

VS COVID-19: Inside the Fight at SickKids Episode Transcript

Intro

Hannah Bank: Hi, I'm Hannah Bank, host of SickKids VS. Today's episode is about COVID-19—and what SickKids is doing to help. I'm talking to the Chief of Infectious Diseases at SickKids, Dr. Upton Allen. For me, and for many others, he has become a leader and a resource on the science of the pandemic as it unfolds. Upton will talk about what we know and don't know about the virus so far, what we can expect, and how his research into immunity can change the future for all of us.

Welcome to SickKids VS, where we take you to the frontlines in the fight for child health. This is SickKids VS COVID-19.

This conversation was recorded over video conference and edited for length and clarity.

Interview

Hannah Bank So can you begin by just telling me what you do at SickKids?

Dr. Upton Allen So at SickKids, I'm the Chief of Infectious Diseases. So, I see patients with various types of infections. I'm also a clinical researcher and I also teach.

Hannah Bank Can you explain to us really the basics of what COVID 19 is?

Dr. Upton Allen It is a cousin of the first SARS virus, so they're closely related. It's a respiratory virus. The ways that it can be spread are similar to several other respiratory viruses that are spread by droplets. And one of the fascinating things about this particular virus is that it is novel, meaning that we were not as human beings, we were not exposed to this before. And so our immune systems have no memory that recognizes this invading organism. Our immune systems are not prepared to put up a fight. And that is one of the reasons why so many people are ill.

Hannah Bank You were on the front lines during the SARS outbreak in 2003. So, I was hoping you could just take us back, starting with the virus itself— why did it have the world so worried?

Dr. Upton Allen Well, in 2003, SARS outbreak, was really quite a frightening experience. And yes, I was a staff member in the Division of Infectious Diseases at the time. What was really scary about this was that we had not, up until then, experienced anything like that before. It was particularly scary because the individuals who were being affected were primarily health care workers. So, SARS One, if you may call it that, occurred within health care institutions, whereas COVID-19 is a community entity with a potential for involvement of individuals within hospitals. But at the time, we did not know much about SARS One; we didn't know how the virus was spread. Eventually we found that out. But in the initial stages, there were many unknowns. I remember speaking with colleagues across the country and elsewhere, and there were individuals who genuinely felt at the time, that as healthcare workers, there was a chance that they could die.

Hannah Bank And from what I remember reading, the actual death rate was much higher than anything we had known before. Certainly higher than COVID-19.

Dr. Upton Allen Well, yes. And in fact, when one looks at the case fatality rate, the case fatality rate or death rates with SARS One was about 10 percent. With COVID-19, the actual death rate is lower. It's just that the total number of deaths from COVID-19 far exceed those that occurred with SARS One.

Hannah Bank Once a patient is infected, are they then immune to the virus for good?

Dr. Upton Allen So that's a million-dollar question. And unfortunately, we don't know for sure. It is highly likely that once somebody has been infected, mounted an immune response, recovered from the viral illness, that there is some degree of immunity. But there are some unknowns. Number one, we don't know how robust or how strong that immune response is that will enable us to be protected. Second, we don't know how long that immunity lasts. What we do believe, though, is that it's likely that if somebody got infected and has recovered, it's probably not likely they got infected a second time, even if the immune response wanes. I think if they got infected a second time, I think there's a good chance the illness would be much milder and the outcome better overall.

Hannah Bank I think we all have that moment, or we all had that moment in our own lives where we realized this is a big deal. This is spreading. This is scary. This is going to potentially affect people that I know. What was that moment for you?

Dr. Upton Allen I must admit. And I want to be really clear about this. We, meaning all the scientists and everyone on the planet, we all got this wrong. We completely, between December and sometime in January, we underestimated COVID-19. And I remember being asked by someone at SickKids, if we were to compare SARS One with COVID, what would we say? And we said, you know, without doubt we'd be more concerned about SARS One. And at that time, we were focusing on the case fatality rate of 10 percent. And perhaps at the time a lower case fatality rate with COVID. Well, what we had not realized was that this thing was going to take off like wildfire. And, in that regard, the moment that I realized that we have a problem, this is when the outbreak started to occur on cruise ships. Because that provided us with an opportunity to realize that, wow, this thing can be spread quite easily within a confined environment. And we could actually see the cruise ship, unfortunately, as if it were a natural experiment. And not only that, not only was a transmission occurring pretty easily, but there were mortality as well.

Hannah Bank How has COVID-19 changed clinical practice in the hospital?

Dr. Upton Allen The approach that we have taken is to assume that whenever we're interacting with patients, that patient could potentially be COVID-positive. And when we're within a short distance, interacting with colleagues and others, there's a potential that one could have a transmission of the virus causing COVID. And so, because of that, it's important to put in place key procedures or PPE to prevent transmission. We feel that we are literally like soldiers going to war. And we have the equipment that we need to fight and protect ourselves. And at the same time, protect others.

Hannah Bank I find one of the scariest things for me, and the most intriguing, is the variety of symptoms that people are experiencing, from symptoms that are quite mild to

really quite extreme. Can you talk a little bit about what you think is happening there and why we're seeing such a discrepancy?

Dr. Upton Allen So it's a really great question. Why is it that two people get exposed to the virus and get infected, one gets it mild and the other maybe gets it more severe, and it can have pretty bad outcomes and some people can even die. There are a number of possible explanations. What we think is happening, though, is that there is a battle, if you will, between the immune system and the virus. And that, in some individuals who get more severely ill, that their immune system overreacts. And that what one is looking at are manifestations of that overreaction of the immune system. And maybe that explains the difference is that we see across different age groups as well, children versus adults. And I often say to my colleagues, in the case of COVID in young children, it's almost as if their immune system negotiates with the virus and decides on an appropriate immune response to the virus that balances things and doesn't result in an overshooting, an overreaction of the immune system to result in outcomes that are not necessarily directly related to the virus itself.

Hannah Bank So if their immune response with this kind of negotiation, similar to what you're explaining that what happens with children, it doesn't necessarily mean that it doesn't fight as hard to overcome the virus. It just means that it doesn't have an overactive immune response.

Dr. Upton Allen Yes, it's you know, it's the, the response is not, is perhaps dialed to to cope with what it needs to contain the virus. And there are several examples of that. There's one virus that I spend a lot of my time pre-COVID working on called Epstein-Barr virus, EBV virus. And that virus, when it affects children, those children are often completely well. Many of them don't even know that they got infected with the EBV or the mono virus. They're literally completely well. The same virus infects a teenager and they get infectious mononucleosis; young adults who are non-immune to EBV get infectious mononucleosis. And in that situation, it's the same virus causing two different manifestations in different age groups, where we think that what is happening there is the immune system in the younger child is more receptive to the virus without putting up too much of an overreaction. Can't be extrapolated to all situations, but perhaps in COVID it might apply. Only research though will help to clarify that.

Hannah Bank Can you talk a little bit about your research and how it began?

Dr. Upton Allen The question that we had was: Why it is that some individuals get mild illness and others get more severe illness? And why children have milder illness, adults have more severe illness? And could it be related to the signals that are, in a grossly simplified way, the signals that are coming from the genes in our bodies to our immune systems? And that perhaps in a 40-year-old who gets severe illness versus a 40-year-old who gets a mild illness, that the differences within that particular age group relates to variations in the genes. And that maybe those variations do apply to other age groups as well, and across age groups. And so our focus then was on what we referred to as the genetic markers of the susceptibility, to look at genetic variations and how perhaps those might influence immune responses, and indeed in identifying genes that are potentially different in different individuals, we could predict what immune pathways are influenced. And by predicting what immune pathways are influenced, we can then decide on the way that perhaps those individuals could be treated, or maybe how vaccines could

be developed to target that particular type of immune response. And so we've been fortunate to collaborate with an incredibly talented team of individuals looking at different areas of the immune system. And in that regard, things are going extremely well.

Hannah Bank What are you hoping to identify through these genetic tests? Are you hoping there'll be one sort of genetic modification that you'll be able to address? Or do you suspect that there will be many different markers that you will have to then treat people on a much more individual basis?

Dr. Upton Allen It's likely that there'll be several different markers, but even if there's several different markers or variations, so to speak. It might well be that we could group them into categories based on the way they influence the immune system. Then we can focus on those ways that immune systems are altered or influenced. And so, by better understand how to devise treatments or how to focus on vaccines.

Hannah Bank I've heard recently on the news that children are presenting in some new ways. For example, things that either look like Kawasaki or are associated with Kawasaki disease. I think they've been calling them COVID toes. Have you heard about this?

Dr. Upton Allen Yes, there are, there are two entities that have been in the news recently. The COVID toes refer to a skin condition, a discoloration of the toes. And the dermatologists are looking at that. It is really not quite clear, one, if that is due to COVID. Two, what mechanism is explaining why this is occurring. But the preliminary tests so far that we have done have shown that in most of the kids who have been tested, they have been negative for COVID. Now, that doesn't necessarily mean that COVID could not have been the trigger. What happens is that the virus comes, does its thing, leaves, but leaves an uncontrolled immune system and that uncontrolled immune system then gives you various manifestations. In other words, the guest has come and has left a lot of stuff behind to be cleaned up. Kawasaki is a different entity, but it's likely that that same phenomenon. And so, we and others now, are carefully looking at those two entities, as well as other entities, to determine the relationship between them and COVID and the phase of the illness and how those cases ought to be managed.

Hannah Bank And so what's next for your research? What do you identify as being the biggest challenges moving forward?

Dr. Upton Allen I ask myself that question as well. In six to twelve months, where do we really want our research to lead? Obviously, it would be great if by then we have enough data that inform the way we manage patients. That's one. But it's another important aspect that I refer to as, if there's going to be a magic bullet. If there is going to be a magic bullet, it's going to be a vaccine. And it is quite likely that the research that we're doing will be part of what we need for what I refer to as vaccine readiness. In other words, we would be able to assess the immune responses of various populations of individuals to determine if the responses that they had were such that it is safe to give them the vaccine, one. And two, that the vaccines will be effective. So there are a number of things that will come out of our research that will contribute to what I referred to as vaccine readiness.

Hannah Bank I was wondering about children that are asymptomatic.

Dr. Upton Allen We're still getting data on that. The bottom line is that there are some individuals who are asymptomatic. And that is they have the virus. But the infection is so low grade that, for practical purposes, there are no symptoms and we call them asymptomatic. The second category are individuals who are pre-symptomatic. In other words, they have the virus. They have no symptoms. But if you follow them for a few more days, they develop symptoms. And we see transmission of virus, of COVID, in both of those scenarios. So, it's really important that during this pandemic, that we assume that anyone could be infected and that they're either asymptomatic or pre-symptomatic. And therefore, we need to put in place the appropriate PPE measures to prevent transmission in those situations where individuals are asymptomatic or pre-symptomatic.

Hannah Bank Is there anything that I missed or that you feel is necessary to speak to our audience about?

Dr. Upton Allen You know, it's not possible to overstate the importance of some key things, like staying home when you're ill. Social or physical distancing using the appropriate PPE and the appropriate hand hygiene measures. You know, it's really amazing. We talk about those things in the flu season. And here it is, during this COVID pandemic.

Hannah Bank Thank you so much. I feel like having you at the helm gives me so much comfort.

Dr. Upton Allen Thank you.

Hannah Bank You were really able to explain things beautifully and I hope to continue to follow your research and that we can continue to connect and hear about the wonderful things that are happening with your work. So, thank you so, so much.

Dr. Upton Allen Thank you. Happy to speak to you anytime.

Outro

Hannah Bank: From SickKids Foundation, this is SickKids VS. Thanks for listening. If you want to support work like this, visit sickkidsfoundation.com/podcast to donate. And if you enjoyed this podcast, please subscribe and rate us on Apple podcasts, Spotify, Google Play, or wherever you listen to SickKids VS. SickKids VS is produced by me, Hannah Bank, Kate Daley, Colin J. Fleming, and Gillian Savigny.

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