

Ethics, Tuberculosis and Globalization

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This article reviews ethically relevant history of tuberculosis and recent developments regarding extensively drug resistant tuberculosis (XDR-TB). It argues that tuberculosis is one of the most important neglected topics in bioethics. With an emphasis on XDR-TB, it examines a range of the more challenging ethical issues associated with tuberculosis: individual obligations to avoid infecting others, coercive social distancing measures, third-party notification, health workers' duty to treat contagious patients, and international justice. In each of these cases, key philosophical questions are highlighted and the need for empirical research/information is demonstrated.

Historical Background

Tuberculosis (TB) has historically been one of humankind's worst enemies. Archaeological evidence indicates that TB illness in humans dates back at least to 4000 or 5000 bc. Considered by some to be 'the greatest killer in history', TB allegedly killed a billion people during the past two centuries (Ryan, 1992, pp. xv and 3). When reporting his discovery of the bacterial agent responsible for TB—*Mycobacterium tuberculosis*—in 1882, Robert Koch claimed:

If the number of victims which a disease claims is the measure of its significance, then all diseases, particularly the most dreaded infectious diseases such as bubonic plague, Asiatic cholera, etc., must rank far behind tuberculosis. Statistics teach that one-seventh of all human beings die of tuberculosis, and that, if one considers only the productive middle-age groups, tuberculosis carries away one-third and often more of these (Daniel, 1997, p. 32).

It was apparently a great victory for medical science and humanity, then, when Koch's discovery was made and TB cures were discovered later in the middle of the 20th century.

Even prior to the discovery of the TB bacterium and curative medication, however, TB mortality in countries such as England was already declining early in the 19th century. The decline, which continued for well over 100 years, was in fact so steady that some have questioned the overall public health importance of scientific discoveries, like those described above, in comparison with other factors. Figure 1 tends to suggest that the rate of

TB decline in England and Wales was affected little by either the discovery of TB's microbial causal agent or the discovery of effective TB cures. Thomas McKeown (1988) famously argues that TB's decline in wealthier nations is best explained by the improvement in living conditions—and, in particular, the improvement of nutrition—associated with industrialization. The implementation of public health measures, such as isolation in TB sanatoria, informed by the germ theory of disease and the development of TB cures need not, according to McKeown, feature prominently in explanations of TB's overall long-term decline in industrialized countries. The McKeown thesis is, of course, controversial. One reason for doubt is that we have no way of knowing—without conducting, or for that matter being able to conduct, controlled studies—that TB's decline would not have levelled off during or after the time that key discoveries were made in counterfactual circumstances where such discoveries were not made. It is entirely plausible and/or likely, on the other hand, that the scientific discoveries in question and the subsequent wide availability of curative medication would have brought about dramatic TB decline in a counterfactual situation where decline was not already in progress. This is demonstrated by the recent success of TB treatment programs in some of the world's most impoverished communities (Farmer, 2003) where the demographic transition emphasized by McKeown has not yet taken place. If it is safe to say that the scientific discoveries in question and the subsequent wide availability of curative medication would have brought about dramatic TB decline in a counterfactual situation where decline was not already in progress (as a result of changing social

conditions), then our actual history may have been one where TB decline was over-determined.

Though in-depth analysis of causal factors responsible for TB's decline in industrialized countries is beyond the scope of this article, it is safe to say that societal factors play a central role in TB epidemiology and that we should be wary of attaching *too much*—or exclusive—importance to pharmacological or narrow public health interventions, such as isolation. This much, at least, is revealed by Figure 1¹ and also by the health care *status quo* in developing countries, as is further discussed below. Recognizing social causes of TB need not lead one to doubt the essential causal role played by the TB bacterium. Whether or not the discovery of TB drugs made an enormous difference with respect to population-level TB statistics, furthermore, it is uncontroversial that TB medications provide cure in the vast majority of cases. And multifactorial analysis suggests that isolation of TB patients in sanatoria during the first half of the 20th century was likely an effective measure (Fairchild and Oppenheimer, 1998). We should not overestimate the importance of biomedical or 'narrow public health' interventions such as isolation, but we should not underestimate their importance either.

Though it was believed as early as the 1950s that TB was on the way to being eradicated, TB decline in the USA was finally interrupted—and temporarily reversed—in the latter half of the 20th century (Daniel, 1997). This was perhaps best illustrated by the highly publicized TB epidemic in New York City during the 1980s and 1990s. Several factors led to TB's resurgence in the USA, and New York in particular. One, ironically, was TB reduction itself. Because TB rates dropped so low, TB sanatoriums were shut down and relevant public health programs were sucked dry of funding. When TB illness had all but disappeared, such things were believed to be no longer necessary. Other factors behind the resurgence included increased homelessness, the emergence of AIDS, and the proliferation of TB drug resistance (resulting from 'noncompliant' patients' failure to complete prescribed treatment regimens). While the New York epidemic primarily affected HIV positive persons, the homeless and/or prisoners, the fact that prison guards and health workers were also infected and killed by multi-drug resistant (MDR) TB strains sent off alarm bells that 'ordinary people' as well as the socially marginalized were threatened. New York City finally brought the epidemic under control during the 1990s, but it relied on coercive public health measures—mandatory DOTS (Directly Observed Therapy Short Course) treatment and detention of 'recalcitrant patients'—and

spent over a billion dollars (US) in the process (Coker, 2000).

While TB was thought to be under control or at least considered controllable in wealthy countries prior to the US resurgence, meanwhile, TB remained a serious problem in poor countries all along. Ninety-five per cent of TB cases and 98 per cent of TB deaths occur in poor countries (Gandy and Zumla, 2002). This is at least partly due to lack of access to medication (Packard, 1989; Ryan, 1992; Benatar, 1995). Matters were made worse when HIV/AIDS took root in places such as Africa. Because HIV/AIDS promotes vulnerability to TB, and vice versa, HIV/AIDS and TB epidemics were fuelled by each other. In 1995 only 23 per cent of those in need worldwide had access to WHO's recommended TB treatment regimen; treatment access increased to 56 per cent by 1998 (Lienhardt *et al.*, 2003, p. 200) and 62 per cent at the time of this writing (in 2007) (Floyd, 2007).

The World Health Organisation declared TB to be a global health emergency in 1993. One-third of the world population is currently infected with the latent form of TB, and 5–10 per cent of these can be expected to develop active illness at some time in their lives. Almost 9 million people develop active illness yearly, and there were 14 million active cases and 1.6 million TB deaths in 2005 (WHO, 2007). TB is the second leading infectious cause of mortality worldwide.

Drug Resistance

A tragedy of this tale, as hinted above, relates to the emergence and spread of drug resistant TB. Drug resistance emerges when a patient fails to complete a full course of TB treatment (which involves a cocktail of several medications). There are numerous complex social reasons why this happens. In rich countries a common explanation is that those infected with TB are usually homeless persons, drug addicts and/or alcoholics whose lives lack order and for whom medication taking is not a high priority. In other cases, patients simply feel better after starting medication and then discontinue treatment in order to avoid side effects from drugs that are toxic (Daniel, 1997). Implementation of mandatory DOTS treatment—where patient medication taking is observed by a health care or social worker—has arguably made great progress in the promotion of compliance. In poor countries, however, treatment has been less widely available and drug stockouts are frequent due to weak healthcare infrastructure. Developing world patients also often cannot afford medicines for which they must pay out of pocket. They similarly

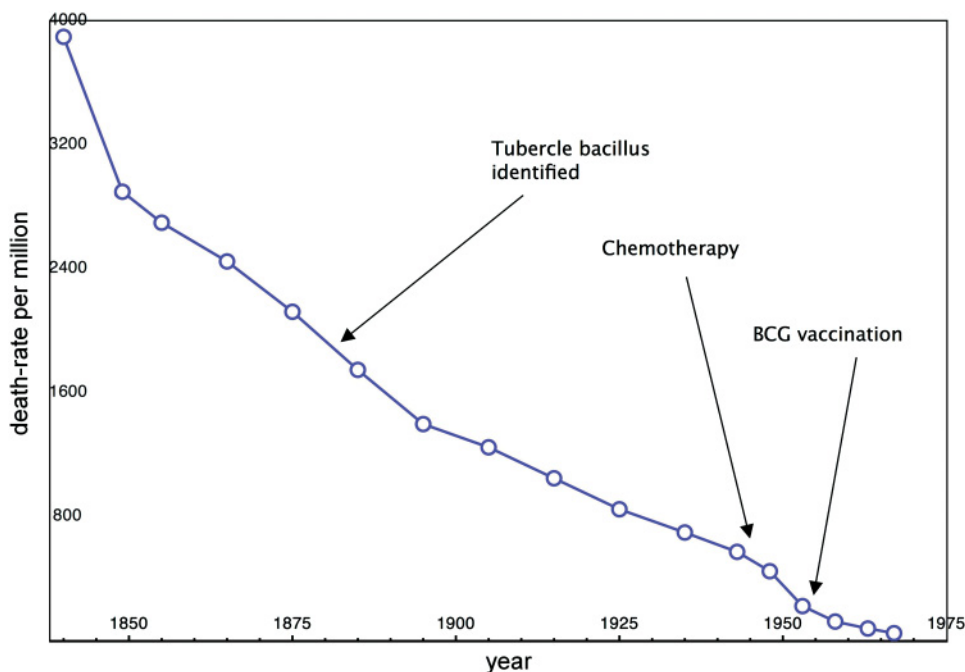


Figure 1 Respiratory tuberculosis death-rates in England and Wales (based upon McKeown, 1979)

often cannot afford time off work or (often difficult) travel to (often distant) clinics even when drugs are available (Farmer, 2003). Drug resistance in poor countries is also driven by the market presence of drugs that are low quality, old, or counterfeit. Last, but not least, is the lack of diagnostics for drug sensitivity testing—which is important for proper prescription. Treatment with drugs to which a strain is resistant is one of the things that can promote drug resistance.

An implication of drug resistance is that drugs that plausibly could have led to the eradication of TB if treatment coverage was better—and if treatment completion rates were higher—have gradually lost their power to cure. A crucial window of opportunity might thus have been missed. In the meantime, no new TB drugs have been developed since the 1960s (WHO, 2004); and none can realistically be expected to become available before 2015 (Mario Raviglione, personal communication). A central explanation for the lack of new TB medication development is that the profit-driven pharmaceutical industry lacks incentive to engage in expensive research and development of interventions against diseases that primarily affect the poor.

A full course of treatment for ordinary TB lasts 6 months and costs only US \$10 to \$20. Though it is usually curable, multi-drug resistant TB (MDRTB) takes two years to treat, and treatment is 100 times more expensive.

The ‘second-line’ medications used to treat MDRTB are, furthermore, both more toxic and less effective than the ‘first-line’ drugs used to treat ordinary TB (Farmer and Walton, 2003, p. 167).

That the problem of drug resistance has reached a critical level was recognized in 2006 when the US Centers for Disease Control and Prevention (CDC) and WHO announced the emergence and spread of ‘extreme’ or ‘extensively’ drug resistant TB (XDR-TB). It remains to be seen, but the emergence and spread of XDR-TB may turn out to be as, or more, significant than AIDS. MDRTB is defined as TB resistant to at least two (namely, isoniazid and rifampicin) of the four first-line TB medications. XDR-TB is defined as TB resistant to at least two of the four first-line TB medications and two or three of the six second-line medications (CDC, 2006; WHO, 2006). A recent study showed that 20 per cent of TB isolates from around the world were MDRTB and that 10 per cent of these (i.e., 2 per cent in total) were XDR-TB. XDR-TB was found in every region of the world, and the study showed that isolates of MDRTB obtained from USA, Latvia and South Korea were, respectively, 4, 19 and 15 per cent XDR-TB (CDC, 2006). The most dramatic epidemic of XDR-TB is currently underway in South Africa. A study in March 2006 showed that 41 per cent of suspected patients in Tugela Ferry were infected with MDRTB and that 24 per cent of these had XDR-TB.

Of the 53 patients with the latter, 52 died within 25 days (MSF, 2006). Many are worried that XDR-TB may 'swiftly put an end to all hope of containing the [AIDS] pandemic [in Africa] through treatment'. According to one expert, 'There is no point investing hugely in ARV [anti-retro viral] programmes if patients are going to die a few weeks later from extreme drug-resistant tuberculosis' (Boseley, 2006). Implications of XDR-TB for the international community are starkly revealed by the CDC's conclusion that XDR-TB 'has emerged worldwide as a threat to public health and TB control, raising concerns of a future epidemic of virtually untreatable TB' (CDC, 2006).

Medical treatment of XDR-TB can cost \$500,000 (Stobbe, 2007a) and even with treatment only 30–40 per cent of XDR-TB patients survive (Altman, 2007). The public health threat of XDR-TB has led to calls for mandatory detention of XDR-TB patients (Singh *et al.*, 2007), and long-term detention is already occurring in South Africa and in Arizona in the USA (Associated Press, 2007; Nullis, 2007). It is possible that the return to a world of untreatable TB will lead to coercive social distancing measures, such as isolation and quarantine, at a scale not seen for decades. That this holds true for rich as well as poor countries is revealed by a highly publicized recent incident that is likely a sign of things to come.

The Speaker Incident

In early May 2007 an American lawyer named Andrew Speaker was diagnosed with MDRTB, and then failed to follow his doctor's advice not to travel. He flew to numerous locations in Europe in order to get married and go on honeymoon. While Speaker was in Italy the CDC determined that he was infected with XDR-TB. They then contacted him by phone and instructed him to report to Italian health authorities. Disobeying these instructions, he flew to Montreal and then drove into the United States, where he aimed to seek medical care. He flew into Canada rather than USA due to (correct) fears that he was placed on the latter's 'no-fly' lists. When he reported to a New York hospital, he was placed under the first US federal quarantine restriction since 1963.

Speaker claims that his initial travel to Europe was not blameworthy because his doctors merely expressed their *preference* that he not travel, rather than insisting that he refrain from doing so. Speaker also claims that his doctors said that he was not very contagious—and thus not a great threat to others—because his disease was still in the early stages. They did not, according to Speaker, even bother to wear masks during face-to-face contact with him. His final decision to travel back to the USA was based on the (hopefully mistaken) fear that he would not

receive the high-quality medical care he would need in Italy, and because the CDC offered him no other option but to charter a private plane back to USA at his own expense of US \$140,000 (Conant and Wingert, 2007). Critics complain that Speaker unnecessarily put many fellow airline passengers at risk of infection with a deadly disease in the attempt to save his own hide. Doctors at the National Jewish Medical and Research Center in Denver, where Speaker was sent for treatment, finally concluded that he did not actually have XDR-TB after all (Altman, 2007). Following treatment he was released in July, when it was determined he was 'no longer contagious and that there was no further detectable evidence of infection' (Frosch, 2007).

Bioethics Neglect of TB

Though I have not yet explicitly addressed ethical issues associated with TB, the above discussion is rich in ethical relevance. The consequences of TB have been, and continue to be, enormous. The fact that TB primarily affects the poor raises issues of social justice. The fact that drug resistance—which exacerbates the TB threat worldwide—is largely a product of the way that drugs are distributed likewise raises issues of justice (Selgelid, 2007a). Public health TB control measures such as isolation and quarantine, finally, raise questions about how the goal to protect public health should be balanced against the goal to protect individual human rights and liberties.

Before saying more about these and other ethical issues associated with TB, it is worth commenting on the extent of bioethics discussion of TB to date. Several authors have recently argued that the discipline of bioethics has neglected the topic of infectious disease in general (Farmer and Campos, 2004; Selgelid, 2005; Francis *et al.*, 2005). AIDS has perhaps been an exception to this rule; it, at least, has received a great deal of discussion in the bioethics literature since the 1980s. And further coverage of ethical issues associated with infectious disease has come with the recent growth of public health ethics and relatively high-profile attention to SARS, bird flu and bioterrorism.

TB, meanwhile, arguably remains the most important neglected topic in bioethics. Given that TB kills nearly as many people as AIDS does each year—and that until only very recently TB killed more people than AIDS each year—one would expect TB to receive a proportionate amount of discussion in health ethics literature. There are, furthermore, good reasons for thinking that the problem of TB is, ethically speaking, even more important than AIDS. In the vast majority of cases TB drugs

can provide cure, and they are much less expensive than AIDS medications. While 1.6 million people die of TB each year (WHO, 2007) and 2.1 million die of AIDS, (UNAIDS, 2007) the former deaths are, economically speaking, much easier to prevent. As indicated above, TB medications are relatively inexpensive—usually costing only US \$10 or \$20 for a full course of treatment. TB therapy is considered to be one of the most cost-effective health care interventions (Farmer and Walton, 2003, p. 164). AIDS medication, on the other hand, costs at least US \$100 for a year of treatment in developing countries, and it often costs much more. In the case of AIDS, furthermore, lifelong treatment is required because no cure exists. Given cost considerations, the case for increasing access to TB medication appears stronger than the case for increasing access to AIDS medication (which is not to say that the case for increasing access to AIDS medication is not itself extremely powerful).

A final reason for thinking that TB may be ethically more important than AIDS is that the former, being airborne, is both contractible via casual contact and much more contagious. While behaviour modification (with respect to IV drug use and sexual practice) can essentially eliminate the risk of infection with AIDS, TB can be passed from one individual to another via coughing, sneezing and even talking. In many ways, then, the threat to ‘innocent individuals’—and public health in general—is greater in the case of TB.

Though the ethical importance of TB at least rivals, if it does not surpass, the ethical importance of AIDS, the former has received comparatively little attention from bioethicists. The lack of attention to ethical issues associated with TB is revealed via searches on the Internet. A *PubMed* search of titles and abstracts (conducted in October 2007)² for the terms ‘ethics’ and ‘AIDS’ yielded 2998 entries; while a similar search for the terms ‘ethics’ and ‘tuberculosis’ yielded only 179. Rather than reflecting difference in ethical importance, the disproportionate amount of bioethics attention to AIDS in comparison to TB reflects the fact that the former disease has been much more highly politicized. I by no means want to deny that TB has received some important discussion in bioethics literature—but it has not received nearly as much attention as it warrants, and a large proportion of discussion to date has focused on the narrow context of the New York epidemic discussed above.

Ethics and Tuberculosis

In what follows I examine a range of ethical issues associated with TB. Though I will not attempt to answer all

the questions raised, I will offer suggestions and identify empirical research needed to make further progress.

Individual Duties to Avoid Infecting Others

Though bioethics discussion often focuses on health workers’ obligations and patient relationships, and issues of social/institutional policy, the Speaker incident highlights ethical obligations of individuals—i.e., to avoid infecting others. I am currently only familiar with two papers on this general topic (Harris and Holm, 1995; Verweij, 2005). Though such an obligation follows from the widely accepted ‘duty to do no harm’, there surely must be limits to such duties. It would be unreasonable, for example, to expect that potentially infected persons should take all possible measures to avoid infecting others—because ‘potentially infected persons’ includes all of us who have been in contact with someone who just might have been contagious without our knowing it—i.e., virtually everyone (Verweij, 2005). It would be crazy to think that we should all, therefore, cut off all future contact with others, or constantly seek diagnostic testing.

The behaviour of Andrew Speaker, on the other hand, raises serious questions. If he really did have XDR-TB and had good reason for doubting that he would receive the treatment he needed in Italy, for example, would his behaviour—which placed a significant number of people at a very small risk of being infected—have been ethically unacceptable if it really were necessary to save his own life? Or would this be like speeding and running red lights to get one’s wife in labour to hospital in a hurry, which seems to be generally accepted? Comparison of the two cases requires quantification of the actual risks involved. Perhaps Speaker’s behaviour was more dangerous, but this was not demonstrated in the high-profile attention his case received. If there was no good reason to doubt that he would have received adequate attention in Italy, the imposition of significant risks on others would have been objectionable. Perhaps the mistake of the CDC was their failure to better assure Speaker that he would receive optimal care in Italy. Some of the world’s leading TB experts are Italians (Stobbe, 2007b).

Additional questions concern the extent to which moral obligations to avoid infecting others should be enforced by law. When coercive public health measures such as isolation and quarantine are considered, finally, the morality (as well as the public health danger) of the behaviour of the person in question may be a relevant consideration.³ If an individual’s failure to take precautionary infection control measures is immoral, that is, then we should be less reluctant to coerce the individual

in question. This follows from Ronald Dworkin's suggestion that if actions are immoral 'then the freedom to pursue them counts for less. We do not need so strong a justification, in terms of the social importance of the institutions being protected, if we are confident that no one has a moral right to do what we want to prohibit' (Dworkin, 1977).

In addition to further analysing, these issues, ethicists should be raising public awareness about the moral imperative of infection prevention.

Coercive Social Distancing

It is common, at least in developed countries such as the US, to confine TB patients who refuse to take their medicines (Coker, 2000). To what extent is coercive restriction of movement ethically justified in the name of TB prevention? And who, exactly, should be confined? It is one thing to confine infectious (i.e. contagious) patients who refuse to take their medication. It is quite another thing to confine noninfectious patients. Sometimes even the latter were confined until treatment completion during the New York epidemic. Consider a patient who has been unreliable—by failing to take her medicines regularly and/or by failing to appear for medical appointments. If she is nonetheless noninfectious she poses no immediate danger to others. The more treatment she has already completed, furthermore, the less likely it is that she will become infectious again. Richard Coker argues that decisions to confine 'recalcitrant patients' during the New York epidemic did not adequately take such factors into consideration and that detention policy there was not sufficiently based on analysis/evidence of the public health risk posed by particular individuals (Coker, 2000).

Of particular importance at present is the question of what should be done with XDR-TB patients who pose threats of infection with an especially dangerous form of TB whether they take their medicines or not. Defenders of confinement in the context of ordinary TB sometimes suggest that detention is justified because patients are at least given a choice between confinement and treatment (Bayer and Dupuis, 1995). If XDR-TB patients are confined because they are untreatable, on the other hand, then no autonomous choice remains. Should XDR-TB patients be segregated for life? In the case of XDR-TB, the question of who to confine becomes especially pressing. At one end of the spectrum are those with highly active illness who are the most contagious. In the middle are those like Speaker whose risk of contagion was only very low. And at the other end of the spectrum, finally, are those with latent XDR-TB (who are not, for the moment anyway, contagious) and those for whom

infection/illness is merely suspected. The latter might be considered candidates for quarantine until diagnosis (Singh *et al.*, 2007).

One might be tempted to think that XDR-TB does not raise new ethical issues, because untreatable TB was common in the past. It is true that untreatable TB was the norm prior to the development of cures in the middle of the 20th century, and a historical study of policy debates that took place then will be valuable. No developed discipline of bioethics existed at that time, however, and so it remains to be seen how policy decisions made in the past will be viewed under the lens of rigorous ethical analysis. The relevant science of epidemiology has likewise progressed. Given population growth and globalization, in any case, the contemporary world is different from the one where untreatable TB previously existed. Because population dynamics are relevant to public health policy, there is no reason to expect that public health approaches to untreatable TB in the past will be appropriate to the contemporary world even if it is determined that such policies were ethically and epidemiologically sound at the time. One reason for thinking that more restrictive measures would be called for now than were called for then, at least in rich countries, is that the free movement of a person with contagious TB is likely to cause more infections in a population with a low infection prevalence rate than in a population with a high prevalence rate. Because those previously infected are unlikely to be infected again, there is a greater chance that any given contact of a contagious individual will be infected in a lower prevalence population—because a higher proportion of contacts will be susceptible (Daniel, 1997). In developed countries where infection prevalence rates are much lower than they were one hundred years ago, free movement of a person with (infectious) untreatable TB poses greater risks (of causing more new infections) than was the case then, other things being equal.

The relevance of prevalence rates to infection danger reveals that appropriate social policy may vary with social context. Higher TB prevalence rates in developing countries may make confinement less important there. Poor countries with high prevalence rates might not, in any case, be able to afford routine confinement even if it would be justified from a public health perspective. Poor healthcare infrastructure, after all, is one of the reasons poor countries have high prevalence rates to begin with.

In the final analysis, coercive social distancing measures must be based on good evidence. Promotion of public health and the protection of individual liberties are both important, and neither should be given absolute priority over the other. If coercive confinement of

an individual is necessary to save others' lives, then liberty infringement may be justified. Liberty infringement would not be justified, on the other hand, if there are no good reasons for believing that it would lead to substantial benefits in the context in question. Because ethical questions about confinement policy partly turn on epidemiological questions, there is an ethical imperative that additional relevant epidemiological research gets done. Ethicists should explicitly advocate such research.

In the meantime, the philosophical question that needs to be answered is how great the threat of a patient's free movement would need to be for detention to be justified. Imagine that the free movement of a patient in a particular condition would on average lead to disease burden *X* in the context under consideration. How great would *X* need to be for detention of an individual for a given period of time to be justified? (The shorter the period of time we are talking about, the smaller *X* would need to be.) This is the key philosophical question. The goal to minimize disease burden should not be the sole aim of public health policy, because human rights and liberties matter too. Taking rights seriously requires accepting at least some additional disease burden in the name of human rights protection.

Third-Party Notification

One of the ethical issues debated in the context of HIV was the question of whether or not an HIV infected patient's right to confidentiality should, if necessary, be breached to notify a third party at risk of becoming infected by him. Similar questions arise in the context of TB, and they are especially pressing in the context of XDR-TB. The ethical question for the physician or other health worker is whether or not to warn close contacts of a patient diagnosed with XDR-TB—or a patient suspected to have active illness, while diagnostic confirmation is awaited—especially if there is reason to believe the patient has not warned close contacts of the danger of contagion and/or is failing to take sufficient precautionary measures. On the one hand, disclosure would apparently violate the patient's right to confidentiality. When a patient presents to health care workers, the implicit or explicit promise is that information regarding his health will be held in confidence (Beauchamp and Childress, 1994). In the above scenario, then, informing the third party would involve breaking such a promise.

The third party in this scenario, on the other hand, has rights too. Her right to life is seriously threatened if the patient has infectious XDR-TB. While health workers have duties to their patients, they also have duties to save lives of others when they are in a position to do so. The

patient's right to confidentiality in this scenario conflicts with his contacts' right to life; and the health worker's duty to maintain patient confidentiality conflicts with her duty to save the patient's contacts by warning them.

The key questions here are (1) whether or not the right to confidentiality should be considered absolute in health care contexts and (2) why confidentiality is important to begin with. One way of evaluating the scenario under consideration is to conclude that the right to life is more basic and important than—and therefore outweighs—the right to confidentiality and that the health worker should therefore breach confidentiality by informing the patient's close contacts. A compatible, but different, conclusion claims that because an incautious patient's conduct is not altogether different from that of a murderer, an incautious patient in effect forfeits his right to have confidentiality protected (McLean, 1996). The third party's right to protection is more important than the incautious patient's right to protection, on this view, because she is innocent and thus, unlike the patient, deserves to have her rights protected.

While it is common to conclude that a health worker is ethically permitted to breach confidence in a case like this, many hold the stronger position that the health worker is not only ethically permitted but also ethically required to breach confidence in order to protect the third party. Legal support for this position is provided by the famous US Tarasoff judgement. In this case a patient told his psychologist that he planned to murder a young woman, and then he went on to do so. When the victim's family took the case to the California Supreme Court, it was ruled that the psychologist had a duty to warn the victim about the danger she was in. The fact that an identifiable third party was at grave risk, according to the court, outweighed the counsellor's duty to hold information about his patient in confidence. Many would argue that the same logic applies in the case of both HIV and TB.

Others, however, deny that health workers should notify third parties in cases like that described above. They claim that patients will refrain from, or delay, visiting the health care system if they are led to believe that promises about privacy are routinely broken, especially in the context of diseases prone to stigmatization. The worry is that a practice of third-party notification would drive the TB epidemic underground when those at risk of infection become more reluctant to seek care from a health care system they do not trust. Those in need of testing and treatment would then become sicker and also more likely to infect others. This rationale for maintaining confidentiality thus pits the duty to promote public health against the duty to protect identifiable third parties at risk of infection. Ethically speaking, one might argue that if the

danger to public health were sufficiently severe, then this could provide a legitimate justification for not warning third parties. The extent to which a practice of notification would in fact have a large negative effect on public health, on the other hand, is an empirical question that requires further study. Parties to the debate in the context of HIV failed to sufficiently emphasize the extent to which answering the ethical question required additional empirical research. There is, in any case, no reason to think that the public health impact of third-party notification in the context of TB would be the same as in the case of HIV/AIDS given important social, epidemiological and medical differences between the two diseases.

Duty to Treat

It is commonly believed that health workers have a duty to care for patients even when this poses dangers to health workers themselves. The idea that health workers have such duties goes back to the ancient world of Hippocrates; and the duty has historically been written into professional ethics guidelines with varying degrees of strength (Huber and Wynia, 2004).

Facing dangers associated with caring for infectious patients is arguably part of a health worker's job—just as it is a fire-fighter's job to face risks. Facing such risks, one might argue, is one of the things that a health worker commits to when she takes on this kind of employment. Some argue that the duty to care is based on a social contract. Society provides privileges by way of exclusive training to health workers—but it then expects health workers to provide health care in return (Huber and Wynia, 2004).

Even if there is a duty to treat, there must be a limit to this duty—or a limit to the level of risk that health workers should be expected to face. One should not expect a health worker to treat a patient when this would almost certainly be a death sentence for the former. Though health care workers may have a duty to treat, some argue that they also have a 'right to refuse'—because health care workers, like others, have a right to have their autonomy protected. One question is whether or not the limits to the duty to treat have been exceeded in any given case (i.e., given the level of risk involved). Another question is whether or not institutional policy should require a worker to care for patients even in situations where, for the sake of argument, it is assumed that such limits have not been exceeded.

In addition to duties to immediate patients, health care workers have duties to others. They have duties to other/future patients that they would not be able to treat if they die as a result of treating this patient. And they

similarly have duties to family members that they could not fulfil in the event of death. Though such duties may conflict with the duty to treat (this immediate patient), health workers also have duties to their co-workers that support their duty to treat (this immediate patient). Co-workers are part of a team—and each expects the others to do their part. If I refuse to treat this patient, then someone else (who might have a family and would have future patients) will be called in to do my job. If too many refuse, then the health care system no longer functions. Solidarity is, therefore, needed (Reid, 2005).

The important questions are the following: What are the limits to the duty with regard to level of risk? And what is the risk in any given situation? In the debate over duty to treat in the context of AIDS, Norman Daniels (1991) argued that refusal to treat AIDS patients would amount to invidious discrimination because treating AIDS patients was not more dangerous than other risks that health workers already routinely faced. In the context of XDR-TB, one wants to know if the same is true—or if, to the contrary, treating XDR-TB patients is more dangerous than already routinely faced risks. If the risk is sufficiently great, then the dangers of treating XDR-TB patients might be more than what health workers signed up for. Preliminary evidence suggests that treating XDR-TB patients may be highly dangerous—especially for those health workers infected with HIV⁴ (Daley, 2007; Matteo Zignol, personal communication)—but further research is wanted.

If the risks are exceptionally high in the context of XDR-TB, then the safety of working conditions must be improved. Risks must be reduced back down to the previously accepted, tolerable levels if the argument that facing such risks is part of what a health care worker signs up for when she takes up employment is to have much bite. If it is reasonable for society to expect health workers to treat patients, then it is also reasonable that health workers expect society (or the health care system) to provide safe working conditions insofar as this is possible. This is a matter for reciprocity (University of Toronto Joint Centre for Bioethics, 2005). Safety can be improved via numerous infection control measures (Daley, 2007).

Compensation to health care workers may also be appropriate (Ly *et al.*, 2007). Those called on to do more dangerous jobs, for example, should perhaps receive extra pay.⁵ Those who become sick may also deserve priority in the provision of drugs or other limited health care resources. Those who become disabled should receive disability pay. And the families of health workers who die should arguably receive compensation from society. Again, these are matters for reciprocity (University of Toronto Joint Centre for Bioethics, 2005).

International Justice

As a disease of poverty, TB raises issues of international distributive justice. Though sufficient resources for health improvement are lacking in poor countries, there are numerous powerful moral (egalitarian, utilitarian and libertarian) and self-interested reasons for wealthy nations to do more to help improve health care in poor countries (Selgelid, 2007b). These issues are complex and intertwined with the above questions regarding liberty-violating public health measures. If health care provision and thus global health were better to begin with, for example, then the occasions upon which liberty infringing public health measures are called for would arise less often.

In addition to improving access to existing medication, increased R&D for drugs and diagnostics is sorely needed in the fight against TB. At present, 'only \$20 million is spent annually for clinical trials for TB drug[s] compared to around \$300 million for HIV drugs in the US alone' (MSF, 2007). Ethicists should critically evaluate recent proposals (Kremer and Glennerster, 2004; Pogge, 2005) and current activities (Moran, 2005) aimed at stimulating R&D on neglected diseases—and the extent to which they are apt for TB in particular. In response to recent arguments that donor aid should aim to improve developing countries' general health care infrastructures—and improvement of general health indicators—rather than targeting particular diseases such as AIDS and TB (Garrett, 2007), the propriety of targeted TB funding should be critically evaluated.

Because infectious diseases—including drug resistant infectious diseases such as XDR-TB—do not recognize international boundaries, bad health in poor countries threatens global public health in general. The strength of associated self-interested reasons for wealthy nations to help reduce TB in poor countries (through targeted or untargeted funding) should therefore, finally, be a major focus of analysis. But this, as with the issues above, raises empirical questions in need of further investigation.

Notes

1. I am here assuming that McKeown's argument that the decline was too rapid to be explained in evolutionary terms is correct.
2. Conducted by Paul Kelly.
3. This point was suggested by Thomas Pogge in discussion.
4. That is to say, because HIV positive persons are especially susceptible/vulnerable to XDR-TB.

5. This point was suggested by Julian Savulescu in discussion

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