workers, the response to asbestos or cigarette smoking, or homicides resulting from the mentally ill, one sees many similarities. Coercive public health measures have not, however, been a major feature in tuberculosis control programmes outside the USA. In the UK, for example, legislation allows for the detention of an individual with a notifiable disease who is a threat to others, but this legislation is rarely used. Moreover, there is no legislation to detain an individual who may become a threat in the future. Whether this will remain so if rates of tuberculosis, and particularly rates of drug resistance, continue to rise is unclear.

How can public health policy directed towards tuberculosis control, which includes coercive measures and which, by necessity, focuses on a disenfranchised group of individuals whose voice may not be heard in policy debates, be as equitable and as fair as possible? What is clear is that the burden of proof that individuals pose a threat to the public should be more demanding when the consequences of regulation include detention than when economic encumbrances are created.[14] Furthermore, we need to recognise that, when people feel threatened, they focus inappropriately on external sources such as stereotyped minorities and blame them, rather than assessing other threats which are perhaps closer to home.[15]

We must further recognise that public health decision making, particularly in a crisis, may be prone to errors, and we must be clear of the goals we are trying to attain. When coercion was used in the South Asia smallpox campaign the goal was different—it was eradication, not control. Although the campaign was successful, concerns have been raised that some of the measures used may hinder future public health campaigns, and that ultimately the use of coercion may be counterproductive.[16]

Despite the WHO's assertion that "everyone who breathes air, from Wall Street to the Great Wall of China, needs to worry about this risk", it is clear that the risks to all from tuberculosis are not equal. For example, in New York City, those using homeless shelters in which beds were spaced 18 inches apart and HIV prevalence was high were obviously at greater risk of exposure than those in the leafy suburbs. But the perception was high in New York that all were at risk, and undoubtedly encouraged the response seen.

As new information regarding tuberculosis transmission becomes available, as circumstances alter, and as our understanding of the perceived threats improves or changes, we must alter appropriately our view of the probabilities of potential given events occurring. Policy decisions should involve assessments that are both individualised and weighted to account for expert views on probabilities (and perhaps further weighted on the basis of past predictive success), upon economic calculations, and upon ethical analysis. Furthermore, one should be able to evaluate whether the consequences of policy decisions are similar to or different from those predicted.

An approach to our understanding of risk with regard to tuberculosis must therefore attempt to define the risk of an event occurring (for example, the transmission of tuberculosis from a smear negative poorly compliant individual), determine the gravity of that event, weight different available measures to be taken, and alter the perception of risk with time both as our understanding improves and as circumstances change. In addition, with the changing perception of that risk, the legislative and regulatory approach to coercive public health measures should be responsive and encourage swift modifications of public health measures. The anxiety over MDRTB in New York has largely abated. It will be interesting to see if either the regulations, or the application of them, is modified in response.

Perhaps more important than any of the above, however, the use of coercive measures to support strategies which improve treatment compliance must be sensitive to national and cultural differences and not simply be based upon perceived successes elsewhere. The global control of tuberculosis may be harmed more than it is assisted by inappropriate, ill judged, culturally insensitive coercive public health measures.

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More carrot or more stick or both?

Richard Coker describes how a system, with a substantial coercive component even for non-infectious patients, evolved in New York based on a perception of risk which was perhaps fuelled by media hype.[1] The reasons why such a system came about can, however, be appreciated from the state of tuberculosis control—or perhaps non-control—in New York in the early 1990s.

Due to a series of cuts in health funding, routine drug sensitivity testing had been stopped, support systems were slashed, and in some areas only about 10% of patients com-

pleted treatment.[2] By 1992 33% of isolates were drug resistant, including 26% to isoniazid, and the rate of multidrug-resistant tuberculosis (MDRTB) was 19%.[3] The expenditure in New York alone of $750 million (£500 million) with an extensive directly observed therapy (DOT) programme had reduced the MDRTB rate to 13% in 1994.[4]

In England and Wales tuberculosis notifications fell progressively until 1987, with a rise between 1987 and 1992 of some 20%[5] to around 6000 cases a year. Drug resistance levels had remained low between 1981 and 1992[6] with a stable MDRTB rate of 0.6%. There has, however, been a rise in the MDRTB rate since 1993 up to 1.6%,[7] with HIV positivity, ethnic minority groups, prior treatment, and residence in Greater London all being significant associations. Tuberculosis in the United Kingdom, as in many developed countries, is increasingly a disease which is localised to certain areas and population groups.[8 9] The problems of tuberculosis control are largely limited to such high prevalence areas which make up some 20% of districts, with Greater London having the greatest number of such districts.[9]

The key elements of tuberculosis control in order of importance are (1) detection and treatment of cases, particularly those with sputum smear positive disease; (2) case holding which could be defined as maintaining treatment to completion; and (3) preventive measures such as chemoprophylaxis and BCG vaccination. There also needs to be adequate staffing levels of doctors and, in particular, of tuberculosis nurses/health visitors to deliver a service with those elements.[10]

The philosophical or ethical dilemma that Dr Coker raises is where the "balance point" between the libertarian and coercive strategies in tuberculosis management lies or, alternatively, where the rights of society in general outweigh the rights of an individual or vice versa. This varies according to the society and situation, and with the public perception of risk rather than the actual risk. In England and Wales currently, as a last resort, sections 37 and 38 of the Public Health Act allow for compulsory detention of a person with infectious tuberculosis of the respiratory tract. Compulsory treatment is not allowed so that compulsory admission is only sought in extreme circumstances to safeguard the public health. When such compulsory admission is sought, there are also the practical problems of maintaining such detention and of determining when "infectivity" ceases. Legally compulsory detention is only allowed for "infectious" tuberculosis of the respiratory tract, but how should this be defined—sputum smear positivity or sputum culture negativity? If a compulsorily detained person with fully sensitive smear positive disease accepts standard short course chemotherapy,[10] trial evidence shows that >90% should become smear and culture negative by two months and 98% culture negative by three months.[11] However, infectivity requiring segregation (if in hospital) is generally only required for two weeks because the infectivity of smear positive individuals declines rapidly.[12 13] Therefore, even applying culture negativity, detention legally would be for a maximum of three months, only half the duration required for full treatment.[10]

The dilemma is even more complicated for HIV positive individuals or those with MDRTB. HIV positive individuals are much more susceptible to disease progression, perhaps 170 times that of HIV negative individuals,[14] and in acquiring infection, so that even smear negative culture positive disease may be significantly infectious for this group. With MDRTB, because of the loss of the main killing drug (isoniazid) and the main sterilising drug (rifampicin), the usual rapid reduction in infectivity is no longer possible,[12 13] and such individuals can remain infectious, however defined, for prolonged periods, sometimes lasting up to months.

The Government in its recent moves on Care in the Community for mental health announced alterations to the Mental Health Act to permit compliance orders which will force psychiatric patients to take their medication, and "assertive outreach teams" to police this with the right to compulsorarily readmit non-compliant patients. Whilst a person with smear positive tuberculosis not taking treatment, or taking it only intermittently, is not as immediately dangerous as an acute paranoid schizophrenic, such persons are infectious, transmit such infections readily to the unvaccinated and immunocompromised, if poorly compliant are at increased risk of developing and then transmitting drug resistance, tuberculosis still carries a significant morbidity and mortality even in immunocompetent cases (5859 cases in 1997, 392 deaths attributable to tuberculosis and 55 due to late effects; P Van Buynder, personal communication), and MDRTB carries a very much higher morbidity and mortality even in immunocompetent cases.[15]

A review of the powers for communicable disease control has been promised over the next few years when such issues will need to be debated by doctors and allied professions, patient representatives, lawyers and politicians representing the "public interest". A possible pragmatic solution would be to increase the incentives to compliance, free drugs with practical help—food, housing, social support for disadvantaged groups such as the homeless and refugees (more carrot), but to strengthen or at least define clearly if and when compulsory detention (and treatment?) should be used for cases where the collaborative approach has failed (more stick). Such a system would be predicated on having minimum staffing levels to monitor and deliver treatment to recommended standards.[10]

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