

# RESPONDING TO THE THREAT OF ANTIMICROBIAL RESISTANCE

Antimicrobial resistance (AMR) is the ability of microorganisms (such as bacteria, fungi, viruses, or protozoa) to nullify the effects of antimicrobial drugs, resulting in these drugs becoming ineffective.<sup>1,2</sup> AMR can affect anyone, of any age, in any country<sup>1</sup>

The global rise of AMR will have devastating effects on lives and economies<sup>2</sup>

## COST<sup>3</sup>

**\$20 billion**

annually in the United States

## IMPACT<sup>4</sup>

**700,000**

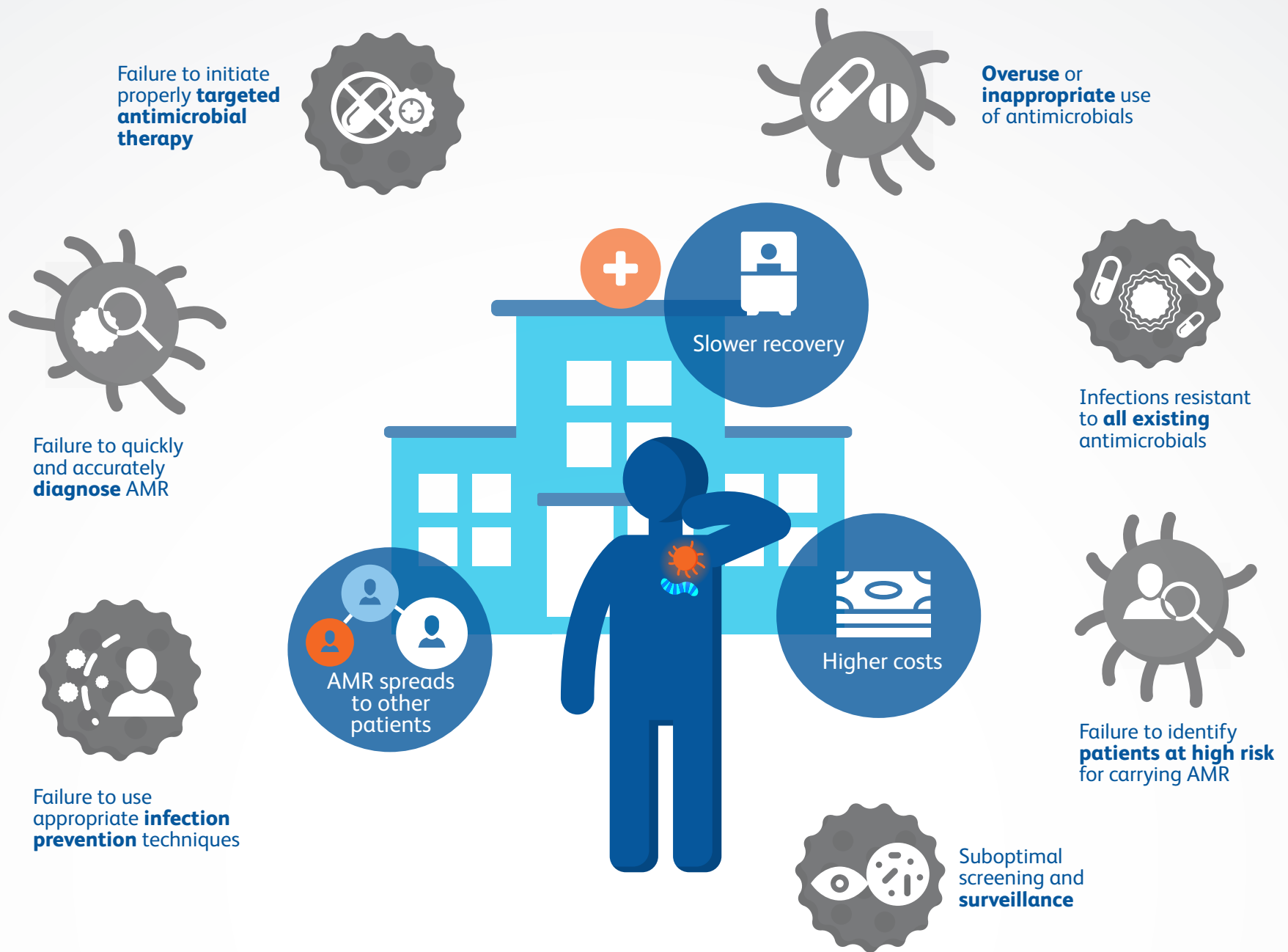
preventable deaths worldwide annually

## PROJECTIONS<sup>4,5</sup>

**10 million** deaths and more than

**\$1 trillion\*** globally per year by 2050

Antimicrobial-resistant organisms can spread due to lack of effective processes, tools, and communication



With effective coordination, patients and the healthcare institutions are protected and costs are reduced

### Infection Prevention & Control

AMR bacteria cause<sup>6</sup>

**17%** of central-line-associated bloodstream infections

**14%** of surgical-site infections

**10%** of catheter-associated urinary tract infections

CREs<sup>+</sup> occur in approximately **1/5** of US long-term acute care hospital patients<sup>7</sup>

Prevent AMR by reducing the spread of pathogens through<sup>10-12</sup>

- 1 Comprehensive protocols for patient isolation
- 2 Cleaning and disinfection
- 3 Optimal selection of medical devices

### Diagnostic Testing

An estimated **30%** of antibiotics prescribed in the United States are unnecessary<sup>8</sup>

Most upper respiratory tract infections are viral, yet

**50%** of patients with such infections unnecessarily receive antibiotics<sup>9</sup>

Effective, timely, accurate diagnostic tests can<sup>3,7</sup>

- 1 Identify infection-causing organism
- 2 Determine antimicrobial resistance
- 3 Guide best therapeutic choice

### Surveillance & Reporting

Up to **70%** fewer patients will get CRE over 5 years if surveillance is properly utilized across facilities to protect patients<sup>6</sup>

Status Quo

**12%** patients will get CRE

Independent Efforts

**8%** patients will get CRE

Coordinated Approach

**2%** patients will get CRE

Coordinated collection, assimilation, and analysis of data are necessary to<sup>6</sup>

- 1 Track high-priority organisms and infections
- 2 Provide early warning of infection outbreaks
- 3 Drive decision-making

## BD solutions to combat AMR

Integrated vascular access

Standardized surgical preparation procedures

Safe drug delivery and blood drawing

Accurate patient screening

Rapid detection and identification

Precise susceptibility testing

Surveillance and outbreak detection

Measurement of antimicrobial use & resistance

Optimized therapy selection and monitoring

<sup>1</sup>Low-impact modeling scenario assuming effects of AMR on labor supply and livestock productivity.

<sup>2</sup>CRE, carbapenem-resistant *Enterobacteriaceae*: Gram-negative bacteria with high levels of resistance to antibiotics.

### References

1. World Health Organization. Antimicrobial Resistance Fact Sheet. <http://www.who.int/mediacentre/factsheets/fs194/en/>. Accessed November 28, 2017.
2. Centers for Disease Control and Prevention. About antimicrobial resistance. <https://www.cdc.gov/drugresistance/about.html>. Accessed May 12, 2017.
3. Tackling drug-resistant infections globally: final report and recommendations. *Review on Antimicrobial Resistance*, 2016.
4. Smith R, Coast J. The true cost of antimicrobial resistance. *BMJ*. 2013;346:f1493.
5. World Bank. 2016. <http://www.worldbank.org/en/news/press-release/2016/09/18/by-2050-drug-resistant-infections-could-cause-global-economic-damage-on-par-with-2008-financial-crisis>. Accessed October 12, 2017.
6. Centers for Disease Control and Prevention. Making healthcare safer. <https://www.cdc.gov/vitalsigns/protect-patients/index.html>. 2016. Accessed July 25, 2017.
7. Centers for Disease Control and Prevention. Antibiotic resistance threats in the United States, 2013. <https://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf>. Accessed July 11, 2017.
8. Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010-2011. *JAMA*. 2016;315(17):1864-1873.
9. Caliendo AM, Gilbert DN, Ginocchio CC, et al. Better tests, better care: improved diagnostics for infectious diseases. *Clin Infect Dis*. 2013;57(suppl 3):S139-S170.
10. Centers for Disease Control and Prevention. Basic infection control and prevention plan for outpatient oncology settings. <https://www.cdc.gov/hai/pdfs/guidelines/basic-infection-control-prevention-plan-2011.pdf>. 2011. Accessed July 25, 2017.
11. Boyce JM. Modern technologies for improving cleaning and disinfection of environmental surfaces in hospitals. *Antimicrob Resist Infect Control*. 2016;5:10.
12. Weinstein RA. Controlling antimicrobial resistance in hospitals: infection control and use of antibiotics. *Emerg Infect Dis*. 2001;7(2):188-192.