Exploring the potential economic impact of a rapid, whole-blood, sample-to-report NGS platform for BSI detection

DNAe's BSI/AMR test on the LiDia-SEQ™ platform promises clinicians a true sample-to-report NGS diagnostic – delivering comprehensive results dramatically faster than today's blood culture-dependent standard of care and saving up to $9K cost per patient.

EOIN BROWN PhD
SENIOR PRODUCT MANAGER

OVERVIEW

Bloodstream infections (BSIs), a major cause of sepsis, remain one of healthcare's deadliest and most expensive challenges, with around 49 million global cases each year[1]. Every hour without appropriate therapy raises mortality risk by 4–9%,[2] and sepsis hospital stays cost twice the average. In the US, the annual financial burden is ~$62B[3]. Current blood-culture-based diagnostics are slow and limited.

Current standard-of-care blood cultures take days, miss many pathogens, and need extra tests for AMR, leading to worse outcomes, longer hospital stays, and higher healthcare costs.

DNAe's LiDia-SEQ™ BSI/AMR test delivers comprehensive, sample-to-report NGS results within hours, transforming clinical decision-making.

ASSESSING ECONOMIC VALUE

Examining the potential economic impact of a rapid, direct-from-whole-blood NGS diagnostic matters because faster, more accurate bloodstream infection detection can shorten time to effective treatment, reduce unnecessary or ineffective antimicrobial use, and ultimately lower hospital costs driven by prolonged length of stay (LOS).

In a recent DNAe study, two complementary economic value frameworks were created to understand the potential cost impact of introducing the LiDia-SEQ™ BSI/AMR Test compared with today's standard of care (SoC) blood culture-dependent pathways for suspected BSI or sepsis. The models draw on a wide base of published evidence — including peer-reviewed studies, guidance from policy and healthcare bodies, and internal data.

This ensures that the assumptions reflect real clinical practice and system pressures. All LiDia-SEQ™ inputs are hypothetical but informed.

Framework 1

This framework explores how LiDia-SEQ™ could change the cost profile of managing suspected BSI/sepsis compared to a blood-culture-dependent molecular rapid diagnostic test (mRDT). The model focuses on elements that drive real-world hospital spend: how quickly the organism is identified, how soon patients receive effective therapy, how antimicrobial choices shift, and how these factors influence LOS.

> *Current SoC blood cultures take days, miss many pathogens, and need extra tests for pathogen ID and AMR, leading to worse outcomes, longer hospital stays, and higher care costs.*

Using a representative cohort of 1,000 adult patients hospitalised with suspected BSI/sepsis, the analysis estimates the downstream economic effect of moving from a culture-dependent pathway to a direct-from-blood NGS approach.

Given that studies have shown that patients on appropriate therapy typically stay 7 days versus 10 days for those initially treated inappropriately, even modest improvements in time to targeted therapy can translate into meaningful cost savings.

Framework 2: Impact of time to actionable results on LOS

The second framework isolates one critical driver: how delays in actionable diagnosis extend LOS. Using a derived adult cohort with confirmed BSI, the model assumes an average LOS of 7.8 days when patients begin on uninformed empiric therapy. Blood culture positivity is set at 24 hours (T0). Every additional hour between T0 and the availability of an actionable result incurs a LOS penalty of 1.004 hours. By comparing LiDia-SEQ™ to the current standard of care, the framework quantifies how earlier organism and resistance identification could reduce LOS and associated costs.

RESULTS

Impact of test performance

The cost analysis framework shows an estimated **saving of $3,147 per patient** when using the LiDia-SEQ™ BSI/AMR Test compared with a culture-dependent mRDT. Its culture-independent workflow, broad panel coverage, and expected analytical performance mean more patients can receive guided therapy sooner. Because LiDia-SEQ™ processes raw whole blood samples,, it can significantly shorten time to pathogen identification, creating meaningful time and cost efficiencies—even when factoring in a potentially higher upfront diagnostic work-up cost.

LOS impact of time to actionable results

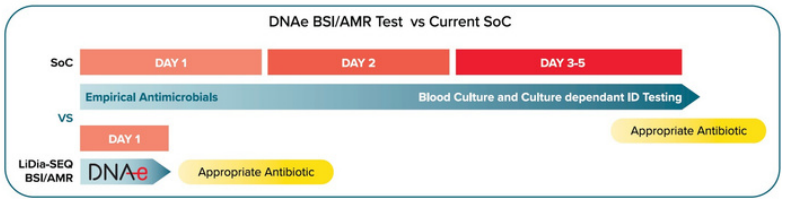
The ability of LiDia-SEQ™ to run a comprehensive sequencing panel directly from a whole blood sample input delivers time-to-diagnostic results in about 7 hours – compared with 28 hours for a culture-dependent SoC mRDT. This faster turnaround can generate meaningful savings – around **$5,131 per tested patient** ($24,033 vs $29,164) when compared to the existing SoC + Maldi-TOF – or a **saving of $2,929** ($24,033 vs $26,962) when compared to a culture-dependant mRDT. This analysis provides a compelling illustration of the benefits of earlier, targeted treatment.

FUTURE DIRECTIONS

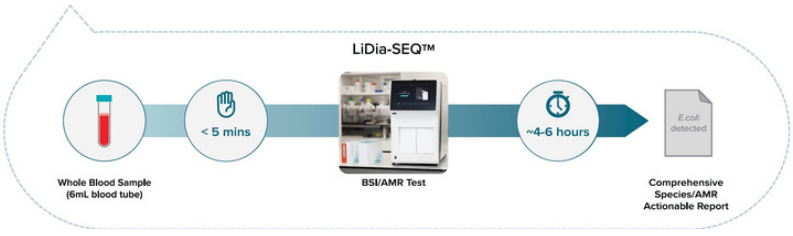
The postulated study demonstrates how the LiDia-SEQ™ BSI/AMR Test could deliver major cost savings compared with current standard-of-care and culture-dependent mRDTs. The system's ability to provide rapid, comprehensive, actionable results highlights the value of a truly fast diagnostic for better decisions, resource use, and outcomes.

As a single, culture-independent whole-blood test, LiDia-SEQ™ can overcome current SoC limitations. By speeding pathogen and AMR identification in suspected BSI or sepsis, it could **save up to $8,728 per patient** and improve management through earlier targeted or de-escalated antimicrobial therapy – reducing delays, inappropriate treatment, and prolonged hospital stays.

> *"LiDia-SEQ™ shows how a truly rapid, culture-independent whole-blood test can cut costs and improve care by delivering earlier, actionable pathogen and AMR results — saving hospitals thousands per patient while supporting faster, more targeted therapy."*



DNAe BSI/AMR Test vs Current Standard of Care



The LiDiA-SEQ™ platform workflow

Fast Time to Results

- *Whole blood to pathogen ID + AMR report in less than a work shift*
- *Direct from a single < 6mL whole blood sample – no need for culture*

Comprehensive Test Panel

- *Designed to detect:*
  - *~7400 bacterial + ~26 most common AMRs*
  - *~800 fungal species*
- *Low LOD of ~1-3 CFU/mL anticipated*

Automated ease of use

- *Fully integrated automated workflow, true sample-to-report*
- *< 5 mins hands-on time*
- *Fully automated onboard bioinformatics analysis & reporting*

1. Liang, Lan, et al. "National Inpatient Hospital Costs: The Most Expensive Conditions by Payer, 2017." Healthcare Cost and Utilization Project (HCUP) Statistical Briefs, Agency for Healthcare Research and Quality (US), 14 July 2020.
2. Rudd, Kristina E et al. "Global, regional, and national sepsis incidence and mortality, 1990–2017: analysis for the Global Burden of Disease Study." Lancet (London, England) vol. 395,10219 (2020): 200–211. doi:10.1016/S0140-6736(19)32989-73
3. Buchman, Timothy G et al. "Sepsis Among Medicare Beneficiaries: 3. The Methods, Models, and Forecasts of Sepsis, 2012–2018." Critical care medicine vol. 48,3 (2020): 302–318. doi:10.1097/CCM.0000000000004225

Disclaimer: The DNAe BSI/AMR test & LiDia-SEQ™ platform are under development and have not been approved or cleared by the FDA or any other regulatory agency.

Download the poster at dnae.com