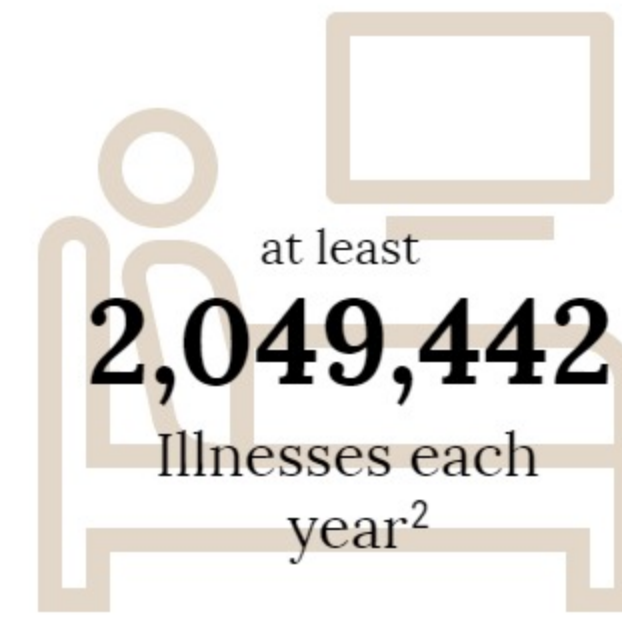


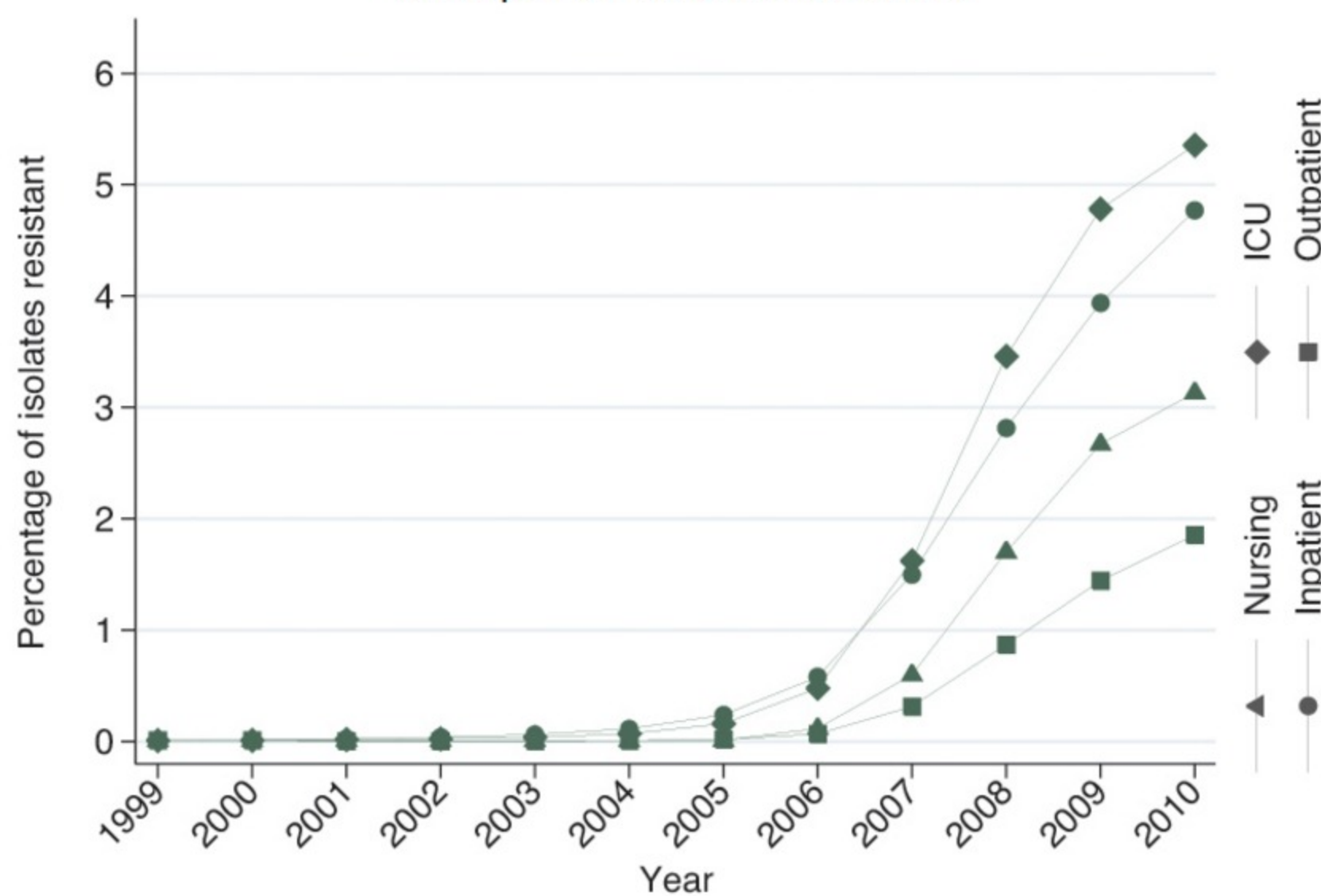
# Antimicrobial Resistance: A Public Health Crisis

Antibiotics have been the **foundation of modern medicine** since the discovery of penicillin in 1928, **saving the lives of millions** of people around the world. They make possible **lifesaving surgery, chemotherapy, organ transplantation, and care for premature infants**. However, after decades of overuse and misuse of antibiotics and the exit of most pharmaceutical companies from antibiotic research and development (R&D), **some bacteria have grown resistant to even our most powerful antibiotics, making them useless**, and leaving doctors without the tools they need to care for their patients and leaving Americans vulnerable to life-threatening infections. Without action, even common infections can become life-threatening in a return to the frightening pre-antibiotic age. **We need to act now.**

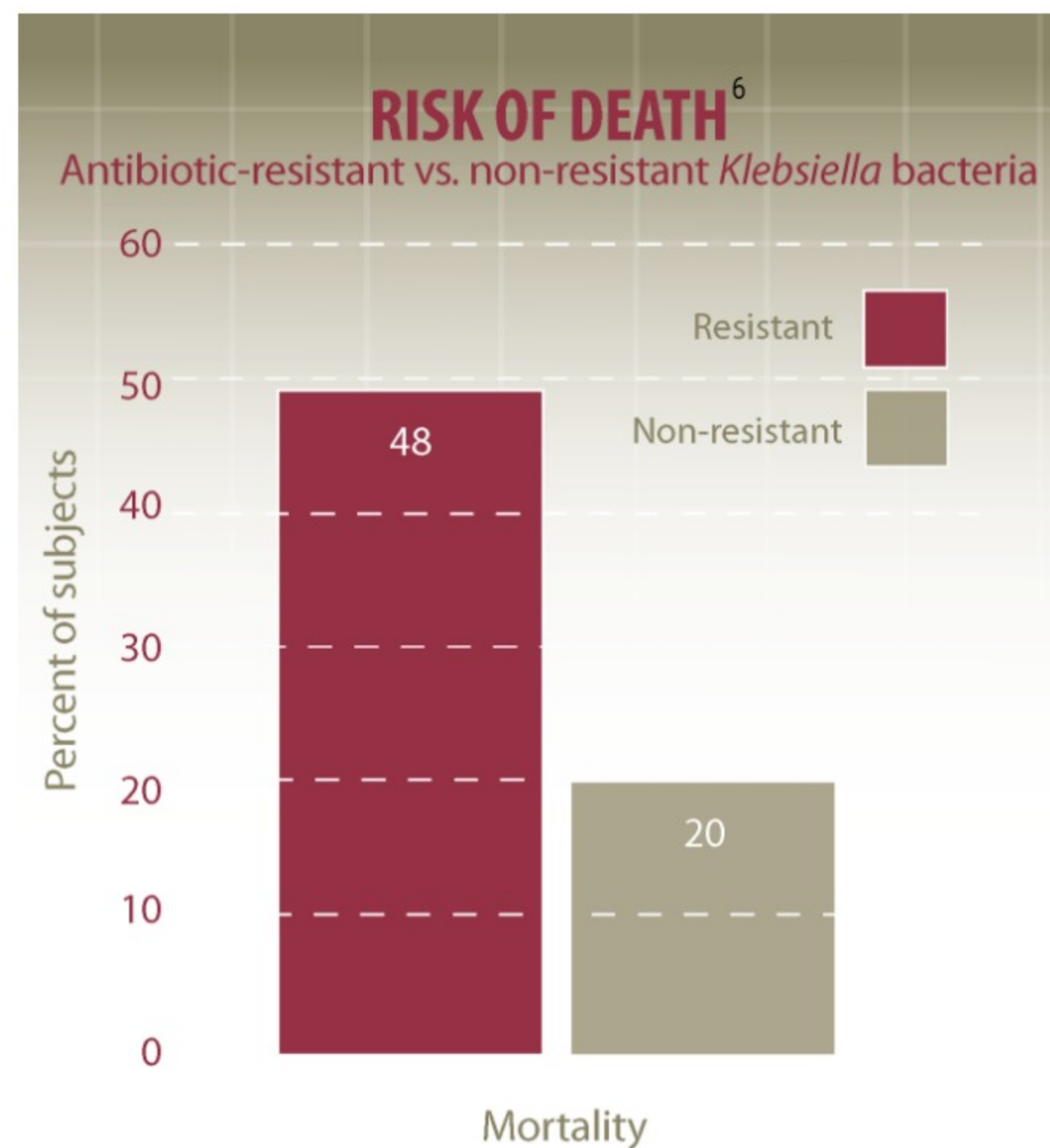


The costs of infections caused by antibiotic resistant pathogens to the U.S. healthcare system are between **\$21 and \$34 billion annually**,<sup>3</sup> with Americans spending an **additional 8 million days in hospitals**<sup>4</sup> as a result of antibiotic resistant infections.

Carbapenem-resistant *Klebsiella* <sup>5</sup>



*Klebsiella*, a common Gram-negative bacteria, is becoming increasingly resistant to antibiotics, including carbapenems, a class of powerful antibiotics that is often the last line of defense against Gram-negative infections.



**Patients with antibiotic resistant *Klebsiella* are over two times likely to die from the infection.**

Patients who receive specialized care will be at highest risk

- Chemotherapy
- Complex surgery
- Joint replacements
- Organ transplants
- Chronic conditions
- Dialysis

Groups particularly at-risk for antibiotic resistant infections

- Young children
- Premature infants
- Elderly
- Soldiers and Veterans

OVER 600,000 PATIENTS  
RECEIVE  
CHEMOTHERAPY EACH  
YEAR  
SPOTLIGHT ON  
CANCER TREATMENT<sup>7</sup>

60,000 CANCER  
PATIENTS WILL BE  
HOSPITALIZED WITH  
NEUTROPENIA AND  
INFECTIONS

1 in 14 of those will die

Antimicrobial resistance is recognized as one of the greatest threats to human health worldwide, and a wide array of organizations such as the President's Council of Advisors on Science and Technology (PCAST), World Health Organization (WHO), European Union (EU), and others have dedicated resources and efforts to combat the threat.

5 TO 10 MILLION CASES  
EACH YEAR WITH 1.1  
MILLION PATIENTS  
HOSPITALIZED  
SPOTLIGHT ON  
COMMUNITY-ACQUIRED  
BACTERIAL PNEUMONIA<sup>8</sup>

#1 CAUSE OF DEATH  
FROM AN INFECTION IN  
THE U.S. (MORE THAN  
BREAST OR PROSTATE  
CANCER)

Disproportionately affects young  
children and older Americans

**A leading factor in the increasing prevalence of antibiotic resistance and associated illnesses and deaths is inappropriate use in both human medicine and agriculture.**

- **At least 30-percent of antibiotics prescribed in U.S. doctor's offices and emergency departments are unnecessary.<sup>9</sup>**
- **About 1 in 5 resistant infections are caused by germs from food and animals.<sup>10</sup>**

## T H E W A Y F O R W A R D

The National Action Plan for Combating Antibiotic Resistant Bacteria (CARB) is organized around the following five goals to turn the tide against the threat of antibiotic resistance:

- Slow the emergence of resistant bacteria and prevent the spread of resistant infections
- Strengthen national One-Health surveillance efforts to combat resistance
- Advance development and use of rapid and innovative diagnostic tests or identification and characterization of resistant bacteria
- Accelerate basic and applied R&D for new antibiotics, other therapeutics, and vaccines
- Improve international collaboration and capacities for antibiotic-resistance prevention, surveillance, control, and antibiotic R&D

1 US Centers for Disease Control and Prevention. (2013). Antibiotic Resistance Threats in the United States, 2013.

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6 Patel et al. (2008). Outcomes of Carbapenem-Resistant *Klebsiella pneumoniae* Infection and the Impact of Antimicrobial and Adjunctive Therapies. *Infection Control and Hospital Epidemiology*. Vol. 29 (12), 1099-106.

7 US Centers for Disease Control and Prevention (2016). Antibiotic Resistance: National Priorities for Urgent Action. Exploring Practical Implementation of Economic Incentives for Antimicrobial Development in the U.S. Expert Workshop. 20 July 2016, Durham, NC.

8 Caggiano et al. (2005). Incidence, Cost, and Mortality of Neutropenia Hospitalization Associated with Chemotherapy. *Cancer*. Vol. 103 (9), 1916-24.

9 Suda et al. (2013). A National Evaluation of Antibiotic Expenditures by Healthcare Settings in the United States, 2009. *Journal of Antimicrobial Chemotherapy*. Vol. 68 (3), 715-18.

10 US Centers for Disease Control and Prevention. (2013). Antibiotic Resistance Threats in the United States, 2013.



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U.S. Stakeholder Forum on Antimicrobial Resistance

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