

Infectious Questions EP 24: Update on COVID-19 Testing in Canada

Shivoan: Welcome to Infectious Questions; a public health podcast produced by the National Collaborating Centre for Infectious Diseases. I'm Shivoan Balakumar. Our series on COVID-19 continues as we try to cover topics and questions of interest among public health practitioners in Canada. If you have any questions to submit, please send them to NCCID@Umanitoba.ca or find us on our website at NCCID.ca. On this 9th episode, we circle back to a topic that we covered in episode one of this series: testing for SARS COVID-2 in Canada. You'll not only hear updates on the testing landscape since our first episode, but you'll get a glimpse into what's coming down the research pipeline for testing and diagnostics for COVID-19.

We once again speak with Dr Jared Bullard, a paediatric infectious disease physician and Associate Medical Director at Cadham Provincial Lab in Winnipeg, Manitoba. Here is NCCID's Aleksandra Wierzbowski with Dr Bullard.

Aleksandra: In early February, you spoke to us about COVID-19 testing in Canada including the tests that were in use, testing criteria and test performance. Has testing in Canada changed since then? If so, what should health professionals know about these changes?

Jared: I think when I last spoke to you we were talking about, what we would call, lab developed tests or LDTs. So, pretty much across the country, everybody had developed their own in-house system for doing that testing. By and large, that was felt to be sufficient and so we were all pretty good and pretty comfortable with the testings. Now, when we're doing out testing here, we're actually using two different gene targets; we use one kind of as a screen and then one is confirmation and for the most part they worked great. Like we really had no issues from the beginning. We were saying to the NML – and for the most part they were just confirming what we already knew, so it didn't take us long to get to really the place where we were comfortable with our own testing platforms.

One of the things that immediately became evident was just the volume of tests we had to get through. Right away, we were aware that we had underestimated. Even though we actually took quite a bit of time to plan ahead, we said that "You know what, based on what our experience was with pandemic influenza back in 2009, if we plan for about 2½ to 3 times the volume we should be able to accommodate that pretty easily." What we found though, was that the volume was, in fact, probably seven or eight times what pandemic flu was at its peak. So, right away, you imagine that you have all these labs that were doing these lab developed tests and suddenly they all require the reagents and different suppliers to be able to

be able to do that testing. So that by far was the biggest change that happened where just the volume was well over what we anticipated.

As a result, though we did manage to reach out to so many different stakeholders across the university, throughout the healthcare system, and they were very, very helpful in providing us with all sorts of resources so we continue doing that testing. One of the other things that actually has happened in the past two weeks has been commercially developed testing. So a lot of testing can be done on automated platforms and so the benefit of that is it's just a lot higher throughput. It's not quite as manual and so you can actually get through a larger number of tests without quite the same amount of manpower required. And so we now actually have two platforms up and running in our lab that are able to do just that. They're automated and so the speed at which we can get through tests are better because we now have three different options.

We have the two automated platforms in the lab developed tests and the final thing that is brand new is that you've probably seen all of these points of care molecular based tests that have developed in – and were in the news and supposed to be the saviour – they're starting to come online as well and should have some Health Canada approval in not too long. The best thing about these options are that they don't require the same expertise and once we've figured out if they perform as well as our other tests, they might be able to be used in rural, remote, northern communities throughout the country. So that's pretty exciting. What do other health professionals have to know about these changes? Well, just that there's a couple of different options. The volume that we're going through, you'll sometimes see changes happen over the course of a few days.

One day we'll be saying that we're testing this specific population and the next day we might find out that we actually have to change course and adjust. And I think it's just because this is such a unique situation that you wouldn't typically have such a short amount of time to adjust and adapt to the requirements of the day. So criteria does get dictated, I'd say, much more locally than it does across the country because each province has their own unique needs, right What applies in BC doesn't necessarily apply in Manitoba and likewise what's happening in Nova Scotia doesn't apply in Quebec. And so I think that the expertise that we share in regard to making the testing happen improves efficiency but ultimately it's more our interaction with public health and what they see as their needs in their own location that kind of help us decide what and who should get testing.

I would say that overall though volume, without a doubt, was the one big change but with the point of care and automated platforms coming on board. I think that we're in a much better place than we were about three weeks ago.

Aleksandra: OK, thank you. How is Canada performing with COVID-19 testing and diagnosis and how could testing improve?

Jared: I think that – one of the things that I've been trying to say is that numbers aren't quite as important as the media is giving attention to it. Why do I say that? I think that the World Health Organization certainly did point out that test-test-test, right? So, the idea is test as many people as you can; if they're asymptomatic or symptomatic it doesn't matter because then you'll be able to isolate them and treat them appropriately. And, to some degree that's true and it is applicable, but it also is predicated on the idea that everybody has the same amount of resources available to them. Certainly, we saw a lot of success in Asia when Taiwan and Singapore and South Korea were doing such aggressive testing. Keep in mind, they had access to, I think, a lot more resources than the rest of the world has had the opportunity to have access to.

So, how is Canada performing in regard to COVID-19 testing and diagnosis? I think they're doing really quite well. I know that we've seen a number of reports that say when you look at the testing we do per capita, we are ranking among the top performers in the world which is really, really good and says a lot about the lab and the lab workers in general and their dedication to the healthcare system. I get to hear a lot about frontline healthcare workers and certainly they are going to be doing the lion's share of dealing with this crisis. I'd say that is just as important as the lab workers who are every bit as professional as healthcare providers in their own way, right? They are also just as scared to be working with all of these samples. They also are concerned about their family and the potential for them to get infected and bring it home and vice-versa.

But, they show up every day and they work extremely hard to get those results out for everybody to work with. Other things that testing could do better; I think that when it comes down to it we're going to have to look at some alternatives to molecular testing. So part of that is going to be that we're going to have to look at things like serology. Serology isn't quite as helpful upfront – in other words, if someone comes in and is sick on Day 1 or 2 of symptoms and we test them with serology, in all likelihood they'll be negative. But, once we get to about that 5 to 7-day marker, where if through serology it would be a lot more helpful because we will start to see some of the antibodies appear and by about 14 days most people will have antibodies.

You can imagine that it's going to be helpful on a population level because we'll know how many people are actually still susceptible to infection and those as well that are no longer susceptible. It has a lot of impact on who can then go out in the community and perform work. Because, once you have immunity, it does seem like you're not likely to get infected again. I already did kind of talk about some of the limitations in terms of our

supply chain. Certainly, the volume again was such a – not a shock but it was certainly we – underestimated the volume that would come our way. We found many, many different workarounds to accommodate for that. But, every now and then, we are surprised because we run out of things that you wouldn't even consider you would run out of.

Tubes – like just tubes for making different aliquots and samples suddenly start to run out and you're like “Wow, we need to get these.” And again, everybody else is competing for the same reagents. One of the other challenges without a doubt is that Canada, I think, was better prepared in terms of testing than our neighbours to the south. Once the US started getting rolling, they had a much different market demand than Canada could compete with. So, if you imagine, we order like 100 000 tests; they can order millions and millions and likewise there are other markets across the world that can do the same sort of thing. So, it did really make us think about what would be a benefit to have within Canada and so I think that was another thing that we could have considered a bit more in terms of being a bit more effective in our testing.

Aleksandra: And to your knowledge, in other provinces, is it mostly the provincial labs still or other clinical labs are going to be helping out as well?

Jared: Initially it was exclusively the public health labs for the most part; what you're seeing now is that some of the commercial labs are just starting to come on board as well. And that just aligns with the fact that they have access to those automated platforms I was talking about earlier. So that's great, it's helpful. It basically takes a takes some weight off and allows us to shift our priorities a little bit more but still, the vast majority of testing is going to be done by the public health labs across the country; with some exceptions. I think that what is amazing is that the labs across the country have been in constant communication and that's really in an effort to make the testing as efficient as possible.

I mean you had labs in BC who used one commercial platform, came up with a protocol, shared that across the country. We had ones in Alberta where they used a different platform and the same thing happened right away. We borrowed from Newfoundland and Quebec to kind of come up with ways of being more efficient and likewise they borrowed from us. We shared efficiency data across the board just to say “If we work like this, you can actually continue to produce more tests results and get through more samples.” It was incredible to watch the lab community come together in that regard. Can I say specifically what each lab is doing? I probably could because we're so closely linked at this point, but we're all different and it's interesting to see what we've taken from other places and adapted to use locally. It's really quite cool.

Aleksandra: OK, thank you. Can you tell us about what is happening here and internationally regarding testing and diagnosis – research and development for COVID-19?

Jared: We're lucky here in Manitoba; we have the national microbiology lab right next door and we have been working diligently with them to validate a number of these different point of care molecular tests and also just help them learn about these different platforms. That's been quite productive and that's going to be continuing for the next couple of weeks. In addition, we've also been trying to get samples to them so that they can do further work; so certainly whole genome sequencing is helpful because once you have a genotype it can help you track how this virus behaves in the population. We're also looking at key things like viral viability. So, in the news recently you probably saw that there was a paper that came out of Nebraska, I believe early last week, was talking about 11 cases in their own rooms and how they could find the SARS Coronavirus to pretty much anywhere they looked including in the air. The method they used was actually molecular. Molecular doesn't mean that the virus that they're finding is still viable, they're meaning that it won't necessarily cause an infection.

That being said, there are ways we can figure out if a virus that was in that environment could and we'd have to do what's called the cell culture. So a cell culture is not again, quite as effective in determining whether someone's infected because it takes a little bit of time. SARS COVID-2 tends to take somewhere between 3 to 5 days, so it's a bit faster than most respiratory viruses but you can imagine that the molecular methods are usually done and available in about 24 hours, so that's different. We're working with them as well just to say 'if we have a sample where we can pick it up using these molecular methods, will these samples still have virus that can grow in cell culture and thus is it possible those viruses can cause infections.' I think that's going to answer a lot of important questions particularly for public health, occupational health, and infection prevention and control.

The other thing that I talked about briefly too was serology and you probably have seen so many different options coming. There's a bit of a challenge in that because there's both legitimate products that are coming out as well as a lot of ones that are far less legitimate. We have seen all sorts of products that are obviously not real. So, when you investigate them a little more closely, you find out that the company doesn't actually exist. When you look closely at their advertisements that they send to you, they look kind of sketchy and so you figure out that "You know what, this isn't real." But then, there are numerous other companies who are now looking into the serological diagnoses and so there's again more manual methods. Soon, I suspect we'll start to see the automated platforms come online.

That's where we'll be able to really do some serious serology surveillance of the population as a whole and really see how many people have been infected with COVID-19.

Shivoan:

That was Aleksandra Wierzbowski's phone interview with Dr Jared Bullard. If you have other public health questions on COVID-19, please reach out to us at NCCID@Umanitoba.ca. Production of this podcast has been made possible through a financial contribution from the Public Health Agency of Canada but the views expressed here do not necessarily represent those of the agency. The host organization of the NCCID is the University of Manitoba. Learn more at NCID.ca.