Medical Xpress

Scientists use breakthrough DNA technology to diagnose cases of TB faster

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Whole Genome Sequencing is a faster, cheaper and more effective way of diagnosing tuberculosis says a new study published in the journal Lancet Respiratory Medicine.

Dr Louise Pankhurst of the University of Oxford and a team of worldwide collaborators including Public Health England utilised innovative DNA technology to diagnose cases of tuberculosis (TB) up to eight times faster than traditional methods.

While Whole Genome Sequencing has been previously used in TB research studies, this is the first time the technology was applied in real world scenarios. The researchers at Oxford's John Radcliffe Hospital were able to detect presence of TB and whether it was resistant to commonly used antibiotics within one week – up to eight times faster than utilising traditional diagnosis methods.

In addition to facilitating faster and more targeted treatment of people with TB, the speedy diagnosis also meant the scientists were able to detect and respond to potential outbreaks as they happen. The innovative technology also proved more cost effective, at an average cost of £481 per positive case, compared to £517 per case using current technologies.

The stunning results of this trial have implications for TB prevention in the UK. It was funded by the Health Innovation Challenge Fund (HIC Fund) and supported by the NIHR Oxford Biomedical Research Centre and the NIHR Health Protection Research Unit in Healthcare Associated Infections and Antimicrobial Resistance. The new technique will be adopted by Public Health England (PHE) and is expected to reduce transmission of TB.

Tuberculosis is a major part of PHE's strategy for infectious diseases due to some increases in incidence and emergence of multi-drug resistant infections. PHE is also working with Genomics England as part of the 100,000 Genomes Project to further understanding of why some people develop severe reactions to infections.

Lead author Dr Louise Pankhurst, University of Oxford, said: 'This is a really exciting time to be working in infectious disease research. The UK is poised to become the first country in the world to replace traditional tuberculosis diagnosis with whole genome sequencing. Our study has shown how this will dramatically speed up the time taken to diagnose TB, helping patients be placed on the most effective treatment as soon as

possible and reducing the risk of disease transmission.'

Professor Derrick Crook, Director of the Public Health England National Infections Service said: 'This ground-breaking research provides a roadmap for faster, cheaper and more effective diagnosis of TB, and is a crucial step in Public Health England's goal of eliminating TB as a public health problem in England.

'This marks a significant milestone in the way we tackle TB, yet things are going to get better as whole genome sequencing technology is rapidly becoming much faster and less expensive and will ultimately inform the way we deal routinely with all infectious disease diagnosis.'

More information: Louise J Pankhurst et al. Rapid, comprehensive, and affordable mycobacterial diagnosis with whole-genome sequencing: a prospective study, *The Lancet Respiratory Medicine* (2015). DOI: 10.1016/S2213-2600(15)00466-X

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