Researchers develop device for fast gonorrhea diagnosis
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Researchers at Johns Hopkins University have developed a portable device and smartphone app to diagnose gonorrhea within 15 minutes, and determine if a particular strain will respond to frontline antibiotics. This invention could significantly speed up testing and treatment, especially in low-resource settings where well-equipped laboratories are not always available to every patient.

The PROMPT instrument can give patient affordable test results in under 15 minutes, while standard-of-care tests in centralized labs can take hours to days. Credit: A.Y. Trick et al., Science Translational Medicine (2021)

More than 87 million people around the world are infected with gonorrhea, a potentially devastating sexually transmitted disease with increasing resistance to antibiotics. Experts say that quickly identifying and treating those infected is the only way to prevent spiraling numbers of cases and the further rise of antibiotic-resistant strains.

Called PROMPT (portable, rapid, on-cartridge, magnetofluidic purification and testing platform), the Wang team’s device runs on a simple five-volt battery and includes thermoplastic cartridges that cost about $2.

Testing is simple: A swab containing the patient’s body fluid is mixed with a solution of magnetic particles in a tube, and a drop of that blend is loaded into a cartridge, which snaps into the device. The device transfers the magnetized particles to reagents in the cartridge, which runs through 40 cycles of polymerase chain reaction (PCR) testing before displaying the results on the cellphone screen. (PCR testing enables scientists to take tiny samples of DNA and amplify them to study in detail. They are the gold standard for testing for COVID-19, for example.)

During testing from sexual health clinics in Baltimore and Kampala, Uganda, PROMPT correctly detected the most common strain of gonorrhea about 97% of the time. It was 100% accurate in determining whether the tested strain of gonorrhea would respond to ciprofloxacin, a medication that targets infections that are resistant to other antibiotics.
"Our test maintains the same sensitivity and specificity currently used in hospital and clinic labs but reduces the cost and time involved," said team member Alex Trick, a Johns Hopkins graduate student in biomedical engineering. "We want these diagnostics to be available to all people who need it, when they need it."

Wang and his team are forming a university spinoff to work through regulatory approval, manufacturing, and distribution.

"We expect to be able to deliver these products to those who can really benefit from them in two to three years," he said.


Provided by Johns Hopkins University