Five barriers to addressing antimicrobial resistance

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Elizabeth Taylor was famously quoted as saying, "It is bad enough that people are dying of AIDS, but no one should die of ignorance." From HIV/AIDS to cancer, these words continue to ring true as they relate to combatting public "ignorance" and political apathy to burgeoning global health crises. Over the last couple of years, the ongoing COVID-19 pandemic has largely consumed the spotlight of global health policy discussions. While the pandemic rages on, the global policy response to other global health crises has largely been sidelined. One clear example of this can be seen in the sidelining of antimicrobial resistance as the next, looming global health crisis.

Antimicrobial resistance (AMR) occurs when disease-causing microbes evolve over time and become resistant to treatment and medicine *(1)*. As a result, antibiotics, antivirals and other antimicrobial medicines become ineffective at treating bacterial infections. The rise of AMR threatens the world's ability to treat common infections, viruses and other deadly diseases. It is estimated that more than 700,000 people die every year as a direct result of drug-resistant diseases, with more than 10 million deaths expected by 2050 *(2)*. Global policy inaction on the prevention and treatment of drug-resistant infections will lead to riskier medical procedures and even higher death rates *(3)*.

New antibiotics and drug treatments will not solve this health crisis alone, nor will the mere call for increased investments remedy the issue (although, new investments in monitoring and surveillance systems will be vital). AMR interventions must be tackled systemically. This systemic approach calls for new conservation strategies for appropriate use of antimicrobials, better regulation on antimicrobial use, reduced usage of antimicrobials in agriculture, increased global awareness of the issue, improved sanitation practices and better incentives for pharmaceutical companies to develop new antibiotics *(4)*. Overuse of antimicrobials in medical and agricultural practices, coupled with the lack of access to antibiotics in most low- and middle-income countries (LMICs), have created a fractured, global health environment with diverging policy priorities.

AMR has often been cited by health experts and activists as the "silent pandemic," due to the pandemic-like nature of the crisis and the relative silence on the issue by national health policy leaders. There are serious policy challenges that remain in addressing this multifaceted issue. Outlined below are five major challenges for future global political and funding action towards addressing AMR.

First, there is the most basic issue of **raising global public awareness on AMR**. Ask the everyday citizen to define what AMR is, and they may respond quizzically to the question. Public knowledge of AMR is crucial to addressing the crisis, as overuse and misuse of antibiotics remain two of the most significant drivers in the development of drug-resistant pathogens *(5)*. Overprescribing antibiotics by medical professionals and over-the-counter drug purchases by individuals (mainly from high-income countries, but also in LMICs) have contributed to its misuse. Humans feed antibiotics to animals that end-up in our food supply chains. Humans are the ones who pollute that the environment through antibiotic manufacturing and byproducts that appear in water supply systems. It is, therefore, incumbent upon us to address these detrimental health and environmental effects through public awareness campaigns. Greater public awareness is essential in limiting overuse and misuse of certain drugs in order to slow the development of AMR.

Second, the **"ask" for AMR may be too much** for certain countries and policy leaders. Not only is it difficult to succinctly define the root causes of AMR, it is also difficult to succinctly define a clear policy solution on how to address it. Unlike other deadly viruses and diseases, which require funding and research to provide a potential cure, AMR requires a systemic change to a country's entire health-care system. The eradication of smallpox, for example, was attributed to the discovery of a single vaccine. By contrast, there is no single solution to "eradicate" AMR. It is a multisectoral health issue, involving various systemic interventions pertaining to economic incentives, sociological changes and new medical discoveries. The myriad policy interventions that are required to accurately address AMR make it difficult for policy leaders to properly comprehend the health and economic risks associated with the health crises. National policy leaders may view AMR

as a remote threat, similar in nature to a pandemic. National leaders may, therefore, view AMR as a secondary priority to other, more immediate health concerns they may perceive as more pressing such as health spending and development strategies.

Third, **AMR is hard to visualize.** Unlike with other global epidemics and deadly diseases, such as HIV, AMR is mostly an invisible crisis. If an individual does not make it to the operating table because of antibiotic resistance, it is difficult for the AMR cause to generate the kind of coordinated action that has been mobilized by individuals living with or experiencing the causes of other viruses and diseases. There is, therefore, a challenge in illustrating the real toll of AMR. For AMR infections, there are multiple species of drug-resistant bacteria that may cause the hundreds of thousands of deaths per year. The way those deaths may arise can similarly be expressed through multiple ways (i.e., through bone or blood-stream infections). While individuals may be recorded as dying from other causes, the resistance from certain drugs may be the underlying cause of death. The way that death is presented to human emotions has an immense effect on global health spending and national health strategies. Without a visual storyline that expresses the deadly impact of AMR, it will be difficult to mobilize the coordinated policy and funding commitments that will be needed to tackle the crisis.

Fourth, there is both a lack **of access to antimicrobials (especially in emerging economies) and poor surveillance mechanisms on AMR policy interventions.** Over the last several years, millions of dollars have been spent in raising awareness of the crisis and developing new financial incentives for antimicrobial research. It is difficult, however, to measure the effectiveness of these investments and the links between health programmes and improvements in antimicrobial use. While National AMR Action Plans (NAPs) have been critical to facilitating improvements in antimicrobial use, there are serious information and surveillance gaps that hinder effective policy responses to AMR. Current surveillance activities have not provided additional clarity on what interventions would be best suited to achieve various AMR policy goals at the national level *(6)*. Evidence-based policy interventions, informed by cultural and health system-specific contexts, will be needed to address these information gaps.

Fifth, a **lack of economic incentives exists for pharmaceutical companies to develop new antibiotics.** As noted recently by the World Health Organization (WHO), the clinical pipeline for new antimicrobials is "dry" *(7)*. Since 2019, WHO has identified 32 antibiotics within the clinical development pipeline. Of those 32, only six have been classified as "innovative". There is a clear market failure for discoveries of new antibiotics and treatments for drug-resistant infections. Several global funding initiatives have been set up to address this challenge. These include the AMR Multi-partner Trust Fund (AMR MPTF), the Global Antibiotic Research and Development Partnership (GARDP) and the AMR Action Fund. These global funding initiatives, however, do not completely address the financial incentives and other research needs to spur further innovation on new antimicrobial medicines, vaccines and diagnostic tools. More funding initiatives and reimbursement models for pharmaceutical companies will eventually be needed to find long-term solutions to the crisis.

Identifying these barriers to addressing AMR will be critical to preventing millions of future deaths. The issue of AMR is complex, requiring multisectoral and country-specific responses. It is a looming global health crisis that must be addressed through a systemic approach. Better global planning and funding coordination can help resolve existing information gaps and financing shortages. Ignorance on the issue, however, can no longer be an excuse for inaction. ■

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