

# PREPARING FOR THE NEXT PUBLIC HEALTH EMERGENCY: ANTIMICROBIAL RESISTANCE

As America's biopharmaceutical companies work [around the clock](#) to combat COVID-19, now is an important time to consider preparedness for the next public health emergency: antimicrobial resistance (AMR). AMR occurs when microorganisms such as bacteria, viruses, fungi and parasites change in ways that make the medicines used to cure the infections they cause ineffective. According to the Centers for Disease Control and Prevention (CDC), more than 2.8 million antibiotic-resistant infections occur in the U.S. each year, and more than 35,000 people die as a result.<sup>1</sup>

Beyond the need for antibiotics to battle infections caused by the world's microorganisms, antibiotics are critical for the many patients with conditions that are particularly susceptible to developing these infections. For example, effective antibiotics are needed for the more than 34 million people in the United States that have diabetes and rely on antibiotics to prevent common infections. Infections are also the second leading cause of death in kidney disease patients receiving dialysis.<sup>2</sup> AMR also threatens many modern medical advances that depend on these medicines to successfully treat patients, including joint replacements, organ transplants and cancer therapy. As we face the current pandemic, now more than ever, it is critically important to overcome the challenges posed by AMR.

## COVID IMPLICATIONS FOR AMR

While COVID-19 is a viral disease, very sick patients are at an increased risk for secondary infections that may need treatment with antibiotics. The patients who are the most ill with COVID-19 are often on ventilators and in critical care units at hospitals for relatively prolonged periods of time. Doctors use large amounts of antibiotics and antifungals to treat these patients because they are at risk for acquiring pneumonia and developing bloodstream infections, due to many intravenous lines and other interventions that increase the risk of these infections. This is also the environment where multi-drug-resistant infections caused by bacteria, or so called "superbugs," emerge and are spread. As a result, medical professionals need to be prepared for the emergence of drug-resistant infections complicating COVID-19 related pneumonia. Unfortunately, the current pandemic will also likely have the effect of speeding superbug growth.

Evidence suggests that COVID-19 patients with secondary bacterial infections may be resistant to our existing arsenal of antibiotics. In fact, initial data has found that 1 in 7 patients hospitalized with COVID-19 acquired a dangerous secondary bacterial infection, and 50% of patients who died had such infections.<sup>3</sup> Hospitals are on the front lines of this crisis and should have the best available innovative medicines to combat these superbugs, but Mother Nature is faster at creating new superbugs than we as a scientific community have been at creating new antibiotics and antifungals to combat them.

## MARKET FAILURES IMPEDE THE DEVELOPMENT OF NEW ANTIBIOTICS

Unfortunately, the environment for developing and marketing AMR treatments is challenging and unattractive due to several factors. First, while antibiotics for drug-resistant infections save lives, they are only taken for a short duration and reserved for only the patients that need them most. These challenges are compounded by bundled hospital payment systems that incentivize the utilization of low-cost generics over novel antibiotics to control costs.

As a result, when companies develop new treatments—a costly and time-consuming process—it can be challenging to earn back investment. Many manufacturers have stopped developing antimicrobial treatments because they cannot earn back the investment that is required to get these products developed, and some small biotechnology companies focused on antibiotics have been forced to file for bankruptcy.<sup>4,5</sup>

It is increasingly recognized that systemic challenges are contributing to the dwindling level of research and development and that the current environment for investment in new antimicrobial products is insufficient to achieve a sustainable pipeline of new products to address drug-resistant infections.<sup>6</sup> Comprehensive policy reforms that could advance new reimbursement methodologies and create new incentives are needed to enable appropriate patient access and create a sustainable ecosystem for antimicrobial research and development and commercialization.

The timing and cause of the next pandemic may not be known, but the continued growth of antimicrobial resistant infections is a public health crisis we can prevent. We need to be prepared and have antimicrobial medicines available, as it is just as important as having available vaccines and countermeasures for the pandemic pathogen.

<sup>1</sup> CDC, "Antibiotic/Antimicrobial Resistance: Biggest Threats and Data" <https://www.cdc.gov/drugresistance/biggest-threats.html>

<sup>2</sup> CDC, Diabetes Quick Facts, <https://www.cdc.gov/diabetes/basics/quick-facts.html>

<sup>3</sup> Fei Zhou, MD, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. The Lancet, March 2020. Available at: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30566-3/fulltext#](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30566-3/fulltext#)

<sup>4</sup> AMR Industry Alliance, 2020 Progress Report, January 2020 <https://www.amrindustryalliance.org/wp-content/uploads/2020/01/AMR-2020-Progress-Report.pdf>

<sup>5</sup> Jacobs, A, "Crisis Looms in Antibiotics as Drug Makers Go Bankrupt" NY Times, Dec, 25 2019. <https://www.nytimes.com/2019/12/25/health/antibiotics-new-resistance.html>

<sup>6</sup> Hu C. Business Insider. "Pharmaceutical Companies are Backing Away From a Growing Threat That Could Kill 10 Million People a Year by 2050." July 2018. <https://www.businessinsider.com/major-pharmaceutical-companies-dropping-antibiotic-projects-superbugs-2018-7>; Jacobs A, The New York Times. "Crisis Looms in Antibiotics as Drug Makers Go Bankrupt." December 2019. <https://www.nytimes.com/2019/12/25/health/antibiotics-new-resistance.html>