

Antibiotics and Waste Water

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We all make use of antibiotics at some point in our lives, but have we ever stopped to consider the unintended consequences of this family of so-called miracle drugs? A recent study published by the School of Medicine in NUI Galway (Ireland) found pathogenic bacteria in the sewage from hospitals that are becoming resistant to antibiotics. The resistance of pathogenic organisms to antibiotics is emerging as one of the major risks of the decade, if not the century. The quality of life generally enjoyed over the last half century by most people is largely due to the success of antibiotics in fighting disease. The question we can now ask is whether this success against disease is coming to an end?

Hospitals tend to use the latest and best antibiotics, so by implication the sewage emerging from such places carries elevated levels of those drugs. The Irish study found that hospital sewage contained high levels of pathogens that were resistant to even the latest drugs. This is worrying for two reasons. One can be found in a famous book published in 1997 by Edward Tenner entitled “Why Things Bite Back: Technology and the Revenge of Unintended Consequences”. Tenner makes an eloquent case for what he calls the “revenge effects” of our own ingenuity. In short humans have been clever by inventing antibiotics that have given them an advantage over Nature in the form of better disease control. But Nature fights back and bacteria mutate in the presence of antibiotics, giving rise to a strain of drug-resistant pathogens. We are therefore locked in a race against Nature, and unless we continue to be highly innovative, we will eventually lose because of natural selection that produces mutations as a mechanism of adaptation under conditions of environmental change.

This leads us to the second area of concern relevant directly to South Africa. We produce just over 5 billion litres of sewage every day in this country. Of this about 20% is treated to a level that makes the water safe to be returned to our rivers and dams. The rest, a staggering 4 billion litres, is returned directly to our rivers and dams, either untreated, or at best partially treated. Ironically it is the partially treated sewage that is the most worrying of all. You see partial treatment only removes the weaker pathogenic organisms, leaving the stronger bugs to fight it out amongst themselves for dominance. But it gets worse, because our untreated sewage also has high levels of partially metabolized antiretroviral medication in it. This means that we are exposing both bacterial and viral populations to perfect conditions for rapid growth, in the presence of a cocktail of drugs designed to kill those pathogens. In short, we are producing super bugs and have no way of predicting how they will mutate, or in what form they will become part of the “revenge effect” of our own human ingenuity.

The purpose of this article is to inform rather than scare, so there are three things that the reader is advised to do. Firstly become savvy in a digitally connected world by learning about pathogens (bacteria and virus) via the internet. There are thousands of quality articles on the topic, so read them and empower yourself. Secondly, take basic precautions by not exposing any of your loved ones directly to river or dam water, because sadly most are now so

contaminated in South Africa that direct exposure can be potentially lethal. Make use of a range of end-of-pipe filtration products to treat your drinking water, because sadly our bulk water treatment plant was never designed to produce safe potable water from sewage effluent. Finally, never dispose of any medication in the toilet. Take it to your pharmacy and ask that they do the responsible thing by returning it to the manufacturer or distributor for safe disposal.