading since it may prevent seeding of lung foci, which may reactivate due to AIDS-induced immunocompromise.

Second, although chemoprophylaxis does not have a high priority in control programmes, the rapidly deteriorating tuberculosis situation in developing countries demands exploration of a more aggressive approach. "Short-course", high-dose chemoprophylaxis of 10–12 weeks duration with the fixed combinations of isoniazid, rifampicin, and pyrazinamide given intermittently could improve compliance and minimise the risk of eliciting drug resistance.⁴ Pyrazinamide substantially influences the sterilisation of lesions when given during the first 2 months of treatment and should form part of any experimental short-course prophylactic regimen. Even with active pulmonary tuberculosis, cure rates of approximately 80% are achieved by 3 months of treatment.⁵ There should also be less concern in children with regard to toxicity as a result of higher drug doses.

In children aged less than 2 years the infected population is relatively small, but disease incidence is exceptionally high and frequently takes the form of tuberculous meningitis or miliary tuberculosis. Among infected infants aged less than 1 year, a mortality of 4920/100 000 was calculated for the USA in 1940,⁶ 5960/100 000 for London in the period 1945–49,⁷ and, more recently, incidence rates of 10 900/100 000 and 8200/100 000 for infected boys and girls, respectively, were calculated for South Africa in 1993.⁸ Very young children who are household contacts of adult-type pulmonary tuberculosis cases therefore constitute a small but deserving group for short-course intensive chemoprophylaxis.

Beyond 2 years of age disease will be increasingly benign and chemoprophylaxis should play a less prominent part, if any, in a tuberculosis-control programme in a developing community. Infection at this age is also less likely to be followed by disease in adolescence than infection later in childhood.⁹

As adolescence is entered the potential benefits of preventing disease are multiplied. Tuberculous disease is now increasingly adult-type pulmonary tuberculosis with frequent cavitation causing further dissemination of infection. Problem areas include the population to be targeted, compliance, and lack of funds and personnel.

Since 25% or more of adolescents in a developing community will already be infected, it is patently impossible to offer all infected individuals chemoprophylaxis. Most communities will not have the

resources to tuberculin test large numbers of teenagers. There are, however, several subgroups who may benefit from a more active chemoprophylaxis policy. Pregnant teenagers who are by implication sexually active and exposed to HIV infection and AIDS are one such group. The higher the incidence of HIV seropositivity the more likely is it that such a policy may prove rewarding. Teenage close household contacts of smear-positive tuberculosis patients are another group in whom short-course intensive chemoprophylaxis may be beneficial.

There is little doubt that the best means of preventing tuberculosis in childhood is by the control of adult tuberculosis. When adult tuberculosis comes under control incidence rates fall rapidly in children. Present policy demands that control efforts be focused upon the diagnosis and management of smear-positive pulmonary tuberculosis. It could be argued that by the time a smear-positive patient is diagnosed the majority of close contacts will already have been exposed to infection and that it would be equally rewarding to find and treat culture-positive, but smear-negative patients before they have developed cavitation and spread infection to children and other close contacts: "one probably needs to be able to diagnose tuberculosis efficiently at all stages of severity in order to find a high proportion of those that are smear positive".¹⁰

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