

Facing a post-antibiotic world

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The risk of total antibiotic resistance should be treated as a natural disaster like bush fires or floods. Credit: AAP Image/David Crosling

It's official. Humanity is racing towards a post-antibiotic era, a time when today's life-saving drugs won't successfully treat common infectious diseases or even infections from minor injuries.

According to the World Health Organisation, many bacteria responsible for common but serious diseases such as pneumonia, diarrhoea, gonorrhoea and bloodstream infections have developed resistance to

antibiotics designed to wipe them out. Worse, few replacement treatments are in the pipeline. The post-antibiotic world looms.

Surprisingly, microbiologist Maurizio Labbate was delighted by the alarming WHO report. "It highlights exactly what we've been saying," says the researcher from the University of Technology, Sydney (UTS).

Dr Labbate and his research partners, Dr Carolyn Michael from UTS and Associate Professor Dale Dominey-Howes from the University of Sydney, agree with the WHO that a global effort is needed to tackle antibiotic resistance. And the trio has an unlikely approach – frame antibiotic resistance as a natural disaster.

Dr Labbate says the key advantage to "rebranding" antibiotic resistance as a natural disaster like floods, fires and cyclones is that developed countries such as Australia have effective and organised emergency risk-management processes for such events. It makes sense, he argues, to adopt similar mechanisms to prepare for and handle the problem of antibiotic resistance.

A disaster-oriented strategy would broaden and strengthen national and international protocols established by health officials and hospitals for handling sudden disease outbreaks because although antibiotic resistance is a "slow outbreak", as it increases, the chances of a sudden and disastrous epidemic or pandemic rise.

This "slow outbreak" began during World War II, soon after a Cambridge University team led by Australian Howard Florey produced significant supplies of penicillin, the first antibiotic. As more antibiotics became widely available, more bacteria developed resistance to them.

Bacteria can become antibiotic-resistant if they undergo random mutations which, by chance, protect them from antibiotics.

Alternatively, the highly promiscuous microbes can acquire drug-busting powers from resistant bacteria.

Then these tough-to-treat microbes invade the world: people, farm animals, seafood, fruit and vegetables- not to mention soil, water and air. The result could be devastating- antibiotics that don't work when people need them.

Already, so-called superbugs can be "multiply resistant" to three or four antibiotics, says Dr Labbate, adding that those causing 5 per cent of Australian infections in hospitals are multiply resistant. For example, the WHO report says "treatment failure" of the "last-resort antibiotic" for gonorrhoea has been confirmed in Australia and nine other nations. Similarly, people infected with a methicillin-resistant strain of the bacterium *Staphylococcus aureus* are 64 per cent more likely to die than people with a non-infectious form, according to the WHO.

Clearly, it's imperative that existing antibiotics be used carefully, as the more they're used the more [resistant bacteria](#) become. Unfortunately, that's not happening.

"We need to look at this problem with fresh eyes," says Dr Labbate. That's why he and his colleagues want to collaborate with social scientists to determine how the public perceives the risk of antibiotic resistance and what factors shape those perceptions – for instance, age, sex, cultural background.

They could then work with emergency managers to communicate to the community the risk and appropriate responses. "Modifying community behaviour is probably the easiest and cheapest way to tackle the [antibiotic resistance](#) problem," Dr Labbate says.

It's also urgent. "Imagine a world of untreatable bacterial infections,

including epidemics and pandemics."

Time to prevent this dystopian future is running short. How short? "The US Centres for Disease Control predicts the era of [antibiotics](#) will be over within a decade or two," says Dr Labbate. "A decade or two."

Provided by University of Technology, Sydney

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