# ASTar®

## – designed to save lifetimes

Q-LINEA

# Rapid AST Results Directly From Positive Blood Cultures

ASTar is a fully-automated system for rapid antimicrobial susceptibility testing (AST). ASTar cuts the time to clinically-actionable results and shortens time to optimal treatment to hours instead of days.

Early information on bacterial pathogens and their antimicrobial susceptibility is of key importance for managing sepsis patients. Within approximately six hours, ASTar delivers true minimum inhibitory concentration (MIC) results directly from positive blood cultures and against a comprehensive and broad panel. The AST Disc has over 330 chambers available for antimicrobials, covering both fastidious and non-fastidious pathogens, allowing optimal targeted therapy of antimicrobials and potential antimicrobial expansion. ASTar also combines high throughput with a user-friendly interface and load-and-go operation.

## Key features

**Phenotypic AST**

- Directly from positive blood cultures
- True MIC results in ~ 6 hours
- Based on the broth microdilution (BMD) method

**Fully-automated analysis**

- 12 samples analysed simultaneously, random-access
- Load-and-go workflow, less than 2 min hands-on time

**Comprehensive AST panel**

- 6–14 two-fold dilutions of each antimicrobial in panel

## Traditional workflow

**0 hours**

- Patient blood draw
- Blood bottle incubation
- Positive blood culture
- Gram stain
- Rapid ID
- Culture on plates
- Overnight incubation
- 0.5 McFarland prepared
- Susceptibility determination
- Optimised therapy

**48–72 hours**

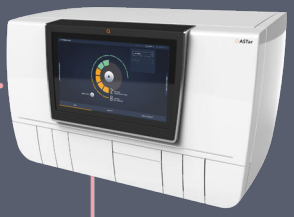
Workflow analysis performed by Q-linea at several European and US hospitals. Workflow may differ between laboratories.

## ASTar workflow

**0 hours**

- Patient blood draw
- Blood bottle incubation
- Positive blood culture
- Gram stain
- Rapid ID
- Optimised therapy

**Susceptibility using ASTar**



**< 24 hours**

## ASTar minimises uncertainty with rapid and comprehensive AST

Several approaches for rapid pathogen identification (ID), e.g. molecular techniques and MALDI-TOF mass spectrometry, are available today. Our phenotypic AST solution can be combined with any of these rapid ID technologies. The AST run can be started independently of pathogen ID, which can be added during or after the ASTar run.

# Three Simple Steps for Complete MIC Results

ASTar simplifies the analytics workflow: less than 2 minutes hands-on time is all that's needed. Simply transfer 1 ml of positive blood culture to the sample preparation Cartridge. Choose the AST Disc and load onto ASTar. Scan and load the Cartridge and tap the START RUN icon on the touch screen to start the run. Pathogen ID can be entered before, during or after the run to generate true MIC results.

1

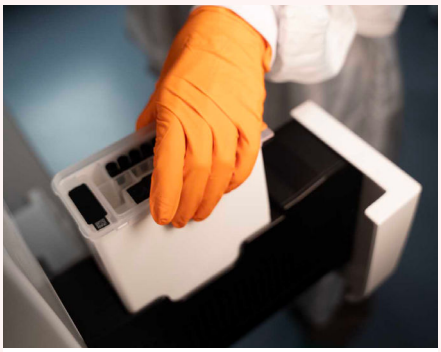
### Inoculate cartridge

Transfer ~1 mL of positive blood culture directly into the ASTar sample prep cartridge. No dilution or additional preparation required. The cartridge generates a controlled inoculum for standardised, reproducible AST analysis.

2

### Load AST disc

The AST Disc allows automated time-lapse imaging of bacterial population growth in wells containing different concentrations of antimicrobial agents.



3

### Load cartridge

Load the cartridge into the ASTar System and press START RUN. All steps of inoculum preparation and AST are handled by ASTar. AST reports are available in ~6 hours.

## ASTar Result Report

Built-in analysis software uses proprietary algorithms to provide true MIC results with interpretations displayed directly on the ASTar Instrument. MIC values are interpreted as S, I, R (EUCAST), or S, I, SDD, R, NS (CLSI), and Expert Rules configured by breakpoint version. Additional comments are provided to give further guidance based on the chosen standard.

Earlier optimisation of antibiotic therapy potentially leads to improved care quality and reduces the risk of developing resistance, thereby preserving antibiotic efficacy for future patients.

**Example result generated by ASTar (EUCAST breakpoints and corresponding Expert rules)**

| Antimicrobial | MIC (mg/L) | Interpretation |
|---|---|---|
| Ampicillin | 4 | S[1] |
| Amoxicillin-clavulanic acid | 8 | S[1,2] |
| Piperacillin-tazobactam | 4 | S |
| Cefazolin | 4 | I |
| Cefepime | ≤0.125 | S |
| Cefotaxime | 0.125 | S[3] |
| Cefoxitin | 4 | * |
| Ceftazidime | ≤0.25 | S |
| Ceftazidime-avibactam | 0.25 | S |
| Ceftolozane-tazobactam | 0.5 | S |
| Ceftriaxone | 0.125 | S[3] |
| Cefuroxime | 8 | I[1] |
| Ertapenem | 0.06 | S |
| Meropenem | ≤0.03 | S[3] |
| Meropenem-vaborbactam | ≤0.25 | S |
| Aztreonam | ≤0.25 | S |
| Ciprofloxacin | ≤0.06 | S |
| Levofloxacin | ≤0.125 | S |
| Amikacin | 2 | (S)[4] |
| Gentamicin | 1 | (S)[4] |
| Tobramycin | 0.5 | (S)[4] |
| Tigecycline | 0.125 | S |
| Colistin | 0.25 | (S)[5] |
| Trimethoprim-sulfamethoxazole | 0.06 | S |

CLOSE EXPORT

Sample ID
C6391134713

Run ID
0003260409145908

Finished
2026-04-09 16:01

Pathogen ID
E. coli

**Detailed Information**

**Comments and Expert rules**

1 Breakpoints are based on intravenous administration.
2 MIC is at the breakpoint. No 'I' category is defined for this pathogen-antimicrobial combination. Therapeutic consideration should be guided by the reported MIC value.
3 Breakpoints apply to indications other than meningitis.
4 For systemic infections, aminoglycosides should be used in combination with another active therapy.
5 For systemic infections, colistin should be used in combination with another active therapy.

**Add notes**

**Information**

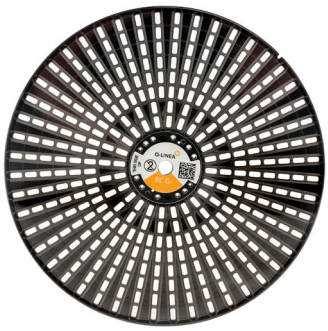
# ASTar BC G– Kit - the Essentials

## The Cartridge & Frozen insert

The Cartridge is a mini-lab that contains all reagents and disposable articles needed for sample preparation, concentration determination, dilution, and growth medium adaptation.

- Contains pre-deposited reagents.
- Generates controlled inoculum for AST.
- A Frozen insert is added to the Cartridge before use.
- Has barcodes for identifying and linking the Cartridge and patient sample.
- Cartridge stored at room temperature, frozen insert stored at –15° C to –25° C.

## The Disc

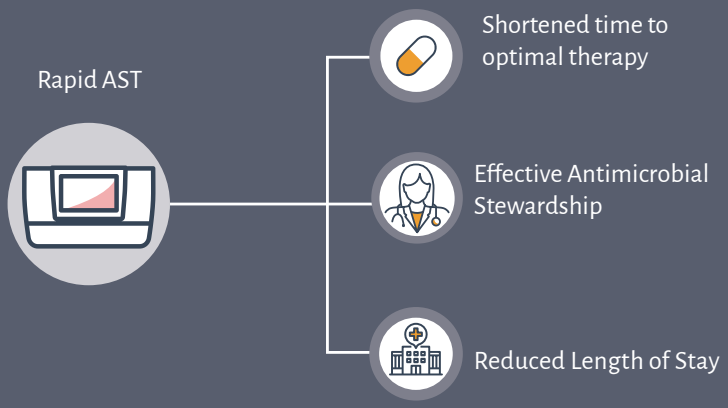


The AST Disc is used for AST and concentration determination. AST is based on the BMD method.

- The AST Disc contains 336 culturing chambers pre-filled with antimicrobials in various concentration ranges, as well as chambers for growth controls, and chambers used to determine bacterial concentration for inoculum preparation.
- Contains a unique barcode for identification and linking to each respective sample preparation Cartridge and patient.
- Stored at room temperature.

### Health Economic Impact of Rapid AST

All these components of ASTar come together to form a comprehensive rapid AST system that, when integrated into an antimicrobial stewardship program, could potentially enhance patient care and reduce costs, aligning with the core goals of healthcare policies and clinical decision-making[1-3].

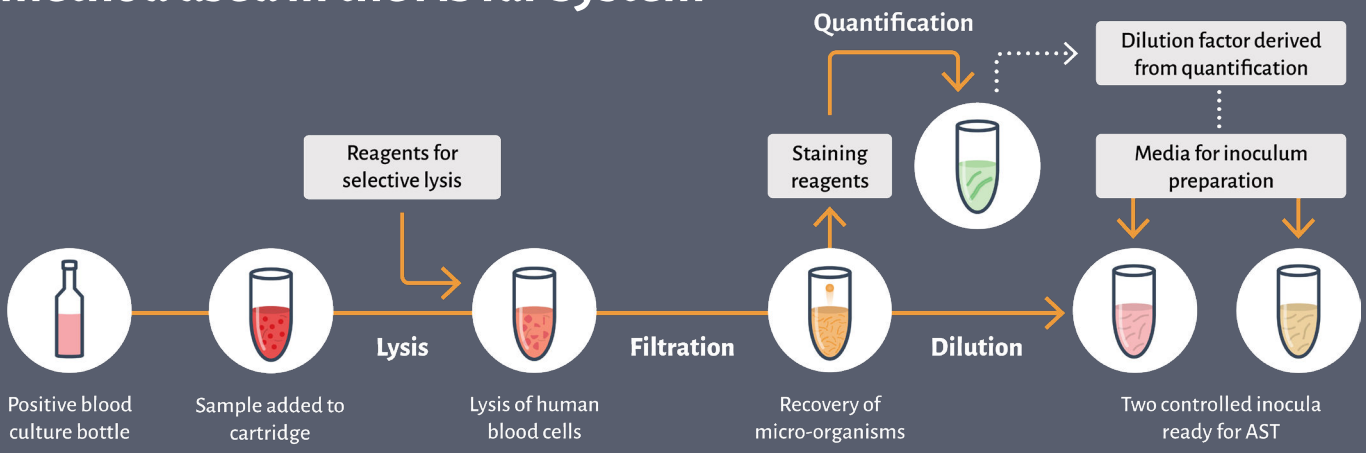



**References**:
1. J. H. Kim et al. Clin Microbiol Infect 27, 69-75 (2021). PMID: 32272171.
2. V. Anton-Vazquez, C. Suarez, T. Planche. J Antimicrob Chemother 77, 771-781 (2022). PMID: 34928343
3. K. Ehren et al. Clin Infect Dis 70, 1285-1293 (2020). PMID: 31094414.

# Standardisation with a controlled inoculum

Minimum Inhibitory Concentration (MIC) results from AST help guide optimal patient treatment by informing clinicians of pathogen susceptibility. However, AST accuracy can be compromised by the inoculum effect, whereby variations in the initial bacterial load lead to MIC variability. Although international standards such as ISO, CLSI, and EUCAST specify defined inoculum concentration ranges for AST, bacterial concentration in positive blood cultures varies, and direct AST will inherit this variation if it is not adjusted for.

## Overview of the automated sample preparation method used in the ASTar System




### The inoculum effect and its effect on patient treatment

The inoculum effect is the attenuation of antimicrobial activity due to a deviating (high or low) concentration of inoculated bacteria. This phenomenon can lead to:

- Unreliable MIC results[1,2]
- Misclassified intrepretations
- Downstream inappropriate antimicrobial therapy
- Higher treatment failure and patient mortality[3]

### Incubation times and inoculum standardisation

Manual inoculum standardisation is time-consuming and labor-intensive, and many microbiology laboratories lack 24/7 staffing. As a result, many blood cultures signal positive during off-hours, delaying AST and increasing the risk of non-compliant inocula.

### The ASTar solution

The ASTar System solves this inoculum issue by fully automating the preparation of a controlled inoculum directly from positive blood cultures. This reduces laboratory workload and ensures reproducible MIC results by consistently providing inoculum concentrations within CLSI and EUCAST-recommended guidelines.

Compared with fixed dilution methods, ASTar's controlled inoculum significantly reduces the risk of erroneous MICs caused by inoculum variability.

By minimising risks associated with inoculum-dependent strains and antimicrobial concentrations, ASTar supports timely and effective treatment decisions, enabling appropriate antimicrobial selection and dosing even when testing is delayed until the following day.

# The clinical impact of rapid AST

AST is the cornerstone for appropriate, timely treatment of bloodstream infections and sepsis, where early initiation of appropriate antimicrobial therapy improves patient outcomes and any associated delays increase morbidity and mortality. When implemented at key points of patient care, rapid AST is a cost-effective approach that helps improve patient outcomes while simultaneously alleviating healthcare system pressures.

## Speed, when time matters most

- **Earlier targeted treatment**
  Rapid AST provides actionable MIC results sooner, supporting timely optimisation of antimicrobial therapies.
- **Improved outcomes in critically ill patients**
  Earlier initiation of appropriate antimicrobial therapy is strongly associated with improved outcomes, while delays increase the risk of disease progression, prolonged hospitalisation, morbidity, and mortality[4,5].
- **Precise and individualised care**
  Faster access to actionable AST allows informed antimicrobial selection and dosing. This is particularly important in critically ill patients with altered pharmacokinectics[6].
- **Reduction of unnecessary antimicrobial exposure**
  Rapid AST facilitates earlier adjustment of broad-spectrum antibiotics and modification of ineffective therapies, helping to reduce emergence of antimicrobial resistance while reducing toxicity and adverse effects in patients[7].
- **Strengthen antimicrobial stewardship**
  Timely, evidence-based treatment decisions helps to support responsible antibiotic use and combat antimicrobial resistance[8].
- **Clinical value with operational efficiency**
  ASTar provides rapid, reproducible MIC results directly from positive blood cultures through full automation and a controlled inoculum preparation: Laboratory workloads are reduced, and same-shift AST results support better patient outcomes and more efficient use of healthcare personnel and resources.

## Minimise uncertainty with the broadest rapid AST panel

Every unnecessary broad-spectrum dose carries risk. Act sooner to help improve patient care.

### Broad coverage

- The ASTar panel covers a broad range of antimicrobials and pathogens to reduce uncertainty and support earlier therapy optimisation

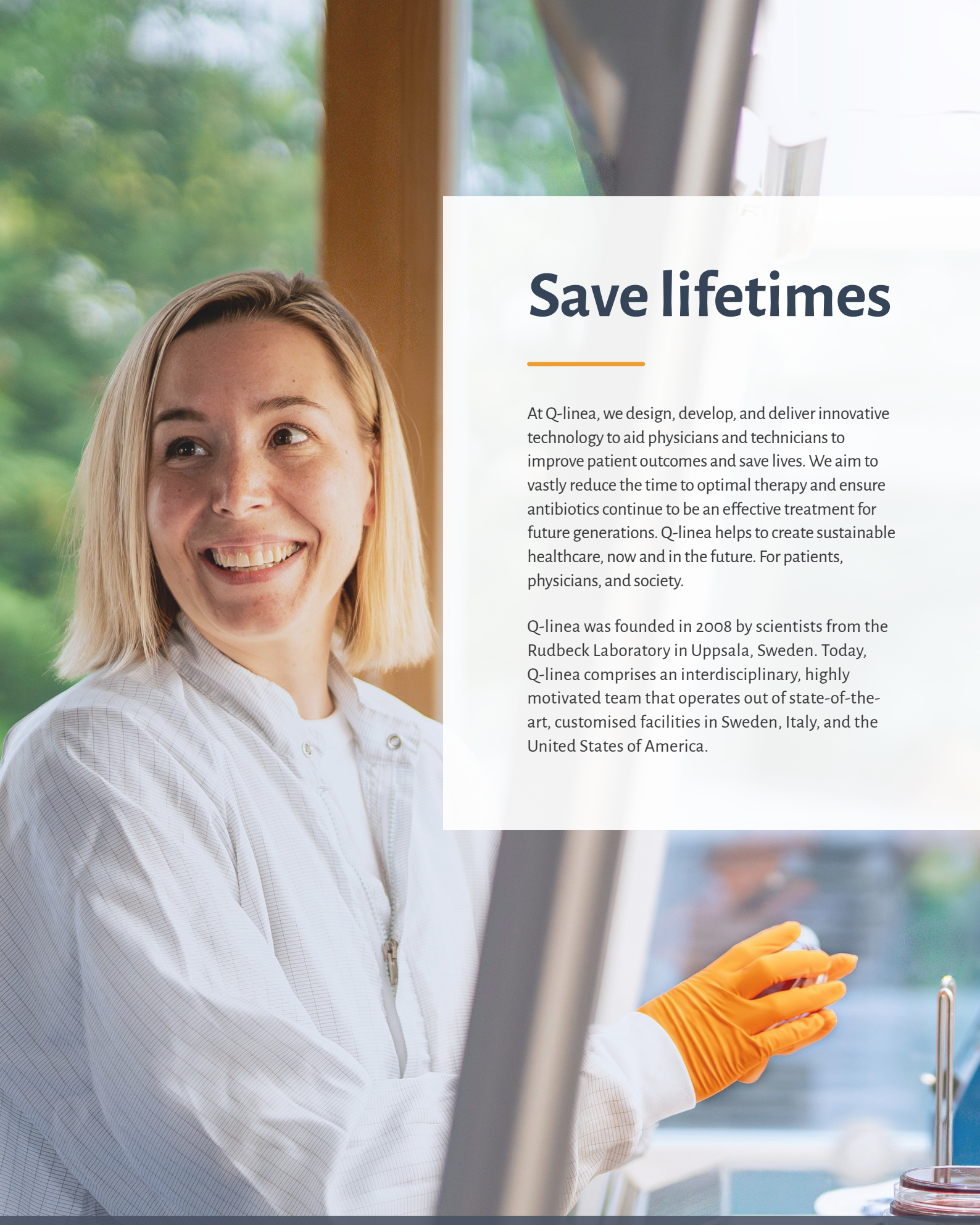
### Same-shift actionable results

- True MIC and SIR in hours, enabling faster clinical decision-making

### Reduced patient toxicity

- Earlier targeted treatment helps limit toxicity and avoidable patient risks


**References**:
1. Smith KP, Kirby JE. The Inoculum Effect in the Era of Multidrug Resistance: Minor Differences in Inoculum Have Dramatic Effect on MIC Determination. Antimicrob Agents Chemother. 2018 Jul 27;62(8):e00433-18. doi: 10.1128/AAC.00433-18. PMID: 29784837; PMCID: PMC6105823.
2. Jaramillo Cartagena A, Taylor KL, Lopez LC, Su J, Smith JT, Manson AL, Chen JD, Pierce VM, Earl AM, Bhattacharyya RP. 0. The carbapenem inoculum effect provides insights into the molecular mechanisms underlying carbapenem resistance in the Enterobacterales. mBio 0:e01540-25. doi:10.1128/mbio.01540-25
3. Miller WR, Seas C, Carvajal LP, et al. The cefazolin inoculum effect is associated with increased mortality in methicillin-susceptible staphylococcus aureus bacteremia. Open Forum Infect Dis. 2018;5(6):1–9. doi:10.1093/ofid/ofy123
4. Tjandra, K. C. et al. Diagnosis of Bloodstream Infections: An Evolution of Technologies towards Accurate and Rapid Identification and Antibiotic Susceptibility Testing. Antibiotics (Basel) 11 (2022). https://doi.org:10.3390/antibiotics11040511
5. Van Heuverswyn J, et al. (2023) Association between time to appropriate antimicrobial treatment and 30-day mortality in patients with bloodstream infections: A retrospective cohort study. Clin Infect Dis 76:469–478.
6. Morales Castro D, Dresser L, Granton J, Fan E. Pharmacokinetic Alterations Associated with Critical Illness. Clin Pharmacokinet. 2023 Feb;62(2):209-220. doi: 10.1007/s40262-023-01213-x. Epub 2023 Feb 2. PMID: 36732476; PMCID: PMC9894673.
7. Kim, J. H. et al. Enhanced antimicrobial stewardship based on rapid phenotypic antimicrobial susceptibility testing for bacteraemia in patients with haematological malignancies: a randomized controlled trial. Clin Microbiol Infect 27, 69-75 (2021). https://doi.org:10.1016/j.cmi.2020.03.038
8. Walsh, T. L. et al. Impact of an Antimicrobial Stewardship Program-bundled initiative utilizing Accelerate Pheno system in the management of patients with aerobic Gram-negative bacilli bacteremia. Infection 49, 511-519 (2021). https://doi.org:10.1007/s15010-021-01581-1



# Save lifetimes

At Q-linea, we design, develop, and deliver innovative technology to aid physicians and technicians to improve patient outcomes and save lives. We aim to vastly reduce the time to optimal therapy and ensure antibiotics continue to be an effective treatment for future generations. Q-linea helps to create sustainable healthcare, now and in the future. For patients, physicians, and society.

Q-linea was founded in 2008 by scientists from the Rudbeck Laboratory in Uppsala, Sweden. Today, Q-linea comprises an interdisciplinary, highly motivated team that operates out of state-of-the-art, customised facilities in Sweden, Italy, and the United States of America.

**www.qlinea.com**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