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Prof Dr Jürg Utzinger of the Swiss Tropical and Public Health Institute (Swiss TPH) outlines the organisation's important role within the global health landscape, how Switzerland collaborates with low- and middle-income countries, the growing significance of data, and what lessons can be taken from the COVID-19 crisis.

Swiss TPH was founded in 1943. The world has changed a lot since then, particularly within the public health and pharmaceutical sectors, but the benefits have not always been evenly spread between developed and developing countries. How has the strategy and mission of Swiss TPH evolved over the history of the institute?

Our vision – first and foremost – is to make the world a healthier place. Over the past 75 years we pursued our mission, that is to improve people's health and wellbeing, not just locally and nationally within Switzerland but particularly internationally. This is done through three pillars: research, education, and services. I am proud to say that our mission has remained unchanged. In a world seemingly turning ever faster and becoming more divided and polarized, it's an asset to have institutions that stick to their mission. I think we live in a world where people feel increasingly insecure, so an institute like Swiss TPH that remains steadfast to our core values is reassuring in providing an anchor and security to society.

In that sense, we have become a trusted leader in global health. We have remained true to our vision and mission, while responding to external circumstances that require attention. When the COVID-19 pandemic began, for example, we allocated resources to join the global fight, but we continued to prioritize our areas of research and projects where we know we can continue to make a lasting contribution.

As mentioned, our mission is to improve people's health and wellbeing here, there and everywhere. This means supporting people in both wealthy countries as well as in low- and middle-income countries (LMICs). Working in LMICs, we need to find solutions that are affordable and scalable for settings where resources are notoriously limited. Many hospitals in Africa, for instance, lack basic healthcare equipment, so when we work there, we have to find solutions and allocate resources in as efficient a way as possible so that we can maximize public health benefit. Incidentally, I think we can learn a lot from these experiences even in wealthy countries. For instance, when the COVID-19 crisis began, in Switzerland as well as many other European countries, we did not have sufficient supplies of masks. Hence, we were also working in a context of limited resources. For this reason, there is a lot of innovation – whether we call it reverse innovation or knowledge circulation – that we can share between LMICs and wealthier countries that can ultimately help us find better solutions within increasingly constrained healthcare systems.

Perhaps starting closer to home, what are some of the projects you are working on in Switzerland you would like to highlight?

The first relates to the tiger mosquito (*Aedes albopictus*) that can transmit a host of infectious diseases. The tiger mosquito originated in Asia but due to reasons including climate change and globalization, it has traveled to Switzerland. What was our approach to this? First, we invested in good monitoring systems to identify and learn about the mosquito so that we could identify the areas where it likes to lay eggs. Only then could we spray those areas with insecticides to kill the larvae before they became disease-spreading adult mosquitoes. Importantly, the tiger mosquito does not stop at borders, which calls for collaboration across countries and bringing together scientists, politicians and civil society.

The second relates to air pollution. More than 25 years ago, there was growing awareness that increased automobile and air traffic is responsible for air pollution. The initial question was how can we evaluate and better understand the negative health consequences of air pollution? The first thing some of my colleagues did was to establish a large population cohort. They looked at a

random sample of around 20,000 adults across all parts of Switzerland. This representative sample of people was monitored over time, which generated an evidence-base that air pollution causes respiratory ill health and other negative consequences. The next step was to come up with concrete policy changes, such as mandatory use of lead-free petroleum and equipping cars with catalytic converters. The large cohort of people allowed longitudinal monitoring of the impact of that policy change on health outcomes. Taken together, the overall process is to conduct scientific studies in order to establish evidence, shape policy, and then monitor changes people's health and wellbeing over time.

We are at a very interesting point globally where there seems to be a lot of distrust in science and experts in general, and the link between science and policy seems to be weakening, especially in countries like the US. What is your perspective on this?

This trend is also evident in Switzerland, and in some instances, it has become harder to bring scientific evidence forward to shape policy. This is worrying. Take the current COVID-19 pandemic as an example. Gathering and following scientific evidence is crucial because it is a new disease and the situation changes so rapidly. There is so much we did not know – and still do not know – about COVID-19, so we really have to establish the best science and generate the scientific evidence first. This process does take time, and it requires dialogue between scientists and the public.

The positive news is that in general, research and innovation in Switzerland is undisputed, and hence, the phenomenon of fake news is not a significant problem within the country. For instance, Switzerland created the Swiss National COVID-19 Science Task Force, comprising experts from different universities and research institutions. This task force is responsible for synthesizing the latest available knowledge, producing policy briefs, and advising the Swiss Federal Council on measures and policies to take.

As you highlighted, Swiss TPH also works a lot with LMICs, and you have a considerable number of projects in the works. How are these projects established and how do you track their success and productivity?

At the heart of a successful project in a LMIC is partnership. We adhere to the 11 principles of research partnership. One of those principles is mutual trust. Selecting the right partner is akin to

selecting a spouse; you choose wisely, and then during the partnership, you have to work together to jointly move the agenda and the ‘marriage’ forward through both easy and hard times.

Deciding on the objectives together is another critical aspect. Gone are the days where someone from Switzerland would go to say, Ghana, and tell the people there what to do. Today, we need to identify the needs together and then establish a research project that address those needs hand-in-hand.

These partnerships have to be scientifically-, not politically-motivated. Swiss TPH has been working in some African countries even before they achieved independence, so we have really been a trusted partner for many decades.

One of our advantages today is that as a large institute, we have a broad network globally, with local offices in around 20 countries, mainly in East, Central and West Africa. Through our capacity building and education efforts, we also teach students from all over the world, and once these students return to their home countries, they often work in academic institutions or key government and non-governmental organization with whom we might work in the present or future. This makes it easy for us to tap into global networks and further expand those partnerships together.

It is increasingly our colleagues in LMICs that come to us with new ideas for projects they want to address, and sometimes they have already applied for funding and are approaching us to bring in the additional knowledge, expertise or technology that we possess. In general, Switzerland has great innovation potential to offer, and I think that is why our partners continue to work with us even though there are now many different institutions and entities with whom they could partner.

When it comes to the topic of global partnerships in health, how do you see the role of China, given that it was a LMIC not so long ago but now stands as one of the largest economies in the world with a rapidly growing and advancing healthcare industry?

Here, I think Switzerland can play an important role again as a trusted partner to bring China and LMICs closer together. For instance, some of our colleagues in China expressed an interest in conducting research on malaria control in Tanzania. If they partnered with us, an institute that has worked in Tanzania for more than 70 years, with a strong emphasis on malaria, we can help them better understand the social, cultural and scientific contexts locally and readily connect them to the key partners in-country. We can help building bridges and expedite collaboration and

partnership.

A lot of the potential new money invested in global health priorities could come from China in the future. Hence, if we can bring China on board and leverage its key strengths, we could create extremely productive global health partnerships.

Speaking of global partnerships, mutual trust, and science-based policy, another big topic across the entire industry is data and the use of data. Is this something that Swiss TPH is focusing on?

Certainly. As a country, Switzerland is on the right track because there is broad support for the strategy of open science. At the start was open access publishing, but the ultimate goal is open science. In Switzerland, if a researcher receives funding from the Swiss National Science Foundation, he or she is obliged to make the data openly accessible. Open science is critical because it reduces duplication and thus reduces research waste.

In LMICs, standards and policies might not always be fully in place. For instance, when I first started working in Côte d'Ivoire some 25 years ago, there was no national ethics committee. Hence, it was a challenge to get approval for running a clinical trial. This kind of research ultimately helped to establish institutional research boards and national ethics committees, often along models that proved successful in Switzerland. Here, partnership comes into play again. For instance, we used to collect biological samples for research in other countries and bring the samples to Switzerland for analysis if the country of origin lacked the necessary facilities. Today, this is no longer allowed in many countries because they view these biological materials as national property, and they want to have their own laboratory facilities and capabilities to do these analyses. We can play a role in knowledge transfer and capacity building, which will ultimately improve the health and wellbeing of people in these countries.

Switzerland can also offer expertise on data curation. The whole data process starts with the study design but continues through to its collection, rigorous cleaning and analysis and ultimately its curation. The job is not over once the primary data have been collected. For instance, we recently established a global neglected tropical disease database. A small group constantly screens the peer-reviewed literature and obtains data from national and international entities. The georeferenced data can then be interrogated to answer key public health questions such as what the impact of a specific health intervention is on the prevalence, incidence or burden of a specific disease.

Coming to the COVID-19 pandemic, having seen the unprecedented levels and nature of collaboration within the industry, what are some of the learnings you hope to see companies apply from this experience to other public health needs

It is truly an unprecedented time for science and science-to-policy. We witness that when there is a global public health crisis that affects not just LMICs but also wealthier countries, the world manages to find the resources to solve the problem in a timeframe we have never seen before. The average time it takes to develop a new vaccine is 10 years and more. With regard to developing a vaccine against COVID-19, we might see the first generation vaccines hitting the market within just 12-18 months. This is transformative.

I think that the pace could have even been slightly faster had the world truly come together and pursuing a common goal. At times, the development of a COVID-19 vaccine has been too much of a race, and I think with better coordination and global leadership, we could have reached the ultimate objective to have safe and efficacies vaccines with less money invested. While competition at the beginning incentivizes the development of different vaccine candidates, once we have a sufficient number of viable options, in my view, the public and private sectors should come together to jointly advance product development in the most effective way. After all, this is a global pandemic, and a global solution is needed.

I also think it is important that LMICs participate more actively in the COVID-19 vaccine R&D efforts because that way, they can ensure that the vaccines developed ultimately meet their population profiles. If we are looking at a vast country like the Democratic Republic of the Congo where there is not even a very advanced road network, we need a vaccine that can reach marginalized populations in the most remote areas. Vaccines that need to be stored at ultra-cold temperatures will pose considerable logistical challenges to reach the most neglected people. The fact of the matter is that COVID-19 anywhere is COVID-19 everywhere, and hence we need to find ways of fair, equitable and rapid access to essential commodities, such as personal protective equipment, novel treatment and ultimately a vaccine.

Yet, let me stress again that the impact of vaccine R&D has been truly amazing, and I hope that these learnings and technologies can eventually be applied to other disease areas. We keep a consistent count of global COVID-19 infections and death rates but very few people are aware that malaria kills more than 400,000 people, mainly children under five in sub-Saharan Africa – year after year. This is all to say that many other diseases also need investment and attention.

A final message to share with our international audience?

“Together, we can make a difference!” Partnership and trust are key. This is very clear for me. We are in a global pandemic and there are other pressing global health issues, such a climate change. Let’s come together and solve these problems jointly – the time is now.

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