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Scaling up multidrug-resistant tuberculosis care in China

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Drug-resistant tuberculosis threatens to undermine advances in tuberculosis control worldwide. Multidrug-resistant tuberculosis (MDRTB), defined as resistance to isoniazid and rifampicin, requires treatment for up to 24 months with expensive diagnostics and second-line drugs. Fewer than 15% of patients diagnosed with tuberculosis worldwide receive drug susceptibility testing (DST); only 20% of the estimated 480 000 new cases of MDRTB annually are treated appropriately.[1] Of these, cure rarely exceeds 65%. Those on ineffective therapy risk acquiring additional resistance and spreading drug-resistant tuberculosis to others. In recent years, new molecular diagnostics and antituberculosis drugs promise an opportunity to improve outcomes for patients with drug-resistant tuberculosis, leading the WHO to prioritise universal access to prevention, diagnosis, and treatment of MDRTB.[1] However, identification of viable models for coordinating and financing scale-up of such services remains a major challenge for most middle-income and low-income countries.

After the widespread implementation of directly observed therapy, short course (DOTS), tuberculosis prevalence and mortality have decreased greatly in China.[2] However, MDRTB remains a formidable problem for China with an estimated 100 000 incident cases annually, a fifth of the global burden.[3] In *The Lancet Global Health*, Renzhong Li and colleagues report[4] on an intervention to provide a comprehensive programme of universal access to MDRTB care, which might offer a model of improved care for other high-burden countries. The programme was implemented in four cities and involved provision of a comprehensive diagnostic, care, and financial package, including financing for specimen shipment, resistance testing, costs of patient transportation and nutritional supplements, and a subsidy for directly observed therapy. It emphasised close communication between treatment facilities and improved care linkages. Diagnosis consisted of the use of a rapid molecular diagnostic (Genechip Capitabio) for isoniazid and rifampicin DST and training of centralised staff in molecular and conventional DST. Treatment was tailored to confirmed degree of tuberculosis resistance, per WHO guidelines. The financial scheme imposed a cap of US$4644 per treated case, with patients' expenses capped at 10% of the total, through creative use of government insurance funds and project resources. The results were impressive,[4] with a 90% decrease in time from testing to treatment initiation and substantial increases in the number of diagnosed patients, use of appropriate regimen, and retention at 6 months, largely due to major decreases in deaths and defaults.

The findings from Li and colleagues[4] add to the mounting evidence that the prioritisation of investments in operational coordination improvements is crucial for better outcomes of MDRTB.[4–6] Specifically, they show that a faster time to diagnosis has both clinical and cost benefits: elimination of hospital stay preceding diagnosis, which reduces potential nosocomial transmission of MDRTB along with hospital expenses, and faster initiation of MDRTB treatment. The investigators note that the National Center for Tuberculosis Control and Prevention will scale-up features of the programme nationwide, including free testing for MDRTB with molecular diagnostics and the standard care package for MDRTB. This investment would seem to be wise. An estimate of the national scale-up cost suggests an initial price tag of $500 million annually, or roughly double domestic spending on tuberculosis in 2011.[7] This number is a substantial figure, but only about 0·2% of annual public health spending in China (an amount considered low by international standards) and 80% of the government's yearly outlay on HIV.[8–10] Moreover, extrapolating the mortality effect shown in Li and colleagues' study,[4] MDRTB-related deaths could be reduced by roughly 80%, with up to 20 000 deaths averted in the first year alone.

To maximise the chances of success, additional elements of the programme should be considered. The molecular diagnostic used in the study's package[4] only performs on smear-positive tuberculosis cases, which were just 28% of those diagnosed with tuberculosis. A molecular diagnostic such as Xpert MTB/RIF (Cepheid) or MTBDR*plus* (Hain Lifescience GmbH), which can be done on smear-negative or culture-positive specimens, could be incorporated to capture all MDRTB cases and avoid initiating patients with smear-negative samples on ineffective therapy.[11] 47 (29%) of the 163 patients with MDRTB tested for additional drug resistance had extensively (XDR) or pre-XDR tuberculosis discovered a

median of 45–55 days after start of MDRTB treatment, delaying initiation of an effective regimen. As rapid second-line DSTs become available, they should be incorporated into diagnostic schemes to ensure the most effective treatment for all patients. Further benefits could be gained from integrating HIV testing and treatment, as the authors acknowledge.[4]

Comprehensive, high-quality treatment models are challenging logistically and financially, demanding commitment at all levels and implementers with considerable technical expertise. This study offers a model with potential for achieving advances in tuberculosis treatment relatively swiftly, while highlighting important policy issues that merit attention. As improved diagnostics and drugs for MDRTB become available, the relevance of such a complete, integrated approach to diagnosis, treatment, and cost to scale-up MDRTB care will only continue to grow.

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We declare no competing interests.

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