New Antibiotics won't solve the Antibiotic Resistance Crisis, but better Diagnostics could

On July 9th 2020, more than 20 leading biopharmaceutical companies announced the launch of the AMR Action Fund aiming to bring 2-4 new antibiotics to patients by 2030. The AMR Action Fund has raised nearly USD 1 billion so far to address the rapid rise of infections with bacteria that do not respond to antibiotic treatment. Antimicrobial Resistance or AMR is a major 21st century healthcare threat as the world is on the verge of losing antibiotics as its most powerful tool in healthcare. AMR is currently responsible for 700,000 annual casualties, a staggering number, that experts expect to increase to up to 10 million/year unless appropriate action is taken. New solutions are urgently needed to preserve existing antibiotics and inform treatment.

The new initiative is expected to significantly strengthen and accelerate antibiotic development. However, will the development of new antibiotics be enough the solve the AMR crisis?

To better understand if new antibiotics alone can solve the AMR crisis, we need to take a closer look at two key aspects: (1) AMR development against antibiotics, as well as (2) the number of infections that cannot be treated with today's antibiotic arsenal.

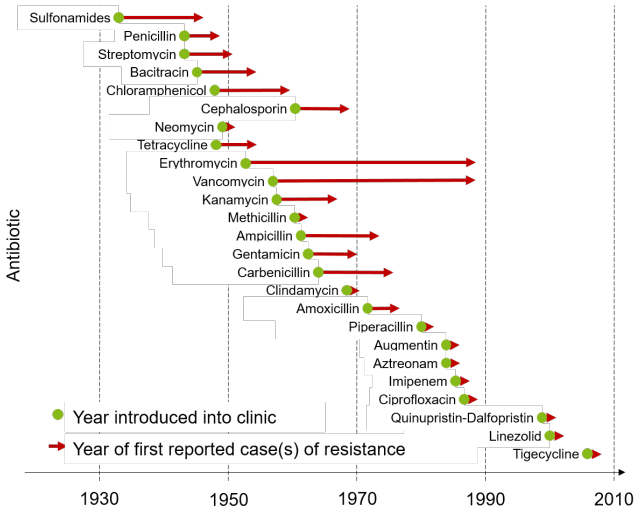

Figure 1. AMR development across antibiotics

(1) AMR is observed across all antibiotics, usually shortly after their introduction into the clinic

There is overwhelming evidence that the use and overuse of antibiotics is fueling the rise of AMR. Mapping emergence of resistance vs. the time of introduction of a new antibiotic into clinical routine clearly illustrates that AMR is observed across all antibiotics, often instantaneously after implementing it in clinic [Figure 1, modified from Pray L, Cambridge Healthtech Institute 2008].

Unfortunately, it is likely that any novel antibiotic will experience AMR development in a similar fashion, due to the pathogens' ability to continuously evolve under antibiotic selection pressure, as well as exchange and acquire genetic factors that render them resistant.

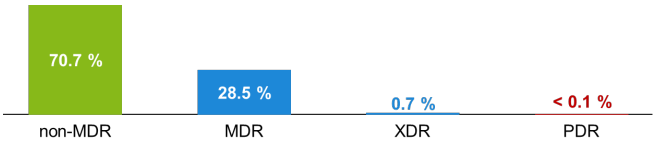

Figure 2. Pathogens that are resistant against nearly all antibiotics are rarely observed.

(2) The vast majority of infections can be treated with existing antibiotics

While antibiotic resistance against individual compounds as well as multi-drug resistance (MDR) are on the rise, luckily extensive drug resistance (XDR) and pan-drug resistance (PDR), that is, resistance against nearly all available treatment options, is very rare. Real world data from one of the largest AMR surveillance programs in the world – The Antimicrobial Testing Leadership and Surveillance (ATLAS) database as well as Ares Genetics' Antibiotic RESistance database ARESdb illustrates that the vast majority of pathogens can be treated with existing antibiotics [Figure 2, estimates based on in-vitro testing results for several hundred thousand of pathogens]. Unfortunately, however, in the absence of predictive diagnostics, information about the nature of a patient's infection and viable treatment options are usually only available after several days, often too late to appropriately inform early treatment.

New antibiotics will help to better address hard-to-treat infections as well as emerging cases of pan-drug resistant pathogens. New drugs on their own, however, will not solve the AMR crisis as they will very likely experience resistance development like any other drug so far. In this context, better diagnostics, matching the right patient with the right drug for early targeted therapy, are desperately needed to sustainably solve the AMR crisis.

At Ares Genetics, a Vienna-based digital diagnostics start-up, we are fully committed to fight the AMR crisis by developing the next-generation of infectious disease diagnostics by combining molecular diagnostics with artificial intelligence to accurately predict response to antibiotics by genetic testing.

Let's take infectious disease testing to the next level. Let's solve the AMR crisis. Together.

OpGen, Inc.
708 Quince Orchard Road
Gaithersburg, MD 20878
CustomerSupport@opgen.com