

Behind the Breakthrough Podcast – University Health Network

Season 2 – Episode 1 – Dr. Brad Wouters

Transcript

CHRISTIAN COTÉ:

Welcome to season 2 of Behind the Breakthrough, the podcast, all about groundbreaking medical research and the people behind it at Toronto's university health network, Canada's largest research and teaching hospital. I'm your host, Christian Cote. And to kick off our second season, a special covid-19 edition. The dramatic inside story of how the pandemic threatened to bring UHN research to a standstill, putting in jeopardy world leading research and more than a thousand jobs.

Plus, we'll examine how the UHN research community rose to the pandemic challenge and is now on the forefront of coronavirus research across Canada, with over 100 trials and research projects underway. To help us navigate this historic crisis, we're pleased to be speaking with UHN executive vice president of research, Dr. Brad Wouters. Brad, welcome to season 2 of Behind the Breakthrough.

DR. BRAD WOUTERS:

Thanks, Christian. Happy to be here.

CHRISTIAN COTÉ:

Let's start back in January, the early days of the virus. It's just starting to spread across Asia and Europe. What's going through your mind?

DR. BRAD WOUTERS:

Well, you know, it didn't have a lot of attention at that time., in January. We started to hear about a new virus in Wuhan. I had actually seen an alert in late December regarding this. It's part of the world health organization's approach to monitor and distribute information but didn't pay a lot of attention at the time. But of course, when we did see the breakout happen in January in China, we were obviously had some concern. But I think us, like virtually everywhere else in the world, didn't realize at the time the true pandemic nature that this was going to become.

CHRISTIAN COTÉ:

Ok, so then in March the WHO declares a pandemic, so take us behind the scenes. What are the scenarios you and your team were preparing for at the time?

DR. BRAD WOUTERS:

Well, things changed really fast in the beginning of March, and you know, we recognized, like many others recognized, that this was going to hit us, too, and hit us hard. And so we began to think about what we were going to have to do, a, to keep our staff safe, and b, to contribute to you know, the reduction in the spread and the mitigation of spread in the community. We started to think about that in early March. In fact, we sent a communication to our entire research staff to ask them to start to prepare for the potential. And that was actually in the second week of March, the potential of having to shut down some of their research operations. Less than a week after that, we had to make the call and to actually ask them to

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Begin an orderly shutdown of research and essentially a suspension of all non-essential research at UHN.

CHRISTIAN COTÉ:

What was that decision, that day like for you?

DR. BRAD WOUTERS:

Yeah, it was a difficult decision, you know it was actually a Monday morning. And the previous Friday, I had sent a communication out to our staff to have them prepare for this potential. We were thinking about it over the weekend. And by Monday morning, we recognized that we are going to have to make this call. And I had a phone call with the other vice presidents of research at the affiliated hospitals at the University of Toronto. And I indicated to them that I was going to send out this communication UHN decided to go first to let them know that we were going to have to suspend the research operations. It was an extremely difficult thing to do. UHN has over five thousand people involved in research. So a huge operation you know, doing all kinds of important lifesaving research. But we decided that we needed to do that in the interests of the safety of our staff, our patients and also the larger community.

CHRISTIAN COTÉ:

So I understand the decision to shut down is one thing, but carrying it out, like the execution of shutting down this volume of research, quite another. Walk us through the scale and scope of - what does shutting down look like?

DR. BRAD WOUTERS:

It is large. You know, we at UHN we operate over a million square feet of dedicated research space. And in addition to that, we have lots of clinicians, scientists and clinician researchers in the hospital. We have sensitive kinds of equipment. We have equipment that needs to be serviced on a regular basis. And you know, lots of sensitive kinds of experiments are underway. Some of these experiments are years in the planning. Many of them are months long. And it's not simply you know, like shutting off the lights and going home. It really is a plan to ensure, to mitigate the consequences of this in terms of lost productivity, lost work, lost science. We have students and trainees, PhD students whose projects depend on this, whose careers depend on this. And so there had to be a lot of thought around how to do this and how to do it in a way that minimized the consequences on our staff and on our research and our facilities. But it was a really a coordinated effort. In order to do this, we put together an incident management system where we brought together an executive table to make decisions in real time and to be able to communicate those in real time. That team met every day for an hour throughout the entire COVID crisis or longer where needed, including weekends. And the community essentially rallied around this. Everyone understood why we were doing this, why it was necessary and stepped up and really did their part. I was you know, really amazed by the way our community did this and did this in an efficient, thoughtful manner.

CHRISTIAN COTÉ:

What were the implications of the research shutdown to the actual research?

DR. BRAD WOUTERS:

Of course, it has huge impact on the science that's going on. We have lots of experiments that are, as I mentioned, that are planned multiple years in advance that are ongoing studies that involve lots of you know, either patients or animals or sensitive cell lines or material that simply could be lost, and have to be repeated and started over. For some that has happened. And there are those consequences and those costs. And we'll have to go back and redo some of those experiments and get started again. So

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There's a financial cost. There's a cost in time, and there's a consequence on individuals and their productivity, their careers and so on. So, you know, at the time we said we were going to shut down for the same period that the schools were being shut down for. I think it was initially two weeks. It seems kind of-

CHRISTIAN COTÉ:

The best laid plans.

DR. BRAD WOUTERS:

And you know we had to make decisions as we went forward to extend that and so on. We did make allowances for what we deemed essential. And this is any research that needed to continue for the health of our patients. We have many patients at UHN that are on clinical trials as part of their care. And these trials are not only helping us learn about the effectiveness of new medicines and new approaches and new devices, but also providing essential care for those patients. So we did not stop any of those trials. Anything that was essential for the care of their patients was allowed to continue. And we created a mechanism through which those research studies could continue. We also allowed staff into the building to take care of our animal facility. We had no issues there. So that staff, they've been on site every day, they're just like our front line workers they're in and looking after the welfare of our animal facility, we had individuals coming in to you know, top up our freezer tanks, to check the freezers and to ensure that we didn't have any other disasters as a consequence of a lack of attention on the facilities and maintenance. So we've had an incredible crew of support staff that have been coming in every day that are ensuring the fidelity of our ongoing research and also the fidelity of our research infrastructure.

CHRISTIAN COTÉ:

You mentioned like - when you're communicating to people that were understanding, of course, of the situation. But I imagine for many this was you know, an extreme disappointment. I mean, as you would say, like their life's work for some of them. How do you manage that?

DR. BRAD WOUTERS:

Well, you know, it's tough to manage. It is disappointing to many on many levels. It could be a graduate student who wants to graduate in the fall and is finishing their last crucial experiments that aren't going to be able to be completed. We've got international trainees here from all over the world that are here to be at UHN and carry out research for a limited period of time. And that's going to be shortened now and impact their ability to get jobs and so on when they finish. And perhaps you know, most important is the impact this is having on patients. We think about the labs and all the research that sort of has to shut down. But we also had to suspend all of our clinical trials, new patients, most of the hospital you know, shut down towards elective care. And we had to also shut down the care you know, that's delivered as part of new clinical trials. And so, you know, individuals who, because of the opportunities they have at a place like UHN could participate in promising clinical trials, didn't have those options available to them.

CHRISTIAN COTÉ:

So in those first few weeks, what are your big concerns or priorities in terms of you know, maintaining staff you know and the funding?

DR. BRAD WOUTERS:

We're funded by a very complex system of external funding groups. We have no base funding. We have no funding from the hospital, the ministry of health. All the funding for research, last year, nearly five hundred million dollars comes from external sources, it comes from government grants, from the federal level, the provincial level. But it also

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Comes from our industry partners, companies that we work with to do these clinical trials that sponsor them. It comes from other health charities, things like the heart and stroke society or the Terry Fox Foundation and many of those organizations, because of COVID, have come into financial consequences themselves. So our industry partners, these are the companies that fund clinical trials, the consequences of the shutdown, we estimated at over five million dollars per month at UHN. That's the amount of support that we get from those companies to help carry out those clinical trials. And that money funds, you know, hundreds and hundreds of staff that we have in our research enterprise. In fact, we estimated that there were over a thousand jobs at risk because of this loss of funding. And there really just is no other pot of money to go to, to help keep those employees' salaries paid, so.

CHRISTIAN COTÉ:

Because if the research is shut down.

DR. BRAD WOUTERS:

That's right.

CHRISTIAN COTÉ:

Those outside partners' funding shuts down.

DR. BRAD WOUTERS:

Exactly. Yeah. So we were paid, you know, when patients enter a clinical trial we're paid on a per-patient basis. So when there's no activity going on, there's also no revenue coming in. We've also, you know, received notices from many groups that they're going to be unable to fund what was planned because their fundraising efforts have been impacted. And then we had all the other staff that are suspended and unable to carry out the work that was planned. They still need to be paid, even though research has been suspended. But in order to do that work that was planned, you know, we need to find new funds to do that. So this became a huge issue, was even threatening the financial solvency of a research enterprise, like UHN, in a very rapid way, burning through, you know, anywhere from between five and 15 million dollars a month in costs that don't have revenue associated with it.

CHRISTIAN COTÉ:

Take us behind the scenes, because I know you were quite active, especially with lobbying behind closed doors, with federal government and federal agencies to somehow be able to hold on to staff. But somehow they weren't qualifying for any of, you know, the emergency, you know, COVID funding that have been provided by government. So what were you doing behind the scenes to avert this?

DR. BRAD WOUTERS:

Yeah, well, obviously you know the financial situation was dire and we were looking at all kinds of options. And I was sitting in my office one day and listening to the prime minister announce the creation of the Canadian emergency wage subsidy, the CEWS. When I listened to the purpose of this, this was designed exactly to protect the jobs of people like our scientists and our researchers at UHN. It was designed to provide temporary assistance. It was 12 weeks at the time in order for organizations which had lost revenue. And they were thinking of stores and you know, retail because of the shutdown to keep their employees employed. And they would contribute seventy-five percent of wage costs to those organizations and you know everyone from a large company like Air Canada down to a corner store could take advantage of a program like this. But it turned out that we were ineligible. And it's really, you know, we sort of fell between the cracks on this. The federal government made ineligible any public institution. We look like a public institution. It's a hospital where our hospital is funded by the provincial government. And of course, you wouldn't expect the federal

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Government to provide a wage subsidy to individuals normally paid by the provincial government. But the problem is, is that the research enterprisethat's inside the hospital we're part of one single organization, we're not funded by the provincial ministry of health. We are funded by all these external sources that i told you about.

CHRISTIAN COTÉ:

Right.

DR. BRAD WOUTERS:

And so we technically weren't eligible. And so that's where I began my effort to speak to the federal government. They wanted to protect jobs like this. This was their priority. But they had created a system where and a model that you know we fell through the cracks. And so that's what i, i tried to raise attention around.

CHRISTIAN COTÉ:

So like, what are the stakes at this point? Because we're now into may. In terms of the chronology here, you're now two months into the shutdown of research, like you must have been coming up to the deadline forhaving to pull the trigger on some layoffs.

DR. BRAD WOUTERS:

We were. So we had launched a very active advocacy campaign and information campaign. I was speaking daily to many different people in the federal government, and many of my colleagues were doing thesame. And the ministry of finance, industry, science, economic development, ministry of health, prime minister's office, privy council office.

CHRISTIAN COTÉ:

You were busy.

DR. BRAD WOUTERS:

On the bureaucratic side, on the political side. And I have to say you know that the people that i spoke with, everyone there, was working incredibly hard. They were trying to solve this problem and they were trying to create solutions that were going to help Canadians. So i felt very motivated to continue because there was a genuine effort to try to address this. Part of the problem is just to you know, to make government understand the complexity of who we are and how we're funded. This recognition of the need to support hospital based research institutes - this was really the, you know, part of the breakthrough here. And in particular to help protect the jobs you know and the scientists and the talent pool that we have in places like UHN that are funded through these non-government sources, through industry, through philanthropy, through health, third party health charities,and you know that was the breakthrough, is that government realized it was important to do that not only to protect those jobs, but to ensure the healthof our hospital based research sector in Canada, which is an amazing contributor to you know, research and development and to improved health for Canadians.

CHRISTIAN COTÉ:

And so may 15th. What was that day like for you anannouncement from the federal government?

DR. BRAD WOUTERS:

Well, you know, there were lots of ups and downs. There were many times where I thought this was done and you know we're ready to announce. And the next day I thought it was going to fall through again. This was this happened you know, many times. We were preparing in parallel a response if this funding didn't come through. So we had actually planned for job layoffs. We had you know, worked with everyone across UHN all our people, leaders to identify the individuals that they would have to give layoffnotices to. We worked through a whole structure for that. We actually

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Postponed it twice and we had planned for this to go out Monday morning. Prior to when that announcement actually came, we had the letters actually ready to go because we just couldn't you know, continue to absorb the risk. This is a decision that we made with our UHN board of trustees you know, we had had many meetings around this and the decisions that we were going to have to make. But Friday afternoon it came through and I actually heard about it Thursday night that this was coming on the morning of I guess it was the May 15th.

CHRISTIAN COTÉ:

Right, the Friday.

DR. BRAD WOUTERS:

That Friday. And the you know, the prime minister announced four hundred and fifty million dollars for our sector. It wasn't everything we asked for. But when you look back at this, this really is a historic investment in health research in our sector. You know, that that allowed us to press pause on those job actions. And I had actually shared very openly with the community our need to do this. So it wasn't just me that was sitting home anxious about the consequence of this. You know, there was a lot of anxiety and worry around our entire staff because they were well aware of this threat that we were facing.

CHRISTIAN COTÉ:

You're one day away from this massive layoff. It sure came down to the wire.

DR. BRAD WOUTERS:

Yeah. You know. And that's you know, obviously we were concerned about you know, our staff and their jobs and protecting their income. But I was also very concerned around the health of our research sector in Canada, because these are you know, some of the most talented people in the world. We compete worldwide for, you know, people like this. And they have lots of options. And I was worried that this would set us back not weeks or months, but years or even decades in terms of having to recover from you know, such an event.

CHRISTIAN COTÉ:

And a few weeks later, I guess this would be considered more good news - you're starting to actually plan a phased in reopening of research. What was involved in that process?

DR. BRAD WOUTERS:

This turned out to be even more challenging and difficult than shutting research down. So, you know, we started to think about you know, from day one, you know, from the initial announcement, what would the criteria be for allowing us to enable research to restart again, and what modifications would we need to make to allow that to happen? And so we had a research restart team that was very active and building these criteria and building these modifications to allow us to come back. They met every day and we developed a four phase plan for doing that. We remained in phase zero for a long time. That was our preparation phase to get ready. It involved modification of our facilities, you know, installation of new hand wash stations, signage, putting in screeners, putting in barriers, in some cases moving equipment around, getting us ready to be able to come back and to be able to practice safe and physical distancing with staff in place.

We initiated phase one, I think, in on June 1st or just at the very beginning of June. This was the initial return back to work and it was at a density of twenty five percent of normal. So we allowed individual labs to construct their own plans and they could bring back at most a quarter of their staff at any one time. We instituted a shift schedule. We ran two shifts per day. In fact, we're

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Still in that now. And six days per week. So that allowed a larger number of people to come back. But again, at that reduced density and we put into place all of the facility cleaning requirements, the reporting, the approvals and the tracking of individuals on site and so on. So this was a tremendous amount of work by a very large team, our facilities team, our safety team, but also by our individual scientists, they played a role in designing that plan for their individual groups and they've been working on that. And, you know, it's gone extremely well. We've come back, we've demonstrated we can do that in a safe way. And I'm really proud of the work that's kind of gone on to get us back.

CHRISTIAN COTÉ:

So in terms of everything that was shut down back in March, is all of that back up and running again in whatever limited or 50 percent capacity form?

DR. BRAD WOUTERS:

It is, yeah. So our clinical research got started, the return to clinical research got started a little bit later. We had to work with the hospital and their timeline for bringing back other kinds of patient care. And so we've done that lock step with the clinical activity. But they're also in phase two right now, moving to phase three soon, which allows recruitment back to the clinical trials at fifty to seventy five percent of normal recruitment activity. So it's not fully back, but much of this is being enabled and it's being done you know, utilizing new digital tools, using remote monitoring for clinical trials so people won't have to come on site. We're looking at how to you know, work with patients and consenting patients delivering virtual care to the extent that we can. So there's been a lot of innovation. The whole move to more virtual care and virtual research is something I think that will live with us after COVID, for a long time.

CHRISTIAN COTÉ:

You're listening to behind the breakthrough the podcast all about groundbreaking medical research and the people behind it at Toronto's university health network, Canada's largest research and teaching hospital. I'm your host, Christian Cote, and this is a special COVID-19, edition to kick off our second season of the podcast - featuring UHN executive vice president of research, Dr. Brad Wouters.

So, Brad, let's move into UHN's COVID-19, research and the response of your team. It's now a huge initiative, over a hundred projects underway. And we should note a lot of it has been made possible by the fundraising efforts of UHN's very own foundations that raise hundreds of millions of dollars each year. There's the Princess Margaret Cancer Foundation, the Toronto general and western hospital foundation and the Toronto rehab foundation. Actually, this is probably a good time. Why don't you speak, first of all, to how these foundations help kickstart UHN's COVID research in the first place?

DR. BRAD WOUTERS:

Yeah, you know, so almost from day one, we had scientists and scientific staff that were interested in trying to address the scientific questions around COVID. You know, how could we develop more effective therapies? How could we mitigate spread? How could we work on preventative medicines to prevent infection and these sorts of things. And obviously, these are unplanned - unfunded - studies. And we're lucky you know, at a place like UHN in that we have these incredible fundraising organizations because they could also, just like our scientists did, turn on a dime and go out and lobby and engage our community for new support for this. And they did this in a very rapid way. So you know, I remember you know, some of the earliest days sitting down with CEOs of these foundations and speaking about how could they help

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And how could we engage the community in this. And that happened very quickly. And we saw early gifts come in that allowed us to launch clinical studies at UHN before new funds were available for this. And I really want to tip my hat off to the work that the Princess Margaret Foundation and the Toronto General, Toronto Western Foundation, Toronto Rehab Foundation have done to raise these crucial funds to make us nimble and allow that to happen you know, in a very quick way.

CHRISTIAN COTÉ:

And people may not understand, but they often are the starting point, right, for seed money to help you leverage other money outthere, correct?

DR. BRAD WOUTERS:

They are, you know. And that's the advantage of having that resource available you know, very quickly because it allows us to get a jump start. It helps make our scientists competitive. And you know, just to give you a bit of a flavour of this, our foundations have contributed new funding of over five million dollars now to support COVID related research. And we have leveraged that to go out and raise or to compete for funding from federal, provincial, international sources of over twenty million dollars that have come in to support these projects. New money specifically for COVID related research.

CHRISTIAN COTÉ:

So I understand your strategy was a three pronged approach to how to harness the talent at UHN, in terms of COVID research, let's start with the first approach, which was basic fundamental research. What does that mean?

DR. BRAD WOUTERS:

As you know, Christian, we conduct research at all points along the spectrum from fundamental to clinical to translational research. And it's not a surprise that our scientists, in being inquisitive and curiosity driven nature of these individuals turn their attention towards COVID and what they could do. And this includes fundamental research. I'm thinking about a study you know, conducted by Dr. Brian Raught at the Princess Margaret Cancer Center. He studies proteins and proteins in cancer and how they contribute to development of cancer and potential therapeutics. And what he did is he used his technology and his understanding of protein biology to look at how the virus infects human cells and interacts with human proteins. With the proteomics approach that he's taken, he could identify every protein in a human cell that interacts with one of the viral proteins.

CHRISTIAN COTÉ:

Wow!

DR. BRAD WOUTERS:

And to map that biology. So it's very fundamental research. But what that does is it reveals targets, other proteins and pathways inside human cells that could potentially interfere with the ability of that virus to you know, infect those cells or to replicate in those cells or to spread through disease. So he's using that and he has identified pathways that could potentially serve as novel therapeutic targets through that approach.

CHRISTIAN COTÉ:

and I would imagine, especially at this basic level of research, this is going to be you know, necessary for years to come because this disease does not seem to be well understood still.

DR. BRAD WOUTERS:

No, there's a huge amount of unknowns. You know, this virus affects many, many different cell types and organ systems. It alters biology in unique ways that differ from other coronaviruses. And we need to

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Understand that to develop you know, really effective therapies for it. So even with a vaccine and even with the elimination of this coronavirus, there will be new coronaviruses in the future. And part of what the work we're doing now certainly may address the current pandemic, and you know, that's the primary attention. But it's also going to build that knowledge base for future pandemics and future viral infections that we're going to be living with. And I think one of the real take-home messages that we're all learning is the need to invest more in pandemic preparedness for viruses, for drug resistant bacteria and for other infectious agents that the world still lives with.

CHRISTIAN COTÉ:

Absolutely. All right. Second thread of research is clinical and epidemiological. Walk us through this, this strand of research where you're at?

DR. BRAD WOUTERS:

Yeah. So you know, we have a number of talented individuals who spend their careers studying the nature of disease and how it impacts populations and trying to understand that. And one of the areas this group is interested in is mapping out you know, even our ability to respond and provide clinical resources to a pandemic like this. And so we had modellers, that could model and predict what this disease was going to look like. And one of the big open questions you know, for our hospital, for our health care system in Ontario, the provincial government is you know, what did we need to do? Do we need more ventilators? How much PPE are we going to need? You know, what are the numbers going to look like at the peak? How long is it going to last? All of this was essential information, not only for making decisions inside the hospital, but for making provincial policy around shutting down businesses and instituting community driven approaches. And so scientists you know, at UHN, were providing daily updates of those models to provincial tables and allowing that information to be used to help direct decision making you know, in real time.

CHRISTIAN COTÉ:

Any studies that stand out for you in that regard that are ongoing there?

DR. BRAD WOUTERS:

Well, Dr. Beáte Sándor is one who led much of that work. Her work you know, modelling the resource needs was used by the province and continues to be. So, she serves as a consultant for that table. So this is an area that she's an expert in, has been studying for many, many years, but in this case could be rapidly applied. And, you know, it demonstrates the value of having this kind of a health research infrastructure in place because it allows us to take advantage and to tap into it in real time when needed.

CHRISTIAN COTÉ:

And then there's our therapeutic research. What's UHN pursuing on this front?

DR. BRAD WOUTERS:

Well, there's lots you know, going on in the therapeutic realm, both to try to prevent infection, you know, antivirals, but also to try and treat patients once they develop infections. And there's a couple of really interesting studies here. And these have received a lot of attention and now a lot of external resources. You know, one that I wanted to highlight. Dr. Jordan Feld is conducting a clinical trial with a form of interferon – it's the PEGylated interferon gamma. It's an antiviral. So it's designed to help suppress the innate immune system, which gets activated early in the disease. And it's built on a long research career and foundation

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That was contributed to by another UHN researcher, Dr. Eleanor fish. So she was one of the first really to understand the nature of how interferons could be used to prevent viral infections. It was used early in the Ebola outbreaks and dr. Fish was involved in that administration and turned out to be an effective therapy there. And in fact, dr. Fish, back in December you know, and many of us weren't paying attention, she actually got involved with a study in Wuhan with interferons to demonstrate that these could actually be effective therapies in that outbreak when it first happened. And you know, she has experience in working in all parts of the world where infectious disease and outbreaks happen. And so she was tuned in to this outbreak before most were. And what it could potentially mean and actually was doing research you know, before most of the world was even thinking about how this might affect us. So that turned out to be positive. There was an indication of success there. And this is also helped fuel this second clinical trial that we're conducting with a slightly different version that could be more effective, which is underway.

Dr. Patrick Lawler and Ewan Goligher have a study they call "attack" and this is using heparin. So it's a very common agent. It's an anticoagulant, also an antiinflammatory, and it's targeting one of the consequences of this disease. It's quite peculiar and unique to this coronavirus, and that's the initiation of a clotting mechanism and causing small blood clots. And we've seen how these blood clots can lodge in the brain and cause strokes they can cause other types of abnormalities in patients. And they've launched a study to see whether heparin can be used you know, as an effective agent to do this. This study is active in over 60 sites worldwide. So it's an international study led out of UHN. Lots of interest, lots of excitement around this as again, as an effective new therapy with an existing drug and existing medication.

CHRISTIAN COTÉ:

And look, everyone's focus, of course, is on a vaccine. There's one hundred and fifty vaccines, I think, in various stages of preclinical and clinical trials, stages around the world. Where does UHN fit into the pursuit of a vaccine?

DR. BRAD WOUTERS:

Well, a vaccine is going to be our way out of this. I think until we have a vaccine, we'll be living with COVID. And there is you know, lots of international efforts underway to move this along. It includes some examples that are fairly mature now. There are several studies have launched their phase three studies that may read out as early as November, December, January. So that looks promising. At UHN we are also involved in vaccine related research. Dr. Tak Mak, who is one of Canada's leading scientists and immunologists, has partnered with a group in B.C., is working on development of a novel vaccine.

You know, we don't know how well the current vaccines are going to work. And this remains to be demonstrated. There's lots of a need for developing you know, more effective and better vaccines. So this work is underway and they have some very unique approaches to doing this. So we are involved in some of the earliest stages of novel vaccine development. And we, of course, will be involved in clinical trials and application of vaccines when they become available in Canada.

CHRISTIAN COTÉ:

and I know you've been asked to comment publicly in news media on some vaccine results elsewhere before they've been peer reviewed and you understandably have to be cautious, which, as you said in the past, is the normal and correct way for this to happen. But covid-19 is breaking all sorts

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Of traditions. There's a real challenge here, isn't there, in terms of this balancing act of maintaining scientific rigour and the worldwide urgency for a vaccine. How do you navigate this?

DR. BRAD WOUTERS:

This is a very important issue.

CHRISTIAN COTÉ:

Yes.

DR. BRAD WOUTERS:

You know, there's a couple of things going on at the same time. You know, one is the need for speed, really to do things rapidly and share information rapidly. And you know, scientists are doing this in a way today like they've never done before. They often are sharing non peer reviewed publications ahead of time. And these are called preprints or there are repositories where people can deposit their papers prior to publication so that they're available immediately - the med archive and bio archive are two examples of these. And a lot of the COVID related research has ended up here for the purpose of sharing with other scientists. But you know, what comes with that is, are all the caveats that this is not peer reviewed, that there may be errors in there. There may be incompleteness, there may be things that researchers haven't considered and so on. And this is all a normal part of science. But what has happened at the same time has been an interest from the general public, in the media, in research and in science like there never has been before. And so many of these studies end up in New York Times or in publications ahead of peer review and ahead of discussion. So without the same kind of understanding and caveats associated with it. So the rapid sharing is good you know. This is something we encourage and we want to be open with our data and sharing those results so that everyone can benefit and move on and make you know, discoveries that are built upon the work of others. But at the same time, that information has to be used with caution and understanding you know, that scientists would be aware of in most cases. But you know, the policymakers and the general public and so on are not it's not textbook kinds of knowledge right now. You know, that's number one.

And number two is you know, there also has been some bad examples where people have rushed and published things you know, before they were ready or you know, even before they were legitimate. And we had two famous examples published in the best journals, medical journals in the world. You know, are certainly the most respected new England journal of medicine, and the lancet, studies that ultimately were retracted and they were based on flawed data sets and perhaps even fraudulent data sets. And you know, when you look at this, there were lots and lots of warning signs that clearly were ignored, probably because you know, others were simply moving too fast and not placing the proper rigour around that, that needs to be in place.

You've seen the controversies with Hydroxychloroquine, you know, people will write books about this. Hydroxychloroquine, when we started was a promising idea. There was good preclinical data suggesting this might be an effective therapy. There were hundreds of different clinical trials launched all over the world. Lots of people had the same idea. And this is sort of you know, also kind of sometimes one of the criticisms of science is that we sometimes operate in an uncoordinated way. And there were probably lots of clinical trials that were just repeats of what other people were doing. It didn't need to be done. But again, because people are moving fast, they were racing. They're trying to evaluate this quickly. Many of these popped up at the same time in different places.

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And you know, unfortunately, what we've seen from those clinical trials, the good ones, lots of good studies that were done, you know, it's shown that that drug has not been effective. And you know, that's the nature of research. That's not a you know, that's certainly not a knock against any of that research. That's the right, that's the right thing. It's just a it's just unfortunately not the right answer. And it's the typical answer, in fact, of most clinical trials that we have more failures than we have successes. That's how research moves forward. But you know, what we've also seen is the public interest in it, the political interest in it, the policy interest in it, and has created all kinds of campaigns of misinformation, selective choosing of science to support your opinion and lots of you know, inappropriate ways to use and interpret science.

CHRISTIAN COTÉ:

if you could perhaps speak to the importance of people understanding that as in the scientific world you learn things you it's not necessarily you're not flip flopping, you're learning things, and you're always remaining open to new information, new evidence so that you refine and sharpen your findings. And i think a lot of people, perhaps in the general public, misinterpret what that process is all about. Maybe there's an opportunity here to actually help the public understand the rigor of science.

DR. BRAD WOUTERS:

I think you're right you know. Science does move ahead in in abit of a burst of development and a lot of failure around it. And that's just that's just the nature of how science moves forward. And it also moves forward in a you know, in a way where we always have an incomplete understanding of the biology and we incrementally build on that development.

But, you know, those nuances are not easy to communicate. But you're right. I think, you know, we certainly have the attention of the general public. Every day I wake up, i see it in the news. We hear about it from our politicians. We hearabout it on the street with our friends. And you know, i think everyone realizes in a state like this the importance of medical research, we do need to capitalize on that. Sometimes we struggle to get attention in other times, but the entire world is seeing the value that medical research plays. And i hope this is going to serve as a stimulus to provide the you know, kind of resources that are going to be necessary to continue to make, critical advances, so nexttime we're moving more quickly.

CHRISTIAN COTÉ:

I have to ask you. Russia's president recently decided to approve a coronavirus vaccine. I don't know when presidents started approving vaccines, but besides the point. And it's still in a, it hasn't finished a phase three clinical trial. Some are saying, of course, this is politically drivento be first. And certainly we've seen a number of examples elsewhere of politically motivated public health policy and research decisions during this pandemic. Does this concern you, this push, pull of the political oversight and versus, you know, sort of coming up against scientific rigor?

DR. BRAD WOUTERS:

Yeah, it's very concerning. You know, those decisions shouldn't be made by politicians or shouldn't be made through political motivations. They should be driven by the weight of the evidence. And, you know, vaccines are amongst our most effective and safest medical procedures or medical approaches that we have in all of medicine. And they are because they're rigorously tested. So these are vaccines that are givento healthy people. And the level of safety that needs to be in place in such a medicine is extremely high. It's much different than an experimental medicine

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For someone who's got a chronic disease or, you know, is has lost other options.

And so these trials often involve tens of thousands of people to ensure that they're safe before they're rolled out to millions or potentially billions of people. And you know, what we're seeing in Russia is very dangerous because this is not gone through a phase three clinical trial. There's danger associated with the people that may get this vaccine. So that's one level. But you could argue that's not much different than you know, the first thirty thousand patients in a clinical trial that are willing to take that risk. But for me, the real risk is the consequences this could have for the vaccines for the rest of the world. Because if it lacks efficacy or even more importantly, if it lacks safety, it's going to scare the population around the world around taking future effective vaccines. And that's the real danger.

And when you talk about scientific rigour and scientific fraud, and if you look at the you know, the case of the fraudulent science and that happened many years ago now and Dr. Wakefield, who published this story that had made up data around the association of vaccines with autism, the study was discredited. It was retracted. It was demonstrated to be entirely fabricated and false. And yet we live today with the consequences of that and the anti vaccine movement and many, many individuals who still fear these false fears around safety of what are very safe and effective vaccines. So that's what I really worry about in terms of what Russia is doing.

CHRISTIAN COTÉ:

Because my understanding is typically a vaccine can take not a few years, it could take up to 10 years to be successfully tested for safe you know use out in the public. So to have it within six months.

DR. BRAD WOUTERS:

It can take a very long time. And the pace at which the world is developing these new vaccines is incredible how fast they've moved from candidates you know, to preclinical testing to phase one to phase two and out of phase three. But the phase three testing needs to involve a very, very large number of people. And that's to look for these very small signals that might be present even in you know, sub one percent of people. That could you know, mean that it's not going to be appropriate to give to tens of millions of people. So you know, that work just has to be done. We have to know it's effective, too, because we don't want to give anyone risk associated with that if there's no efficacy. And in order to understand that, we need to wait long enough to see if there are differences in the rate at which people who get the placebo and the people who get the vaccine you know, aren't developed COVID.

Christian Cote': big picture for you in this unprecedented time. I mean, I'm sure this will in some ways define your research career. There's not a lot of playbooks out there. So what has guided you as a leader throughout this crisis?

DR. BRAD WOUTERS:

Well, I think more than anything, it's been the other you know, people around me. It's at times like this, you really see individuals who step up and contribute. And it's, you know, that's been really rewarding. We've had tremendous amounts of collaboration across UHN. Two years ago, we put together our strategic plan and our tagline was "in it together". And never more true than it is right now. And in fact, you know, we've seen collaborations and individuals working together across departments, across hospitals, in different research institutes that we were looking for ways to create this kind of collaboration. And COVID has served as a stimulus

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For that. And that's through not only at UHN it's through, through partnerships across our hospital networks in Ontario, across the country and even internationally. And I think so, you know, that's certainly one of the takeaways for me is this power of a common enemy. We are all focused on one thing and you see how fast progress can be made and the power of collaboration in making that progress. When you really have a target of what you want to do and what you want to see changed.

CHRISTIAN COTÉ:

I'm going to put you on the spot. I need you to crystal ball gaze for our audience here. What do you see happening over the next year or two years or three years in terms of vaccine and eradicating the virus?

DR. BRAD WOUTERS:

I hold out strong hope that one of these early vaccines is going to be effective. You know, we'll know that. I think probably in the early part of the new year, maybe spring. Governments are already hedging their bets and putting in contracts and trying to build manufacturing for many of these, so that we're, they're relatively ready. I do think we're going to go through a period where there's going to be a lot of attention around availability, people who are willing to get the virus to get the vaccine or not. Lots of political attention around that. So I think we should get prepared for that. But, you know, Canadians are pretty, pretty pragmatic and prudent individuals, and I think Canada will do well. I think we'll have a vaccine in the spring. And my hope is that you know, this time next year, we're back to focusing all of our efforts on moving all clinical research forward.

CHRISTIAN COTÉ:

Wouldn't that be something? Okay I'm going to have you back in a year's time - we'll follow up.

DR. BRAD WOUTERS:

Okay.

CHRISTIAN COTÉ:

Dr. Brad Wouters, executive vice president of UHN research, thanks for speaking with us and continued success leading us through this difficult time.

DR. BRAD WOUTERS:

Thanks, Christian.

CHRISTIAN COTÉ:

For more on covid-19 studies underway at UHN research, go to www.uhnresearch.ca - that's all one word - .ca - and for more on the podcast, go to our web site www.behindthebreakthrough.ca and let us know what you think. We love to hear from you.

That's a wrap for this special edition of behind the breakthrough, the podcast all about groundbreaking medical research and the people behind it at the university health network in Toronto, Canada's largest research and teaching hospital. I'm your host, Christian Cote. Thanks for listening.

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