GE HEALTHCARE
SPECIAL SUPPLEMENT

Cover Story:

The Future is Digital

How Healthcare Can Unlock the Promise of Big Data

Summary: The healthcare space will not only need to change its systems, operations and infrastructure, but also healthcare professionals may have to adopt an innovative mindset to embrace the changes and challenges brought to their working lives by implementing big data.

I believe that big data present enormous opportunities in the healthcare space to improve the quality of life for patients and drive efficiencies for professionals charged with their care. With the vast quantities of data generated in the last decade, we have more insights than ever before into the best patient management and outcomes.

Somewhere in all these data are, in my view, opportunities to note trends in best practice healthcare delivery, predict epidemics and avoid preventable deaths, particularly from chronic diseases. All of this points to a more personalised level of care for each patient, with the capacity for

doesn't just begin and end with their health.

How do we assure ordinary citizens that their data – and in particular their medical records – are going to be used beneficially? Recent events, such as the Facebook backlash over privacy, are causing a general sense of unease. Both healthcare systems and citizens are opting out of sharing their data, suspecting they may be used for commercial purposes.

As a network, we will need to explain the opportunities that exist and then win the support of Europe's citizens. That is not a task for the innovators alone, it is a task

Privacy is a very real issue, as improving patients' lives doesn't just begin and end with their health

healthcare professionals to make increasingly tailored diagnoses, thereby improving efficiency.

However, from what I've seen, there are sizable barriers to overcome in ensuring the promise of big data is brought to market to truly benefit patients, rather than remains unrealised. These barriers include the challenges of combining and analysing the vast range of different data sources across regional and national boundaries to ensure that we can make like-for-like comparisons and draw meaningful conclusions.

Big Data Present Enormous Opportunities

National health systems and databases in Europe are diverse and fragmented, and need a common data format. There are also organisational, legal and ethical issues associated with data sharing, including the General Data Protection Regulation.

Against the promise of bringing vast improvements to patients' lives, we also need to come up with solutions that address concerns of privacy and autonomy of Europe's citizens. Privacy is a very real issue, as improving patients' lives

for the industry. We need a new deal where people get not only better health for their data, but also the assurance that those will not be misused.

Last but by no means least, in my view, are the perceptions by often overstretched healthcare professionals that implementing big data will only add extra information and a cognitive burden, or even eradicate their jobs.

Initiatives Harnessing Real-World Data

EIT Health is dedicated to finding solutions that both strengthen healthcare systems and improve the lives of citizens and as such, one of our core focuses is supporting organisations and initiatives that are considering these challenges seriously and harnessing real-world data for the benefit of society. For instance, in 2018, the EIT Health Think Tank brought together more than 100 experts and key stakeholders in big data and healthcare to discuss and plan how to accelerate innovation in this area in the future.

One initiative that EIT Health has implemented as a result of Think Tank is RABBIT (Registries and BioBanks in Transition). Access to qualitative sample and data

collections from registries and biobanks can give unparalleled insights, paving the way for new medicines and treatments. Discussions at Think Tank, however, highlighted that there were different rules in different countries for how they could be managed and used, resulting in hard-to-access, fragmented information. EIT Health therefore launched RABBIT to simplify this access and improve knowledge sharing.

We have also created a website, which acts as a portal holding transparent information on all biobanks and registries across Sweden, Estonia and Denmark. The goal is to eventually expand the reach across Europe. The website increases exposure for biobanks, but also improves entrepreneurs' access to big data to ultimately deliver enhanced solutions for patients.

Another initiative that EIT Health supports is 'Data Saves Lives.' It aims to raise wider patient and public awareness about the importance of health data, and improve understanding of how they are used across the continent. This initiative establishes a trusted, multi-stakeholder environment to promote responsible data use and good practices across Europe. It empowers both patients and healthcare professionals to experience how big data can underpin the health interventions that make the most difference to the end-user.

Using AI to Fight Antimicrobial Resistance

Among other innovative projects we're bringing to market is Abtrace, which harnesses Artificial Intelligence (AI) to fight the threat of antimicrobial resistance (AMR). As certain bacteria become resistant to the most powerful antibiotics available, due to overuse and misuse, healthcare professionals are finding that infected patients are becoming harder to treat. AMR is expected to kill more people than diabetes and cancer combined (House of Commons Health and Social Care Committee 2018). The

statistics are sobering: antibiotic resistance causes 25,000 deaths per year in Europe and 2.5 million extra hospital days (World Health Organization 2018). Equally alarming is the fact that 30% of all antibiotic prescriptions are inappropriate, meaning the patient will not benefit from or does not meet the clinical criteria for the treatment (Dyer 2016).

Abtrace uses AI to quickly analyse and aggregate vast sets of global antibiotic prescription data in a software tool. Clinicians can make more informed prescribing decisions, so that patients receive the most appropriate antibiotic for their particular condition.

Impact on Healthcare Professionals

I'm of the view that all of this digital technology promises to deliver significant improvements to patient outcomes. But as we've already identified, what about the healthcare professionals tasked with using the software? Are they ready for this brave new world? If not, what changes need to happen?

Lina Mosch, Director of Policy at the European Medical Students' Association (EMSA), sees a clear appetite for training in data science amongst medical students. A recent EMSA survey (2019) found that more than half of medical students consider their eHealth literacy either 'very poor,' 'poor' or 'acceptable.' Ms Mosch talks about a gap between the lack of awareness of these technologies, and the willingness of tomorrow's clinicians to be key players in big data.

To help to meet this gap, EIT Health has introduced a number of educational initiatives. One of these, Pathways, is free of charge for hospital decision-makers and trains them to use state-of-the-art tools to mine data about clinical processes in the cardiovascular field. Pathways uses algorithms to analyse data produced by recording routine processes so that clinicians can understand how to ask questions, identify methodologies and use their professional knowledge to analyse clinical processes.

Finding Encouragement in New Technologies

It's clear that for big data to become fully embedded in the healthcare space, there needs to be proper, coordinated and cross-border investment in both people and processes so that healthcare professionals feel emboldened – and not burdened by – these technologies.

Dr Umar Naeem Ahmad is both a clinician and AI pioneer behind Abtrace. He's optimistic that infrastructure barriers to adoption are being overcome: 'I see that both front-line practitioners and national policymakers are now seeing innovation as a necessity rather than a luxury. If the top and bottom are on board, it may take a little longer for management structures to roll out aspects like data-sharing agreements, payment structures for AI-related services and open, interoperable systems – but things are changing.'

Robert Madelin, Honorary Fellow of the Royal College of Physicians of London, writes in the European Health Forum about the need 'to adopt an innovative mindset if we are to make the most of innovation opportunities for better health, more resilient health systems and better patient outcomes.' With the right training and support, in my view, we may be looking at healthcare professionals who are actively involved in the design of AI-enabled technologies, and can navigate their ethical considerations.

As big data absorb more of the routine work, it is likely that healthcare professionals will have more time to devote to patients. And if more human interaction is the key legacy of this innovative new technology, surely this is something to strive for. ■

📄 Author: **Jan-Philipp Beck**
CEO | EIT Health | Munich/Berlin | **Germany**
info@eithealth.eu | eithealth.eu | 🐦 @JanPhilippBeck

✓ Key Points

- Big data present enormous opportunities for improving the quality of life for patients and driving efficiency for healthcare professionals and health services.

- These opportunities include: more insights into the best patient management and outcomes, spotting trends in best practice healthcare delivery, the ability to predict epidemics and avoid preventable deaths including from chronic diseases, thereby reducing spending inefficiencies and resource wastage.

- However, there are barriers to the effective use of big data, partly due to the challenges of combining and analysing data across regional and national boundaries to draw meaningful, actionable conclusions.

- In addition to the fragmentation of data formats in Europe, alongside the ethical and legal issues surrounding data sharing, there is also the question of whether already overloaded healthcare professionals are supported and trained to take advantage of these life-changing technologies.

REFERENCES

Dyer O (2016) A third of US antibiotic prescriptions are inappropriate finds CDC study. BMJ, 353:i2660.

European Medical Students' Association (2019) Digital Health – a gap in medical education. The Medical Students' Perspective. Available from iii.hm/118r

House of Commons Health and Social Care Committee (2018) Antimicrobial resistance. Available from iii.hm/11i7

World Health Organization (2018) Antibiotic resistance. Available from iii.hm/118t