

Infectious Questions Ep. 16: Testing for 2019 n-CoV (2019-nCoV, Pt 1)

Shivoan: Welcome to Infectious Questions Public Health Podcast produced by the National Collaborating Centre for Infectious Diseases. I'm Shivoan Balakumar.

Today begins the first of several episodes on the 2019 Novel Coronavirus, an emerging infection recently declared a public health emergency of international concern by the World Health Organization. In this episode, we will be speaking with Dr. Jared Bullard, a pediatric infectious disease physician and Associate Medical Director at Cadham Provincial Lab in Winnipeg, Manitoba.

Dr. Bullard spoke with NCCID's Dr. Aleksandra Wierzbowski about testing and diagnosis for the Novel Coronavirus and Canada's laboratory response so far.

Aleksandra: What is it that health professionals in Canada need to know about testing and diagnosis for the 2019 Novel Coronavirus?

Jared: Well, testing for this Novel Coronavirus is important. Public Health has to be on top of this particular infection, particularly as it comes outside of China. So, here in Canada we have a couple of criteria that help us know who we should test. One of the most important things is a travel history, so has this person been to an affected area. For now, it's primarily concentrated in two provinces in China, so it's important to know that.

The second criteria will be clinical. Does this person have any symptomatology? So, we're all used to the flu and know the symptoms around that. Just to reiterate those, it would be things like fever, runny nose, a cough, feeling achy in your muscles, and just generally unwell. We think that those are important symptoms to have.

Who can order this test? Pretty much any practitioner, but that should be done in consultation with an ID specialist or someone in Infection Control, or one of the Medical Officers of health who have pretty clear criteria as to who is considered a bit more high-risk to have this Novel Coronavirus.

Because one of the worst things that can happen is a sample shows up to the lab and we don't know it's coming, it's a bit of a risk for everybody involved because we're sitting there trying to figure out is this truly something that requires further testing. Sometimes they might not even say that this person is on the requisition and, without that communication in place, it really is suboptimal for everybody involved.

At this point, we're still trying to figure out what the best sample is, but based on our knowledge of existing coronaviruses and other respiratory viruses, nasopharyngeal samples work really well. That's just a swab that goes up into the nose to the back of the nasopharynx. You can also get a nasopharyngeal aspirate, when you're putting a little bit of sterile saline into the back of the nose and suctioning it out. We know too that sputum samples might be a useful sample. Then, finally, if someone is ill enough, we can actually get deeper samples from the lungs.

In terms of getting a result, if we think it's really high-risk, you should have that resolved within 24 hours. Now, that is 24 hours after received in the lab not necessarily 24 hours after getting the sample.

Aleksandra: What can you tell us about testing accuracy and the process of laboratory confirmation for this novel virus?

Jared: The testing at this point in terms of figuring out accuracy is a bit challenging. We know based on experience that the testing that we have now is very sensitive and specific, meaning that it's going to find most cases and when it is positive it actually is really going to be Novel Coronavirus. But, the trick here is that we don't have a lot of positive samples to compare it to. Until we have that, we can't say definitively this is a true sensitivity and specificity.

Is there a potential for retesting? Yeah, that is possible. We may see some false negatives early on, but we will become better the more testing we do. If we do in fact have a positive test, what do we do in the lab? The testing that we're doing at Cadham Provincial Lab is primarily screening, meaning that we're just saying yes this is positive or no it's not.

The National Microbiology Lab has played an important role in the confirmation of screened and positive tests, so those tests that are screened positive will make their way there. Even some that have... certainly high risk will also make their way to the National Microbiology Lab to have that concurrent testing going on. In addition, everybody that has to be notified will be notified, so the Public Health people, the clinician who ordered it, the Infection Control people, and they'll all act accordingly based on their protocols.

Laboratory confirmation, at this point, will be a positive molecular detection, but it may also include culture; not that we're doing that, because that would be considered a Containment Level 3 activity. Most labs aren't equipped to do that. The Public Health Labs in general do have that ability, but the focus is on molecular diagnostics, primarily because of the speed. You can get a result in 24 hours.

And if you're trying to do a viral culture, at best, maybe three or four days, but more likely you're dealing in more seven to 14 days, if you can grow it at all. The beta coronaviruses, in particular, grow not so badly. So, could we use it? Sure. Is the speed going to allow for it? Probably not in terms of appropriate clinical, Infectious Control and Public Health response, but it will be important for the long term.

There is a process in place just to make sure that what tests we get are appropriate. It is a bit more challenging to ensure that we are dealing with a Novel Coronavirus case, and that's why the history was important in the picture of clinical symptoms. Because, on top of that, we are also in the midst of influenza season, so the vast majority of people that present, even if they have travelled to China, are going to have the flu.

Aleksandra: Can you tell us a little bit about what happened behind the scenes in terms of Canada's laboratory response to the 2019 Novel Coronavirus?

Jared: So, the Public Health Labs in Canada don't act by themselves. There's actually the Canadian Public Health Lab Network. And so all the different Medical Directors and higher-level staff in those labs communicate quite regularly, and they are kind of led by the National Microbiology Laboratory. So, the good part about that is the National Microbiology Lab is linked to the World Health Organization and has a lot of contacts throughout the world, including in China.

As soon as they kind of realized there was something new going on and this Novel Coronavirus first appeared, they were on top of that, and so they were communicating fairly regularly with the other Public Health Labs across the country. Cadham was no different. We were aware of it and we were already starting to think about, well, how would we develop the test. But, that was primarily the main impetus to get us to know that something was going on and that we needed to be a little bit more prepared.

Since then, of course, we've had opportunities to develop tests. Wherever they have had positive cases, they started to develop tests. In particular, places Japan and Germany have kind of been on the forefront of that. Certainly, China has probably the most advanced testing at this point, but the testing we're using in Province at the moment is based on the Germany protocol.

Aleksandra: How would you compare Canada's and the Global Laboratory response to this virus to previous viruses of international concern that we have encountered?

Jared: The biggest difference I can see is that we're just over a month into the Novel Coronavirus in China and already worldwide testing is available. I think that has a lot to do with the communication that is constantly going on. And, that's quite different. I'd say with Novel Coronavirus, we certainly knew about it fairly quickly, but I don't know if its assays were ready quite as quickly.

Certainly, the other big difference is that this still doesn't have the same mortality as something like Ebola, so there is more general ability to do the diagnostics. What I'm also seeing that's a little bit different is that commercial assay, so industry is actually jumping on board quite quickly as well, and they really want to have something that's up and running. So, I think the speed and the way that it is being shared is a little bit different compared to the other pandemics or the pandemics that I have seen in the past. I'll use Ebola as an example, or pandemic flu or Zika virus.

Shivoan: That concludes our conversation with Dr. Jared Bullard at the Manitoba Provincial Public Health Lab. If you have other questions about the 2019 Novel Coronavirus, please reach out to us as we would like to address them in future episodes.

Production of this podcast has been possible through 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 nccid.ca.