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Action Needed to Avoid the End of Modern Medicine

By Martin Khor

As global health leaders warn that antibiotic resistance is leading to the end of modern medicine, the World Health Organization (WHO) issues guidelines to prohibit or restrict using antibiotics to feed animals reared for their meat. Urgent coordinated actions are needed to avoid the end of modern medicine. The author Martin Khor is the Executive Director of the South Centre. This article was also published by Inter Press Service (IPS).

The next time you have a bad cold and reach for the antibiotics left over from your last visit to the doctor, think again.

Firstly, the antibiotics won't work as they only act against bacteria while the cold is caused by a virus.

Secondly, you will be contributing to arguably the world's gravest health threat – antibiotic resistance.

The wrong use and over-use of antibiotics is one of the main causes why they are becoming increasingly ineffective against many diseases, including pneumonia, tuberculosis, blood disorders, gonorrhoea and foodborne diseases.

While an effective antibiotic kills most of the targeted germs, a few may survive and develop resistance which can spread to other bacteria that cause the same infection or different infections. The rate of resistance and its spread can increase if antibiotics are wrongly or over used, and they then become increasingly ineffective to treat bacterial infections.

Global health leaders are now ringing the alarm bell. “Antimicrobial resistance is a global health emergency,” warned the World Health Organization’s Director-General Tedros Adhanom Ghebreyesus. “The world is facing an antibiotic apocalypse,” said the United Kingdom’s Chief Medical Officer Dame Sally Davies. “It may spell the end of modern medicine.”

Warns the WHO: “Antibiotic resistance is rising to dangerously high levels in all parts of the world. New resistance mechanisms are emerging and spreading globally, threatening our ability to treat common infectious diseases...Without urgent action, we are heading for a post-antibiotic era, in which common infections and minor injuries can once again kill.” (WHO Fact Sheet on antibiotic resistance, Nov. 2017).

These warnings were highlighted on World Antibiotics Awareness Week on 13-19 November when activities were held in many countries.

Antibiotic resistance is part of the wider phenomenon of anti-microbial resistance (AMR), which includes resistance of bacteria, fungi, viruses and parasites to medicines.

About 700,000 people die annually due to antimicrobial resistant infections, and this is estimated to rise to 10 million deaths a year by 2050 if action is not taken, with a cumulative economic cost of US \$100 trillion, according to a 2016 review on AMR sponsored by the UK government.

A key tipping point was reached recently when it was found that some bacteria had evolved to be resistant to colistin, the antibiotic of last resort which is used on a patient when all other antibiotics are found ineffective.

In 2016, researchers in China found colistin-resistant *E. coli* bacteria in 20 per cent of animals, 15 per cent of raw meat and 1 per cent of hospital patients that were sampled. The colistin resistance gene (*mcr-1*) could easily be transferred among different bacteria.

Malaysia was also one of the first countries where scientists found colistin-resistant bacteria. “Since the publication of our findings, *mcr-1* gene has been found in many other countries,” said Associate Professor Dr Chan Kok Gan of University Malaya. “This is a frightening scenario and the whole world should sit up and take action to prevent further abuse of antibiotics.”

If this resistance continues to spread, colistin will become less and less effective and we will eventually lose the “antibiotic of last resort.”

The colistin story also carries another lesson. It is widely thought that resistance is due to over-use of antibiotics by consumers or the spread of infections caused by resistant bacteria to patients in hospitals.

However resistance is also spread through the agriculture sector and the food chain, as shown in the study on colistin in China.

In many countries, much of the antibiotics used (80 per cent in the case of the United States) are fed in farms to animals as growth promoters, to make them grow fatter and faster, as well as to prevent or treat diseases.

Resistant bacteria build up in the animals and are present in raw meat. Some of these bacteria are passed on to humans when they eat the meat.

In Malaysia, the Department of Veterinary Services in 2012 found that half of the domestic chickens tested had bacteria that were resistant to three types of antibiotics (ampicillin, sulphonamide, tetracycline), as cited in a memorandum by the Consumers’ Association of Penang.

The environment is another source of the spread of resistance. Residues and wastes containing resistant bacteria flow from farms and hospitals and contaminate soils, drainage systems, rivers and seas. Some of these bacteria find their way to humans.

The European Union banned the use of antibiotics as growth promoters in animal feed in January 2006 while the US started action to phase them out in December 2013.

In most developing countries, little action has so far been taken. Hopefully that will start to change. In November 2017, the World Health Organization issued its first ever guidelines on the use of antibiotics in food-producing animals.

“Scientific evidence demonstrates that overuse of antibiotics in animals can contribute to the emergence of antibiotic resistance,” said WHO’s Food Safety Director, Dr Kazuaki Miyagishima.

A WHO-sponsored study published in *The Lancet Planetary Health* in November 2017 found that interventions that restrict antibiotic use in food-producing animals reduced antibiotic-resistant bacteria in these animals by up to 39%, according to a WHO press release.

The research paper (authored by William Ghali and 10 other scientists), reviewed thousands of studies, and selected 179 relevant ones, to find if there is an association between interventions that restrict antibiotic use and reduction in the prevalence of antibiotic-resistant bacteria in animals and in humans.

The key findings are that:

- “Overall, reducing antibiotic use decreased prevalence of antibiotic-resistant bacteria in animals by about 15% and multidrug-resistant bacteria by 24-32%.”
- The evidence of effect on human beings was more limited but showed similar results, “with a 24% absolute reduction in the prevalence of antibiotic-resistant bacteria in humans with interventions that reduce antibiotic use in animals.”

This study influenced the development of the WHO’s new guidelines, which are aimed at influencing policy makers in the agriculture and health sectors. According to a WHO press release, the guidelines include:

- An overall reduction in the use of all classes of medically important antibiotics in food-producing animals.
 - Complete restriction of these antibiotics for growth promotion and for disease prevention without diagnosis.
 - Healthy animals should only receive antibiotics to prevent disease if it has been
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- diagnosed in other animals in the same flock or herd or fish population.
- Antibiotics used in animals should be from the WHO list as “least important” to human health and not from “highest priority critically important.”

In 2015, Health Ministers attending the World Health Assembly adopted a Global Plan of Action on anti-microbial resistance, and they agreed that each country should prepare national action plans by 2017.

Since there are many sources of antibiotic resistance, the national effort must include not only the health authorities but also those responsible for agriculture and the environment.

The health authorities should take action to control the spread of infections (including in hospitals), carry out surveillance of antibiotic resistance, introduce and implement regulations and guidelines on proper prescriptions, ethical marketing of drugs and rational drug use.

The agriculture authorities should phase out inappropriate use of antibiotics for animals, especially for growth promotion, while the environment authorities should prevent resistant bacteria and genes from contaminating soils, drainage systems, rivers and seas.

There should be campaigns to make the public aware of the dangers of wrongly using antibiotics and that they should not demand that doctors give them antibiotics unnecessarily.

The medical profession should adhere to guidelines on the proper use of antibiotics, while drug companies should not push for maximum sales but instead advocate prudent use of their antibiotics in both the health or animal sectors.

These are the more obvious actions that need to be taken and urgently if we are to succeed in slowing down the alarming rate of antibiotic resistance. If we fail, it may well be “the end of modern medicine”, as the health leaders and the scientists have warned us.

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