



FORUM: The Third Committee of the General Assembly (SOCHUM)

QUESTION OF: Fighting the increasing number of antibiotic-resistant bacteria with special regard to overuse of reserve antibiotics

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"If we fail to act, we are looking at an almost unthinkable scenario where antibiotics no longer work and we are cast back into the dark ages of medicine"

David Cameron, former UK Prime Minister

INTRODUCTION

It has been more than 70 years since antibiotics were first prescribed to treat serious bacterial infections. No doubt, the discovery of antibiotics has saved many lives, thus it has transformed modern medicine since then. However decades after that, bacterial infections become a threat again. Since antibiotics were first used in the 1940s, the number of resistant pathogens has increased steadily, attributed to the overuse and misuse of antibiotics. This endangers the effectivity of antibiotics, whose number and thus their treatment options are limited. Additionally, the increasing number of antibiotic-resistant bacteria leads to a further reduction of possible treatments. Consequently, it became and will become in the future more difficult to combat bacterial infections. The spread and development of pathogens and their resistant genes is a problem worldwide and affects the world's population health due to several reasons.

BACKGROUND INFORMATION

It is a natural process, that pathogens build up resistance towards antibiotics over the time to defend themselves. Bacteria that are naturally resistant or which have acquired resistance can not be killed by antibiotic treatment. Consequently, they can reproduce freely. Furthermore, they can spread the resistance, as they can transmit their resistant genes to other bacteria. Bacteria become multi-resistant when they took up several resistant genes to protect themselves against different types of antibiotics.

Wherever antibiotics are used frequently, resistant bacteria flourish, as it promotes their natural selection. In these places, the number of resistant bacteria increases, while the number of susceptible bacteria decreases. This is the case not only in hospitals but also in livestock or agriculture in equal measure.

Animal-holders treat their animals with antibiotics commonly, to grow faster and as a prevention for diseases. They are mainly used for cattle, chicken and pigs. It is estimated that the usage of antibiotics in the farming industry will uprise up to 67% in 2030 in the most populated countries in the world.

Animals and humans are often infected by the same pathogens, in fact about 70 percent of the emerging diseases can infect both humans and animals, wherefore they are often treated with similar antibiotics. Consequently, both humans and animals have a mutual influence on the problem of resistance.

The increasing number of resistant pathogens is a result of the incorrect use of antibiotics. Antibiotics are misused when they are taken by humans to treat a viral infection like a cold or flu for example. About 40 percent of all Europeans wrongly believe that antibiotics work against colds and flu. Besides that, antibiotics are often given to healthy animals, to prevent diseases, which makes up a big part of the antibiotic usage in livestock farming.

Another reason is the inadequate hygiene measure in places, like hospitals, where antibiotics are used regularly. Inadequate hygiene measures allow resistant pathogens to spread easily.

Additionally, the lack of information on the part of the doctors leads to the overuse of antibiotics of any kind, including reserve antibiotics. They often prescribe unnecessary antibiotics, because of the patients or animal-holders wishes.

The extent of the issue is linked to the various ways antimicrobial-resistant bacteria can spread.

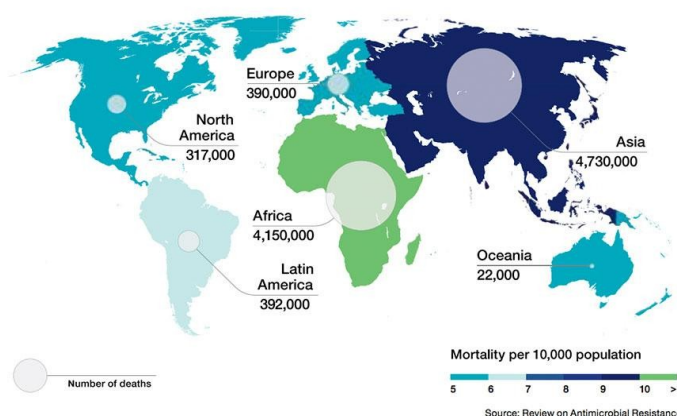
Antimicrobial-resistant bacteria can be transferred via food, just like other germs. In agriculture, many goods are treated with plant protection products, which contain antibiotics. By consuming raw vegetables or salad, the antibiotics transmit into the human body.

Furthermore, they can not only be transmitted from animals to people but also vice versa. Either by having contact with an infected animal, with the slaughtered meat of an infected animal or by consuming the meat. The antibiotics that were given to the animals easily cross-contaminate into the human body, as well as the resistant bacteria. Although boiling or frying the meat, kills off the bacteria, they can easily spread to other food beforehand.

After ingesting these bacteria, they can cause diseases, for example in the digestive tract, or pass on the resistance to other bacteria in the organism.

The complex international trade system makes it harder to protect the consumer, because the global

Deaths attributable to AMR every year by 2050



market and the worldwide exchange of goods, allow resistant bacteria to spread all over the world, as well as tourism does. Moreover, resistant bacteria and antibiotics can be transferred from the environment to the human. Antibiotics can get into the groundwater through the effluent for example, which can cause serious harm to humans due to water sources, which lack of hygiene.

The widespread of resistant bacteria results in longer treatment times for the patient and additional stress caused by the delays in the healing of infection. The treatment can also fail as a whole, which can have fatal consequences, like prolonged illness, disability and death. It is estimated that about 33 000 people die annually in the European Union, as a direct consequence of a resistant bacterial infection.

The longer treatments burden the health system and also the economy, as the cost per infection caused by a resistant pathogen is more than twice as high, as the cost per infection caused by susceptible pathogens. This is similar to veterinary medicine. The higher costs are caused by the longer duration of illness, additional tests and the usage of more expensive medicals.

Nowadays resistance has eventually been seen to nearly all antibiotics that have been developed. Nevertheless, there is an absence of new antibiotics, since the pharmaceutical industry does not introduce many new antibiotics at the moment. The research and developing process are linked to high costs. These can hardly be covered because antibiotics are given very rarely and only for a short period in comparison to other medicals. Therefore the health industry stopped after the early 1980s to introduce many new antibiotics.

The resistant bacteria issue affects not only human but also the veterinary medicine in equal measure. It is a major challenge worldwide. High rates of resistant bacteria of several serious bacterial infections have been found as well in high as in low-income countries. Several measures need to be taken, to curb the development and spread of antibiotic-resistant bacteria so that they maintain their effectivity.

DEFINITION OF KEY TERMS

Antibiotics

Antibiotics occur naturally. They are defending and signaling substances, which balance the coexistence of micro-organisms. Bacteria produce different antibiotics to be able to defend themselves against other micro-organisms, by curbing their growth or killing them.

Antibiotics as medicines

Antibiotics are used in medicine to treat bacterial infections, since 1928, when the Scottish Scientist Alexander Flemming first discovered the effect of penicillin. Some antibiotics come from nature, others are produced partly synthetically or synthetically. The different groups of antibiotics differ in the way they work and on the effect they have on different types of bacteria.

Antimicrobial resistance (AMR)

Antimicrobial resistance is the ability of microbes to be resistant to the effects of medicine, which once treated the microbe successfully. Antibiotic resistance is a subset of AMR, as it only applies

to bacteria being resistant to antibiotics.

Antibiotic resistance (AR or ABR)

Bacteria can naturally protect themselves against antibiotics or other microorganisms, which results in resistance towards them. It is caused by certain genes in the genetic make-up of the bacteria. Sometimes those genes are formed by natural mutations. The resistance genes can be passed on between different bacteria, as they can swap the resistant genes between each other.

Multi-resistance

Multi resistant bacteria are resistant to a large number of antibiotics. These bacteria take up several resistance genes so that they are protected against many different antibiotics.

The World Health Organisation (WHO) categorized antibiotics into three different groups:

ACCESS antibiotics:

ACCESS antibiotics should be available in all countries at all times. They are antibiotics that should be used for common infections as a first- or second-choice option.

WATCH antibiotics:

WATCH antibiotics include antibiotics, which should only be prescribed for certain indications since they are on a higher risk to cause antibiotic resistance. Some antibiotics out of the ACCESS group are also categorized in the WATCH group.

Reserve antibiotics:

Reserve antibiotics should only be prescribed to treat a serious bacterial infection and when treatment with antibiotics out of the other two groups has failed. Antibiotics of this class, should be the last option and only be used in severe circumstances.

Defined daily doses (DDD)

The DDD is a measurement of the assumed usage dose per day for an antibiotic of an adult used for its main indications. The DDD not necessarily reflects the recommended or prescribed doses.

MAJOR COUNTRIES AND ORGANISATIONS INVOLVED

World Health Organization

It is of high priority for the World Health Organization, to tackle the increasing number of antibiotic-resistant bacteria. Therefore they took several measures regarding the issue. One was the categorization of antibiotics into three groups, another one is the „global action plan on antimicrobial resistance“, which was endorsed at the World Health Assembly in May 2015.

This issue affects almost every nation worldwide, either in humanitarian medicine, veterinary medicine, livestock or agriculture, depending on the accessibility and usage of antibiotics. As resistant bacteria transfer not only from animals to humans and vice versa but also from the environment to humans, resistant bacteria could spread through commerce and tourism all over

the world. The issue affects the countries in different aspects, however, every country is affected and endangered by the increasing number of resistant bacteria.

QUESTIONS DELEGATES SHOULD CONSIDER

Does your countries population have easy access to (any kind of) antibiotics?

Is the access to certain types of antibiotics restricted by the need for a prescription to get them?

Are antibiotics available at all times and everywhere in your country?

To what extent does the farming industry of your country use antibiotics?

How many people die annually due to resistant pathogens? Was there an increase/decrease in this number in the last decades and how are the numbers expected to change in the future?

Does your country monitor the nation's usage of antibiotics?

Is your country enrolled in the Global Action Plan on Antimicrobial Resistance? How does your country progress in it?

How are the hygienic measures in your countries hospitals?

Does the population of your country have access to clean drinking water or could it contain antibiotics?

Is your country politically aware of the issue and did the government undertake any actions to tackle it?

USEFUL LINKS/SOURCES:

Global Action Plan on Antimicrobial Resistance

<https://www.who.int/antimicrobial-resistance/publications/global-action-plan/en/>

<https://www.who.int/antimicrobial-resistance/global-action-plan/database/en/>

<https://digitallibrary.un.org/record/3807197?ln=en>

<https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6008583/>