

# Combating Anti-microbial resistance

Without effective antibiotics, many of the modern day miracles of medicine will not be within reach—cancer chemotherapy, organ donation, bone marrow transplants, routine surgeries. As Margaret Chan, Director-General of the WHO, put it, we stand at the precipice of a “post-antibiotic era.” The cost of inaction is staggering. The UK Review on Antimicrobial Resistance (AMR) has estimated this will total up to \$100 trillion by 2050, and up to 10 million lives by that year—more than those who die from cancer today each year.

This looming challenge to global health has only recently seized policymaker attention, from the G7 and G77 to the WHO and the United Nations. Responding to this challenge, the World Health Assembly has adopted a Global Action Plan, a tripartite collaboration among the WHO, the Food and Agriculture Organization (FAO) and the World Organization for Animal Health (OIE) is taking shape, and the United Nations General Assembly, preparing a political declaration.

An effective response will require a tripod of innovation, stewardship and access. These goals are inter-linked and have to be addressed across sectors, both in human medicine and in food animal production systems. Innovation is needed not only to replenish a faltering R&D pipeline for antibiotic drugs, but also to develop diagnostics, vaccines, and other alternatives that might reduce the use of these drugs in the first place. Tackling innovation may involve strategic targeting of incentives, enabling fair returns on public investment, and ensuring affordable and accessible end-products. Product development partnerships, initiatives to accelerate the development of novel drug candidates, and investments to transform the innovation ecosystem—not just bets on one company or one drug at a time—may be needed.

In the near term, the dearth of novel antibiotics will likely continue. So stewardship—again in both healthcare delivery and agricultural systems—can help safeguard the effectiveness of existing drugs. Yet calls for coordinating and financing much needed research focuses on innovation of novel technologies, not innovation of practices to conserve existing ones. The greater use of antibiotics increases drug resistance, yet drug companies whose earnings rely on higher volumes of sales are incentivized to sell more product. Delinkage is the concept that the return on investment to drug companies should be divorced from volume-based sales, that is, price x quantity.

Access, but not excess antimicrobial drugs is an equipoise not easily achieved. Ensuring access has multiple dimensions—financial affordability, adaptation to the local delivery context, and of course, availability in local hospitals and clinics. Just as concerns over high prices and limited availability of life-saving, second-line antibiotics have arisen in healthcare delivery, so have proposals of taxes on antibiotics in food animal production stirred concerns over the impact of such measures on the livelihoods of small-scale farmers needing to treat diseased animals.

Steps to address antimicrobial resistance must be urgently taken now if this generation and ones to come are to have a future free from the fear of untreatable infections.