Background Paper

Committee: World Health Organization (WHO)

Topic A: Addressing Antimicrobial Resistance (AMR)

Chairs: Emiliano Galarza Gamboa and Maria Jose Aguilar Arribas

Antimicrobial resistance poses a big danger to global health, AMR occurs when bacteria, viruses, fungi, and parasites develop to resist the drugs used to treat the infections they cause. As a result, common medical treatments, such as antibiotics and antivirals, have become not as effective as before, leading to longer illnesses, higher medical bills, and increased mortality.AMR can extend rapidly through things like global trade, travel, and food supply chains, making it a global problem. If not taken care of, it could lead back to a time when healthcare a time when infections that are easily treatable in this time could once again become mortal.

Before antibiotics were discovered, diseases that were easily spread were the main reasons for deaths globally. Simple bacterial infections, like pneumonia or wounds, were frequently fatal because there were no treatments that were effective. The discovery of penicillin by Alexander Fleming in 1928 changed medicine forever. It was the first effective antibiotic that could effectively treat a lot of different bacterial infections, during World War 2 penicillin became used frequently, saving many lives by treating ear infections. Shortly after antibiotics started being used frequently signs of bacterial resistance began to emerge. In the 1940s, before penicillin was used a lot, researchers observed bacteria produced penicillinase, an enzyme that deactivated penicillin. By the 1950s and 1960s, other antibiotics like streptomycin and tetracycline were created, but resistant strains soon followed.

AMR is one of the biggest dangers to global health. Without effective antibiotics, common infections, such as pneumonia, tuberculosis, and sepsis, become a bigger threat that

becomes almost impossible to treat. This can bring longer illnesses, disability, or death. According to the World Health Organization (WHO), AMR could cause up to 10 million deaths annually by 2050 if left unchecked. AMR has the potential to set off global health crises. Resistant pathogens can spread rapidly, and without effective procedures, such outbreaks could overload healthcare systems. Unlike traditional pandemics provoked by viruses, AMR involves a broader range of bacteria, making it harder to control and predict. Antimicrobials released into the environment through wastewater, agricultural runoff, or improper disposal can add to resistance in natural ecosystems. This environmental reservoir of resistance can affect both human and animal populations globally.

The overuse and misuse of antibiotics are a problem, antibiotics are often overprescribed or used improperly. For example, patients may be prescribed antibiotics for viral infections like the flu, which are not treated with antibiotics. Al, so some patients may not complete their whole procedure, which can allow resistant bacteria to survive and multiply. In agriculture, antibiotics are used widely in livestock, poultry, and aquaculture not just to use as a treatment for infections but also to promote growth and prevent disease in crowded or unsanitary conditions. This non-therapeutic use creates ideal conditions for the evolution of resistant bacteria, which can move to humans through the consumption of animal products, contact with animals, or the environment. Improper and poor prevention and control of infections in settings such as hospitals and nursing homes, inadequate infection control practices like improper hand washing, and lack of sterilization equipment can steer the spread of resistant bacteria. Patients with weakened immune systems or those undergoing surgeries are especially vulnerable.

The focus of the debate should address how to improve antibiotic stewardship in healthcare systems. This includes better guidelines for prescribing antibiotics, raising awareness about the dangers of overuse, and making sure that antibiotics are only used when absolutely necessary. Education campaigns targeted at both healthcare providers and the public are important to reduce unnecessary prescriptions.

Developing new antibiotics and alternatives, given the slowing development of new antibiotics, the debate should focus on how to incentivize pharmaceutical companies to enrich antibiotic research. This could include public-private partnerships, government grants, or economic incentives like market entry rewards to encourage the development of new antimicrobial agents. Alternative treatments, there should also be a focus on evolving traditional antibiotics, such as bacteriophage therapy (using viruses to kill bacteria), immunotherapies, vaccines, and antimicrobial peptides. Investing in innovative technologies could bring new tools to battle resistant infections.

Work Cited

1 “Antibiotic resistance: How to prevent the next public health emergency.” *MIT Department of Biology*, 25 August 2020, https://biology.mit.edu/antibiotic-resistance-how-to-prevent-the-next-public-health-emergency/. Accessed 24 October 2024.

2 “Antimicrobial resistance.” *World Health Organization (WHO)*, https://www.who.int/health-topics/antimicrobial-resistance. Accessed 24 October 2024.

3 cameronw1986. (2017, July 28). *Tackling antibiotic resistance with Dr Stefano Donadio*. FEMS. https://fems-microbiology.org/tackling-antibiotic-resistance-dr-stefano-donadio/

4 “Antimicrobial Resistance | ASM.org.” *American Society for Microbiology*, https://asm.org/resource-pages/antimicrobial-resistance. Accessed 24 October 2024.

5 “Antimicrobial Resistance | Antimicrobial Resistance.” *CDC*, https://www.cdc.gov/antimicrobial-resistance/index.html. Accessed 24 October 2024.

6 Shuttleworth, J. (2021, March 3). *EAM: A complex solution to the AMR crisis is possible*. FEMS. https://fems-microbiology.org/eam-a-complex-solution-to-the-amr-crisis-is-possible/