Cancer and Antimicrobial Resistance
Challenges and the Path Forward

Introduction

Antimicrobial resistance (AMR) is one of the greatest public health threats of our time. Drug-resistant infections sicken at least 2.8 million and kill at least 35,000 people annually in the United States. Antibiotic resistance accounts for direct health care costs of at least $20 billion. If we do not act now, by 2050 antibiotic-resistant infections are expected be the leading cause of death in the world.

Anyone can develop an AMR infection, but cancer patients and other immunosuppressed individuals are disproportionately impacted. Cancer patients depend upon effective antibiotics to prevent and treat bacterial infections. Although cancer survivorship has increased with the success of modern cancer care, current therapeutic approaches continue to make these patients vulnerable to infections. Additional resources for AMR prevention, surveillance, stewardship and antibiotic research and development are needed to relieve the burden that AMR places on cancer care.

Cancer and AMR: Human and Economic Toll

Infections are one of the most frequent complications seen in cancer patients. A cancer patient has a risk of dying from a fatal infection that is three times higher than an individual without cancer. Antibiotics are required to support nearly all patients who require cancer therapy, including chemotherapy recipients with neutropenia, patients with long-term catheters and patients undergoing oncologic surgery and biopsies. AMR diminishes the ability of antibiotics to prevent and treat infections in cancer patients. A recent study reported that 46% of the oncologists in the United Kingdom are worried that chemotherapy will be unavailable due to AMR.

In a study of cancer patients, 26.8% of pathogens found were resistant to the standard prophylactic antibiotics prescribed to prevent post-chemotherapy infections. This study forecasted that a reduction in antibiotic efficacy of 30% to 70% would result in nearly 4,000 to 10,000 additional infections and 500 to 1,000 additional deaths per year in the U.S. among patients who are going through chemotherapy for hematological malignancies.

A study in 2015 found that 23% of the deaths among cancer patients requiring intensive care were due to hospital acquired infections. In 88% of these cases, a multidrug resistant pathogen was identified. The overall prevalence of multidrug resistant pathogens was nearly 40% in patients admitted to the intensive care unit.

Infections are thought to play a primary or associated cause of death in approximately 50% of patients with hematological malignancies or solid tumors, even if drug-resistant infections are rarely recorded as the official cause of death. Antibiotic failure in cancer patients increases the frequency of sepsis, sepsis-related mortality and sepsis-associated costs of care.

When cancer patients are neutropenic, they are typically treated with prolonged antibiotic therapy. While necessary for these patients, prolonged use of antibiotics likely contributes to the emergence of resistance, underscoring the need for policy solutions to address AMR and ensure the development of new antibiotics to treat resistant infections.

Cancer and AMR worsen health disparities. African American, Latinx and Indigenous communities experience higher cancer incidence and lower survival rates for many types of cancers. Many complex factors drive these disparities, and experts have identified many reasons to suspect a disparate impact of AMR, including differences regarding use of prescribed and nonprescribed antibiotics, barriers to medical care, higher rates of foreign travel to regions with high AMR burden and more likely employment in food animal production. Taken together, the joint epidemics of cancer and AMR can contribute significantly to persistent health inequities.

AMR escalates the cost of cancer care. Out of all-cause health care costs during first-line chemotherapy, neutropenia-related costs (primarily to prevent and treat infections) accounted for 32.2% in non-small lung cancer patients diagnosed with febrile neutropenia.

Key Policy Issues

Surveillance: The CDC Antibiotic Resistance Solutions Initiative has strengthened AMR surveillance since its launch in 2016, but significant gaps in data on emerging resistance and resistant infections remain, including the ability to track resistant infections in cancer patients.

Prevention: Preventing infections across the population is an important strategy to protect vulnerable individuals, including cancer patients. Resources also are needed for targeted infection prevention strategies in cancer settings.

Antibiotic Stewardship: Antibiotic stewardship programs have been proven to improve patient outcomes, decrease inappropriate antibiotic use and resistance and lower health care costs. Reducing inappropriate antibiotic use among all populations is a crucial strategy to protect antibiotics' efficacy for individuals who may require more frequent antibiotic use, including cancer patients. Stewardship in oncology settings is also essential to ensure patients with cancer receive the right antibiotic at the right time. The adoption of antibiotic stewardship programs is uneven across health care settings.

Dwindling Antibiotic Market: Because antibiotics must be used sparingly to preserve their efficacy and are typically prescribed for a short duration, antibiotic developers face extreme difficulty in earning a return on investment in novel antibiotics. We need to spur antibiotic research and development to develop novel antibiotics to treat patients with serious and life-threatening conditions, such as cancer.

Recommendations for Addressing AMR and Cancer

Cosponsor the Pioneering Antimicrobial Subscriptions to End Up-Surging Resistance (PASTEUR) Act (H.R. 3932/S. 2076), which establishes a new payment model for novel antibiotics that focuses on value over volume by providing set contract payments for a supply of novel antibiotics, regardless of the quantity of antibiotics used.

Increase funding for the CDC Antibiotic Resistance Solutions Initiative to enhance surveillance and antibiotic stewardship, including in oncology settings. Improving support for surveillance data on antibiotic resistance, including in oncology settings, will be critical in tracking trends and linking rates of resistance to interventions.