Interview with Dr. Isaac Bogoch

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Dr. Isaac Bogoch

Dr. Bogoch completed medical school and internal medicine training at the University of Toronto. He then pursued an infectious diseases fellowship through the Harvard Partners program, and an HIV fellowship at the Massachusetts General Hospital. He holds a master's degree in clinical epidemiology from the Harvard School of Public Health, and a diploma in tropical medicine and hygiene from the Gorgas Memorial Institute and the Instituto de Medicina Tropical in Lima, Peru. Dr. Bogoch sits on the Ministers' COVID-19 Vaccine Distribution Task Force.

UTMJ: Could you please tell us about yourself and your role as infectious disease specialist?

IB: Sure. So, I'm a general internist and an infectious disease physician based out of the Toronto General Hospital. I have some background training as well in epidemiology and public health. As an academic clinician, I spend a lot of time doing clinical work and teaching, but also have dedicated time for research. A lot of my research is in the realm of tropical medicine and emerging infectious diseases and I have various research projects and research collaborations locally and globally that I work on. I sort of work in the realm of where epidemiology, public health policy, and medicine intersect.

UTMJ: How did you first become interested in your field?

IB: So, I went to medical school at the University of Toronto and I wasn't sure what I was going to do for residency. I did electives in medicine, neurology, trauma, surgery – it was kind of broad. I recognized after the trauma surgery elective that I thought surgery was fantastic, but it just probably wasn't the lifestyle that I really wanted. And quite frankly, I wasn't sure what I wanted to do, so medicine was a bit of a delay tactic where I could still have some general training and decide to either be a general internist or perhaps sub-specialize. I did internal medicine training here in Toronto as well and I really loved a lot of different aspects of medicine. I was thinking about respirology, ICU, I really liked infectious diseases as well. I think I could have gone into a lot of different paths and had a wonderful time. I think there were a lot of right answers and I'm glad I picked one of several of them. And then I did a chief medical residency in Toronto, split between Toronto General and Toronto Western Hospital. I have to say that was one of the best years of my life and also one of the best years of training. It was just a great year – you get to really understand cases and you get to do a lot of teaching.

I think one of the surprise winners of that year is being in many meetings, which doesn't sound so exciting, and I still hate meetings, but it was wonderful to be a fly on the wall in high-level hospital and high-level university meetings. I really got an appreciation of what a skilled administrator is and I had never really appreciated that before. You can see how people craft policy, come to consensus, and deal with challenging issues. That was so invaluable and it was really helpful to be involved with that process. I did my infectious diseases training in the Harvard hospital systems and I did a master's of epidemiology at the Harvard School of Public Health, so I was in the United States for a few years. And then I ended up, one way or another, coming back to Toronto.

UTMJ: Thank you for that introduction. Could you give us a rundown of the vaccine development process, in other words from conception to eventual distribution?

IB: I'll give you some very sparse details from conception to production, and maybe more details on distribution. At the end of the day, I'm foremost an infectious diseases physician and the field of vaccinology is a really sub-specialized and interdisciplinary field that has basic science, epidemiology, and translational science. In a clinical trial, there's a lot of interdisciplinary work involved with the design and testing of vaccines. In broad strokes, you start with your concept in the very early basic science approach, and then you move into preclinical studies which would be in non-human animals, and you look for animal models for whatever illness it is you're looking for. So, for example, for COVID-19, there was some really good preclinical work in non-human primates. And then when you have a safety signal, and perhaps an efficacy signal or immunologic signals that might demonstrate that this is a potentially useful vaccine, you move into human clinical trials. And that really involves three phases.

The first phase of human clinical trials involves a very small number of people and you're looking for different doses of the vaccine and safety of the vaccine. You can also glean some very crude immunologic markers from the vaccine. The second phase of the clinical trial will also look at safety, but you have a greater number of people enrolled. Instead of measuring in multiples of ten, usually it's measured in the hundreds, sometimes a few thousand, but usually in the hundreds. Then you're really looking at a lot of the immunologic markers of

the vaccine. Is the immune system responding in a manner that it should if it's been given a vaccine? So, you're looking at, for example, antibody responses and T cell responses. And then, if you have safety and crude markers of efficacy, mainly extrapolated from immunologic testing, you move on to the much larger phase three clinical studies which start to enrol tens of thousands of people in a prospective randomized, placebo-controlled manner, which is one of the gold standards for clinical trials. Now you're not only looking at safety, but you're also starting to truly measure efficacy when you have a much larger population. And we saw some landmark studies over the last year looking at for example, Pfizer, Moderna, AstraZeneca, Novavax, Johnson and Johnson, all of these have large phase three clinical trials that enrolled tens of thousands of people. You can comment on the safety and the efficacy of the vaccine based on that data. And most of those were well conducted studies.

And then it's interesting because it doesn't stop there. After the phase three clinical studies, the companies submit their data to regulatory bodies. So, for example, in Canada it's Health Canada and in the United States it's the FDA. These regulatory bodies look at all the data, some of which might not even be publicly available, but some of it is published in peer reviewed medical journals. It's not just safety and efficacy, they'll look at manufacturing data, and they either give it a thumbs up, or a thumbs down. And if they give the thumbs up, then you start to roll out your vaccine in a larger population. And then what you do there is known as post marketing surveillance where you look for much more rare events that you might not pick up in a basic clinical trial. When you're rolling this out to hundreds of thousands or perhaps millions of people, you'll just see things that you won't see in a phase three clinical trial when you only have tens of thousands of people vaccinated.

The other interesting thing is that you don't just measure efficacy, you measure effectiveness. How effective is this vaccine in a real world setting where some people might not show up for their second appointment, where you've got a much looser restriction as to who's getting the vaccine? You may include older people or immunocompromised people in vaccine roll outs, so you have a much better measurement if you measure the effectiveness of the vaccine. You've seen the benefit of post marketing surveillance. For example, in any of the phase three clinical trials with AstraZeneca and Johnson and Johnson, we never heard about any of these rare blood clotting events. That's because they're so rare, you're not going to see them when you enrol twenty or thirty thousand people in a clinical trial. You're only going to see them when you start to give this vaccine to millions and millions of people. So, this post marketing surveillance component after a vaccine has been approved and rolled out is extremely important.

UTMJ: How has your experience been on the vaccine distribution side of things?

IB: Oh, it's been terrible (said jokingly). I mean, it's tough, but it's an interesting challenge. For starters, even before we get into the vaccine distribution task force, it's fair to say that if you're a healthcare provider in Canada, you're very busy at the moment. Forget all your other duties, you're very busy just by virtue of being a healthcare provider. So that's one. We're all busy. Secondly, if you are a healthcare provider and you work in an academic environment, you're also busy because some of your other obligations still exist. So, you still have some other teaching or administrative or research duties. Now having said that, by and large, the universities and the hospitals try to recognize the pandemic and make things a little bit easier, but there still are other duties, above and beyond patient care. Then you add in these types of additional layers of work and responsibility.

So, the vaccine distribution task force is a provincial task force that helps create vaccine policy for the province, and we feed our recommendations to the Ministry of Health who will choose to implement the policy, sometimes with modifications. It's a lot of work but very interesting. On the one hand, you can help shape sound, data-driven, equitable policy for a province of about 14 and a half million people. And that's obviously a pretty unique experience. On the other hand, you have a lot of other competing responsibilities for your time and you want to do a very good job. You're balancing a very challenging, political, and increasingly polarized pandemic response, which includes vaccine rollout. So that does add additional challenges, and a lot of time, so I wouldn't say it's a cakewalk. There's a lot of very valid criticism and then there's a lot of noise and politicized criticism. I know personally, I try my very best to listen to everybody, to take everyone's concerns seriously, and to try and sift through what are some very valid criticisms that we truly need to iron out and what are some very valid suggestions that need to be addressed. And then also how to filter out some of the amplifications of some polarizing comments. I think we'd be foolish to ignore the fact that public health is, of course, political. But on the other hand, I'm trying my hardest to not have any partisan views, to stick with data, to listen to viewpoints from multiple sides of the spectrum, and to continuously push to improve the vaccine rollout to make it as data driven, efficient, and equitable as possible. And just to be totally clear, I'm not always successful. There are obvious problems with the rollout which I've tried to be as transparent as possible about, but there's other issues as well that I think are actually being ironed out and are going okay.

UTMJ: What should medical professionals and the general public alike be expecting in the next few months regarding vaccinations? How should we counsel people who have received the vaccine with regards to social distancing, travel, and other in-person activities, especially now that summer is on its way?

IB: The pace of vaccination has clearly picked up in Ontario. So, the strategy now is to continue to prioritize based on a few different avenues. One is to prioritize people based on their individual risk for severe outcomes which is age based, and also people with medical comorbidities. There's also

the priority of communities at risk as well. So, putting more vaccines into disproportionately impacted communities is helpful, and this includes vaccinating essential workers, their families, and the communities they live and work in. And then the third component is really prioritizing those at greatest risk of getting the infection by virtue of where they live or work so for example congregate settings like refugee shelters, homeless shelters, and prisons. So those are the three overlapping priority groups and I think over the next two months, we'll have vaccinated a significant proportion of eligible adults in the province of Ontario. There are obvious bumps on the road, but we'll get there.

As for the second dose delay, the original recommendations were to have the second dose after four weeks, but now people can expect after getting their first dose to wait up to four months. This recommendation is from the National Advisory Committee on Immunization so we can vaccinate as many people as quickly as possible. And I think it's fair to say that there's decent data to support dose delay to two months and even three months. It gets a little more scant at delaying doses by four months but we're doing it in Ontario and Canada. What we shouldn't be doing is a four-month delay for people in certain circumstances such as people with medical conditions like certain types of cancers, or organ transplant recipients, or people over a specific age, such as 80. I think these people should have that second dose delay limited, for example to a month.

But I think it's fair to say that for the vast majority of people it's just not going to be an issue. Obviously, it's not ideal and in a perfect world if we had unlimited supply we wouldn't need a dose delay, but there isn't an unlimited supply. I think we just have to be realistic based on the supply that we have and this is the position that we're in. There's also trade-offs for everything. If you said we're going to stick with the dose schedule of dose two at 21 days for Pfizer and 28 for Moderna, we could do it, but we'd be vaccinating at half the rate and it would just take a lot longer to get out of the mess that we're in. We know that there still is a significant degree of protection two weeks after the first dose of a two dose vaccine series.

So, there's a long-winded answer of saying what people can do after the first dose of a vaccine. I wish I knew. I have personal opinions on the matter based on my understanding of the protection that a dose of the vaccine gives us, but it's none of my business to tell Ontario or Canada how to behave. We should really be getting some senior political or public health leadership to discuss what are expected behaviours following dose one. And this should be standardized, so the people in British Columbia behave the same as people in Newfoundland. You can't just make this up as we go along. The problem is, in the absence of this guidance, people make it up for themselves which is troubling. It's what they did in the US, the CDC released some guidance on what you can do two weeks after your second dose and I thought it was very pragmatic and helpful real-world guidance. What we can do as healthcare professions is continue to advise individuals, follow social distancing, wear masks, and follow public health guidelines.

UTMJ: A few weeks ago, it was the one-year anniversary of the WHO declaring COVID-19 a global pandemic. And even though the fight isn't over yet, looking back, what lessons do you think we can learn from this pandemic?

IB: Yes, even though the fight isn't over yet, I really think that just like anything else, the pandemic is going to come to an end. And as ugly as things are right now in Ontario and in many parts of Canada, this wave will come to an end. We will get vaccinated at some point and receive our boosters after that. But I do think it's important to recognize a few points. One is that we need better global coordination on a pandemic response and we need better early detection systems. Of course, this means investing in public health, not just in Canada or the United States, but also in low-income countries globally. Supporting local public health units and local surveillance efforts in low-income countries is the smart thing to do for several reasons. One, it's the ethical decision, but the other thing too is it also has tremendous global benefit as well. It allows for better coordination on our global surveillance efforts which will improve our global coordination when we do have emerging infectious diseases. I think that would be of significant help in the future.

UTMJ: What are some specific ways that we can foster this global transparency?

IB: I'm not sure, because now we're entering the realm where public health merges with politics. We also know that some countries are just less transparent than others for a variety of reasons. Some of it might be politically driven and some might be technologically driven. There's probably a lot of reasons why some countries have higher degrees of transparency than others. Obviously, we can't ignore politics here, but I would say it's a lot more than just politics. But I think if we ever want to avoid any of this, we really need to focus on better global coordination, and part of that includes significant transparency from a global standpoint along with data sharing.

UTMJ: So, the pandemic has revealed that public health systems across many nations lack integration with governance. How do you think this gap can be mitigated in Canada?

IB: We need to invest significantly in public health at all levels, federal, provincial and municipal public health. And I think of that in terms of investing in capacity but also investing in high calibre individuals. You want to attract and foster talented people and give them the tools needed for success that can enable them to have a successful and fulfilling career. I think it is a very rewarding career and many people might choose to go down this path, especially with some of the issues that were raised during the pandemic as public health is currently front and centre. Ultimately, I think you have to invest significantly in public health at all levels in Canada, this includes investing in infrastructure and the industry to attract the highest calibre people.