

THE ROLE OF DIAGNOSTIC TESTS IN ANTIBIOTIC RESISTANCE



In the U.S., the number of deaths each year as a result of methicillin-resistant Staphylococcus aureus (MRSA) is estimated at **19,000**, this is greater than the number of deaths caused by AIDS.¹



If bacteria keep evolving at the current rate, antibiotic resistance will kill **10 million** people a year by 2050 from otherwise curable diseases.²

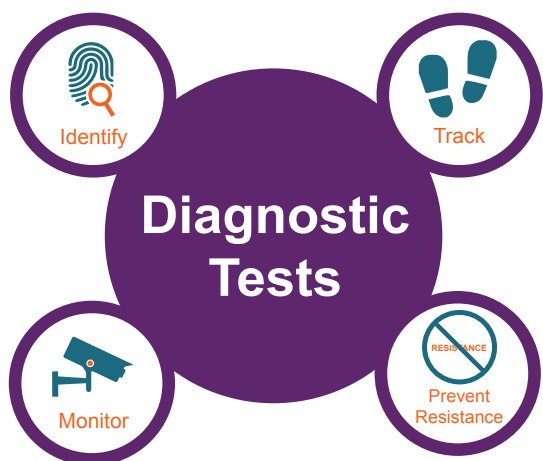


Rapid flu tests for influenza take **15-30 minutes** to complete and cost **\$10-\$25**.³



Treating a single case of MRSA costs more than **\$60,000**.⁴

Diagnostic tests can help physicians decide whether an antibiotic will cure an infection and which one will work best. They can be used to:



Millions of Americans Develop Drug-Resistant Infections Each Year

Antibiotic resistance means that an antibiotic is no longer effective against the bacteria it is intended to treat. According to the Centers for Disease Control and Prevention (CDC), more than two million people in the U.S. develop drug-resistant infections annually and at least 23,000 people die as a result.⁵

There are numerous reasons why bacteria become resistant to antibiotics. However, this phenomenon is largely due to widespread overuse and incorrect prescribing practices. In fact, up to 50% of all the antibiotics prescribed are either not needed – for example, antibiotics prescribed to treat a viral infection – or are not effective as prescribed.⁶

Today, antibiotic resistance is a leading global health problem with a substantial impact on patients, health care systems and economies worldwide.

Drug-Resistant Infections Can Negatively Affect Quality of Life

Antibiotic resistance poses a threat to both public health and patients – particularly immunocompromised individuals including chemotherapy and transplant patients, the elderly, preterm infants, people with HIV/AIDS and others. Many patients and their families have already suffered the debilitating effects of antibiotic-resistant infections.

Today, infections that were once easily treated can become fatal, and if not addressed, common medical interventions – including surgery, chemotherapy, organ transplantation and care for premature infants – may become impossible in the future.⁷

Drug-Resistant Infections Drive Up Health Care Costs

Estimates of the total economic cost of antibiotic resistance to the U.S. economy range as high as \$20 billion in direct health care costs, with additional costs to society for lost productivity as high as \$35 billion a year.⁸ In many cases, antibiotic-resistant infections lead to:

- Prolonged and/or costlier treatments;
- Extended hospital stays;
- Additional doctor visits; and
- Greater disability and death compared with infections that are easily treatable with antibiotics.⁹



Improving Patient Care

Recent advances in diagnostic tests have enabled health care practitioners to quickly distinguish between infections that require treatment and those that do not by testing patients at the point of care and determining the appropriate treatment strategy at an earlier stage. They also help physicians distinguish between viral and bacterial infections, only the latter of which requires treatment with antibiotics.

Reducing Health Care Costs

These innovative diagnostic tests can help prevent resistance and improve the judicious use of antibiotics, especially in outpatient or point-of-care settings where they are often overused. Proper utilization of diagnostic tests enables the appropriate administration of antibiotics, thereby reducing potential misuse and decreasing overall health care costs.

In one cost analysis, 140 patients treated for septicemia, an infection of the blood, with a broad spectrum antibiotic cost the health care system \$66 per day. An adjusted therapy based on diagnostic susceptibility testing – an aid for selecting the most appropriate antibiotic therapy for an individual patient – cost \$3 per day and resulted in one less hospital stay per patient, saving the health care system a total of \$386,820.¹⁰

Additionally, a recent clinical study found that use of a diagnostic test for the early detection of MRSA enabled doctors to prescribe optimum antibiotics 1.7 days sooner, reducing the length of hospital stay by 6.2 days and lowering hospital costs by approximately \$21,000.¹¹

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10. Keeping You a Step Ahead: Rapid Microbiology Solutions, bioMerieux, accessed November 11, 2015 at http://www.myrolematters.com/cmss_files/attachmentlibrary/my-role-matters/rapid-microbiology-flyer.pdf.
11. Goff, D et al. An Antimicrobial Stewardship Program's Impact with Rapid Polymerase Chain Reaction Methicillin-Resistant Staphylococcus aureus/S. aureus Blood Culture Test in Patients with S. aureus Bacteremia. Clin. Infect. Dis. November 2010. Accessed November 11, 2015 at <http://www.cephid.com/us/cephid-solutions/clinical-ivd-tests/healthcare-associated-infections/xpert-mrsa-sa-bc>.

Additional Resources

- 1 Infectious Disease Society of America (IDSA)
- 2 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Antibiotic Resistance Threats in the United States, 2013
- 3 World Health Organization's Antimicrobial Resistance: Global Report on Surveillance 2014

