

Editorial

Misuse of today's wonder-drugs threaten our future

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To state the obvious, death is a universal experience, but is very different around the world. In affluent Western nations, with healthy life expectancy around 70 years of age, malignancy and chronic diseases associated with ageing have become leading causes of death, yet in other parts of the world death from infection, famine, and war predominate [1]. The availability of analgesics is a scandal in itself, with massive oversupply in North America, Australasia and Europe, leading to abuse, yet many parts of the world cannot access morphine for those in excruciating pain and women routinely die in childbirth. In Sierra Leone, recently devastated by Ebola, one in ten women don't survive pregnancy and childbirth [2].

Currently, 80% of the world's dying cannot access morphine; 6% of these are dying children [3]. We have to ask ourselves as doctors, can we continue to tolerate this? How do we overcome the bureaucratic and knowledge barriers to provide even basic pain relief to those in the severest pain imaginable can have the most basic of care?

These stark inequities are seen over other resources too. In the early 20th century infection was the major cause of death across all age groups, across all nations. Penicillin, first produced at scale during World War II, revolutionized survival chances. Wartime posters announced that thanks to penicillin the wounded might come home – previously most died of their wounds within days. Following penicillin, a pipeline of antibiotics allowed populations to take them for granted. But now we see antibiotic resistance becoming a major threat to world health. Contrary to popular myth, it is the organism that develop resistance, not the individual.

Given that the average human is made up of 30 trillion human cells and hosts around an astonishing 39 trillion bacterial cells [4], it is hardly surprising that there could be up to a trillion different microbial species on earth. Of course, they don't all cause disease. The majority are commensals, living in harmony with the human host, or become opportunist microbes that only cause a problem when the host body changes due to decreased immune-competency or a wound for example. But then there are pathogen organisms – the killers of everyday life across the globe. When these organisms share antimicrobial genetic material through a naturally occurring 'mobile genetic elements' or through internal mutation in response to exposure to antimicrobial medication, then we are in trouble. The result is high death rates, high healthcare costs and limited treatment options.

Whenever a patient takes antibiotics, drug residues are excreted unchanged through wastewater into the environment, where they may persist and further invoke resistant strains in those microbes that encounter even tiny amounts. In the UK today over 15% of E Coli infections show antimicrobial resistance to fluoroquinolones; in India well over 75 % of isolates today show such resistance [5]. Why is this happening? Over-the-counter availability of antibiotics, widespread use of antibiotics for viral infections and general excessive use across health care, combined with a lack of awareness amongst many clinicians of the scale of the problem are undoubtedly contributing factors.

Use of veterinary antimicrobials as growth promoters has exacerbated the problem, but farming cannot be held solely to blame. It is human abuse of these valuable drugs that is rendering them potentially useless in the long term, when surgery, chemotherapy and other interventions may become too risky to undertake [6].

Global consumption of antibiotics has increased by nearly 40% between 2000 and 2010, increasing the rate at which resistance is developing [7]. The problem facing the world is

exacerbated by the lack of new antibiotics coming through the pipeline. And this combined with the rapid development of widening antibiotic resistance, we will inevitably see more and more deaths in otherwise fit young people – deaths that were previously avoidable. This makes antibiotic resistance one of the biggest threats to global health, food security and therefore to international security today [8].

Multi-drug resistant tuberculosis is now emerging as major threat from those parts of the world – India, the Asia Pacific Basin, China, Russia and across central Africa – where TB prevalence and hence mortality rates are high. In India almost 2 million new cases of TB were notified in 2017; there is a TB mortality rate over 30/100.000 population and 12% of relapse cases have drug-resistant TB [9].

For some diseases, vaccination has changed the picture worldwide; smallpox has been eradicated. But polio, measles, diphtheria and others are on the rise again, in part due to an increasing number of anti-vaccination fanatics who spread dangerous misinformation via the internet and social media groups. Populations need a 'herd immunity' of 95% to decrease the risk of epidemics of disease. Measles has increased 300% in the first quarter of this year compared with the same period last year, rapidly increasing in many countries because of failed vaccination programs. Diphtheria, which kills by suffocation and through toxin, has reemerged globally through low vaccine coverage and waning adult immunity. Poliomyelitis is still seen in Nigeria, Afghanistan and particularly in Pakistan, where violent militant group still thwart WHO efforts at supplying vaccination to all children.

Disease control through vaccination can succeed when governments work with WHO initiatives and, importantly, promote education of mothers about the need to protect their children.

The irony is that many governments around the globe have draconian controls over morphine, yet almost none over antimicrobial use. Our duty to our patients today must not ignore our duty to the patients of tomorrow. Nor must we be blinkered, ignoring the global consequences of all we do. Doctors need to engage in the political debate to inform politicians and their bureaucrats responsible for enacting rules legislation of the science behind responsible prescribing and the need to protect the wellbeing of future generations. Control of antibiotic prescribing is as urgent as the supply of basic analgesia. At the moment many legislations around the world have got the balance wrong.

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