

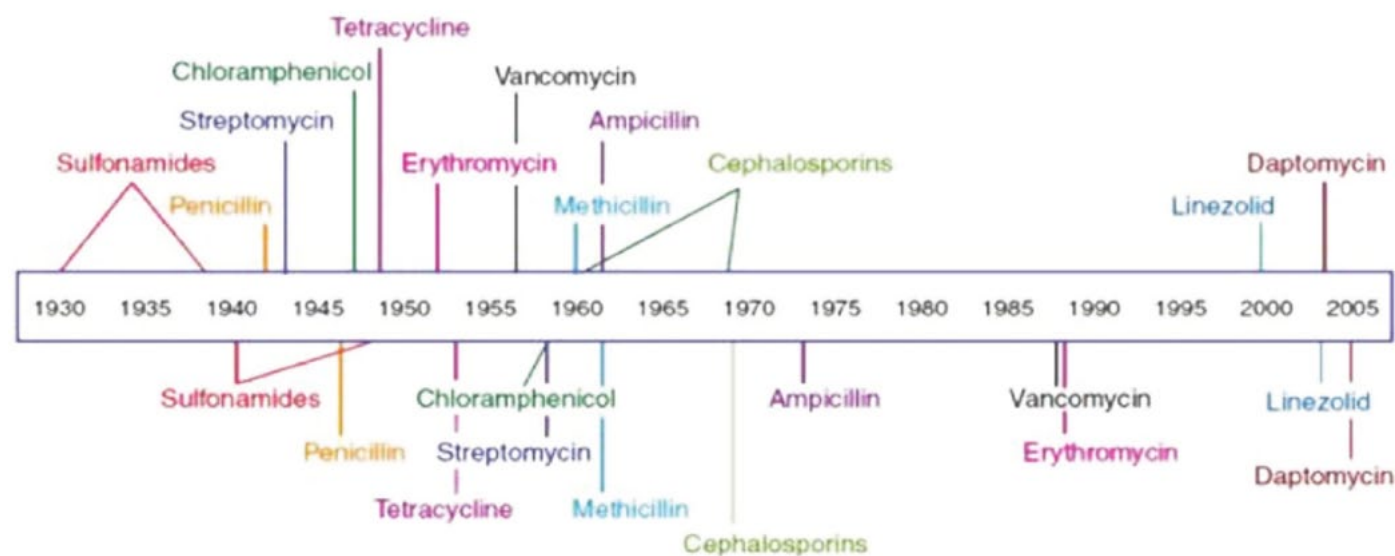
Antibiotic Misuse and its Consequences



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Antimicrobial use has been stated as an important indicator in the selection of resistant microorganisms. The relationship between antimicrobial use and bacterial resistance has been examined in numerous published studies since the 1950s since there exists a temporal and often a parallel relationship between use of antibiotics and resistance for various organisms. Thus, antibiotic combination therapy has been suggested in some early studies, and many subsequent studies have backed-up this relationship, including recent reports regarding MRSA and resistant Gram-negative organisms.

Antibiotic deployment



Antibiotic resistance observed

Currently, almost every type of bacterium has become stronger than it once was, which means typical antibiotics are not going to treat the condition, hence, much more expensive treatments have to be used and each time an individual is administered antibiotics, resistance may be promoted. **The antibiotic sensitive bacterium is destroyed, yet resistant germs are left behind to grow and multiply. Moreover, it has been shown that the bacterium which has become resistant to antibiotics can quickly spread to family members, schoolmates, co-workers, and others in the community.**

When talking about antimicrobial resistance, there is a threat that the creation of a new strain of infectious disease could be more difficult to cure and more expensive to treat. In addition, significant danger and suffering can occur in children and adults who contract common infections that were once easily treatable with antibiotics. Microbes also can become resistant to a specific medication or to numerous medications, thus, treating infections becomes more difficult and sometimes even impossible to treat. Illnesses that are resistant can spread from person to person, and in some cases an illness can lead to serious disability, or even death and that is why there is a fear that a resistant strain of bacterium starts an epidemic phenomenon, for which no treatment is available.

Figure 1: Deployment of Antibiotics and Observed Resistance.

Figure 1 displays the creation of antibiotics from 1930 up until 2005. The first class of antibiotic described is the Sulfonamides. Sulfonamides were developed in the 1930s, and resistance began almost 10 years later. Penicillin was discovered in the early 1940s, and began showing signs of resistance a few years later, in about 1945. Erythromycin was discovered in the early 1950s, and signs of resistance did not occur until the late 1980s. Based on the chart above, Erythromycin has had the longest lifespan among the antibiotics in figure 1, before showing any signs of resistance. One of the most recent antibiotics, daptomycin, showed signs of resistance within a few years of its development. In the early years, the time between creation of an antibiotic and signs of resistance were generally longer. **Some antibiotics have become cheaper and are more widely available and this may have contributed to the increase in resistance.**

Several new drugs have been discovered since the introduction of the first antibiotics. These discoveries have provided clinicians with more options to treat diseases that were previously life-threatening. The wide usage of antimicrobial drugs is the main problem which introduced a new era, in which, clinicians have to face the emergence of antimicrobial resistant pathogens. The risk for people contracting a bacterial infection that may have no current treatments available increases as the bacterial resistance to antibiotics increases.

Some studies explained that the number of hospitalizations attributable to antibiotic-resistant infections increased by 359% from 37,000 in 1997 to almost 170,000 in 2006. The World Health Organization used the slogan: "Antimicrobial resistance: no action today, no cure tomorrow" on world health day 2011. Then in April 2014, WHO released its first global report on the surveillance of antimicrobial resistance, "Antimicrobial resistance: global report on surveillance 2014", and strongly warned of the imminence of a post-antibiotic era – in which common infections and minor injuries can kill.

Antibiotic resistance is the world's most pressing public health problems. Yearly, at least two million people in the U.S. become infected with antibiotic resistant bacteria, and at least 23,000 people die as a result of this. Doctors are reporting hopeless cases of patients that contract infections in hospitals and are not longer responsive to any treatment whatsoever. The director of the CDC said that, antibiotics will be a thing of the past if it continues on the same path it is going on. For some patients and microbes, this is already the case. For most people living today, antibiotic

resistance has become a serious major clinical, and public health problem. The lack of therapeutic options for resistant organisms to antibiotics is a concern. Resistant organisms have become a critical health hazard due to the lack of therapeutic options. Daily, antimicrobial resistance bacteria are growing, both in the community, and in the hospital setting, increasing mortality, and morbidity, as well as the financial burden associated with it. The constant growth and spread of resistant organisms pose some questions about their future treatment, and represent a serious threat for their clinical efficacy.

As previously mentioned, pharmaceutical companies do not want to continue spending the money to create new antibiotics because the antibiotics become resistant so quickly. Since 2000, there have only been three new classes of antibiotics introduced into the market for human use, and one is for topical use. Antimicrobial resistance increases along with the reduction in production of antibiotics, and the increase in bad pathogens in the community. The cost of this resistance, and the impact the resistance has on the healthcare industry, patients, and the community is significant. Hospitals and public health programs should be concerned in spreading the knowledge regarding the proper antibiotic use.

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