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The Public Health Costs from Antimicrobial Resistance in Ten Common Pathogens

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Katherine Toran, Michael Lanthier, and Andrew Estrin
U.S. Food and Drug Administration

Introduction

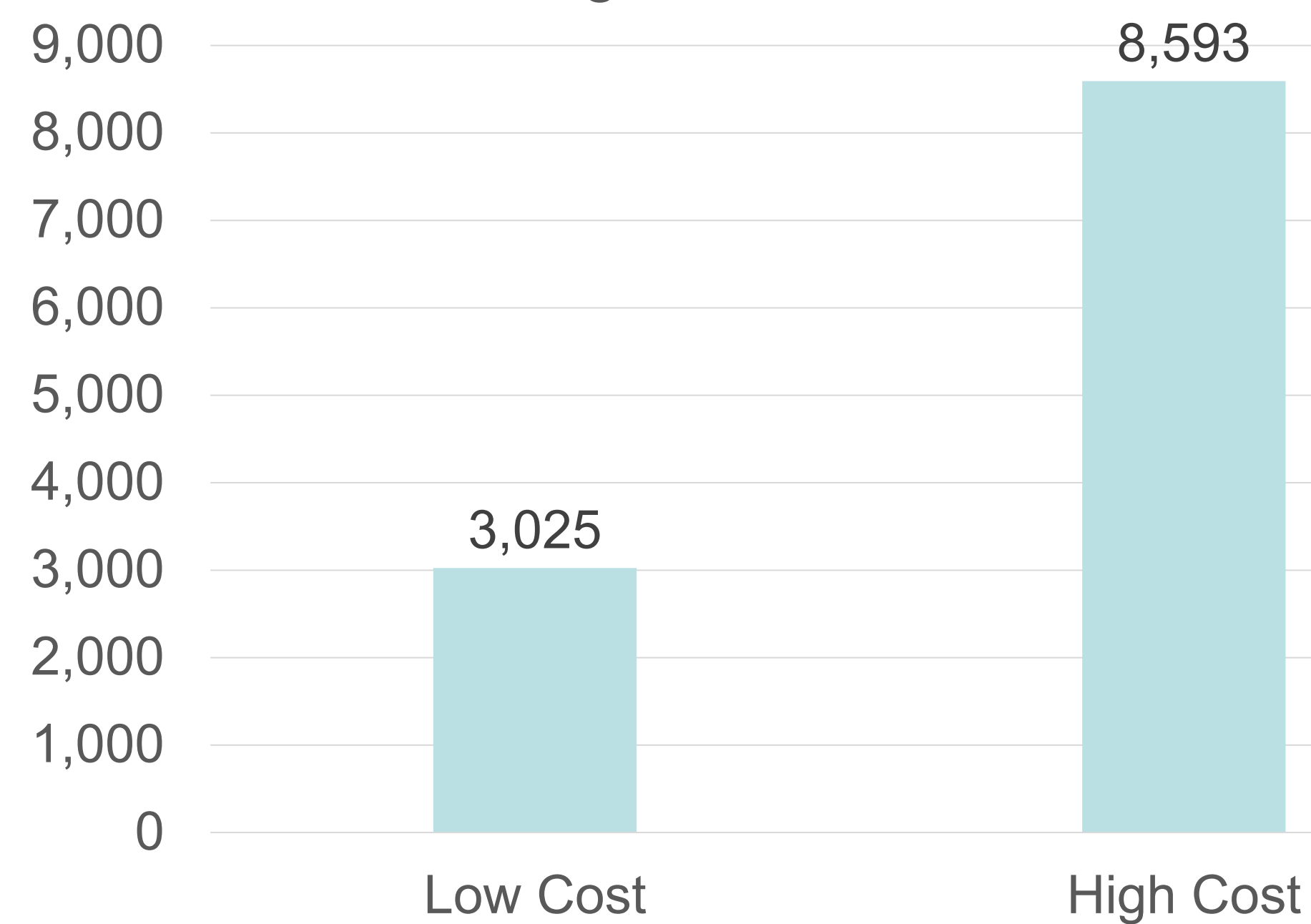
Antimicrobial consumption by humans and animals has been associated with increased antimicrobial resistance (AMR). FDA’s Center for Veterinary Medicine regulates the use of medically important antibiotics for companion animals and in food animal production in order to reduce the overuse of antibiotics and thus reduce the spread of antimicrobial resistance. In 2020 there were about 6 million kg of medically important antimicrobials sold in the United States intended mostly for food animals, and about 2.5 million kg of systemic antimicrobial drugs sold for human use.¹ There were an estimated 4.95 million deaths associated with bacterial AMR in 2019.²



Methods

We estimate the costs of antimicrobial resistance in humans for ten diseases for which the CDC has identified as urgent or serious antimicrobial threats.³ First, we obtain estimates from the CDC of the number of laboratory-confirmed illnesses in humans from antimicrobial resistant strains of ten pathogens. Next, we adjust these numbers to account for underreporting using the multipliers from Scallan, et al. (2011).⁴ Finally, we obtain estimates of the costs per case, including hospitalization, doctor costs, quality of life, and mortality using an updated version of the model used in Minor, et al. (2015).⁵ We note that this method may overstate the public health costs of antimicrobial resistance to the extent that these illnesses would have occurred anyway.

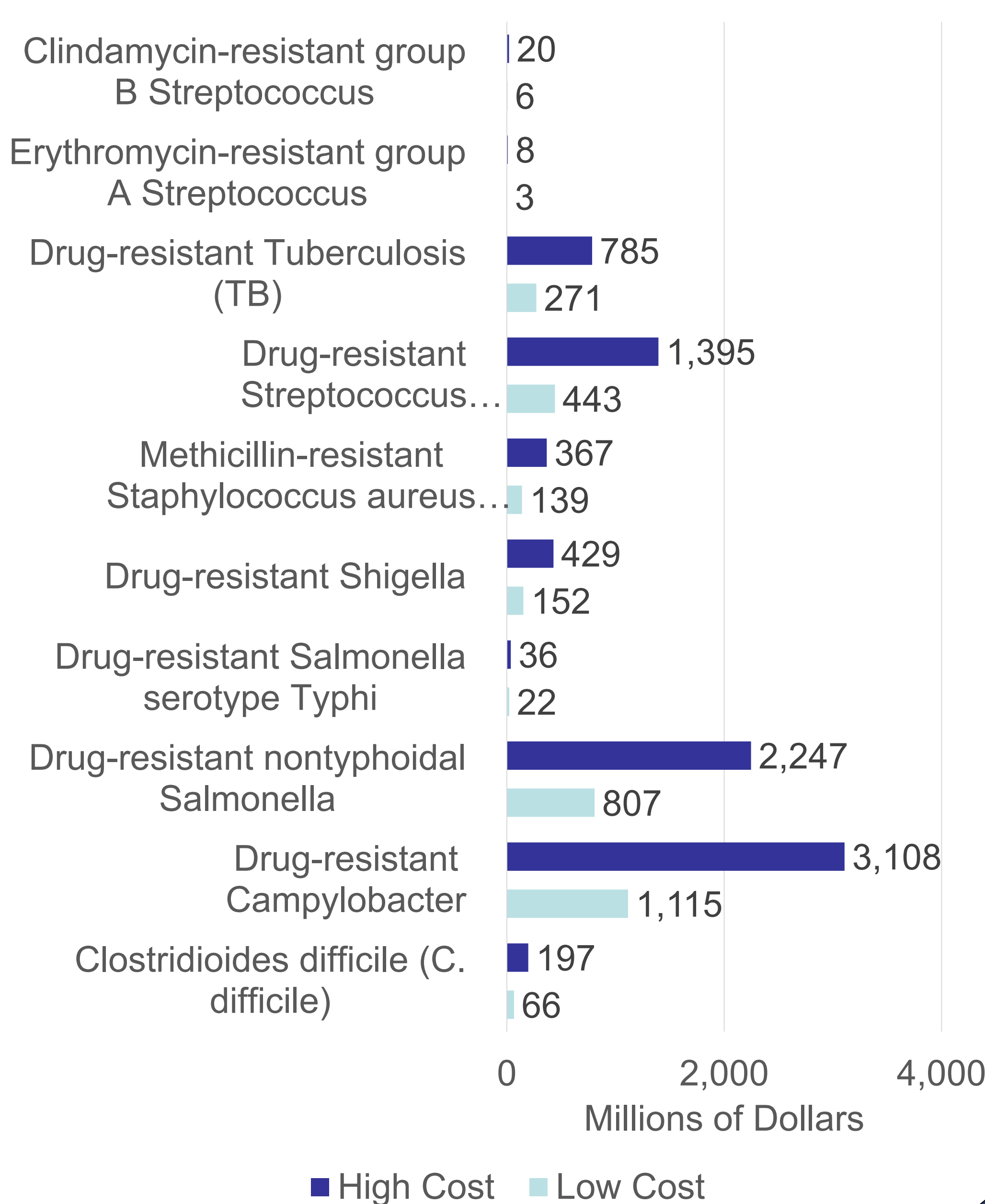
Total Costs of Antimicrobial Resistance for Ten Pathogens in 2017 in Millions \$



Results

We estimate a low cost of \$3.0 billion and a high cost of \$8.6 billion due to antimicrobial resistance for ten diseases in 2017. This suggests the importance of policies that reduce the prevalence of antimicrobial resistance.

Increased Costs Due to Antimicrobial Resistance By Pathogen in 2017



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