Antibiotic resistance: Bacteria are winning the war

The insidious spread of the latest form of antibiotic resistance is just one more sign that governments haven’t grasped the gravity of the situation, writes Frank Swain

The Guardian

In what has surely become the most ritualised medical practice since the Hippocratic Oath, the World Health Organization took to the stage again today to warn that the misuse of antibiotics was threatening to render one of our most potent medicines useless. This comes a decade after an identical appeal from the organisation warned of a global crisis in the making.

Health experts have been ringing the alarm over antimicrobial resistance for so long that it seems to have become part of our collective background noise, like the endless rasp of waves on the shore. And like stupid tourists, we sleep in the sun while the tide comes in.

It might surprise you to learn that resistance to antibiotics was identified even before Fleming’s wonder drug hit the shelves. The first clinical application of penicillin came in the early 1940s, but the discovery of beta-lactamase – a bacterial enzyme capable of destroying penicillin – preceded that revolution by a few years. The microbes were always one step ahead. As early as 1960, it was clear that overuse of antibiotics was driving the emergence of resistant species.

We also knew how to combat the problem: restricting the use of antimicrobials, ensuring patients completed their courses, containing outbreaks of resistant species. But despite repeated appeals at every level, we couldn’t match the tenacity of microbes. Last year, resistant bacterial infections killed around 25,000 people in Europe alone.

In 2008 the rising waters were finally lapping at our feet. An unusually hardy strain of *Klebsiella pneumoniae* was isolated from a 59-year-old Swedish patient who had been treated in a New Delhi hospital. The bacterium was found to be indifferent to even our most powerful antibiotics. To make matters worse, the genes that gave it this superpower were found on a small ring of DNA that is easily traded between different species of bacteria.

New Delhi metallo-beta-lactamase (NDM-1) has since turned up in more than 16 countries across the world, including Britain. A study published in Lancet Infectious Diseases today shows the resistance factor has spread to 14 different species of bacteria, including pathogenic varieties responsible for dysentery and cholera. Most bacteria holding the NDM-1 plasmid are resistant to all but a couple of our most clumsy, brutal antibiotics. One strain is immune to all of them.

In a report published last year, the US Institute of Medicine described antimicrobial resistance as “a global
public health and environmental catastrophe", while the WHO called the rise of NDM-1 a "doomsday scenario of a world without antibiotics".

These are not hollow words. Beyond antibiotics, we have few options left on the table. New antibiotics take around 10-20 years to develop, and there are few in the pipeline. Vaccines are the most obvious alternative, but vaccination programmes are challenging to run even in the most industrialised societies.

Scientists have been training viruses to chase down bacterial cells like packs of hunting dogs for the better part of a century, but Georgia is the only country in the world where suchphage therapy is licensed. More exotically, an experimental procedure using a jet of ionised argon gas shows promise, although it can only treat external infections.

After a torrent of dramatic headlines, interest in NDM-1 fell away. After all, in a world well-stocked with superbugs – MRSA, MDRTB, C diff – what was another acronym? The media tend to train their spotlight on highly pathogenic diseases – those that kill in no time flat – at the expense of untreatable diseases, which are far less dramatic. The trouble with superbugs like NDM-1 is that once they gain a foothold in hospitals, even minor surgical procedures are burdened with a much higher risk of serious postoperative complications.

Last year, the chairman of the Board for the Canadian Committee on Antibiotic Resistance, Professor John Conly, spoke out on the issue. I asked him why NDM-1 had elicited such little concern. "None of us have the answers as to why the issue of antimicrobial resistance does not capture more meaningful attention by governments and governmental agencies," he wrote. "The problem is that it is somewhat akin to climate change and so slow and insidious that people, and notably our politicians, are lulled asleep."

Although previous campaigns in France and the USA have achieved substantial reductions in the prescription of antibiotics, their uncontrolled use in other countries has undermined those successes – microbes do not respect national borders. As such, the failure of governments to control drug resistance has often been labelled a "tragedy of the commons".

But there's a crucial difference. Left to their own devices, forests and fisheries restock themselves. Medicine cabinets don't. Even if we rein in our appetite for antibiotics, NDM-1 is here to stay. Perhaps that will be enough to prompt the action called for by health practitioners 50 years ago, but it's hard to shake the feeling that the microbes have us in checkmate.