

I: Hey Emmanuel. As the first question, I wanted to ask you what responsibilities you've had in the Vogas project?

R: Well, I've been the clinical investigator in this project. So we've participated in the designing the collection point in the search of the most relevant clinical aspects that we have regarding gastric cancer. And then, we have trained a team of research nurses and technicians that would help us to collect all the samples that are required as well as initial data. And when the device arrived here in Brasil we were responsible for assembling it and then recruiting patients as well as all the data. And apart from that I have given a few suggestions of further use of the device in order to follow up the patients with some quite relevant clinical aspects and questions that have to do with the routine of the clinic.

I: What challenges have you faced during this project? For example, limits and ethical considerations, or any other challenges that you'd like to bring up?

R: Well, in fact some challenges that we had in the beginning, is that the protocol that we use here to treat the patients is little bit different from the other groups. So we a protocol where as soon as the patient is diagnosed, we start treating the cancer before doing the surgery. There are some studies suggest that this is better for the patient. However, as we understand, when the patients go to surgery eventually some of them don't even have a tumour there, there is some effect on the volatile, that's brought on by the drug that are used to treat the patient. And other clinical centers do not have this approach, so they could contribute more with tissues and other samples that were collected from the patient in the moment of the surgery. So this was the first challenge that we've faced.

[R] And also the routine here is quite heavy, here with the endoscopy department. Sometimes you lose a few patients because there is no time to go there, identify them, interview them, explain the project, have the consent form properly signed, and then go to collecting the samples. And of course, we are not allowed to do anything if the patient doesn't know what it is and doesn't agree with it. And maybe finally, the other challenge that we had was to be working with a device that is not fully ready, that is a prototype, and we have faced many issues of connecting the breath sampler, and the proper heating of some parts of the equipment and many challenges related to how the equipment worked. So most of the time the equipment was here, and we managed to recruit some patient, we're not able to collect any volatiles from them because of that [equipment malfunction]. And as I have mentioned [due to the possibility of the drug affecting the volatiles], it's maybe even more critical here because we try to start treating the patient as soon as they're diagnosed. So it's different from other partners, because after diagnosing the patient, then all the process and pre-surgical procedures that we have to do give you some time, some extra time, so you can say "okay, I can not collect from you today, maybe the next visit before your surgery I can collect the sample". But in our

case, this is not possible, because we try to start treating the patient as soon as possible and then we might not have the time to collect the sample later on. So I guess that these were the main challenges that we had in the project.

I: Alright, thank you. Then I wanted to ask you about the main lessons that you have learned during these projects?

R: Well, maybe the key lesson that we had is that together we're stronger. So it's been quite challenging for most of us to have the patient identified at the right time, gather the consent and the samples collected when they had to be. But when you put together a good team of very committed people, then we can reach good and important milestones. And also that we work with the global population as a whole, each one with different aspects, characteristics, diet, different compounds that are going to affect it. So if we do not act together, we may end up with a final divide or a final group of volatiles that are not relevant in some parts of the world. So we need to act more comprehensively, if I may say like that. That's the only way to have something that is more relevant.

And another main lesson is that sometimes we're quite optimistic that very soon we're going to have something, and usually, because of all these problems that I have reported, usually it takes longer than expected. And we have to be ready to try to convince the authorities and the project officers and all these people that we need more time. And of course, we have faced hard times with COVID-19. And this was a major impact as well, in not only having the electronic parts ready, but also in having patients coming back for routine exams and this affected quite a lot in most cases.

I: As the final question I want to ask you how do you think that digital health tools and Vogas could improve health equality?

R: Well, I think that we can improve health equality tremendously. First, from the gastric cancer perspective, first, that we are more advanced. Now we know that, in many situations, we can reach patients early during their journey – not only those that already have gastric cancer but many circumstances and I have personally interviewed patients that in the end were controlled. I remember the case of a young lady. She was 31 and she was going there for her first endoscopy because she had many relatives in the family who died with gastric cancer. That I am concerned that I have to come here every year to do my endoscopy because I'm afraid that I'm going to find something. And if you have something that is much, much less invasive. That the costs are close to negligible. Not only have people go in when they have a reason to suspect this or a higher change of having a gastric cancer, but also something that is ready for any person that's interested. As a consequence, what we are going to have is very early diagnosis. So patients that usually are diagnosed when they have a more advanced tumour. Now we're going to diagnose these people very early on. Eventually, they don't even have to go to surgery, they can go to a procedure where you just remove parts of the stomach, more inner part. Then you

not only increase the chance of survival but you tremendously improve the quality of life. I'm very optimistic that we're going to have a strong impact in the lives of people, we're going to save many, many lives.

And I would go further as well, because we have a suggestion based on the work we've been doing. And it's to monitor the patient after surgery. So let's say that I have a specific volatile that is produced the tumour cell. Then we remove the tumour and we expect that specific volatile to drop. And if we keep following the patient, monitoring for whether the disease comes back, then, eventually, that specific volatile is going to increase again. So the application is not only for diagnosis but for disease follow-up as well, where this is quite important. And another aspect, as I have mentioned, many centres in the world do like we do, that is to start treating the patient as soon as the disease has been diagnosed. But most of the patients are not going to respond to the approach. And we had this idea of following the patient as soon as the treatment starts. And we expect that tumour-specific volatiles are going to drop, if the tumour is responding to that specific drug. And if not, they're going to have the same levels, or even increase, and it is a strong sign that you can either change the drug, or that we have to take the patient immediately to surgery. So there are many more applications than just diagnosing the patient. And of course we're starting with gastric cancer, but there are numerous other applications with many other tumours. And not only tumours but also many different situations and diseases in the clinical setting.

I: That really sounds marvelous. Thank you so much for taking the time to do the interview, Emmanuel.