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Tuberculosis detector would ferret out disease by scent

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Researchers are developing an electronic nose that would sniff out tuberculosis like a Breathalyzer detects alcohol, putting an end to current time-consuming tests and possibly saving hundreds of thousands of lives each year.

The concept, by a team in India where the highest number of tuberculosis sufferers live, has undergone early testing but needs more research and cash to determine whether its promise can be turned into reality – a major challenge that's receiving a significant aid boost Monday.

Grand Challenges Canada, a government-funded development agency, and the Bill & Melinda Gates Foundation are injecting $950,000 to support the development of this potentially ground-breaking technology. If it can successfully detect tuberculosis from biomarkers in breath, the electronic nose would drastically reduce the cost and wait for diagnosis, hasten treatment and lower transmission of the lethal disease.

TB is rare in the developing world, but in poor countries it claims close to 1.7 million lives a year. It is the second most deadly infectious disease in the world after HIV and AIDS. With earlier TB detection and treatment, medical experts estimate as many as 400,000 deaths a year could be prevented.

The electronic nose "is a bold idea with potentially big impact," said Peter Singer, chief executive officer of Grand Challenges Canada. "Tuberculosis kills … and the weak link in the chain is diagnosis."

Standard TB tests currently involve costly laboratory work to analyze sputum, a spit sample coughed up from the lungs.

Taking time off work to travel for TB testing is simply not possible for many of the world's poor, said Ranjan Nanda, who works with the New Delhi-based International Centre for Genetic Engineering and Biotechnology and a lead researcher on the electronic-nose project.

Dr. Nanda envisions creating a handheld device that runs on batteries and would be readily available in communities throughout the developing world.

The next step for Dr. Nanda and the research team centres on developing and testing a prototype. Their study will include 500 people from different regions of India, home to two-tenths of the world's TB cases.

"Tuberculosis is a local problem," Dr. Nanda said. "We need a better screening device."

Researchers hope to have a clearer picture of whether their electronic nose will work by the end of 2013. The emerging technology holds promise for identifying other diseases with unique breath signatures, such as lung cancer and pneumonia. Scientists at the Technion-Israel Institute of Technology have been testing an electronic nose to detect multiple sclerosis.

Although TB rates are low in Canada, the infectious disease remains a concern, particularly among the homeless. A 10-year study, published earlier this year in the journal Emerging Infectious Diseases, showed death rates among homeless people in Toronto were alarmingly high: One in five died within a year of TB diagnosis.

“TB is right around the world and it does tend to be a disease of marginalized communities,” said Dr. Singer of Grand Challenges Canada.
