organizations has already been working with the observatory to find alternative communications technologies, such as satellite phones, that can be used around the antennas, according to Henning Myburgh, a farmer in the area. "Adequate electronic communications, especially for children, are a basic human right," he says. Myburgh says that the cooperative's search has now moved to finding mobile-phone technologies that can coexist with the SKA and replicate the phone facilities the farmers currently have. "This is a major shift, and if possible will be a huge step forward," he says.

Still, says Myburgh, there are farmers who are unhappy. "I don't think that anybody will ever be happy with the situation, taking into account the massively intrusive nature of the project in the region," he says.

Nicol Jacobs, who farms in the area of the spiral arms, says the SKA was originally going to affect only two farms. He says he found out about the full extent of the telescope when the government began buying more farms. "We're going to be eaten piece by piece," he says. Jacobs says he would like the government to return the bought farms to the agricultural community.

Despite residents' annoyance, South African law says that the country's science and technology minister can preserve the area of the SKA's land for astronomy. The department of science and technology, which oversees astronomy in the country, is responsible for finalizing regulations about areas that will lose mobile-phone coverage, and for defining radio-wave frequencies that will be protected for astronomy. Asked when they would be finalized, the department's astronomy-management authority declined to give a firm date.

Although resident's complaints may not affect the SKA's layout, an environmental assessment — due to be finalized next year — could change matters. Earlier this month, the SARAO tasked the South African Environmental Observation Network with implementing an environmental assessment of the telescope site, and made 3 million rand (US$209,000) available for the work.

"The relative position of the dishes determines the quality of the telescope beam," says Robert Braun, science director of SKA Organisation at Jodrell Bank, UK, which is designing the telescope. The organization has drawn up an ideal map of dish positions, says Braun. But it might have to shift them if the environmental assessment finds that local habitats or biomes are affected, says Casper Crous, an ecologist who is part of the assessment collaboration.

The overarching plan is to turn South Africa's SKA site into a nature reserve and a site for long-term environmental research once the telescope is operational, says Crous. ■

BEAWIHARTA/REUTERS

People newly diagnosed with tuberculosis are treated here at a clinic in Jakarta, Indonesia.

INFECTIOUS DISEASE

TB diagnostic test fails to curb cases

Poor response to roll-out of automated test highlights need for better health-care infrastructure in many countries.

BY EWEN CALLAWAY

Seven years ago, the global community of researchers, health-care workers and activists battling tuberculosis was euphoric. A landmark 2010 trial showed that a new genetic test was highly effective at diagnosing TB, raising hopes that countries could soon finally control the disease, which killed 1.45 million that year. The World Health Organization (WHO) promptly endorsed the automated test, called GeneXpert, and promoted its roll-out around the globe to replace a microscope-based test that missed half of all cases.

But the high hopes have since been dashed, because rates of TB have not fallen dramatically (see 'Tuberculosis trends'), and nations are now trying to address the problems that cause so many TB cases to be missed, as well as the difficulties of treating those who are diagnosed. Health ministers and officials from 100 countries met in Moscow on 16–17 November in an attempt to turn the tide. And a United Nations General Assembly devoted to TB is scheduled for September 2018. Experts say that the roll-out of GeneXpert offers a cautionary lesson — although, in hindsight, an obvious one — in the battle against TB. The tale is a familiar one in global health care: a solution that seems extraordinarily promising in the lab or in clinical trials falters when deployed in the struggling health-care systems of developing and middle-income countries.

"What GeneXpert has taught us in TB is that inserting one new tool into a system that isn't working overall is not going to by itself be a game changer. We need more investment in health systems," says Erica Lessem, deputy executive director at the Treatment Action Group, an activist organization in New York City.

NO GAME CHANGER

Some 10.4 million people were infected with TB last year, according to a WHO report published on 30 October. More than half of the cases occurred in China, India, Indonesia, Pakistan and the Philippines. The infection, which causes coughing, weight loss and chest pain, often goes undiagnosed for months or years, spurring transmission. The US government and others spent more than US$100 million developing GeneXpert. Yet despite the

WHO's ringing 2010 endorsement, the roll-out of the test, which is manufactured by Cepheid, a company based in Sunnyvale, California (and bought by Danaher, headquartered in Washington DC, earlier this year), was initially slow.

GeneXpert machines cost $17,000 each and require constant electricity and air-conditioning — infrastructure that is not widely available in the TB clinics of countries with a high incidence of the disease, so requiring the machines to be placed in central facilities. Until the US government, together with the Bill & Melinda Gates Foundation and UNITAID, an international organization that aims to lower drug prices, began subsidizing tests in 2012, each one cost $16.86 (the price fell to $9.98), compared with a few dollars for a microscope TB test.

WEAK HEALTH SYSTEMS

The WHO says that more than 23 million GeneXpert tests have now been paid for in the public sector in 130 countries that are eligible for the discount. But Madhukar Pai, an epidemiologist at McGill University in Montreal, Canada, says that this still represents a relatively small proportion of people suspected of having TB. Most countries use the test on selected groups of people, Pai says. India, for example, offers it only to people who also have HIV.

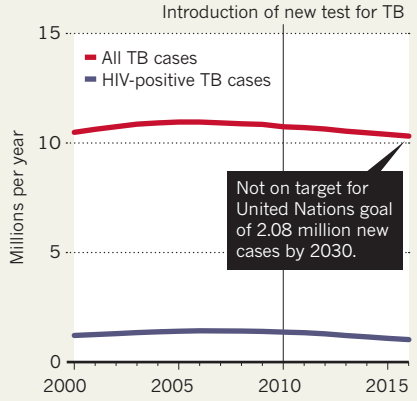
Even countries that have fully embraced GeneXpert are not seeing the promised returns. After a countrywide roll-out begun in 2011, the test is available in South Africa for all suspected TB cases. But a randomized clinical trial conducted during the roll-out found that people diagnosed using the test were just as likely to die from TB as those diagnosed at labs still using the microscope test (G. J. Churchyard *et al. Lancet Glob. Health* **3**, e450–e457; 2015). "Just intuitively, one would think that finding TB cases earlier would avert TB deaths. The fact that we didn't find that was surprising," says Gavin Churchyard, a physician specializing in TB at the Aurum Institute in Johannesburg, South Africa, who led the study. Similar studies in other countries have come to much the same conclusion about GeneXpert.

Churchyard suspects that doctors have been giving drugs to people with TB-like symptoms even if their microscope test was negative or missing, and that this helps to explain why his team found no benefit from implementing the GeneXpert test. Others have speculated that, by being involved in a clinical trial, participants in both arms of the study received better care than they would otherwise have done, obfuscating any differences between the groups.

Either way, Churchyard says, his team's study shows how broken South Africa's TB treatment system is, a problem echoed across other countries with high incidences of TB. Even with accurate tests, cases are still missed. Results from the GeneXpert tests take just as long to deliver as microscope tests, and many people never return to the clinic to get their results and drugs; those who begin antibiotics often do not complete the course of treatment. "What the study really unmasked was that it's not enough to have new technology and introduce it into a weak health system," Churchyard says. ■

TUBERCULOSIS TRENDS

The introduction of a new test for TB in 2010 has had little impact on the number of cases.



SOURCE: WHO

RESEARCH FUNDING

Hungary rewards success

Only scientists with highly cited publications are eligible for 'frontline' grant programme.

BY ALISON ABBOTT

Earlier this year, cell biologist Attila Reményi was facing his toughest decision since returning to his native Hungary a decade ago. With his generous start-up funding about to run out, should he downsize his lab?

Then, in June, the government's National Research, Development and Innovation Office (NRDNI) put out a call for five-year basic-research grants of up to 300 million Hungarian forints (US$1.18 million) each for highly cited scientists such as Reményi. "It came out of the blue," says Reményi at the Hungarian Academy of Sciences (HAS) Research Centre for Natural Sciences, Budapest, who learnt on 13 November that he was among 12 winners.

But for NRDNI president József Pálinkás, the Frontline Research Excellence grants are the result of years of work. They are part of a plan to create a long-term, systematic plan of grants and rewards to encourage researchers in all fields to strive for world-class publications and to tempt Hungarian scientists working abroad to return. In a country whose leaders are coming under increasing criticism for autocratic and xenophobic tendencies, scientists say that the situation for science has never been rosier.

Under Viktor Orbán's nationalist government, this small, post-communist country has been steadily falling on *The Economist* magazine's Democracy Index. Last year, several foreign members of the HAS resigned, citing the failure of the academy to protest against what they saw as anti-democratic moves by the government. HAS president, mathematician László Lovász, responded that the academy is not a political organization. Scientists in the country are noticeably reluctant to comment publicly on politics, and several young researchers told *Nature* they fear that criticizing the government might compromise their careers.

> ***"Without such serious selection science won't work well."***

Yet within this troubled political environment, Pálinkás, a physicist, has spent the past few years quietly persuading the government that basic science matters as much as product-focused research. Shortly after becoming president of the HAS in 2008, he created the Momentum system of start-up funding — one-time, five-year grants of up to 50 million forints per year — to encourage Hungarian scientists to set up independent labs back home. Reményi was a Momentum recipient in 2013.

In 2015, Pálinkás left HAS to become the founding director of the NRDNI, where he designed a system of regular grants to help ensure that returnees stay after the start-up money runs out. The frontline grants are a key part of this, giving the recipients salaries equivalent to the European Union average, which is two-and-a-half times higher than the salary that a scientist would normally earn in Hungary. Around 50 of these grants will eventually run each year. The programme ▶