The future of medicine has to be data-driven

How combining AI and expert knowledge is supporting clinicians in the age-old battle against cancer

By Dr Jurgi Camblong

The c-word has long been associated with death. Many of us have been affected or know someone who has been diagnosed with cancer, in some cases too late. We live in a time where recent medical and technological innovations have led to significant advances in the battle against cancer. A great example is the rapid adoption of Next-Generation DNA Sequencing (NGS) and AI capabilities in clinical applications.

The nature of the beast

In Europe, with more than 3.7 million cases and 1.9 million deaths each year, cancer represents the second most important cause of death and morbidity. The World Health Organization estimates that although more than 40% of cancer deaths can be prevented, cancer accounts for 20% of deaths in the European region. However, European cancer mortality projections since 2017 confirm the overall downward trend. Improved treatment options, organised screenings and the growing adoption of diagnostic testing are all factors associated with this development.

From the perspective of medical experts, the cause of cancer lies at the molecular level – our genetic code. As such, clinicians must decrypt the information contained in their patients' DNA to be able to better diagnose and treat them. Next-Generation DNA Sequencing (NGS) technology is the latest medical advancement to help decipher patients' DNA. What makes this technology challenging is both the complexity and quantity of the data that is produced. Raw NGS data has many biases that cloud the clinicians' view of the underlying genomic cause of their patients' diseases – also known as 'finding the signal'. This is where humans and machines can work together to address this challenge. By creating an AI, trained by world-leading experts, from the bottom-up we can 'cut through this noise', and offer a standardised clinical-grade solution that helps clinicians diagnose patients faster and more accurately.

Better diagnosis to better care

Today it is possible to diagnose a patient faster and more precisely for a wide range of cancers and congenital diseases, than could ever been imagined even ten years ago. However, this is only the beginning.

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The aim is to deal with the root cause of the disease, rather than just dealing with the symptoms. The future of medicine has to be data-driven. We need to work together, across national and organisational borders, break down information silos and combine the two most important resources we have available: cutting-edge technology and human expert knowledge. If we are able to fully and globally engage these two resources, we can truly make a meaningful difference in patient management around the world.

Employing data-driven medicine will allow us to create cohorts of patients with similar characteristics including the genomic profile of their tumours. By assembling these data sources, we are entering a new era where we will be able to cluster patients' cancer cases in virtual cohorts and determine whether the cancer of a specific patient is similar to that of 10,000 other patients who received treatment A or B that saved them.

Many countries have already realised the importance of data-driven medicine and its ability to revolutionise patient care. The rapid adoption of genomic testing powered by AI in recent years illustrates the faith in this technology to optimise and accelerate diagnostics and treatment. SOPHiA artificial intelligence is for instance the first clinical-grade and standardised technology, having analysed the genomic profile of over 200,000 patients to date, helping clinicians daily from 450 hospitals worldwide.

AI can help us with a lot of complicated and time-consuming tasks, but ultimately it will remain a support technology that clinicians will leverage to make the right decision at the right time. What we still need to work on is accelerating the global effort, continuing to adopt such relevant technologies and sharing expert knowledge, so that patients, regardless of where they are based, can benefit from it equally. Then, being diagnosed with cancer will no longer be a death sentence.

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