

The Value of Vaccines in Preventing and Combating Antimicrobial Resistance (AMR)

Antimicrobial resistance, or AMR, is a significant public health problem affecting all areas of the world—negatively impacting millions of people and costing billions of dollars. In the United States alone each year, the CDC estimates that AMR bacteria cause at least 2 million infections and result in 23,000 deaths.¹

ANTIMICROBIAL RESISTANCE (AMR) IS A SERIOUS ISSUE ACROSS THE GLOBE.



MORE THAN 50,000 LIVES ARE LOST ANNUALLY
in the U.S. and Europe due to AMR infections.



MORE THAN 100 UN MEMBER STATES
are seeing resistance against commonly used antibacterial drugs.

COSTS IN PERSPECTIVE: THE GLOBAL IMPACT OF AMR

A CONTINUED INCREASE IN RESISTANCE WOULD

REDUCE THE WORLD GDP BY AN ESTIMATED 2-3.5% BY 2050.⁴



€1.5 BILLION

estimated economic burden in the EU from AMR per year.



\$18,588–\$29,069

estimated AMR medical costs per patient.

KEY TAKEAWAYS

AMR results in a combined 50,000 deaths each year in the U.S. and Europe.²

In the E.U., the economic burden associated with these infections costs an estimated €1.5 billion per year.³

Two examples of the critical role of vaccines in helping to reduce AMR infections are the pneumococcal conjugate and *Haemophilus influenzae* type b, or Hib, vaccines.

Everyone has a role to play in reducing AMR, from governments and regulatory bodies, to non-profit organizations and the healthcare industry.

THE VALUE OF MEDICINES: THE ROLE OF VACCINES IN AMR PREVENTION

The good news is we are not defenseless in this fight. In addition to new guidelines on antibiotic use and the development of new drugs, we already have a powerful tool at our disposal: **vaccines**.

Vaccines can help prevent an infection before it ever takes hold, which means we can do two things:

1

We can help prevent an individual from ever developing an infection which requires antibiotic treatment; and

2

We can reduce the transmission and circulation of certain types of bacteria, including strains that are in fact antibiotic resistant.



Vaccines are critical in helping to combat the growing AMR crisis.



FLU

A Canadian ecological study estimated that antibiotic prescriptions during the influenza season were **reduced more than 60 percent** after introduction of a universal seasonal influenza immunization program.⁵

HIB

Several studies have seen a correlation between the use of *Haemophilus influenzae* type b (Hib) vaccine and a reduction in resistance to one or more antibiotics—including a **50 percent decrease** in resistance to ampicillin and related antibiotics.⁶



PNEUMOCOCCAL

Pneumococcal disease is a group of illnesses caused by the bacterium *Streptococcus pneumoniae* (*S. pneumoniae*) or pneumococcus.⁷ Pneumococcal infections can include serious diseases such as meningitis, bacteraemia and pneumonia, as well as more common illnesses, such as acute otitis media.⁸ Despite this, **only 31 percent of the global target population had been immunized as of 2014**, and only 14 additional countries added a PCV to their NIP that same year.⁹



Vaccines in action



It is estimated that universal coverage with a pneumococcal conjugate vaccine could avert up to **11.4 million days of antibiotic therapy** annually in children younger than five years of age.¹⁰



Since the introduction of the Hib vaccine, several studies have seen a correlation between use of the Hib vaccine and a reduction in resistance to one or more antibiotics, including a **50 percent decrease in resistance to ampicillin and related antibiotics** across all ages in a 10-year Italian study after universal introduction of the vaccine in 1999.⁶



In the province of Ontario, the introduction of a universal influenza immunization program for everyone aged 6 months and older in 2000 resulted in a **64 percent decrease in influenza-associated respiratory disease antimicrobial prescriptions**.⁵

WORKING TOGETHER TO ADDRESS AMR

A mix of different, complementary incentives is needed to encourage increased AMR-focused antibiotic and vaccine development—for example, transferable regulatory data/marketing exclusivity, IP mechanisms, and/or priority review vouchers (tPRV), to R&D tax credits. Each should of course be considered within the framework of the regulatory and IP systems of the country.

It is important that we all advocate for health policies and education that increase access to, and adoption of, vaccines along with better stewardship of antibiotic drugs.

EACH STAKEHOLDER HAS AN IMPORTANT ROLE TO PLAY IN PROTECTING LIVES.



Industry



Government and Policy Makers



Healthcare Providers



Non-profit Organizations



Patients

PFIZER'S COMMITMENT TO COMBAT AMR

Pfizer has a long tradition in infectious disease R&D resulting in vaccines and anti-infectives that continue to have a significant impact on patients' lives. Pfizer was one of the leaders in the development of the industry Declaration on Combating Antimicrobial Resistance and the subsequent Industry Roadmap for Progress on Combating Antimicrobial Resistance released by 13 Pharmaceutical Companies on September 20, 2016. Pfizer is committed to continuing its role in the development of new strategies between governments, private industry, and NGOs for increased public education and to spur new innovation.

Pfizer's R&D focus in this space supports development of medicines for both treatment and prevention. We apply our expertise in vaccine technology to this important area, which we believe will enable us to impact patients' lives. Pfizer has a rich history in vaccine research and development; we have played a role in nearly eliminating the world of deadly diseases like smallpox and polio.

Pfizer believes that vaccines are essential tools in our fight against antibiotic resistant infections. By reducing infections caused by vaccine-preventable diseases and helping limit their transmission, vaccines may allow providers to prescribe antibiotics less frequently and therefore to be used more sparingly. Pfizer's vision is to protect lives with our broad portfolio of innovative vaccines that fight serious diseases worldwide and meet the needs of the global community we serve.

Pfizer is committed to doing our part to save lives from vaccine-preventable diseases and reduce AMR.



VACCINE DEVELOPMENT

Marketing the pneumococcal vaccine and investing in a robust R&D pipeline to develop vaccines against *S. aureus* and *C. difficile*



ANTIBIOTIC DEVELOPMENT

Uncovering new treatments against bacterial infections



AMR SURVEILLANCE PROGRAMS

Continuing nearly two decades of surveillance, including support of JMI Laboratories' survey of over 30,000 gram-positive and gram-negative organisms

ENDNOTES

- ¹ Centers for Disease Control and Prevention. Antibiotic Resistance Threats in the United States. 2013. Available at: <http://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf>.
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- ⁵ JC Kwong, et al. The Effect of Universal Influenza Immunization on Antibiotic Prescriptions: An Ecological Study. 2009. Clin Infect Dis. 49 (5): 750-756 doi:10.1086/605087.
- ⁶ M Giufrèa, et al. Ten years of Hib vaccination in Italy: Prevalence of non-encapsulated Haemophilus influenzae among invasive isolates and the possible impact on antibiotic resistance. 2011. Vaccine 29, 3857–3862.
- ⁷ The World Health Organization (WHO). Pneumococcal Vaccines: Summary and Conclusions. 2003. Available at: <http://archives.who.int/vaccines/en/pneumococcus.shtml>.
- ⁸ The World Health Organization (WHO). Weekly epidemiological record: Pneumococcal vaccines WHO position paper – 2012. 2012. Available at: <http://www.who.int/wer/2012/wer8714.pdf>.
- ⁹ S Tricarico. Pneumococcal conjugate vaccine implementation in middle-income countries. 2017. Pneumonia (Nathan). doi: 10.1186/s41479-017-0033-2. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5471880/>.
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