# Sepsis: a race against time

The timely, accurate diagnosis of bloodstream infections poses a significant challenge to hospitals, patients and their families. These life-threatening complications also represent a high medical and economic burden for society. **GenMark Diagnostics** is looking to transform the diagnosis of sepsis with the ePlex blood culture identification solution. Professor Max Maurin from CHU Grenoble Alpes shares his perspective on sepsis and GenMark's solution.

### Could you explain the clinical impact of sepsis?

**Professor Max Maurin:** Sepsis is an extremely critical medical condition, affecting nearly 30 million people worldwide every year. Managing sepsis is challenging given that, for every hour of treatment delay, the mortality rate increases by around 8%.

The situation has recently worsened due to the emergence of multidrug resistant (MDR) pathogens, increasing the risk of administration of non-adapted empirical antibiotic therapy. Due to their severity, bloodstream infections (BSIs) are the most expensive condition treated in most hospitals.

### What are the unmet clinical needs involved in managing sepsis?

While traditional bacteriological methods are effective at identifying the causative organisms and their antibiotic susceptibilities, it usually takes at least two days to get these results. During this time, patients will receive empirical antibiotic therapy that may be poorly effective against MDR pathogens, increasing the risk of severe complications and death. Moreover, this broad-spectrum therapy favours selection of new resistances in the commensal microflora.

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There is an urgent need to develop innovative technologies that enable faster identification of an involved pathogen, as well as detection of resistances to first-line drugs, in order to allow rapid optimisation of therapy. The ideal situation would be to detect microorganisms directly in the patient's blood samples but, at present, this goal remains unattainable. The current best alternative is to rapidly determine the pathogen and its resistance markers from blood bottles flagged positive after incubation. This would allow the clinician to adapt the antibiotics at least 24 hours earlier than current practice, with an expected significant improvement in patient outcome.

### Could you describe the ePlex BCID solution?

GenMark took a unique approach in offering three individual panels for detection of Gram-positive bacteria, Gram-negative bacteria and fungi. The panels allow rapid detection of microorganisms most frequently involved in BSIs and critical antibiotic resistance markers for bacteria. The appropriate panel is selected based on the Gram-stain result of the blood culture, which remains a critical step in BCID analysis.

Thanks to the innovative, multiplex approach being developed by GenMark, the organism identification and resistance markers can be obtained within approximately an hour and a half from the positive blood culture, which is a technological breakthrough that allows significant improvement in the management of patients.

### How will the ePlex BCID solution help address the threat of antibiotic resistance?

In our laboratory, we perform antibiotic susceptibility testing (AST) following MALDI-TOF MS identification of the isolated pathogen to guide antibiotic therapy, which takes around two days. Patients with a BSI generally stay on empiric therapy until those results are available. With ePlex BCID, we expect to review identification and resistance marker results within about an hour and a half from the blood culture flagging positive, allowing treatment decisions much sooner than before.

For complex antibiotic-resistance mechanisms, the GenMark approach may allow accurate identification of the involved resistance gene, while AST may only provide various hypothetical mechanisms, which will have to be confirmed by additional tests. The GenMark system, therefore, helps to ensure that some of the most common resistance mechanisms won't be missed and resistant infections won't be left untreated or transmitted to other patients, which is critical to improving infection control and antibiotic stewardship efforts. The goal is always to get more actionable information earlier to drive improvements in patient care and outcomes.

### How do you see ePlex BCID improving patient care?

Sepsis is life-threatening, and reducing time to optimal therapy is critical. By reducing time to a more actionable answer, clinicians can enhance antibiotic stewardship, improve hospital-bed management and reduce patient length of stay. All of these factors should lead to better patient outcomes and cost savings. ■



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