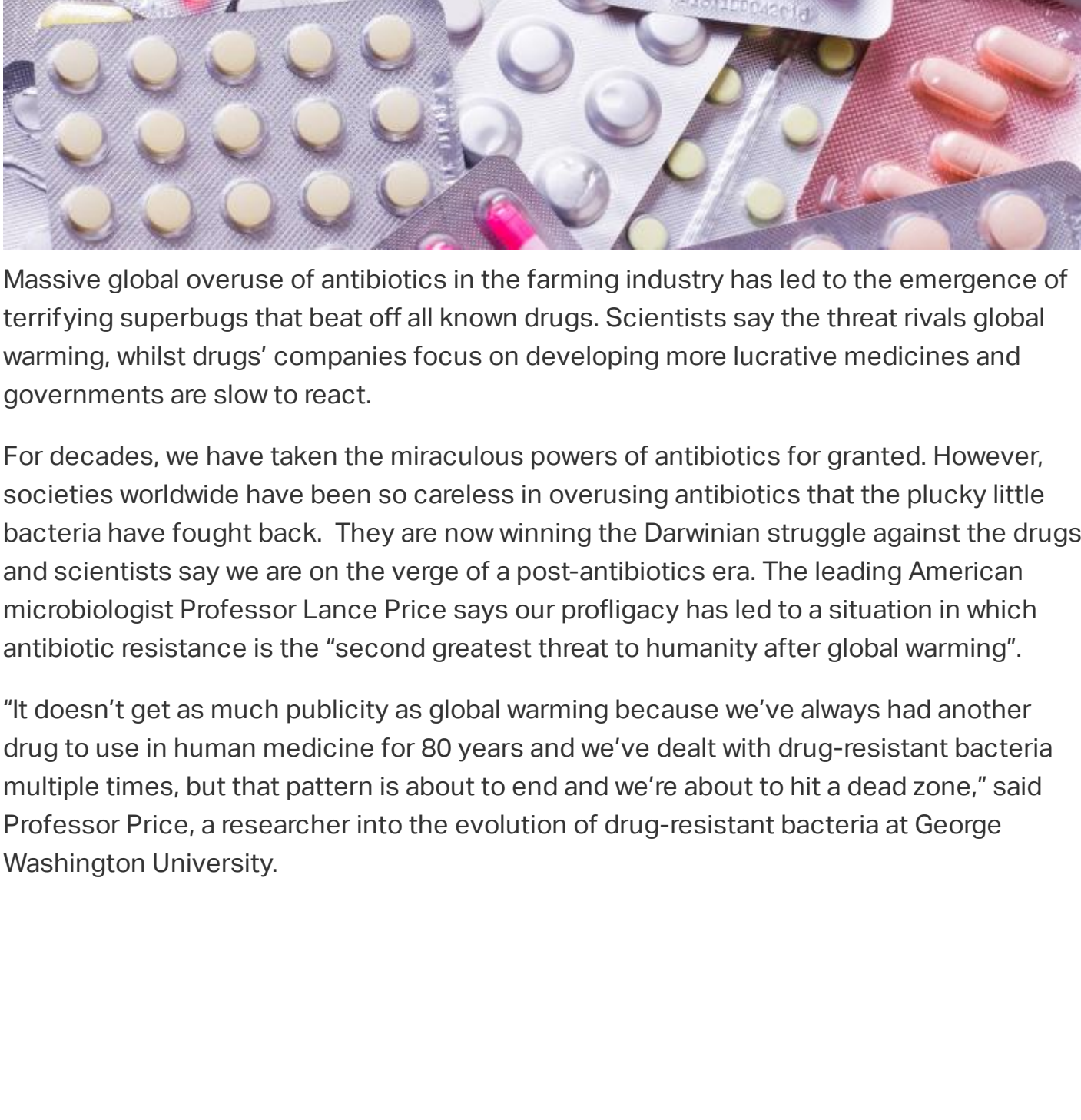


# World on Verge of Antibiotics Apocalypse

FEBRUARY 4, 2016 • PHARMACEUTICAL INDUSTRY • BY **DAVID SMITH**

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Massive global overuse of antibiotics in the farming industry has led to the emergence of terrifying superbugs that beat off all known drugs. Scientists say the threat rivals global warming, whilst drugs' companies focus on developing more lucrative medicines and governments are slow to react.

For decades, we have taken the miraculous powers of antibiotics for granted. However, societies worldwide have been so careless in overusing antibiotics that the plucky little bacteria have fought back. They are now winning the Darwinian struggle against the drugs and scientists say we are on the verge of a post-antibiotics era. The leading American microbiologist Professor Lance Price says our profligacy has led to a situation in which antibiotic resistance is the "second greatest threat to humanity after global warming".

"It doesn't get as much publicity as global warming because we've always had another drug to use in human medicine for 80 years and we've dealt with drug-resistant bacteria multiple times, but that pattern is about to end and we're about to hit a dead zone," said Professor Price, a researcher into the evolution of drug-resistant bacteria at George Washington University.

The emergence of untreatable bacteria, he says, will change every aspect of our daily lives. "People will be terrified of picking up common bacteria as more and more people will die of everyday infections. It will transform everyday activities such as riding around on the underground. People will be afraid to grab the handle to stabilise themselves for fear of picking up deadly bacteria."

Lethal bacterial infections are just the start. There are deadly repercussions for the treatment of many other illnesses. "Antibiotics are essential for a lot of procedures in hospitals that lower the immune system and make people susceptible to bacterial infections, such as using chemotherapy," he said.

"They're also crucial when we carry any surgery on a part of the body that harbours a population of bacteria such as the guts, bladder and genitals. A lot of it will be off the table when we have widespread untreatable bacteria."

Microbiologists have been warning the world for decades about the dangers of abusing antibiotics, Professor Price says. However, there is an analogy with global warming in that policymakers paid no heed to their 'crackpot' and 'marginal' views. Like global warming, the problem has become so serious that all we can do now is mitigate it.

"The microbiologist Stuart B. Levy started his Alliance for the Prudent Use of Antibiotics nearly 40 years ago, but no one listened to this eccentric bow-tie wearing scientist with no media empire to help him shape his messages," said Professor Price. "We are a reactive society and we have an enduring faith in technology. Even I have a belief that we will find new drugs even though that flies in the face of the evidence," he said.

The most alarming development to date in the story of antibiotics resistance was announced just a few weeks before Christmas, in China. A study published in the Lancet Infectious Diseases journal in late November showed that bacteria with a dangerous new antibiotic-resistance gene had spread from livestock to people. To Professor Price it was the equivalent of finding the proverbial 'smoking gun'.

The gene - called mcr-1 - allows common bacteria to become resistant to colistin, the sole remaining antibiotic capable of dealing with the worst superbugs. The mcr-1 gene has a scary ability to make copies of itself and jump between common bacteria, including E coli and Klebsiella.

It is already widespread in the superbugs called Enterobacteriaceae (CRE) carried by pigs and people in south China and scientists predict it will soon spread worldwide. CRE can cause a range of diseases, from pneumonia to serious blood infections. Some strains with the gene have epidemic potential.

"I've studied this issue for years and been running round the world telling people about the dangers of overuse of antibiotics in livestock and this is the big in-your-face evidence I've been expecting," said Professor Price. "The scientists found a clear link between the overuse of colistin in agriculture in China - where they use thousands of tonnes a year - and the development of resistance in E coli and Klebsiella. It is now undeniable that the most dangerous gene out there came from animal production.

"The worrying thing is how fast it is spreading. In just two weeks, there was evidence of it in 10 different countries. If the gene overlays onto CRE, we will see many people dying of infections. This bacterium spreads silently. There are no symptoms except in cases in intensive care units. But usually there's no trail of breadcrumbs to track it down."

The development of superbugs in industrial farming raises questions about the dangers of mistreating animals for profit. Producers depend on antibiotics to prevent the spread of diseases. Without the restraining effect of antibiotics, disease is more likely to spread between stressed animals housed in closely confined spaces. However, this is an abuse of antibiotics for profit.

In some parts of the world, notably in Scandinavia, the use of antibiotics in farming is more carefully controlled. Sweden, for example, banned their use in 1986. Instead, farmers rely on better hygiene, ventilation and balanced diets to keep animals healthy.

As a result, older antibiotics Penicillin and Doxycycline are still effective, whereas they are obsolete in the US. "What we've seen in Sweden is that older antibiotics can become revitalised when antibiotics use is restricted," said Professor Price. "I have arguments in the US with people who say 'why do you care about these antibiotics that are now useless in human medicine?' But the Swedish experience shows that strains of bacteria carrying the extra resistance can get outcompeted when there aren't a lot of them floating around."

In a globalised world, however, Swedish bacteria cannot exist entirely in isolation. Bacteria are always likely to be brought by passengers on planes from foreign climes. Local solutions help up to a point, but global solutions are essential to solve the problem.

Lazily, we assume that science and technology will save us, but the belief that we will continue to produce new antibiotics is false, Professor Price says. Drug makers developed 13 classes of antibiotics between 1935 and 1968, but there have been only three since then.

Nowadays, most drug companies are not investing in the development of antibiotics because they make far more money out of other drugs. Two of the few major companies still in the antibiotic discovery business, Merck & Co. and AstraZeneca, recently announced plans to lay off more than 200 scientists tasked with finding new ways to fight dangerous bacteria.

"There's been a dramatic decline in research because they make more money out of expensive drugs for high blood pressure, or heart disease, that people take every day for the rest of their lives. Antibiotics are normally taken for short periods only," said Professor Price. "Antibiotics have no place in a for-profit business model. We naively think the drug companies have an obligation to society, but they are just vehicles for making profit."

What we need, he argues, are global trusts that set the rules on how antibiotics are used and establish permanent non-profit patents. Federal and state funding is also essential to finance research. John Rex, the head of anti-infective drug development at AstraZeneca has proposed an insurance-style scheme under which the Government pays a fixed fee for antibiotics regardless of the volume sold, removing the incentive for manufacturers to maximise sales.

"With enough federal incentives we could do this easily. It could be set up in a competitive structure so that high-functioning groups are involved. The US Government has started down this road towards incentivising drug companies but we need much more," Professor Price said.

Even more important than new research, however, is more judicious use of existing antibiotics. This means drastically reducing their use in farming. However, when President Obama announced his National Action Plan for Combating Antibiotic-Resistant Bacteria in March last year there was a lot about reducing human consumption of antibiotics, but little attention paid to animals. Yet around 80% of antibiotics in the US go to farm animals.

"If it weren't for politics we'd have solved the problem 40 years ago," said Professor Price. "It's disgusting how the powerful farming lobbies influence the debate. In addition, I have been disappointed with the Obama administration's lack of progress. The Government continues to separate the human and animal issues, whereas it is the same problem.

They let the US Department of Agriculture handle the animal side, but that public entity does what the industry wants rather than what is good for society. Their reluctance to act is a form of corruption even though no one is handing out money in a back room. It's corruption that is accepted as legitimate."

Despite a growing awareness of the dangers, the global problem of the overuse of antibiotics in animals is getting worse, according to a Princeton University study. Antibiotic use in animals expects to surge by two thirds globally between 2010 and 2030, while doubling in emerging BRIC giants like China, Brazil, India and Russia. China's livestock industry alone could soon be consuming nearly a third of the world's antibiotics.

A recent report commissioned by the British Government forecast that a failure to tackle drug-resistant infections would lead to at least 10 million extra deaths a year and cost the global economy about US\$100 trillion (£64 trillion) by 2050. To put the figures into context there are currently about 8.2 million deaths a year from cancer and the annual global GDP stands at around US\$75 trillion.

One good sign is that consumer pressure is starting to influence producers. Because of media exposure, Tyson Foods, the largest meat and poultry producer in the US, has pledged to drastically reduce the use of human antibiotics in its chicken production. McDonalds and Chick-fil-A are also committed to reducing antibiotics use. However, the fact remains that millions of kilograms of antibiotics are used for US animals every year.

"We have to hope that the emergence of the mcr-1 gene is a wake-up call for the Chinese Government and they act swiftly to reduce antibiotics' use in farming," said Professor Price. "Just as important in the developing world is the development of better hygiene. If you have bacteria in the Ganges and people get their water there they will be colonised much more quickly and that's a fast way to disseminate these kinds of bacteria around the world."

See also: [Bashing Drug-Makers for Short-term Political Gain has Risks](#)



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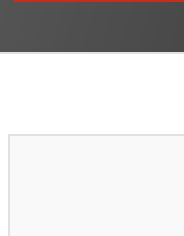
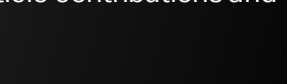
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