# How to hinder tuberculosis control: five easy steps

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The control of tuberculosis remains an area of interest and concern. Some recent *Lancet* papers bring positive news, albeit with important questions left unanswered. Wang and colleagues' longitudinal study[1] concluded that tuberculosis prevalence in China was reduced by shifting to the recommended approach based on directly observed treatment, short course (DOTS) for tuberculosis diagnosis and treatment, but did not consider that economic progress might have also been a driver. Pietersen and coworkers' cohort study,[2] which reported that 73% of patients with extensively drug-resistant tuberculosis in South Africa died within 5 years of treatment initiation, acknowledged the poor treatment outcomes but did not question whether survival is any better than in the pre-treatment era—better than no treatment at all.[3] A review by Dheda and colleagues[4] aptly highlighted that diverting funding to multidrug-resistant tuberculosis control might destabilise national tuberculosis programmes, using the example of South Africa where multidrug-resistant tuberculosis represents less than 3% of tuberculosis cases but consumes over a third of the national tuberculosis budget.

Difficult decisions about resource allocation clearly need to be made. These should be made on the basis of evidence and long-term strategic goals. A review of studies done by the British Medical Research Council's tuberculosis units between 1946 and 1986 made the striking assertion that, by the late 1980s, we had all the evidence needed to design successful tuberculosis control programmes.[5] Our historical failure to embed research findings into effective policies has meant we have squandered opportunities and resources. We highlight five steps, commonly taken by policy makers, that might be impeding efforts to control tuberculosis (panel).

**Panel: Five easy steps to impede tuberculosis control efforts**

- Incentivise national tuberculosis programmes to obscure rather than highlight programmatic challenges
- Rush to medical or technological solutions rather than systems strengthening
- Focus on purchasing drugs for multidrug-resistant tuberculosis and ignore essential infrastructure requirements to deliver them effectively
- Leave the unregulated private sector to incorrectly dispense antimicrobials
- Start and stop tuberculosis programme funding suddenly

The first step is to incentivise national tuberculosis programmes to obscure, rather than highlight, programmatic challenges. Uniform targets for indicators, such as the tuberculosis treatment success rate (85%), are often set for national tuberculosis programmes. When asked what would happen if treatment success was lower than the target, a programme manager in China candidly told us, "'then I will lose my job". When jobs are at risk if targets are not met, there is little incentive for programmes to highlight challenges posed by patients dropping out during the lengthy tuberculosis treatment course, which is a major cause of the emergence of multidrug-resistant tuberculosis.[6] Moreover, China's reported successes in coverage of DOTS—up to 100% in parts of the country[1]—ignores the fact that access to DOTS facilities is woefully low in some of those same areas.[7] Powerful incentives to report so-called success hide a profoundly challenging implementation issue: China is a large, diverse, and complex country.

International donors might also introduce perverse incentives that affect reporting by national tuberculosis programmes. The Global Fund to Fight AIDS, Tuberculosis and Malaria uses a performance-based funding mechanism to decide which grants to renew, with the stated objective of freeing up committed resources from non-performing grants.[8] In other words, if reports do not show that targets are met, the programme loses funding for subsequent years. Since renewal of funding is often dependent on maintaining a high treatment success rate in patients with multidrug-resistant tuberculosis, there is an incentive to avoid expansion of services to so-called hard to treat groups of patients—for example, migrants, drug users, people who are extremely poor, and those who live in remote areas—in case this leads to a drop in the overall rate of treatment success.

Second, policy makers often rush to adopt medical or technological solutions rather than to strengthen countries' health systems. Decision makers often allocate resources for control of multidrug-resistant tuberculosis on the basis of urgency to treat rather than evidence in support of long-term strategic goals. This treatment-focused approach to the growing epidemic of multidrug-resistant tuberculosis is akin to allowing a running tap to flood a room while you mop up the water rather than switching the tap off. Multidrug-resistant tuberculosis is created by poorly functioning tuberculosis treatment systems. WHO estimates that more than 400 000 new cases of multidrug-resistant tuberculosis occur globally every year.[9] Even if funding for diagnosis and effective treatment is miraculously implemented for all of these cases, it might have to be repeated the next year because close to 400 000 additional cases could be generated while the previous year's patients are being treated.

WHO's *Global Tuberculosis Report 2013* highlighted multidrug-resistant tuberculosis as a major obstacle to global tuberculosis control, but focused on increased diagnosis and treatment rather than prevention as the key strategy.[9] The tendency to base policies on limited evidence and unfounded assumptions owing to a sense of urgency was referred to as "extrapolitis" in a paper on control of multidrug-resistant tuberculosis in Russia almost 15 years ago.[10]

Applying medical and technological approaches to public health problems that need broader solutions is not confined to tuberculosis.[11] Unfortunately, complex socio-politically embedded solutions attract the attention of international policy makers far less than technological solutions because their timelines are longer and attribution of success more challenging.

A myopic focus on expanding treatment for multidrug-resistant tuberculosis at the expense of strengthening systems for the control of drug-sensitive tuberculosis may not just be a misallocation of resources, it may actually cause harm. Undue focus on increasing the number of patients with multidrug-resistant tuberculosis who receive treatment can reduce a tuberculosis programme's capacity to ensure adherence to treatment in most patients with drug-sensitive tuberculosis. Lower adherence to tuberculosis treatment is likely to exacerbate the emergence of multidrug-resistant tuberculosis. Thus a diversion of resources from drug-sensitive to drug-resistant tuberculosis, which occurs when the two are seen as separate problems, could in fact contribute to an increase in multidrug-resistant tuberculosis.

The third step is to focus on purchasing drugs for multidrug-resistant tuberculosis and ignore essential infrastructure requirements to deliver such drugs effectively. A serious pitfall, when funding is directed towards control of multidrug-resistant tuberculosis, is limiting financial support to cover only the costs of second-line tuberculosis drugs. Other essential costs incurred in initiating or expanding a treatment programme for multidrug-resistant tuberculosis include: determining the profile of drug resistance; training of medical personnel to diagnose and manage patients; increasing laboratory capacity to monitor treatment progress; setting up a locally appropriate treatment support system, which includes support for transport costs to collect or deliver drugs; providing ancillary drugs to manage side-effects; and establishing information systems to monitor and evaluate the programme. When funding is provided for second-line drugs but not for the many other additional costs, national tuberculosis programmes are forced to cut corners on elements that are important for ensuring patients' adherence to treatment and for maintaining an effective system for managing the wider introduction of second-line drugs.

Maintaining access to second-line drugs when systems that support and monitor treatment are inadequate is likely to expand the resistance profile of tuberculosis.[12] Access includes the provision of second-line drugs through inadequately functioning public facilities and inappropriate use of second-line drugs by private practitioners; the latter is an area essential for tuberculosis control that is largely ignored.

The fourth step is to leave the unregulated private sector to incorrectly dispense antimicrobials. A range of antimicrobials are readily available at pharmacies and local grocery shops in many low-income and middle-income countries.[13] The quality of the medicines is questionable, and usually no advice is given to patients about duration of treatment for anti-tuberculosis drugs.[14] Patients can

buy as many days of treatment as they can afford.[15] Studies in India and Pakistan have shown that even when patients with tuberculosis visit private doctors rather than self-medicating, they are often prescribed antimicrobials incorrectly.[16–18] Most patients with tuberculosis who live in south and southeast Asia first seek care in the private sector,[19, 20] and often receive incorrect antimicrobial treatment for tuberculosis. Thus, conditions are ripe to generate multidrug-resistant tuberculosis, and potentially expand the resistance profile further.

The fifth step that impedes tuberculosis control is abruptly changing levels of funding for tuberculosis programmes. It is easy to understand why a sudden reduction in funding for medicines or treatment support would lead to interruptions in tuberculosis treatment and promote the generation of drug resistance. Such interruptions in funding have occurred in the past with catastrophic results, for example, in Zambia[21] and the former Soviet Union,[22] and continue to occur. In February, 2014, the suspension of Médecins Sans Frontières' activities in Myanmar (Burma) resulted in about 3000 patients with tuberculosis being unable to access treatment.[23] Unfortunately, the threat of multidrug-resistant tuberculosis has increased as a result, particularly in the Rakhine state where health services are still suspended.[23]

It is undoubtedly challenging to formulate policies for the optimum control of tuberculosis, especially with limited resources. However, history shows that acting on the basis of urgency or unfounded assumptions rather than evidence, and ignoring realities on the ground, such as perverse incentives and unregulated private practitioners, will lead to squandering of tuberculosis control efforts at best, and causing harm at worst. The repeated call for strong leadership seems especially naive, when that same call repeatedly ignores local contextual priorities and impediments to control. We feel forced to ask whether, in another 30 years, we will look back and say that, despite our knowledge base and experience, we exacerbated the burden of tuberculosis because of our haste simply to act. Perhaps now is a good time to recall the oft-stated maxim "insanity is repeating the same mistakes and expecting different results".

We declare no competing interests.

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