

# Rapid blood test to diagnose sepsis at the bedside could save thousands of lives, study suggests

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Researchers at King's College London have identified a biomarker – a biological 'fingerprint' – for sepsis in the blood, and showed it could be possible to diagnose the condition within two hours by screening for this biomarker at a patient's bedside.

Sepsis (sometimes referred to as '[blood poisoning](#)') is a life-threatening condition that arises when the body's inflammatory response to a bacterial infection injures its own tissues and organs. Costing the NHS over £2 billion annually, the condition kills more people than breast and bowel cancer combined (approximately 37,000 a year). Rapid diagnosis and treatment with antibiotics saves lives, but as there are currently no biomarkers in clinical use to enable fast diagnosis, it can take up to two days to analyse samples in the laboratory.

Published today in the journal *PLOS ONE* and funded by both Guy's and St Thomas' Charity and the National Institute for Health Research (NIHR) Biomedical Research Centre at Guy's and St Thomas' NHS Foundation Trust and King's College London, this study highlights a possible biomarker for the rapid diagnosis of [sepsis](#). The work was performed in collaboration with Cepheid, developer of the GeneXpert, which is capable of performing rapid molecular detection.

RNA helps decode and regulate DNA. This paper investigated microRNAs, which come in many varieties and influence disease

processes. Researchers at King's and Cepheid, a molecular diagnostics company, took samples of blood from three groups of [patients](#); those with sepsis, patients with other Systemic Inflammatory Response Syndrome (that does not respond to antibiotics), and healthy patients. From the blood samples they were able to amplify small amounts of RNA into large quantities to see which particular microRNAs were increased. By using this method, the team found that a certain group of microRNAs were more active in the sepsis patients than in the other groups, highlighting a potential [biomarker](#) for the condition.

The study was replicated with a large group of Swedish patients with [severe sepsis](#), which validated the results. By using this method of screening and analysing the blood in both studies, the researchers were able to diagnose sepsis within two hours, with 86 per cent accuracy.

Professor Graham Lord, Director of the NIHR Biomedical Research Centre at Guy's and St Thomas' NHS Foundation Trust and King's College London, said: "Sepsis is a hidden killer, causing nearly a third of all hospital deaths. Rapid antibiotic treatment for the condition is vital – every minute counts. Yet current diagnostic methods can take up to two days, so an accurate diagnostic test that can be carried out at the patient's bedside is urgently needed.

"We have for the first time identified a group of biomarkers in the blood that are good indicators of sepsis. We have shown that it is possible to detect these markers by screening a patient's blood in the ward, a process which can deliver results within two hours. This is an extremely exciting development which has the potential to completely transform the management of this severe disease and save thousands of lives worldwide every year. These are promising early findings, and now we need to test this approach in a large clinical trial."

Symptoms of sepsis are similar to other types of Systemic Inflammatory

Response Syndrome (SIRS), yet only sepsis responds to antibiotics. It is therefore important for clinicians to be able to distinguish sepsis from other types of SIRS as administering antibiotics in non-sepsis cases can add pressure to the development of antibiotic resistance. Professor Lord continued: "Not only would an accurate diagnostic test improve outcomes for patients, but it would contribute to tackling the ongoing problem of antibiotic resistance by allowing clinicians to distinguish between SIRS and sepsis and diagnose these severe conditions more accurately."

Plans for a randomised clinical trial are underway at King's College London and Guy's and St Thomas' NHS Foundation Trust, part of King's Health Partners Academic Health Sciences Centre.

Provided by King's College London

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