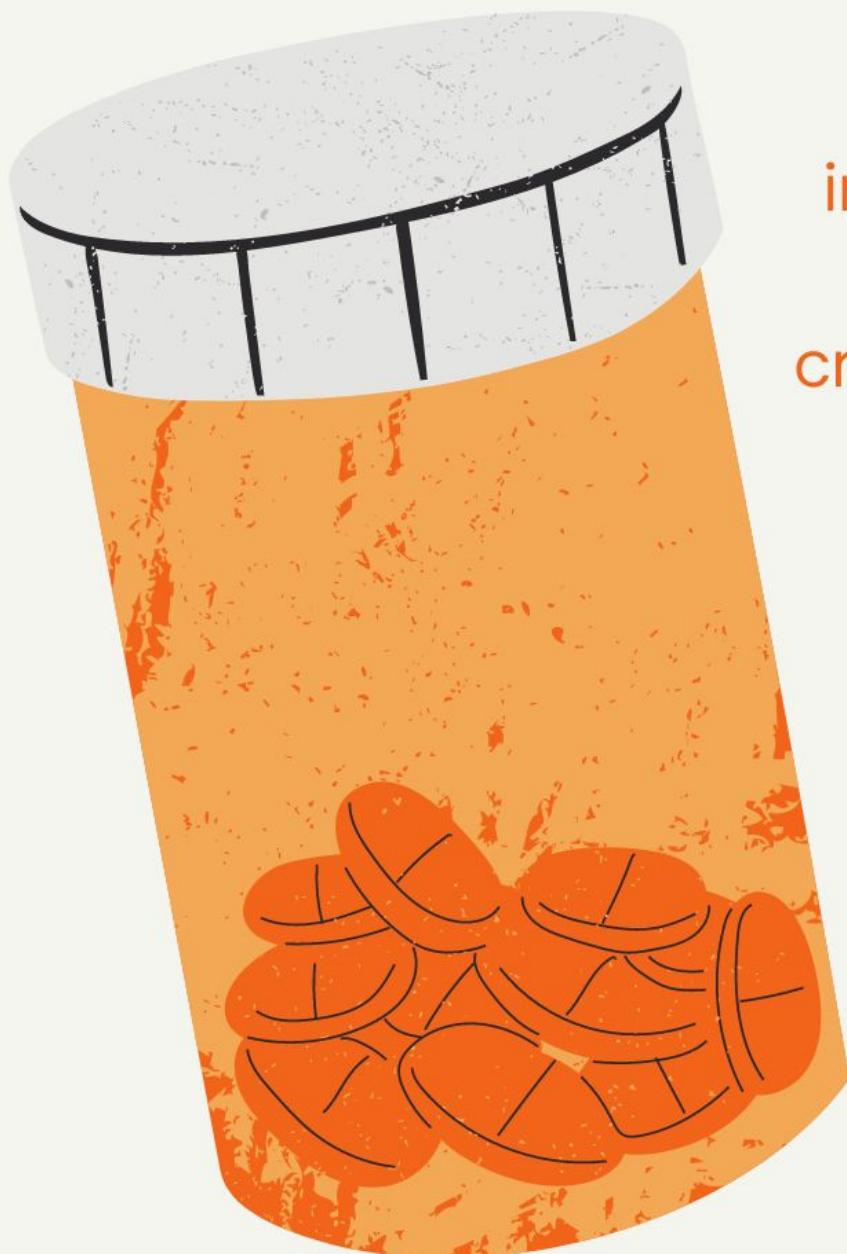


## FROM THE DISCOVERY OF PENICILLIN TO ANTIBIOTIC RESISTANCE:

# A Journey Through Antibiotics



Recognizing antibiotics' importance in treating infections and addressing resistance is crucial for public health and future treatment effectiveness.



# THE DISCOVERY OF PENICILLIN & ITS IMPACT ON THE ERA OF ANTIBIOTICS

In 1928, Sir Alexander Fleming accidentally discovered what would become known as the first antibiotic: penicillin. Motivated by the widespread rate of infections witnessed on the battlefields of World War I, he sought to find a method to fight bacterial infections. This unintentional finding occurred when Fleming noticed that a mold contaminating a petri dish stopped the growth of bacteria around it. He later named the substance "penicillin" and recognized its potential for treating bacterial infections.

While Sir Alexander Fleming's initial discovery did not gather much support at the time, his discovery of penicillin allowed scientists a decade later to further research antibacterial substances and develop a usable form of penicillin. Penicillin was then used to treat throat infections, meningitis, pneumonia, and other bacterial infections. These diseases were all life-threatening if left untreated, however with the help of penicillin, survival rates greatly increased. In fact, during World War 2, penicillin caused the death rate from bacterial pneumonia in soldiers to drop from 18% to just 1%, and ended up saving the lives of 1 out of 7 wounded UK soldiers.

The discovery of penicillin has enabled hundreds of other antibiotics to be created, which have all improved the health and well-being of virtually every human being. These antibiotics have revolutionized medicine, transforming once-deadly bacterial infections into treatable conditions. Overall, the impact of penicillin and later antibiotics has been immense, significantly shaping the course of human health and lifespan.

# WHAT ARE ANTIBIOTICS?

Antibiotics are substances made by bacteria and fungi that can either kill other germs or stop them from growing. There are numerous antibiotics available, with hundreds of different types. This results in a wide array of options to treat these types of infections. These medicines are used to treat bacterial infections, including respiratory infections, UTIs, ear and sinus infections, strep throat, skin infections, etc. It's important to note that antibiotics do not work against viral infections, like the common cold or flu. Using antibiotics for viral infections is not effective.



As more antibiotics were used to treat infections, bacteria began adapting to survive against them, leading to antibiotic resistance. This occurs when bacteria change in ways that reduce the effectiveness of antibiotics against them. This means that the bacteria can survive and continue to multiply even when exposed to antibiotics that would normally kill or inhibit them. Antibiotic resistance is known as one of the most urgent global health challenges of our time.

# EFFECTS OF ANTIBIOTIC RESISTANCE

## Causes

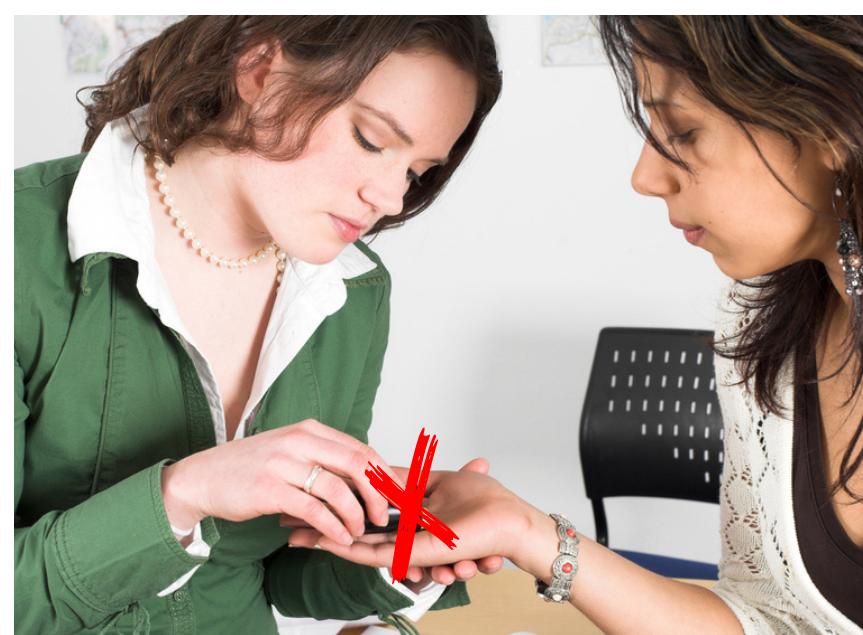
- Overuse and Misuse of Antibiotics
  - Healthcare providers sometimes prescribe antibiotics when they aren't necessary, which can cause resistant bacteria to develop. Taking antibiotics when you don't need them or not finishing the full course can also make bacteria more resistant.
- Agricultural Use of Antibiotics
  - Antibiotics are often used in animal agriculture for growth promotion and disease prevention, which can contribute to the spread of resistant bacteria in animals and the environment.
- Poor Infection Control
  - Inadequate hygiene practices in healthcare settings and communities can facilitate the spread of resistant bacteria.
- Lack of New Antibiotics
  - There has been a decline in the development of new antibiotics, limiting treatment options for resistant infections.

## Effects

- Increased Morbidity & Mortality
  - Resistant bacterial infections are tougher to treat, causing longer illness, worse symptoms, and more complications, leading to more deaths.
- Longer Hospital Stays
  - Treating resistant infections requires more intense and longer hospital care, increasing healthcare costs and straining healthcare systems.
- Impact on Vulnerable Populations
  - Certain vulnerable groups, like the elderly, children, and those with weak immune systems, are more prone to resistant infections, resulting in higher illness and death rates in these populations.
- Economic Consequences
  - Antibiotic resistance leads to higher healthcare costs from longer hospital stays, more procedures, and expensive treatments. It also affects productivity and economic growth due to lost work days and decreased productivity from illness.

# HOW TO AVOID ANTIBIOTIC RESISTANCE?

- Avoid using antibiotics to treat viruses such as colds or flu because they are ineffective against viral infections.
- Refrain from requesting antibiotics from your healthcare provider unnecessarily.
- When prescribed antibiotics, make sure to follow the instructions carefully. Complete the full course of medication even if symptoms improve, as stopping too early can lead to bacterial survival and potential reinfection.
- Do not share your antibiotics with others or use someone else's prescription.
- Refrain from saving antibiotics for future use.
- Wash your hands regularly as consistent handwashing is crucial in combating germs and reducing the risk of illness.



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