Optimizing tuberculosis control in the inner city

J. Mark FitzGerald, MD

? See related article page 789

Tuberculosis (TB) is a problem of global proportions. Within Canada, rates of TB are low relative to international standards, with a current rate below 8 per 100 000.[1] However, this national rate hides a number of high-risk groups, whose incidence rates considerably exceed the national average. Most notable among these groups are aboriginal Canadians and, to a lesser extent, immigrants from high-prevalence countries.

The key principle in TB control involves identifying active cases, particularly smear-positive pulmonary cases, and rendering them noninfectious with appropriate antituberculous therapy.[1] In Canada, we are fortunate that multidrug-resistant TB is not a major problem.

The paper by Dr. Wendy Wobeser and colleagues in this issue (page 789) highlights the challenges in managing 145 of 150 cases of pulmonary TB diagnosed in 5 Toronto hospitals in 1992/93.[2] The results should be interpreted with caution, as the authors note in their introduction that, for regimens not observed directly, treatment completion can be estimated only indirectly. Completion rates will be more difficult to estimate in the self-administered group. Allowing for this caveat, their results are of particular concern in that only 58% of the subjects completed treatment. For 127 patients, the drug regimen was prescribed by a specialist. Thirteen different drug regimens were used, of which only 75% were correct. Initial treatment with an appropriate regimen is critical to rendering an active smear-positive case of TB noninfectious. Given the wide disparity in regimens prescribed in this study, it is tempting to suggest that a more centralized process or clearance system for the initial regimen would be useful. Such a centralized coordination should not, however, detract from the importance of local community agency involvement in implementing TB control strategies.

Although Wobeser and colleagues' results are less striking than those reported for New York City in the late 1980s,[3] their findings for the HIV-infected cohort are alarming: of the 22 patients with HIV infection, only 27% completed treatment, 23% died, 36% defaulted, and 14% were transferred to another treatment centre and no treatment results were available. These are frightening data, given that many HIV-infected people come from inner-city environments, where many of their friends and cohabitants in housing shelters either have HIV infection or are at high risk by the nature of their recreational activities, in particular, intravenous drug use. The potential for transmission of *Mycobacterium tuberculosis* infection and progression to active TB in these populations, particularly the homeless, was dramatically illustrated by Barnes and colleagues[4] in Los Angeles and our group in Vancouver.[5]

An additional concern is that only 21% of the patients not known to be HIV positive at the time TB was diagnosed were screened for this coinfection; 2 of these 26 patients were found to be HIV positive. This low rate of screening for HIV infection among patients with TB is a major cause for concern. Because TB is often the sentinel opportunistic infection in HIV-positive people, it may represent the first opportunity for the clinician to identify a person as being HIV positive. Early diagnosis of HIV infection brings with it the opportunity for disease-modifying intervention with antiretroviral therapy. The more recent introduction of protease inhibitors has given rise to problems of interaction between these agents and rifamycin-based compounds, but a pragmatic strategy has recently been suggested.[6] The high death rate in the HIV-infected subset of patients in Wobeser and colleagues' study is consistent with reports that AIDS, lack of initiation of TB treatment and multidrug-resistant *M. tuberculosis* are all associated with increased mortality.[7]

Subsequent to Wobeser and colleagues' experience in the early 1990s, several papers have been published emphasizing strongly the benefits of directly observed therapy.[8] Markers of a poor TB control program, including primary and secondary resistance rates as well as relapse rates, have all been shown to be reduced with the use of directly observed therapy.[9] As the name implies, the process involves the ingestion of medication under direct observation. It may initially appear to be more expensive, but there are reports indicating that it ultimately is more cost effective than self-supervised therapy.[10,11] A 2-month intensive daily phase of treatment has been suggested before twice-weekly therapy is begun. In groups at high risk of default from therapy, the twice-weekly regimen can be

started at an earlier stage.[12] As outlined by Caminero and associates,[12] the use of directly observed therapy allowed them to be immediately aware of poor compliance, because missed doses of medication are immediately known to the public health agency, in contrast with self-administered therapy, where poor compliance may not be noted right away.

A more recent trial, from South Africa, has indicated a higher treatment completion rate among patients randomly assigned to self-supervision of their therapy than among those randomly assigned to receive therapy under direct observation (60% v. 54%).[13] Among "retreatment" patients (those receiving a second course of therapy), the difference in completion rates was even more striking (74% v. 42%). Given the location of this study, the low recruitment rates and the low completion rates in both groups, the generalizability of this study to North America is uncertain.

Although studies have identified people who, owing to a certain lifestyle (e.g., intravenous drug use), appear more likely to be noncompliant, overall it is not possible, in a general population sample, to predict those who will or will not take their medications.

An important group of patients in Wobeser and colleagues' paper was subjects who were transferred to another treatment centre and for whom treatment completion could not be determined. A study from Los Angeles showed that for patients who moved, the odds ratio for defaulting was 5.5 compared with the stable population.[14] It is unclear whether patients in Wobeser and colleagues' study who were transferred are truly comparable to those in the Los Angeles study who moved; however, the latter study does alert us to the problems of patients moving between jurisdictions and the need for careful follow-up to ensure treatment completion.

We should thus learn from Wobeser and colleagues' paper that optimal control of TB will come only from improved prescribing of appropriate antituberculous treatment. Although debate continues, it would appear reasonable to have a low threshold for the use of directly observed therapy in high-risk inner-city populations as we await further randomized controlled trials. Improved communication between clinicians and public health agencies is also critical, as is communication between public health agencies when a patient moves or is transferred to another area. Careful attention to improving management is the only way to prevent the emergence of multidrug-resistant TB and its attendant challenges.

Dr. FitzGerald is with the BC Centre for Disease Control Society, Vancouver, BC.

Competing interests: None declared.

References

1. Standards Committee, Canadian Thoracic Society. *Canadian tuberculosis standards*. 4th ed. Thorold (ON): Canadian Lung Association; 1996.
2. Wobeser W, Yuan L, Naus M, and the Tuberculosis Treatment Completion Study Group. Outcome of pulmonary tuberculosis treatment in the tertiary care setting — Toronto 1992/93. *CMAJ* 1999;160:789-94.
3. Brudney K, Dobkin J. Resurgent tuberculosis in New York City: human immunodeficiency virus, homelessness and the decline of tuberculosis control programs. *Am Rev Respir Dis* 1991;144:745-9.
4. Barnes PF, Yang Z, Preston-Martin S, Pogoda JM, Jones BE, Otaya M, Eisenach KD, et al. Patterns of tuberculosis transmission in Central Los Angeles. *JAMA* 1997;278:1159-63.
5. Evidence for TB clustering in Vancouver: results from a pilot study using RFLP fingerprinting. *Can Commun Dis Rep* 1996;22:49-51.
6. TB/HIV Advisory Committee. Management strategies for candidates for protease inhibitors and requiring treatment for Mycobacterium tuberculosis. *Can Commun Dis Rep* 1998;24:77-80.
7. Pablos-Mendez A, Sterling TR, Frieden TR. The relationship between delayed or incomplete treatment and all cause mortality in patients with tuberculosis. *JAMA* 1996;276:1223-8.
8. Squire SB, Wilkinson D. Strengthening "DOTS" through community care for tuberculosis [editorial]. *BMJ* 1997;315:1395-6.
9. Weis SE, Slocum PC, Blais FX, King B, Nunn M, Matney GB, et al. The effect of directly observed therapy on the rates of drug resistance and relapse in tuberculosis. *N Engl J Med* 1994;330:1179-84.
10. Burman WJ, Dalton CB, Cohn DL, Butler JRG, Reves RR. A cost effectiveness analysis of directly observed therapy vs self-administered therapy for treatment of tuberculosis. *Chest* 1997;112:63-70.
11. 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.
12. Caminero JA, Pavon JM, Rodriguez de Castro F, Diaz F, Julia G, Cayla JA, et al. Evaluation of a directly observed six months fully intermittent treatment regimen for tuberculosis in patients suspected of poor compliance. *Thorax* 1996;51:1130-3.
13. Zwarenstein M, Schoeman JH, Vundule C, Lombard CJ, Tatley M. Randomised controlled trial of self-supervised and directly observed treatment of tuberculosis. *Lancet* 1998;352:1340-3.
14. Cummings KC, Mohle-Boetani J, Royce SE, Chin DP. Movement of tuberculosis patients and the failure to complete anti-tuberculosis treatment. *Am J Respir Crit Care Med* 1998;157:1249-52.

Correspondence to: *Dr. J. Mark FitzGerald, BC Centre for Disease Control Society, 850 W 12th Ave., Vancouver BC V5Z 1J5; fax 604 875-4695*