Microbiology and the pandemic

The COVID-19 pandemic posed major challenges for medical laboratories. The Pipette discusses the difficulties, opportunities and lessons learned with Professor Gilbert Greub. He is Director of the Institute of Microbiology, Lausanne University Hospital (CHUV), and Professor at the University of Lausanne.

Professor Greub, you are interested in the discovery of new pathogens of pneumonia. Was the COVID-19 pandemic a stroke of luck for you?
This was not a stroke of luck for anyone. It has affected the whole world and more than 6 million people have died from it. However, it was an opportunity to test our knowledge and approach towards new pathogens. When I first learned about COVID-19 in the news, I knew we had to develop new diagnostic tools. Right after the Christmas 2019 vacations, we started looking for primers. We were happy to be able to use an established R&D approach that we had used with various previous emerging pathogens like Parachlamydia, since this expertise in R & D of our team reduced much the time to get an established reliable diagnostic SARS-CoV-2 PCR.

Your laboratory has been busy with something that has affected everybody. Did you feel the public's attention, and did that lead to increased pressure on you or your laboratory?
Yes, the lab was under a lot of pressure because we had to be able to deliver the test with a high accuracy and a short turn-around time. We were also exposed to the risk of a shortage of reagents and a shortage of manpower. This was the first time we did such a huge number of analyses per day. But it was also possible to interact with the lay public and improve their perception of microbes in general. In the past, we developed a game about microbes to help people understand the risks and how to get protected. I also tried to continue lay communication and we developed a second game including SARS-CoV-2. With this, we wanted to moderate the debate.

You pointed out the importance of lay communication in a recent publication. Are there lessons that we need to learn from the pandemic?
In terms of communication, we encountered several problems. Different people have communicated contradictory messages. In the beginning, we did not have the knowledge about the disease and about the best testing strategy. One expert had one opinion and another expert had a different opinion. We did not discuss this in scientific meetings, but openly in the newspaper. And that's not good, because it leads to a loss of confidence in science and medicine in the population.

As it was the case with the antigen tests?
Regarding the antigen tests, that was really weird. We have known for years that antigen tests are not good enough for respiratory viruses like influenza. We already knew in April 2020 that the mean viral load of SARS-CoV-2 was comparable to that of influenza and other respiratory viruses. There was no clue that it would work any better for SARS-CoV-2. Of course, this could be a solution when reagents are not available or for very remote regions without access to PCR. Moreover, it is only possible to use antigen tests at the time of highest infectivity (day 1 to 4 of infection) and not in asymptomatic patients. This should have been better communicated so that people do not completely trust antigen tests. If I, as a dutiful layman, want to protect my grandmother from infection and perform an antigen test before visiting her, I will possibly transmit the disease. We have to do a better job here in the future.

But how can we organize a better communication in the future and who should do this job?
One problem is that experts in Switzerland are organized in national societies, for example the Swiss Society of Microbiology. These would be the ideal people to contact, but they have not been asked at all regarding antigen testing. The decision was made at the political level and everyone was surprised. The epidemiologists were driving this decision without asking the microbiologists.

Indeed, I had the impression that some specialists were not asked at all – such as microbiologists and laboratory physicians – and others were asked again and again. Do you think that the composition of the Swiss National COVID-19 Science Task Force was balanced in this regard?
Yes, I think that microbiologists have not been involved enough in the diagnostic group. In the Swiss Society of Microbiology, we have a coordinated clinical commission for many years and none of the members were part of the diagnostic task force. But that was partly due to the origins of the task force. Various researchers from EPFL and ETH wanted to be active here. In contrast, we were too busy organizing the daily routine in the medical laboratory. Until April 2022, we didn't have time to worry enough about political issues. As an example, some researchers asked us why did we initially test only fragile, symptomatic people? But in the March 2020, we simply had too few tests available, there were no commercial tests available. In this situation, the focus of testing had to be diagnosis (at-risk subjects), not epidemiology (all the population, including asymptomatic subjects without history of close contact).

The situation in developing the tests and setting up the test structures was difficult; there were no commercial reagents, few personnel, and a competitive situation regarding new analytical equipment. How did you deal with this situation?
In our lab, we had an automated PCR solution with pipetting robots and extraction machines already before COVID-19. Fortunately, our solution allowed for large analysis numbers. The analyzers of the other large laboratories in French-speaking Switzerland all required reagents from one company, which then could no longer deliver. By chance, this was not the case in our laboratory. But we also had many reagents

available because we analyze 110 different pathogens on our system and most of the reagents are interchangeable. Since February 14, 2020, we could provide the tests. As of March 24, we had the Roche Cobas Platform in addition and could use both at the same time, thus positively impacting the access to PCR reagents.

So, the key of success was an existing automation system before the pandemic?

Yes, with this strategy we were ready before the outbreak in Switzerland of this world pandemic.

As a final question, what were the three most important things you learned during the pandemic that laboratory medicine in Switzerland should do better next time?

The most important point is that we should define clearly when and how to do a test. Because it is nonsense to do a test when it is not needed. As an example, in the spring of 2020, we did a huge number of tests without any being positive. This has led to large costs for the society. Secondly, we must prioritize a short time period to test result. In various laboratories, the time to test result was simply too long, and this led to the unpleasant story with the antigen tests. Thirdly, communication with the stakeholders is extraordinarily important – also with industry partners, authorities, and politicians. And if I may make a fourth point – this is good communication with lay people.

Question were asked by Michael Nagler, Editor-in-Chief, «pipette» on 29 March 2022.

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