

**ADVANCING  
DATA TECHNOLOGIES  
TO CORNER  
AMR 2019**



INTERNATIONAL MATCHMAKING SYMPOSIUM  
5 JUNE 2019 • AMSTERDAM • THE NETHERLANDS

## ANTIMICROBIAL RESISTANCE (AMR)

Antimicrobial resistance (AMR) is considered the biggest global threat of Health and Food Safety (*Source: WHO*). AMR develops when bacteria, fungi, or viruses are exposed to antibiotics, antifungals or antivirals. As a result, the antimicrobials become ineffective and infections may persist. In addition, medical interventions including surgery, caesarian sections, chemotherapy and stem cell therapy may become impossible. It is estimated that AMR causes at least 700,000 casualties per year with the low- and middle income countries (LMIC) bearing the harshest burdens. More recent recalculations indicate substantially higher numbers. According to the 'Review on Antimicrobial Resistance' by Jim O'Neill we may face some 10,000,000 casualties per year in 2050 with cumulative GDP loss of \$ 100 trillion<sup>ii</sup>.

"Planet earth faces the very real threat of having to survive in a 'post-antibiotic' era in which there are few, if any, antibiotics which effectively and affordably cure infections".<sup>iii</sup>

Both at an international as well as at a national level action plans have been set up to fight AMR. These plans have five 'strategies' in common:

1. Better prevention of infectious diseases
2. Further implementing antibiotics stewardship
3. Developing improved microbiological diagnostics
4. Developing new (classes of) antibiotics
5. Developing alternative antimicrobial strategies (like phage therapy).

## THE FOURTH INDUSTRIAL REVOLUTION

"We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society."<sup>iv</sup>

Within the context of the fourth industrial revolution Information and Data Technologies are no longer a supporting tool but a value-creating factor vital for the policy and strategy of every organization. A broad social development is going on in which data and data analysis plays a central role.

Fighting Antimicrobial Resistance in the era of the fourth industrial revolution is manifest in various concrete applications:

1. Artificial Intelligence
2. Internet of (Diagnostic) Things
3. Blockchain Technologies.

## Artificial Intelligence

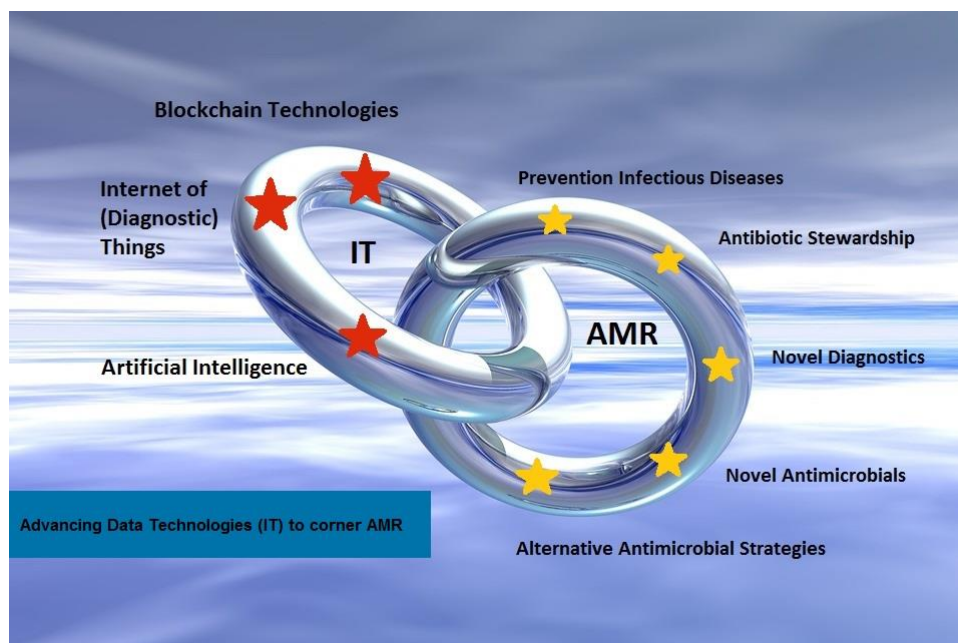
Artificial Intelligence is the use of machine learning and underlying algorithms to analyze big data as well as the use of deep learning with neural networks. Interesting applications include methods to identify and predict which genes cause infectious bacteria to become resistant to antibiotics, deep learning solutions like DeepARG to fight antibiotic resistance and whole genome sequencing with AI machine learning algorithms in combination with microbial resistance databases.

## Internet of (Diagnostic) Things

Internet of Things implies a network created from objects, which have the ability to communicate with other devices. The number of internet-connected objects could increase to somewhere between 20 and 100 billion by 2020. Appealing applications include connected diagnostics, wearables for remote patient monitoring and smartphone capabilities potentially revolutionizing the fight against AMR. Also think of future clinical development of novel antibiotics by point-of-care diagnostics and digital biomarkers to the patient.

## Blockchain Technologies

Blockchain Technologies hold a distributed virtual 'balance book' in which transactions are bundled by using cryptography and further processed, validated and recorded. The approach enables secure and transparent processing of transactions. Relevant applications include supply chain management of (last resort) antibiotics and smart contracts to control the sales, prescription and the use of antibiotics. Also think of clinical trials of novel antibiotics whereby blockchain is key managing confidentiality of patient information and integrity of trial data. Also blockchain will facilitate new modes of collaboration and shorten the timelines for clinical development of novel antibiotics.



## SYMPOSIUM SUMMARY

### ADVANCING DATA TECHNOLOGIES TO CORNER AMR 2019

The aim of the event is to provide an international, professional podium for emerging data technologies that have proven or have the potential to strengthen, further develop or effectively implement one or more of the five strategies for the global curbing of AMR.

The event is a one day international matchmaking symposium on 5 June, 2019 in The Netherlands.

Target groups include international:

- **Academia:** (technical) universities, medical centers, research institutions
- **Private sector:** start-up's, SME's and multinationals: IT, Pharma, Diagnostics
- **Authorities:** national and international authorities, WHO, FAO, ECDC and NGO's
- **Finance:** business angels, (social impact) financiers, venture capitalists
- **Others:** hospitals, diagnostic labs, CRO's, insurance companies,

The event will provide a podium to Artificial Intelligence, Blockchain Technologies and Internet of (Diagnostic) Things in the global curbing of AMR. The event includes (key note) lectures, round table and guided matchmaking sessions, information market and extensive networking opportunities with the international AMR and IT communities.

Visit the preliminary website and read more on the anticipated program:

<https://www.amr-insights.eu/advancing-data-technologies-to-corner-amr-2019/>

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<sup>i</sup> <https://www.who.int/en/news-room/fact-sheets/detail/antimicrobial-resistance>

<sup>ii</sup> <https://amr-review.org/>

<sup>iii</sup> <https://www.daghammarskjold.se/publication/antimicrobial-resistance-and-sustainable-development-a-planetary-threat-but-a-financing-orphan/>

<sup>iv</sup> <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>