



Protect Your Patients and Staff

From Drug-Resistant Infections with Fast PCR

→ Improve **Infection Control** and **Antimicrobial Stewardship** with Cepheid's Portfolio of Testing Solutions





Antimicrobial Resistance (AMR)

The Pandemic Behind The Pandemic

AMR is growing rapidly, with superbugs threatening our ability to treat common infectious diseases. Fast and accurate diagnostics can greatly improve **time to result**, allowing clinicians and infection prevention professionals to quickly identify, isolate and appropriately manage patients colonised or infected with drug-resistant bacteria, helping to prevent the spread of resistance in patients and staff alike.¹



THE PROBLEM

1 Ever-Increasing Threat of AMR^{1,2}

Microorganisms are continually evolving to resist the treatments that are available. AMR is:

- Accelerated by the misuse and overuse of antibiotics, as well as poor infection prevention and control
- Associated with longer hospital stays, higher medical costs and increased mortality



2.5 Million
annual extra hospital days
due to AMR³



1.5 € Billion
annual extra healthcare
costs and productivity losses
due to AMR⁴



33,000
annual deaths per year
caused by AMR⁵

2 Relationship to Healthcare-Associated Infections (HAIs)^{6,7}

HAIs are frequently caused by drug-resistant bacteria. HAIs can:

- Prolong length of stay
- Cause large outbreaks
- Disrupt service delivery
- Worsen patient outcomes



1 in 3
bacteria associated with HAIs
are **resistant to antibiotics**⁶



4.5 Million
annual number of patients
with **at least one HAI**⁷



1 in 15
number of patients on any given
day with **at least one HAI**⁶

3 Everyone is at Risk⁸

Some, however, are high-risk and disproportionately impacted:

- Patients **undergoing cancer therapy**
- Patients with **weakened immune systems**
- Patients **undergoing dialysis**
- Patients **undergoing complex surgery**

1 WHO. Antibiotic Fact Sheet. Updated July 2020. Accessed Feb 2021. <https://www.who.int/newsroom/fact-sheets/detail/antibiotic-resistance>

2 Cassini A, et al. Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis. *Lancet Infect Dis.* 2019 Jan;19(1):56-66.

3 WHO. 2014. Antimicrobial Resistance Global Report on Surveillance. Accessed Feb 2021. https://www.who.int/antimicrobial-resistance/publications/AMR_report_Web_slide_set.pdf?ua=1

4 ECDC. 2019. Antimicrobial Resistance: Tackling the Burden in the European Union. Accessed Feb 2021. <https://www.oecd.org/health/health-systems/AMR-Tacklingthe-Burden-in-the-EU-OECD-ECDC-Briefing-Note-2019.pdf>

5 European Commission. EU Action on Antimicrobial Resistance. Updated November 2020. Accessed Feb 2021. https://ec.europa.eu/health/antimicrobial-resistance/euaction-on-antimicrobial-resistance_en

6 MedTech Europe. 2014. Healthcare-Associated Infections Brochure. Accessed Feb 2021. <https://www.medtecheurope.org/resource-library/hai-brochure/>

7 ECDC. 2018. Healthcare-Associated Infections - A Threat to Patient Safety in Europe. Accessed Feb 2021. <https://www.ecdc.europa.eu/en/publications-data/infographichealthcare-associated-infections-threat-patient-safety-europe>

8 CDC. 2019. Antibiotic Resistance Threats in the United States 2019. Accessed Feb 2021. <https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf>

Infectious Diseases of Concern

Bacteria associated with resistance are spreading

Highly transmissible microorganisms such as *Clostridioides difficile* (*C. difficile*) and carbapenem-resistant bacteria can quickly result in difficult-to-manage outbreaks, and can be harmful to patient outcomes, disruptive to clinical service delivery, and costly.^{1,2}



C. difficile

Leading cause of antibiotic-associated diarrhea³



Carbapenem-resistant Bacteria

Significant threat to antibiotics of last resort²



**Methicillin-resistant
Staphylococcus aureus (MRSA)**

Prominent cause of HAIs⁴



Vancomycin-resistant Bacteria

Has few or no treatment options⁵



Drug-resistant Tuberculosis (TB)

Frequent cause of death worldwide⁶



Group B *Streptococcus* (GBS)

Leading cause of early onset neonatal sepsis⁷



Group A *Streptococcus*

Most common bacterial cause of sore throats⁵



***Mycoplasma genitalium* (*M. genitalium*)**

Emerging difficult-to-treat sexually transmitted bacteria⁸

¹ van Beurden Y, et al. Cost analysis of an outbreak of *Clostridium difficile* infection ribotype 027 in a Dutch tertiary care centre. *J Hosp Infect.* 2017 Apr;95(4):421-425.

² Patel, B, et al. Carbapenemase-producing Enterobacterales: a challenge for healthcare now and for the next decade. *IPIP.* 2020 Sep;2(3):100089.

³ Guery B, et al. *Clostridioides difficile*: diagnosis and treatments. *BMJ.* 2019 Aug;366:4609.

⁴ Hübner C, et al. Impact of different diagnostic technologies for MRSA admission screening in hospitals – a decision tree analysis. *Antimicrob Resist Infect Control.* 2015 Dec;4(50).

⁵ CDC. 2019. Antibiotic Resistance Threats in the United States 2019. Abgerufen im Febr. 2021. <https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf>

⁶ WHO. Global Tuberculosis Report 2019. Abgerufen im Febr. 2021. <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-report-2019>

⁷ Helali E, et al. Point-of-care intrapartum Group B *Streptococcus* molecular screening: effectiveness and costs. *Obstet Gynecol.* 2019 Feb;133(2):276-281.

⁸ Gratrix J, et al. Prevalence and antibiotic resistance of *Mycoplasma genitalium* among STI clinic attendees in Western Canada: a cross-sectional analysis. *BMJ Open.* 2017 Jul;7:e016300.



THE IMPACT TODAY

↑
6.9%
COVID-19 hospital-admitted patients with a secondary bacterial infection¹

↑
72%
COVID-19 hospital-admitted patients who received antibiotics¹

↑
92.5%
COVID-19 ICU-admitted patients who received antibiotics²

COVID-19 Impact on AMR and HAIs

Viruses can contribute to the AMR threat

The COVID-19 pandemic has elevated concerns about AMR, with significant increases in prescriptions for antibiotics, hospitalisations and drug-resistant bacteria transmissions.¹ Patients admitted to hospital with suspected COVID-19 are frequently empirically prescribed with antibiotics; however, many do not have a bacterial co-infection, thereby potentially propagating more resistance.³



Shift from narrow- to broader-spectrum antibiotics⁴



Increase in drug-resistant outbreaks in COVID-19 ICUs^{5,6}

- 1 Langford B, et al. Bacterial co-infection and secondary infection in patients with COVID-19: a living rapid review and meta-analysis. *Clin Microbiol Infect.* 2020 Dec;26(12):1622-1629.
- 2 Pritchard M, et al. International Severe Acute Respiratory and Emerging Infections Consortium, COVID-19 Report: 8 June 2020. medRxiv. Abgerufen im Febr. 2021. https://www.researchgate.net/publication/343217999_ISARIC_COVID-19_Clinical_Data_Report_8_June_2020
- 3 Hsu, J. How covid-19 is accelerating the threat of antimicrobial resistance. *BMJ.* 2020 May;369:m1983.
- 4 Abelenda-Alonso G, et al. Antibiotic prescription during the COVID-19 pandemic: a biphasic pattern. *Infect Control Hosp Epidemiol.* 2020 Nov;41(11):1371-1372.
- 5 Arcari G, et al. *Klebsiella pneumoniae* infections in COVID-19 patients: a 2-month retrospective analysis in an Italian hospital. *Int J Antimicrob Agents.* 2021 Jan;57(1):106245.
- 6 Kampmeier S, et al. A nosocomial cluster of vancomycin resistant Enterococci among COVID-19 patients in an intensive care unit. *Antimicrob Resist Infect Control.* 2020;9(1):1540820-8.



Preventing Infections and the Spread of Resistance

THE SOLUTION

1 Fast & Accurate PCR Answers in ~1 hour* with Cepheid's GeneXpert® system

On-demand identification with the GeneXpert system's fast PCR tests help healthcare professionals reduce onward transmission of resistant bacteria throughout the patient pathway, and optimise appropriate therapy management, helping prevent the spread of pathogens and resistance.^{1,2} Explore fast and accurate testing for:

<i>C. difficile</i>	43 minutes	TB & Multiple Drug-resistant TB	< 90 minutes
Carbapenem-resistant bacteria	50 minutes	Influenza, RSV & COVID-19	36 minutes
Vancomycin-resistant bacteria	48 minutes	Group A Streptococcus	24 minutes
MRSA & <i>S. aureus</i>	47 minutes [^]	Group B Streptococcus	30 minutes [#]
<i>M. genitalium</i> & macrolide resistance	<120 minutes		



CE-IVD. In Vitro Diagnostic Medical Device. Not available in all countries.

* Turnaround times vary by test. See individual Product Inserts for specific turnaround times.

[^] For positive MRSA reporting. Reporting negatives in 70 minutes.

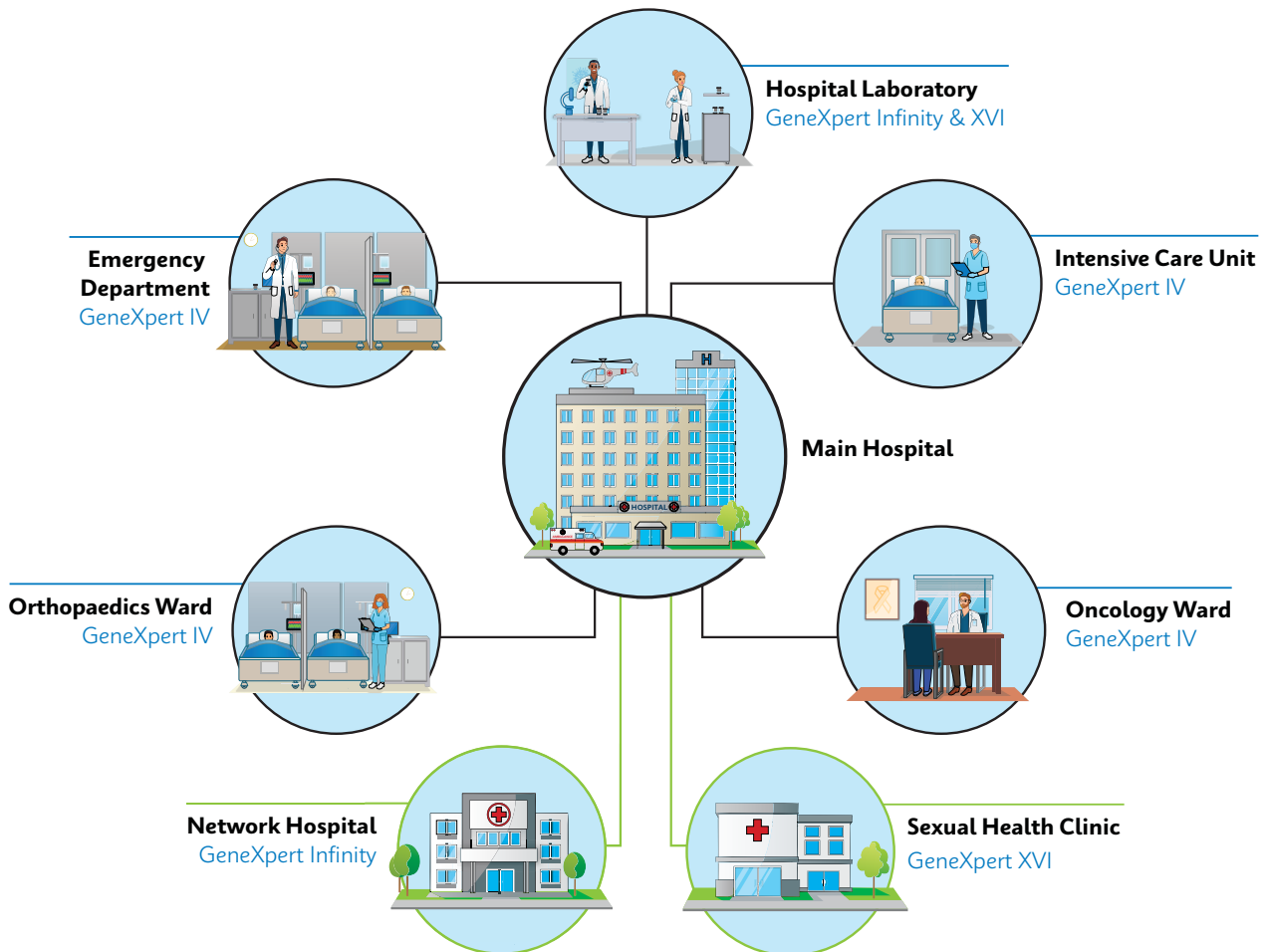
[#] For positive GBS results with Early Assay Termination (EAT). 42 minutes for negative GBS results

¹ Casari E, et al. Reducing rates of *C. difficile* infection by switching to a stand-alone NAAT with clear sampling criteria. Antimicrob Resist Infect Control. 2018 Mar;7(40).

² Corless C, et al. Impact of different carbapenemase-producing Enterobacterales screening strategies in a hospital setting. IPIP. 2020 May;2(3):100011.

2 Enabling High-Quality Answers for Anyone, Anywhere, Anytime*

Now more than ever, immediate access to fast and accurate answers is essential for improving infection control and patient management. Cepheid's GeneXpert system provides on-demand PCR answers within and across sites of care, for optimised management of patients and infectious diseases everywhere, 24/7.



Visit us at www.cephheid.com

to discover how Cepheid's solutions are protecting staff and patients from drug-resistant infections, and improving infection control and antimicrobial stewardship, everywhere.



Broad Disease Coverage

Through the most easy-to-use PCR menu

With the GeneXpert® system's growing menu of fast, accurate and easy PCR tests, Cepheid provides broad coverage for a range of clinically relevant disease states to help diagnose and prevent the spread of disease.

Respiratory Diseases	<i>Combined and stand-alone tests for:</i> Influenza Respiratory Syncytial Virus (RSV)	COVID-19 Group A <i>Streptococcus</i>
Healthcare-Associated Infections & Other Infectious Diseases	MRSA screening MRSA infection <i>C. difficile</i> -associated disease	Vancomycin-resistant bacteria Carbapenem-resistant bacteria Norovirus
TB & Emerging Infectious Diseases	<i>Tuberculosis</i> Rifampicin resistance Multidrug resistance	Ebola Virus
Blood Virology, Women's Health, & Sexual Health	Chlamydia Gonorrhea <i>Mycoplasma genitalium</i> * and Azithromycin resistance Trichomonas Human papillomavirus (HPV) Group B <i>Streptococcus</i>	<i>Viral Load</i> Hepatitis B Hepatitis C HCV from fingerstick blood <i>HIV-1</i> Qualitative Viral load
Oncology & Human Genetics	<i>Bladder Cancer</i> Detection Monitoring <i>Breast Cancer Biomarker Assessment</i> ER/PGR/HER2/Ki-67	<i>Chronic Myeloid Leukemia</i> BCR-ABL monitoring <i>Coagulation</i> Factor II and Factor V Leiden



Visit us at www.cepheid.com

to explore Cepheid's full AMR and infectious disease solutions

CE-IVD. *In Vitro* Diagnostic Medical Device. Not available in all countries.

* Manufactured by SpeedX under the Flexible Cartridge Program. Distributed by Cepheid.

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