

Quick \$2 test reveals if you caught a superbug in hospital



Is it MRSA? We'll know very soon

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By **Alice Klein**

Detect, control and contain. At last we have a way to rapidly detect if a patient has picked up a bacterial infection while in hospital. The device could help doctors catch and treat infections more quickly, and slow the rise of deadly superbugs like MRSA (methicillin-resistant *Staphylococcus aureus*).

Hospitals are meant to be places of healing, but 1 in 15 patients in developed countries will catch an infection during their stay. Such bacteria can be resistant to antibiotics, and can spread between patients with fatal consequences.

Doctors therefore need ways to identify infected patients early, so they can be isolated and treated before the infection passes to others, says [Hakho Lee](#) of Harvard Medical School in Boston. But standard tests for bacterial infections take three to five days to get results, allowing ample time for the bacteria to spread and for the patient to take a turn for the worse.

"We want a good diagnostic assay that is fast, comprehensive, and cost-effective," he says.

The big five

Now Lee and his team have developed a small, portable device that can detect [five of the most common infections](#) in hospitals – *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Acinetobacter baumannii* and *Pseudomonas aeruginosa*.

Each of these has acquired resistance to some of our [broadest-spectrum antibiotics](#), and more than 50,000 people die from resistant infections in Europe and the US every year.

The new device may save lives. If a patient starts showing symptoms, the device can analyse a sample of mucus or other fluid in a matter of hours, sending the results straight to a physician's phone.

The best method hospitals currently have involves growing bacterial cultures from patient samples in the lab, which takes several days. Lee's device cuts out the need to grow bacteria. Instead, it uses a technique that can quickly read the genetic sequences of bacteria, determining which species, if any, are present in a sample – and it only costs \$2 a time.

When tested on nine patients who were showing signs of infection, the device was just as accurate as the standard culture method, identifying four cases of *E. coli*, one of *S. aureus*, and one *K. pneumoniae* infection.

Beating MRSA

As well as detecting the presence of these bacteria, the test could be adapted to identify if they have any genes that give them resistance to particular antibiotics. The device has already been designed to detect if any *S. aureus* present is in fact [MRSA](#).

Speeding up identification of pathogens is crucial so that doctors can tailor therapy to the specific bacteria present, instead of relying on broad-spectrum antibiotics, says [James Paton](#) of the University of Adelaide in Australia. Prescribing too many of these drugs in particular encourages the evolution and spread of resistance genes.

Rapid testing could also cut down on antimicrobial resistance by preventing the use of antibiotics in [patients who don't have bacterial infections](#).

"Often a patient will present with symptoms of acute infection, but because doctors don't know if it's viral or bacterial, they'll start them on antibiotics just to cover themselves," Paton says. "We need to be able to target antibiotics more appropriately."

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