Addressing antibiotic resistance: Breath analysis aims to reduce unnecessary prescriptions

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The overuse of antibiotics gives harmful bacteria the opportunity to evolve into drug resistant strains that threaten health care. To help tackle the problem, scientists in China have begun a pilot study examining biomarkers exhaled by patients. The team's goal is to develop an efficient (fast, accurate, painless and affordable) test that will assist doctors in prescribing antibiotics only when the treatment is absolutely necessary.

Reporting their first results in *Journal of Breath Research*, the researchers based at Zhejiang University have used benchtop analytical methods as a stepping stone towards developing future diagnostic tools.

The group is focusing its initial work on ventilator-associated pneumonia patients in the intensive care unit. Here it is critically important to differentiate between life-threatening bacterial infection and common colonization to avoid prescribing antibiotics unnecessarily.

"To confirm whether patients have a bacterial infection of the respiratory tract, doctors currently have to take a number of different samples (blood and sputum), and even chest x-rays in the case of pneumonia," explained Kejing Ying, who is coordinating the work and is based at the Zhejiang University School of Medicine.

Breathe in, breathe out

Analysing samples from 60 volunteers, the scientists have found a potentially useful link between the presence of exhaled acinetobacter baumannii derived volatile organic compounds (VOCs) and patients diagnosed with bacterial pneumonia.

"The challenge we face is that many VOCs are not unique to one pathogen," added Ying who is working with colleagues at Zhejiang University's Department of Biomedical Engineering.

Ultimately, the team hopes that its research will lead to an approved non-invasive test to provide early warning of bacterial infection in the lower respiratory tract.

More information: Jianping Gao et al, Breath analysis for noninvasively differentiatingventilator-associated pneumonia from its respiratory tract colonization of ventilated patients, *Journal of Breath*

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