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The evolution of genomic medicine needs to be accompanied by the willingness of the hospital system – and to some extent, the payer system as well – to embrace these new technologies

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Genomic medicine expert Professor Thomas D. Szucs explains what ignited his interest in the field and how payers and authorities are adapting to the strain on resources that genomic medicine can contribute to. Professor Szucs also evaluates the sustainability of personalized medicine and China's rapid progress in the field.

Thomas, with your extensive experience in the field of healthcare, can you quickly sketch the main responsibilities and roles you currently hold?

I call myself a healthcare professional because I have been blessed to have had opportunities to work across different healthcare fields, from the clinical field to the payer side to the pharmaceutical industry, and across countries like Germany, Italy, and now Switzerland. All these experiences have blessed me with a good understanding of where the healthcare sector currently stands and where it is heading.

Currently, I wear three hats. The first is as professor and director of the European Center of Pharmaceutical Medicine at the University of Basel. We teach not only national and international pharma executives, but also regulators from around the world on how to best develop medicines.

We also started teaching in the US about 15 years ago, and 12 years ago, we started a Chinese course in Drug Development and Regulatory Sciences. My institute at the University of Basel is strongly involved in the art and science of developing drugs, and of course, we also work on research in the field of pharmacoeconomics, pharmacoepidemiology, pharma policy and other essential areas.

Secondly, I have been chairman of Helsana Group, the largest health insurance company in Switzerland for ten years now, which has given me insights from the payer's perspective. I am also on the board of an outpatient ambulatory mental health clinic. I have been privileged to be able to work on the boards of pharma and biotech companies, as well as hospital boards, throughout my career.

The third element is in personalized medicine. During my second and last sabbatical, I decided to return to work as a clinician and I went into personalized healthcare because I have always been interested in pharmacogenetics and genomic medicine. Since 2013 I'm running a practice for genomic medicine at the Hirslanden Private Hospital Group, Switzerland's largest private hospital. In October 2020, I was appointed as Co-Lead of Genomic Medicine of this private hospital group in Switzerland where I got the opportunity to play a decisive role in the establishment of the group's Precision Medicine division.

What specifically ignited your interest in genomic medicine?

I have always been fascinated by it. I used to ask myself, why do certain drugs work better in some patients than others? Throughout my drug development career, I also became really interested in the first pharmacogenetic chip. I still remember the early days when Roche introduced the first app in this space, the Amplichip ®, which was really the starting point of preemptive genotyping to identify and develop better personalized treatments. Over time, these technologies have become so efficient and cost-effective that such analysis is now very feasible. Pharmacogenetics also plays a huge role in patient safety.

I have since moved on from pharmacogenetics since many new genes have been characterized and have entered in clinical medicine. They are becoming easily measurable with the modern gene panels and next generation sequencing technology. In my hospital, for instance, I can work with not only cancer patients but also patients with other conditions with hereditary components, for instance, in the area of cardio genetics, where we can explore phenomena like hereditary rhythm disturbances, congenital long QT syndrome and so on.

I am confident that we will increasingly see such genomic tests become part of the normal clinical pathways or patient journeys. They have become mainstream because many such tests are now covered by basic insurance in many countries.

Genomic medicine requires a lot of resources and expertise throughout the healthcare system. How are payers and hospital systems adapting to this?

This is a broad question. Certainly, the evolution of genomic medicine needs to be accompanied by the willingness of the hospital system – and to some extent, the payer system as well – to embrace these new technologies. Speaking for the hospital group where I work, we are investing heavily in this space. For instance, we have decided to establish our own genetic testing lab and develop our own sequencing capabilities. This means we will have faster turnaround times and quicker results.

We also want to involve many clinicians across the 17 hospitals that are part of the group. We are really accelerating our efforts to adopt the use of precision medicine. That being said, we cannot accomplish this from one day to the other, a lot of education and training is required to upskill our clinicians because while precision medicine is becoming more mainstream, it is still a new science. We need to communicate with our clinicians, so they understand how to use and are comfortable with using these new technologies.

For instance, with CAR-T therapies and some of the gene therapies that are emerging, one of the most important aspects is that we have the buy-in of clinicians. This means understanding the technology, understanding the patient need, but also adapting to more interdisciplinary discussions. Increasingly, I think we will be discussing the question of whether the patient should receive a specific therapy in dedicated tumor boards that will be much more molecularly driven. We have seen some great results from CAR-T therapies, and some are definitely breakthrough treatments, but we still have to see whether they are best used as first-line, second-line or third-line therapies.

I currently run the genomic board at the Hirslanden hospital where I work, looking partially at genomics in both oncology and non-oncology areas. CAR-T therapies are so far concentrated in the oncology space but we know that there is a possibility that such therapies could also work in the non-oncology areas, so ultimately it is important to take an interdisciplinary approach when it comes to identifying the best treatment for each patient.

Certainly, the administration of such therapies will be confined to hospitals that are equipped and able to understand the entire patient pathway. They would need to have the capabilities to manage patients in advanced disease stages.

Many academics and stakeholders have argued that healthcare systems might be able to afford a couple of these but certainly not thousands CAR-T therapies with price tags of that can reach the USD 1 million each. If we are moving towards an environment of increasingly personalized therapies, is this sustainable? What are your views on this?

I can share the current Swiss approach. CAR-T therapies are currently being reimbursed based on a contractual approach directly with the manufacturers. It is not as straightforward as simply having the CAR-T therapies on the reimbursement list and the reimbursement being automatic. The process is actually strictly regulated, and it is a contractual agreement between the payer and the manufacturer, where the price is agreed upon and so on.

The fundamental question is whether the current provision model is sustainable for large volumes. It is not too futuristic to imagine that the engineering of the T-cells could eventually be done closer to the patient in the hospitals. With autologous CAR-T therapies, where the patient's own T-cells are extracted, this may be more challenging because of time and space constraints, since hospitals are not equipped to manufacture hundreds of CAR-T doses, but this may be feasible with allogeneic CAR-T therapies, because the doses could be pre-manufactured and there may be more economies of scale. We can look at it as 'off-the-shelf' CAR-T therapies that can perhaps be shipped more easily and across longer distances.

Ultimately, every hospital and health system will have its own approach to the adoption of new technologies and innovations. I think this is positive because that is also how different entities compete to offer the best services. The playing ground also varies from country to country, and even from hospital to hospital.

The classical view is that there are two types of healthcare systems: the Beveridge system and the Bismarckian system. The Beveridge model is tax-based. Here we are looking at the single-payer system in the UK, Spain, Italy and so on where citizens pay taxes and then do not pay anything for healthcare at the point of entry. The Bismarckian model, on the other hand, has a number of payers in competition, which does complicate the system to some extent, but it also triggers competition between providers and between payers. Under that system, different payment and reimbursement schemes will naturally emerge.

What we have seen is that countries with the Beveridge system do very well with long-term disease management and in the treatment of chronic diseases but not as well when it comes to specialized and high-cost areas like cancer. Access to the latest innovations in specialty care areas can be slower. For instance, certain cancer outcomes in the UK have not improved due to lower access to the newest innovative therapies. This is a challenge for countries with Beveridge-type healthcare systems: how to cater to rare diseases with more expensive therapies.

Speaking from a hospital group perspective, we are always striving to be among the best in terms of quality and patient outcomes. If we allow hospitals to decide how to embrace and manage new technologies, I think that would incentivize more competition. Competition encourages entities to strive for excellence.

You are also an honorary professor at the University of Peking Health Sciences Center in China. Chinese companies have been making great strides in the areas of personalized medicine and advanced therapies like cell and gene therapies. How do you evaluate their progress on this front?

I have been studying the developments in China over the last 12 years and before the pandemic, I used to travel there four times a year.

My first observation is the high levels of education, training and commitment I see in my postgraduate students. Most of them go on to work in the pharma industry, and they are really eager to understand all the aspects that go into drug development and so on. There is a keen hunger to learn.

The second observation is about the high level of digitalization. It is really incredible to see, and of course, some like to highlight the negative aspects, but at the end of the day, having a system for data collection and exchange that works is what we need in healthcare in order to advance the development of new medicines. What China has done in digital medicine is incredible, we are seeing mobile apps and wearables, and the exchange of data between hospitals, both public and private is well established. The rise of private payers is also helpful, which are still controlled by the government, but allowing for competition with each other. Even technology companies like Tencent are joining the healthcare game, establishing walk-in clinics and apps that allow you to book doctor appointments.

I recently visited PICC (the People's Insurance Company of China), who has recently established a health insurance business. They are targeting the growing middle class in China, which is very affluent, and they sell a tremendous amount of new health insurance contracts daily, completely via digital channels. The numbers are astounding, and if you can have all that data organized and accessible, that is incredible.

The third observation relates to genomic medicine, then, and the use of genomic data. I think in some Western societies, there is the idea that we have to protect everything – sometimes there is the sense that we might even need to protect the patient from himself! Genetic information is extremely important to healthcare treatments and its use for healthcare purposes should not be made prohibitively complicated. Obviously, we do not want to stigmatize or discriminate based on genomic data, but it would be extremely helpful if a patient was able to visit a doctor and say, here is my genome, you can look at it to help with your diagnosis and treatment. Some European countries have done this very well, like Denmark and Estonia, for instance, where a good healthcare data infrastructure is in place.

A final message to our international audience?

Almost all disease has a genetic component. For that reason, personalized and precision medicine is the most important area in medicine, in my view. Increasingly, we will be able to utilize these approaches even in chronic conditions. If we can understand the genetic component of disease better, it will drive better drug development and better therapeutic delivery. We have already seen incredible advances and certainly, any pharma company should be embracing the use of genomic medicine.

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