

A world without antibiotics? The risk is real, experts say

January 19 2014, by Mariette Le Roux

Humans face the very real risk of a future without antibiotics, a world of plummeting life expectancy where people die from diseases easily treatable today, scientists say.

Experts tracking the rise of [drug resistance](#) say years of health gains could be rolled back by mutating microbes that make illnesses more difficult and expensive to cure and carry a higher risk of death.

Some say the threat to wellbeing is on the scale of global warming or terrorism—yet resistance is being allowed to spread through an entirely preventable means— improper use of antibiotics.

"It is a major public health problem," Patrice Courvalin, who heads the Antibacterial Agents Unit of France's Pasteur Institute, told AFP.

"It is about more than not being able to treat a disease. It will erase much progress made in the last 20-30 years."

Without antibiotics to tackle opportunistic bacteria that pose a particular risk for people who are very ill, major surgery, organ transplants or cancer and leukaemia treatment may become impossible, he explained.

"In some parts of the world, already we have run out of antibiotics," said Timothy Walsh, a professor of medical microbiology at Cardiff University.

"In places in India, Pakistan, Bangladesh, possibly Russia, Southeast Asia, central South America, we are at the end game. There's nothing left. And unfortunately there is nothing in the pipeline either."

Resistance to drugs emerges through changes in the bacterium's genetic code—altering the target on its surface to which antibiotics would normally bind, making the germ impenetrable or allowing it to destroy or "spit out" the antibiotic.

These super-germs triumph through Darwinian pressure, helped by humans.

The wrong antibiotics, taken for too short a period, in too low a dose or stopped too early, will fail to kill the altered microbes.

Instead, the drugs will indiscriminately damage other bacteria and give the resistant strain a competitive advantage—allowing it to dominate and spread.

At the base of the problem is doctors prescribing antibiotics wrongly or unnecessarily, and the ease with which medicines can be obtained without a script in some parts of the world, including Asia and Africa.

As much as 70 percent of antibiotics are given for viral infections, against which they are wholly ineffective, the experts say.

Then there is the problem of farmers in countries like the United States adding antibiotics to animal feed to help herds grow faster.

Compounding all of this is the rise in global travel—a boon for bacterial spread, and a sharp drop in antibiotics development blamed on a lack of financial incentives for the pharmaceutical industry.

A return to the pre-antibiotic era?

The World Health Organisation (WHO) says drug resistance "threatens a return to the pre-antibiotic era".

"Many infectious diseases risk becoming untreatable or uncontrollable," it states in a factsheet on antimicrobial resistance.

A case in point: some 450 000 people developed multi-drug resistant (MDR) TB in 2012 and 170,000 died from it. MDR TB does not respond to the most potent TB drugs—isoniazid and rifampin.

Nearly 10 percent of MDR cases are thought to be of the even deadlier XDR (extensively drug resistant) variety which does not respond to a yet wider range of drugs.

Like other drug-resistant microbes, MDR and XDR TB can be transferred directly between people—you can get it even if you have never taken antibiotics in your life.

"Antibiotic resistance is an emerging disease and a societal problem. The use you can make of an antibiotic depends on the use made by others," said Courvalin.

Another worry for health planners today is the spread of a multi-drug resistant strain of the bacterium *Klebsiella pneumoniae*—a common cause of infections of the urinary tract, respiratory tract and bloodstream, and a frequent source of hospital outbreaks.

In some parts of the world, only the carbapenem antibiotics class remains effective, but now signs are emerging of resistance even to this last line of defence.

Antibiotics are thought to have saved hundreds of millions of lives since Alexander Fleming first discovered penicillin in 1928.

But even Fleming's own warnings of impending drug resistance went unheeded, and now scientists say people may start dying from infections like meningitis and septicaemia that are eminently curable today.

"If we keep going like this, the vast majority of human bacterial pathogens will be multi-resistant to antibiotics," said Courvalin.

The answer? Prudent drug use—better and faster diagnosis to determine whether an infection is viral or bacterial and whether it is even susceptible to treatment.

Farmers must stop feeding [antibiotics](#) to their livestock, and hospital and individuals improve their hygiene to prevent bacterial spread.

Yet few experts believe the damage can be undone.

"The bugs have become very sophisticated, they've become very complex," said Walsh.

"You can decrease resistance or reduce it, but never completely reverse it."

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