

Background

Antimicrobial resistance (AMR) is growing at alarming rates worldwide and is a grave threat to the practice of modern medicine. In the US, AMR is estimated to cause US\$20 billion in additional hospital costs and cause US\$35 billion in productivity loss each year [1]. In Europe, unless rising AMR is addressed, resistance to second-line antibiotics will be 72% higher in 2030 than it was in 2005 and AMR to last-line treatments will more than double [2]. The emergence of AMR threatens advancements in medicine such as the development of complicated surgeries and the use of chemotherapy in cancer patients which rely on antimicrobials for successful treatment. Increasing AMR will also have broader societal costs in the form of lost labor, changes in health seeking behavior, animal health and welfare, rising cost of animal products, and lower consumer confidence in the safety of these foods [3].

Purpose

The World Health Organization identified AMR as a top ten priority health threat in 2019 [4]. There is a clear, imperative need to address, monitor, and slow the emergence of AMR around the world. In the face of rising resistance, policymakers seeking to address the issue have often called for more data to best mitigate and prepare for the rise in resistant infections [5]. Multiple networks for surveillance of both AMR and antimicrobial consumption (AMC) already exist, however, consensus has not yet been reached on the best ways to gather and connect this data. Global surveillance system has chosen rather to focus on creating new networks instead of attempting to connect existing ones. Laboratory data alone is not sufficient in effectively monitoring the emergence of AMR and informing key stakeholders. Only through a multifaceted approach combining consumption and clinical data along with laboratory data will we be able to effectively monitor AMR to slow or even stop its emergence [6]. Our study hopes to overview current surveillance efforts, identify gaps in data collection in monitoring AMR, and provide a case promoting a more integrated and collaborative approach to monitor AMR.

Summary

Strong, coordinated, and purposeful surveillance has been shown to greatly reduce the evolution and incidence of resistant infections around the world. In order to create effective surveillance systems to inform physicians and providers in how to best treat their patients, policymakers on how to best allocate resources, and activists and researchers to pressure government, we must follow a One Health approach developed by the World Health Organization. This approach will require the combination and combined analysis of microbiology resistance data, clinical data, demographic data, antimicrobial consumption data, and data from the agricultural sector on agricultural antimicrobial consumption along with the consideration of different cultural factors. Continued apathy towards one of this century's great medical problems will not only affect the health of humans globally but will fundamentally alter the way we practice medicine.



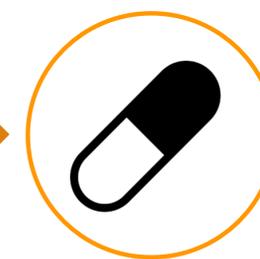
Laboratory Data

- Provides specific resistance data based on different pathogen and antibiotic combinations of interest
- Most common and most readily accessible data in terms of AMR surveillance
- Promotes diagnostic stewardship for physicians
- Provides vital information to policymakers on how to allocate resources [7]
- Industry has played a pivotal role in standardizing lab methodologies and providing data for low income countries
- Data deficient in low income countries in Africa and SE Asia [8]



Clinical Data

- Hospital stay duration, previous infections, contacts, etc. are all clinical variables
- Places laboratory data and consumption data into context
- Data provides important information that confounds typical AMR data
- Promotes a One Health Initiative



Consumption Data

- Consumption of antimicrobials is directly linked with changes in the rates of AMR [9]
- Data provided from drug manufacturers, wholesalers, national pharmacies, and customs import and export data
- All consumption data is estimates and extrapolated from a small subset of data
- Data deficient in low income countries and there is no consensus for the collection of consumption data
- Antibiotic Resistance Index aggregates laboratory data and consumption data to create a single index value of resistance



Inform Providers on current AMR trends to promote diagnostic stewardship and effective prescribing



Provide Policymakers the necessary data to allocate resources and create policy to slow the emergence of AMR



Promote Discovery amongst industry to create new in class therapies to combat the emergence of AMR



Activate Parties to pressure govt. and industry to create change and slow the emergence of AMR

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