Chair Report

World Health Organization

"Addressing the Global Threat of Antibiotic Resistance and the Reemergence of Infectious Diseases"

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Introduction

Antimicrobial resistance (AMR) is one of the top 10 global health risks yet it is rarely discussed and talked about. It directly takes the lives of about 1.3 million people each year and contributes to an additional 5 million deaths. The leading cause of AMR is the misuse of antibiotics in humans and animals as well as the lack of preventative measures within healthcare settings. The AMR issue will also negatively impact the economy. By 2030 AMR could cause a global loss of about $3 trillion annually, potentially pushing approximately 28 million people into poverty worldwide by 2050. Medical procedures that rely heavily on effective antibiotics such as cancer treatments, organ transplants, etc will be at significant risk due to AMR. Infections will become harder to treat which will cause a rise in demand for healthcare systems and an unstable economic system that harms the individuals and the healthcare market.

Definition of Key Terms

Antibiotic: A type of medicine used to treat bacterial infections by either killing bacteria or inhibiting their growth. Antibiotics are not effective against viral infections and are commonly used to treat conditions like pneumonia, strep throat, and urinary tract infections.

Antibiotic Resistance: A specific type of antimicrobial resistance where bacteria develop resistance to antibiotics, making bacterial infections harder to treat and leading to increased mortality and morbidity.

Infectious Disease: Illnesses caused by harmful microorganisms, such as bacteria, viruses, fungi, or parasites, that invade the body. These diseases can spread from person to person, through animal contact, or via contaminated food or water. Common examples include influenza, tuberculosis, and malaria.

Antimicrobial resistance (AMR): when a microbe adapts to an antibiotic, either by mutating or sharing genetic code with other microbes, the antibiotic becomes ineffective and can no longer kill the microbe or stop it from growing.

Major Parties Involved and Their Views

The United States of America - The U.S. has been essential to combat AMR. They have invested in research for new antibiotics and have implemented a national action plan for fighting the issue within their borders. They have also supported international plans such as the "Global Health Security Agenda".

The United Kingdom - The U.K. has been very active in the fight against AMR focusing mostly on its negative economic impacts. The UK declared the "O'Neill Review on Antimicrobial Resistance" which suggested global strategies such as inciting new antibiotic development and reducing unnecessary antibiotic use.

India - India faces an intense issue with AMR due to their lack of sanitation in healthcare spaces as well as their overuse of antibiotics. They have called for global support and action on the issue. India has attempted to control the issue nationally by declaring a national plan.

China - Although China has acknowledged the need for tighter regulations on antibiotic use they have contributed greatly to the issue in the past because they are a large producer and consumer of antibiotics. China has taken steps to regulate antibiotic use agriculturally and in healthcare spaces by implementing a national program called the "China Antimicrobial Resistance Surveillance System" (CARSS).

Brazil - Brazil has been very active in fighting AMR in Latin America and attempting to find affordable and effective solutions to the issue. They partnered with other countries in the region (Peru, Argentina, Colombia, Paraguay, Uruguay, and Chile) to create the PAHO AMR action plan.

Sweden - Sweden has low rates of AMR due to their rigid and strict policies regarding antibiotics. Sweden hosts initiatives such as the reAct network which advocates for fighting AMR and stricter laws on antibiotics.

Timeline of Events

Date	Event
1928	Discovery of Penicillin, the first true antibiotic. This revolutionized medicine by enabling the effective treatment of bacterial infections, drastically reducing mortality from previously untreatable diseases.
1943	The mass production and use of Penicillin during World War II helps treat infected wounds and save countless soldiers' lives. This period marks the beginning of the “antibiotic era.”
1952	The first documented case of Penicillin resistance is reported. This highlights the early signs of antibiotic resistance as a growing concern in healthcare.
1981	A type of bacteria called Staphylococcus aureus, which is resistant to the antibiotic methicillin (known as MRSA), starts to become a major problem in hospitals. By the mid-1980s, MRSA spreads widely and becomes a serious global concern, signaling a big shift in the growing issue of antibiotic resistance.
2001	The World Health Organization (WHO) launches the first global strategy to contain antimicrobial resistance, emphasizing the importance of surveillance, infection control, and research into new treatments.
2014	WHO identifies antibiotic resistance as one of the greatest threats to public health, emphasizing the urgent need for global collaboration to combat it.
2015	WHO launches the Global Action Plan on Antimicrobial Resistance. The strategy focuses on improving public awareness, regulating the use of antibiotics in humans and animals, and prioritizing research and development of new antibiotics and diagnostic tools.
2020	Significant progress in developing new antibiotics, rapid diagnostics, and alternative therapies, including phage therapy and immunotherapies. These breakthroughs represent hope in addressing the growing resistance crisis.

Previous Solutions and Attempts to Solve the Issue

New Antimicrobials

One of the main actions has focused on creating antibiotics and antimicrobial agents. However, there is room for improvement as ongoing research aims to find new therapeutics as well as to use existing drugs in a new way. The drug repurposing approach along with predictive mathematical models has been suggested to be a relatively cheaper option to come up with new antibiotics.

New Emerging Treatments

Scientists are exploring new ways to fight infections that work with antibiotics instead of replacing them. Some treatments target only harmful bacteria, protecting the good ones in the body. Others, like bacteriophage therapy, use viruses that can kill bacteria naturally. Another approach focuses on stopping bacteria from causing harm without actually killing them. These new ideas are designed to work alongside antibiotics, showing we still need to develop new medicines.

Antibiotic Stewardship Programs

Antibiotic stewardship programs started being implemented in the 1980s due to the emerging threat of antibiotic resistance. Such programs are developed to ensure that the treatment of infections is optimized and the adverse effects of antibiotic overuse are minimized. The development of MRSA underscored the need for such programs, with hospitals looking to prevent the spread of resistant strains.

Public Health Campaigns

Public health campaigns have been vital in increasing awareness of the responsible use of antibiotics. The World Health Organization has led several campaigns that have helped shed light on the prudent use of antibiotics among healthcare providers and the general public. The WHO Global Action Plan on Antimicrobial Resistance that was launched in 2015 outlined strategies for improved surveillance, infection prevention, and research into new treatments.

Relevant United Nations Documents and Resources

1. Global action plan on antimicrobial resistance (2015)
2. WHO Global Antimicrobial Resistance and Use Surveillance System Reports (GLASS)
3. FAO/WHO Codex Alimentarius Guidelines
4. PAHO fight against Antimicrobial resistance

Questions to Consider

1. What's the most effective way to combat AMR?
2. Why have past solutions failed in the past? What were they missing?
3. What is the main factor of disagreement amongst nations when it comes to fighting AMR? What's a good compromise?
4. How can nations combat the financial burden that comes with implementing AMR policies?
5. What steps can be taken to combat the possible issue of counterfeit antibiotics?
6. How can the international community ensure that everyone gets equal access to proper antibiotics and medical care?

Possible Solutions

Strengthening Infection Prevention and Control

Improving infection prevention and control measures in healthcare settings are critical. These measures involve strict hygiene practices and vaccination programs, as well as systems for controlling outbreaks. This reduction in infections can lower the need for antibiotics.

Global Collaboration and Policy Development

Addressing antibiotic resistance is a global challenge that requires coordinated efforts across countries and regions. International collaboration among governments, healthcare organizations, and research institutions is crucial for developing effective policies and strategies. This includes sharing data on antibiotic use and resistance, establishing global standards for antibiotic stewardship, and promoting equitable access to new treatments.

Boosting Research Funding and Collaboration

Increasing financial support and fostering partnerships are essential to speed up the discovery and development of new antimicrobials. Promoting the culture of inclusivity and the free exchange of research results can boost the creativity of the process and minimize the duplication of efforts. Offering incentives, such as the provision of grants, subsidies, and public-private partnerships will help the attraction of investments and steady progress in countering antibiotic resistance and the appearance of new infections.

Synthetic Biology and Engineered Antimicrobials

Synthetic biology is the technology that enables the creation of completely new types of antimicrobials. With the help of artificial building blocks such as peptides or nanomaterials, we can direct our attack at idiosyncratic features of the bacteria, thus attaining effective and flexible solutions.

Antimicrobial Stewardship with New Drugs

Besides the new development of antimicrobials, the emphasis should also be laid on their responsible use. For example, through the correct implementation of strong antimicrobial stewardship programs, the lifespan of new drugs can be prolonged due to the reduction of their misuse and overuse.

Conclusion

The global threat of AMR and the reemergence of infectious diseases are among the most significant challenges to public health, economies, and healthcare systems. The annual loss of millions of lives and a projected economic burden over the coming decades necessitate immediate and coordinated action.

While substantial progress has been made in understanding and addressing AMR, past efforts have often lacked effectiveness due to a lack of coordinated strategies and insufficient international cooperation. A significant portion of antibiotic overuse and misuse could be avoided by improving infection control, using antibiotics more strategically, and raising public awareness. Countries must work together to create thorough policies, share vital data, and advocate for the responsible use of antibiotics. Furthermore, innovative approaches like synthetic biology and engineered antimicrobials show promise for the future, but they require dedication and collaboration to succeed.

Different strategies have been suggested, including the development of new antibiotics, investigating alternative therapies such as bacteriophage treatment, and instituting antibiotic stewardship initiatives to reduce excessive use. Public health initiatives led by the WHO have also played a crucial role in promoting awareness about the responsible usage of antibiotics. Nonetheless, AMR continues to pose a major risk, necessitating ongoing global cooperation and innovation to prevent its harmful impact on public health.

In the end, by acknowledging the scale of the threat and taking action, we can ensure the effectiveness of antibiotics for future generations while safeguarding global health against the resurgence of infectious diseases. This issue demands urgent global attention, as the health outcomes for millions of individuals worldwide will be determined by how the situation is addressed.

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