



# Antimicrobial Resistance, from bench-to-publicside

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## Abstract

Antibiotic resistance is a growing worldwide problem, which challenge current therapeutic approaches. Several predictions alerts about millions of deaths by 2050, with additional enormous economical losses, related to the increasing loss of activity of antibiotics. A rationale use of antibiotics is essential to fight antibiotic resistance, but all actions, decisions and policies focused to limit the antibiotic uses to those strictly necessities need for the support of the society. Raising public awareness is the only way to be successful in this endeavor.

**Keywords:** public health, antibiotic resistance, education, infectious diseases.

## Where we are

The antibiotic era began in the first third of the last century with Fleming's re-discovery of penicillin and its introduction into clinical practice during World War II (1).

From initially being rare, antibiotic-resistant pathogenic microorganisms evolved to becoming commonplace, because boundless, continuous and growing antibiotic pressure exerted in almost all environments (2,3). This finding leading to increased economic costs related to longer hospitalizations and the need to use new more expensive antibacterial agents as well as resulting in personal and professional costs, with the most serious consequence being the negatively impact that antibiotic-resistant pathogenic microorganisms have on patient outcomes

(4). Currently, antibiotic resistance is considered responsible for around 700,000 deaths each year and also has a relevant impact on global economy (5,6).

## What we can do

We cannot reverse the scenario back to that present in the early years of the antibiotic era. Thereby, we need to propose roadways able to minimize, reduce and reverse this situation as far as possible, developing strategies, including procedures and new tools for more efficient barriers to avoid dispersion and be able to detect both antibiotic-resistant pathogenic and non-pathogenic microorganisms in hospital settings early and redoubling our research efforts on new antibacterial agents or new vaccines; but especially, it is mandatory to constrict the use of antibiotics to cases which are strictly necessary, effectively controlling access to these agents. While utopic, only a strong decrease in the overall consumption of antibiotics would have an effect, at least in part, on restoring antibiotic-susceptible bacterial populations.

## Roadmaps beyond utopias

While research efforts and strong and determined policies are mandatory, the most powerful weapon, and perhaps, the only weapon able to transform this utopia into a plausible scenario, and the scenario into a new reality, would be to develop truly divulgative actions targeting all population segments; the current feeling is that the dramatic situation of antibiotic resistance only seems to be known by microbiologists through research publications or meeting presentations, and it often seems that the message is limited to those that already know the current situation.

We need the conviction of society, that antibiotics must be preserved as part of a heritage that we must pass on to future generations, and this will only be possible if we leave our laboratories, medical or veterinarian settings and start a continuous campaign to alert about the critical situation point and the worrisome and pessimistic future if we persevere in our attitudes.

## Climate emergency as example

Long-term divulgative campaigns alerting on the risk of climate emergency have led to growing number of countries to the implementation of measures, regulations and educative actions to fight this problem. It was not a matter of a day, it was a long way to get where we are, and there is still a long way to go, but from a handful of people, a global opinion trend has been created, which grows day by day, and that drives those little everyday things, which are not seen, but which add up; and they add up a lot. Even more, this stream is already pushing policymakers to make decisions. It is not a fast path to travel, but

it is a path to be walked together. This is the mirror in which we need to reflect; that is the path we have to take to fight antibiotic resistance, and we must begin that journey now: later it will be too late.

Just the conviction and momentum of the society in the right direction will allow introducing important changes in the current use of antibiotics and limit their use to only that which is necessary.

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