Health officials warn of poor tuberculosis detection

Southeast Asia has a quarter of the world's poor and a third of its tuberculosis burden, with an estimated 4.9 million infected persons.

According to recent estimates from the World Health Organization (WHO), over 500,000 cases of multidrug-resistant tuberculosis (MDR-TB) occur annually worldwide—including 50,000 extensively drug-resistant tuberculosis (XDR-TB) cases. Southeast Asia has 28% of the world's MDR-TB cases, with India heading the list. But there are no national data for this and many developing countries on XDR-TB, and most cases are detected *ad hoc* among patients with MDR-TB not responding to treatment.

A March report from the WHO South-East Asia Regional Office cautions that despite marked improvement in detection and management of tuberculosis cases in national programs, an estimated one third of both regular and resistant cases in the region still go undetected or are treated outside national health programs with poor outcomes (*Bull. World. Health. Organ.* **88**, 164, 2010). These patients not only transmit the disease but also often develop drug resistance.

In most countries, national programs are not designed to track and treat individual cases to curb drug resistance. For example, India's revised national tuberculosis control program designed in the 1990s "addressed the clinical treatment of MDR-TB without developing a public health response to reduce its spread," says Jacob John, advisor at the department of virology and microbiology at Christian Medical College–Vellore in Tamil Nadu, India. "The same error should not be repeated with XDR-TB."

Laboratory diagnostic capacity for MDR-TB and XDR-TB is the main limitation, says Nani Nair, regional advisor at WHO South-East Asia Regional Office's department of communicable diseases. This needs tremendous scale-up of infrastructure, trained staff, lab equipment and supplies, Nair told *Nature Medicine*.

The report warned that with the current status quo the region will not achieve the UN millennium development goal of reducing tuberculosis prevalence and deaths to half the 1990 rate by 2015.

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This is your brain online: the Functional Connectomes Project

Reference projects such as GenBank and the HapMap, which catalog gene sequences, have ushered in a new era of discovery in many avenues of biomedicine. But the burgeoning field of neuroimaging still lacks such scientific tools. This is in part because data from one of the most commonly used tools for studying human cognition—functional magnetic resonance imaging (fMRI) on subjects performing a specific task—cannot easily be compared across study sites. As a result, there's a growing need for a large database to serve as a reference of activity patterns within the human brain.

Last month, a team led by Michael Milham, a neuroscientist at New York University (NYU) Child Study Center, published the first analysis from the 1,000 Functional Connectomes Project, a collection of fMRI data sets donated by researchers from 35 centers around the world. This freely available resource includes data from more than 1,400 healthy subjects who underwent fMRI scans that assessed their brain activity when their minds were at rest (*Proc. Natl. Acad. Sci. USA* **107**, 4734–4739, 2010). The study showed that resting-state fMRI data—long thought of as nothing more than random, background noise—can be reliably pooled across scanners to unveil a universal architecture of activity connections within the brain.

Unlike task-based fMRI, which can be highly specific to the study site, the 1,000 Functional Connectomes resource allows for systematic explorations of healthy and diseased brains to discover hitherto unknown underlying differences. "We're moving in the direction of being able to have objective measures of neurological and psychiatric illness," Milham says. "It's all stepping in the direction of being a clinical tool."

The effort takes its name from the Human Connectome Project, a $30 million initiative launched by the US National Institutes of Health last year to map the entire physical circuitry of the healthy adult human brain. But functional connectivity and structural connectivity are not the same thing. Functional connections, for example, can span more than one synapse and can be modulated by emotion or sleep, whereas anatomical circuits are more or less fixed over the short term.

"Having this much data in one place is a real treasure trove that is free to anybody who wants to play with it," says Marcus Raichle, a pioneer of resting-state fMRI at Washington University in St. Louis, Missouri who was not involved with the study.

"The connectomes project has the power to ask more questions," adds Craig Bennett, a cognitive neuroscientist at the University of California–Santa Barbara who published a review this month questioning the reliability and repeatability of fMRI scans in most typical neuroimaging studies (*Ann. N.Y. Acad. Sci.* **1191**, 133–155, 2010). "You're not just looking across one study, you're drawing from such a large body of research that you really say things with authority."

Since having been posted online last December, the data set has been downloaded more than 4,500 times from researchers across 54 countries, according to Milham. One person who has explored the resource is Nora Volkow, director of the US National Institute on Drug Abuse in Bethesda, Maryland. Volkow is now developing quantitative methods to measure functional connectivity in her lab to follow up on preliminary observations of systemic differences between males and females.

"What's striking is how terribly consistent [the data] are—it's mindboggling," Volkow says. "I could use that data set to assess whether the connectivity patterns that I'm seeing in my patient actually differ in any significant way from this data set, which I can use as reference."

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Correction

In 'State of Denial' (*Nat. Med.* **16**, 248 (2010)), we originally stated that David Rasnick denied the existence of AIDS while serving on an advisory panel. Contrary to a report produced by the panel, Rasnick says he did not question the existence of AIDS. Rather, he says that AIDS is not contagious and is not caused by HIV. The text should have read "Rasnick was also a member of South African president Thabo Mbeki's AIDS Advisory Panel; as part of the panel, Rasnick suggested that HIV testing be outlawed and antiretroviral drugs no longer used in the country." The error was corrected in the HTML and PDF versions of the article on 17 March 2010.