HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

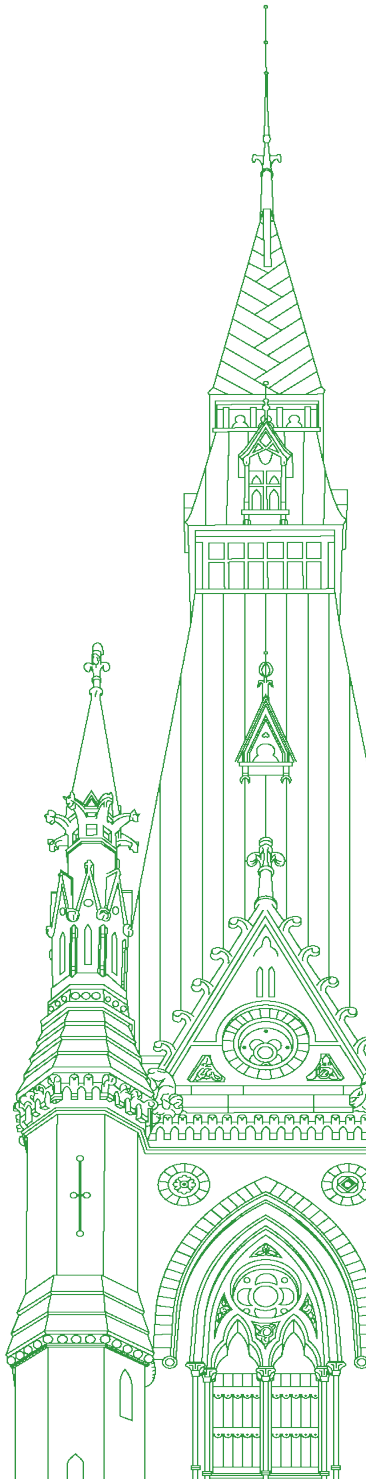
43rd PARLIAMENT, 1st SESSION

Standing Committee on Health

EVIDENCE

NUMBER 023

Monday, May 25, 2020



Chair: Mr. Ron McKinnon

Standing Committee on Health

Monday, May 25, 2020

● (1400)

[*English*]

The Chair (Mr. Ron McKinnon (Coquitlam—Port Coquitlam, Lib.)): I call this meeting to order.

Welcome, everyone, to meeting number 23 of the House of Commons Standing Committee on Health. Pursuant to the orders of reference of April 11 and April 20, 2020, the committee is meeting for the purpose of receiving evidence concerning matters related to the government's response to the COVID-19 pandemic.

Firstly, in order to facilitate the work of our interpreters and ensure an orderly meeting, I would like to outline a few rules to follow. The interpretation in this video conference will work very much like in a regular committee meeting. You have the choice at the bottom of your screen of either floor, English or French. Please speak slowly and clearly and hold your microphone in front of your mouth, as directed during the sound check. If you will be speaking in both official languages, please ensure that you switch to the language that you will be speaking on the translation icon. That will help the interpreters and people listening to the feed, and also allows for better sound quality for interpretation.

Before speaking, please wait until I recognize you by name. When you are ready to speak, click on the microphone icon to activate your mike. Should members need to request the floor outside of their designated time for questions, they should activate their mike and state that they have a point of order. I'll remind you that all comments by members and witnesses should be addressed through the chair.

Should any technical challenges arise, please advise the chair or the clerk immediately and the technical team will work to resolve it. If necessary, we will suspend while that happens.

Before we get started, can everyone click on their screen, on the top right-hand corner and ensure they are on gallery view. With this view everyone should be able to see all of the participants in a grid-like fashion. This will ensure that all video participants can see one another.

I'd like to welcome our witnesses now.

Each witness group will have 10 minutes for an opening statement, followed by the usual rounds of questions from members. As individuals, although appearing together, we have, from McMaster University, Dr. Gerry Wright, director of the Michael G. DeGroote Institute for Infectious Disease Research and David Braley Centre for Antibiotic Discovery; and Dr. Karen Mossman, acting vice-president, research. We also have, as individuals, from the Université de Montréal, Dr. Caroline Quach-Thanh, full professor, department of microbiology, infectious diseases and immunology, faculty of medicine, and medical microbiologist and epidemiologist, CHU Sainte-Justine; and Dr. Cécile Tremblay, professor of microbiology, immunology and infectious diseases.

Welcome, and thank you all for sharing your time with us today. We will begin with Dr. Wright and Dr. Mossman. You have 10 minutes between the two of you. Please go ahead.

Dr. Karen Mossman (Acting Vice-President, Research, McMaster University, As an Individual): Thank you, Mr. Chair. I would like to thank you all for inviting my colleague and me to appear today to discuss Canada's response to COVID-19. My name is Dr. Karen Mossman and I am the acting vice-president, research, at McMaster University. I am also a professor in pathology and molecular medicine, and a virologist by training.

Very early on, my team was involved in isolating SARS-CoV-2, the agent responsible for the outbreak of COVID-19. Isolating and propagating the virus has enabled researchers across Canada to better understand the virus and work on potential solutions.

At McMaster University, our researchers pivoted very quickly to respond to the COVID-19 pandemic. This includes working on the development of home test kits, leading a national trial for plasma transfusion and leading a trial on anti-coronavirus therapy. A great deal of work is being done across the university to innovate respiratory ventilators and N95 masks. Thanks to funding from the CIHR, my own lab is studying SARS-CoV-2 pathogenesis in human and bat cells.

The university is also doing its part as a member of the community. We donated our stock of personal protective equipment to our community hospital, and our residences are currently being used to host medical residents as needed.

Many of our researchers are at the forefront of the global coronavirus research. This pandemic is the very reason that we established our Institute for Infectious Disease Research. We have built infrastructure to respond to crises and outbreaks like COVID-19. One of our researchers with the institute, Dr. Dawn Bowdish, is currently looking at how the immune system responds to infection and will provide insight for the prevention and management of COVID-19 which may lead to potential treatments.

I will now pass it over to my colleague, Dr. Gerry Wright, who is the director of our Institute for Infectious Disease Research and who can speak more to the work that is being done there.

Thank you.

Dr. Gerry Wright (Director, Michael G. DeGroote Institute for Infectious Disease Research and David Braley Centre for Antibiotic Discovery, McMaster University, As an Individual): Thank you very much for the invitation to speak here.

The COVID-19 pandemic is revealing what we in the field have known for decades—that is, despite the tremendous advances in medicine over the past century, we remain highly vulnerable to infectious diseases. We knew this because of the lessons of other pandemics, epidemics and outbreaks that we experienced in recent memory. These include HIV/AIDS, Ebola, the first SARS epidemic, MERS, H1N1 influenza and now COVID-19.

My own research is focused primarily on addressing the other pandemic we are simultaneously experiencing, that of antibiotic resistance, or AMR. AMR is slower-moving than COVID-19, but it has the potential to be even more deadly and create greater economic burdens than the current crisis. I will return to AMR in more detail later, but first I want to frame my remarks around what I see as the current reality.

Despite these past experiences with epidemics and pandemics, we must be honest and recognize that we have, time and time again, failed to learn that we must continuously support research and development in infectious diseases to be prepared for the next problem. To paraphrase Donald Rumsfeld, in infectious disease there are the “known knowns”, the things that we know are a problem, like AMR. There are the “known unknowns”, the things that we know will happen but can't easily predict, like a new viral pandemic such as the one we're experiencing. Then there are the “unknown unknowns”, the things that we don't even see coming, like the emergence of prion infections like mad cow disease, which took us all by surprise.

The only way we can prepare for these eventualities—that are, eventually, going to occur—is to support a robust, nimble and multidisciplinary community of infectious disease researchers in Canada.

● (1405)

The parallel to fire departments is often made. We as a society support the purchase of fire trucks, the very best and reliable equipment, and employ well-trained firefighters, because we have learned to be prepared for fires. We value this protection. Even though we hope that as individuals we never need it, if we do, then we sure are happy that we invested in it.

To be prepared for the next challenges in infectious disease, we need to invest in and develop a vibrant community of scientists, clinicians, engineers and social scientists who will dedicate their careers to solving our current problems and the ones that we know will emerge. However, given the lack of sustained funding in this area, our best and brightest young researchers and clinicians do not see great opportunities to thrive—

The Chair: I'm sorry, Dr. Wright, interpretation isn't on any more. They're not getting anything.

We will suspend the meeting briefly and sort this out.

● (1405)

_____(Pause)_____

● (1405)

The Chair: We will resume the meeting.

Dr. Wright, please carry on. We will set your time back to five minutes. Please go ahead.

Dr. Gerry Wright: Again, I apologize for the technical problem.

I was making the point that to be prepared for the next challenges in infectious diseases, we need to invest and develop a vibrant community of scientists, clinicians, engineers and social scientists who will dedicate their careers to solving our current problems and the ones that we know will emerge. However, given the lack of sustained funding in this area, our best and brightest young researchers and clinicians do not see great opportunities to thrive by studying infectious diseases. We do not have sufficient support to maintain our existing key facilities such as the biosafety level 3 labs that are so important today, let alone expand our capacity in an emergency.

I want to be clear that I'm very grateful for the funding that my team and I have received from CIHR to address the COVID-19 crisis. We're working with a great team of virologists, chemists and experts in human responses to infection to find new candidate drugs to treat COVID-19, but this is challenging, as you can imagine, in the midst of a pandemic. Had we invested in the past in programs that sought to build these teams and support them, we might have been in a position to lead the globe in this crisis. Canada can and should be leading the world in infectious disease research.

This takes me back to AMR, the other pandemic we're now experiencing, a known known. No one can argue that antibiotics haven't changed medicine, perhaps like no other group of drugs has. Antibiotics not only cure infections caused by bacteria; they have enabled much of the progress in modern medicine over the last 75 years by being there to prevent infection. For example, in major surgeries, cancer chemotherapy, organ transplants or hip and knee replacements, antibiotics are used to make sure that these procedures occur infection-free.

Imagine where we'd be without these miracle drugs. It's actually pretty easy to imagine. We'd be exactly where we are right now with SARS-CoV-2, with no therapies and all the devastation that results. Ironically, we may face even more pressure in AMR due to the current pandemic as we deploy more of these drugs to avoid secondary bacterial infections, and due to untested claims of the use of antibiotics such as azithromycin in COVID-19 therapies that put pressure on drug supply and derail antibiotic stewardship efforts.

We haven't had a new class of antibiotics since the 1980s. Since then, bacteria continue to evolve and have become resistant to, actually, all of our drugs. Paradoxically, the pharmaceutical industry does not see antibiotics as profitable, and they have systemically shut down antibiotic discovery programs over the last 15 years.

At McMaster, we're trying to buck the trend. Aided by remarkable philanthropic investments, we created the Michael G. DeGroote Institute for Infectious Disease Research and the new David Braley Centre for Antibiotic Discovery. We've built a culture of innovation and dedication to solving the most challenging infectious disease problems we face today, including AMR and now COVID-19. The team is multidisciplinary. It spans medicine, biology, chemistry, math, engineering, computer science and social science. This is essential to respond to future waves of COVID-19 and future pandemics.

In closing, I'd like to again express my gratitude for the rapid research funding programs that have been deployed to address the current pandemic and for the unity of the House in supporting these investments. I can assure you that the researchers in our teams, who I note include many young people—graduate students, medical students and post-doctoral fellows—are working day and night to solve this problem.

What I, frankly, worry about is what's next for these amazing young people. They are our firefighters, but are we prepared as a society to invest in a world-class fire department for them?

Thank you, Mr. Chair.

● (1410)

The Chair: Thank you, Dr. Wright.

We go now to Dr. Quach-Thanh.

Please, go ahead. You have 10 minutes.

[*Translation*]

Dr. Caroline Quach-Thanh (Full Professor, Department of Microbiology, Infectious Diseases and Immunology, Faculty of Medicine, Université de Montréal, Medical Microbiologist and Epidemiologist, CHU Sainte-Justine, As an Individual): I want to thank the chair and the members of the Standing Committee on Health for the invitation to speak. I also want to acknowledge the work of our public health authorities. Both Dr. Tam, at the federal level, and Dr. Arruda, in Quebec, are doing unenviable work. They must all make public health decisions with imperfect data and with scientific evidence that's emerging as we go along.

I'm a pediatric microbiologist and infectologist and a clinician-researcher at CHU Sainte-Justine. I'm also a full professor at the Université de Montréal's Department of Microbiology, Infectious Diseases and Immunology. I'm a past president of the Association of Medical Microbiology and Infectious Disease Canada. I'm a member of the COVID-19 expert panel established by the chief science advisor of Canada. I'm also a member of the COVID-19 immunity task force's leadership team.

My clinical and research expertise is in infection control, from the hospital to the community, and it also extends to immunization. I want to thank the Fonds de recherche du Québec en santé for supporting this research topic from the start. What stands out in the current situation is how much infection control generally isn't seen as essential, but rather as a necessary evil.

Back in 2001, the Public Health Act already acknowledged that infectious diseases could pose a threat to public health. In 2005, in the wake of the *Clostridium difficile* outbreak, the Aucoin report, entitled “First do no harm...Nosocomial infections in Quebec, a major health issue, a priority,” revealed that successive budget cuts had prompted facilities to reduce resources not related to the direct care of users.

This led to a decrease in the already insufficient number of infection control professionals and a reduction in housekeeping services, which had the impact that we know. The report concluded that competent and stable infection control teams were required and that a culture of prevention needed to be developed and nurtured.

Following the report, terms of reference were established in 2006 and reviewed in 2017. This document recommended that prevention teams conduct simulations as part of their preparations for managing outbreaks of virulent or emerging pathogens. The document also recommended that facility managers create clinical and administrative teams to manage major or persistent outbreaks in order to facilitate decision-making and implement recommended measures.

In this situation, management must give the designated infection control officer and the nurse manager of the department the necessary authority and resources, including line authority to suspend activities that could put people's safety at risk.

The terms of reference also recommended adherence to ratios of infection control professionals per number of beds adapted to the various types of facilities, including residential and long-term care centres, or CHSLDs. These ratios are one of the monitoring indicators at the departmental level. It would be useful to see whether the facilities monitored these ratios in the run-up to the current pandemic.

Despite the Aucoin report's findings and the resulting terms of reference, clearly many recommendations took a back seat over the years because of a significant lack of human, financial and material resources, or because they weren't considered important enough.

Infection control expertise remains key in all health crises. It must be included in the steering and management committees of facilities and networks, which isn't always the case. The infection control officer and the nurse manager, along with the other managers, must be at the decision-making table at all times, not just in times of crisis.

Prevention expertise must be recognized in all settings. We must continue to promote the prevention role played by the officer, nurses and professionals in order to attract quality people who have the necessary leadership skills and the desire to pursue a long-term career in the field.

In addition, hygiene and health workers play a key role in infection control and must be properly recognized. Occupational health offices are also understaffed, which prevents them from conducting fit testing of N95 masks and tracking workers exposed to COVID-19 cases in a timely manner.

● (1415)

Everyone knows the saying “an ounce of prevention is worth a pound of cure.” Yet in Quebec, preventive medicine accounts for only about 3% of the health care budget. Infection control is no exception, and it has suffered from chronic underinvestment.

The current devastation in our seniors' residences and centres is partly the result of insufficient infection control resources in these places. Obviously, the prevention measures implemented in these places must be thoroughly reviewed. The public will only be better for it.

The current pandemic also exposed the lack of personal protective equipment, which forced the infection control advisory committees to take this factor into consideration in their recommendations.

This situation shouldn't have occurred. After the severe acute respiratory syndrome, or SARS, crisis in 2003, stocks were built up. However, some stocks don't appear to have been replenished over the years.

In addition, the inability of our industries to manufacture personal protective equipment and certain drugs locally has exposed our dependence on other economies. The necessary steps must be taken to address these shortcomings in the near future.

The growing complexity of treatment and care and the fragility of our patient population in pediatric, geriatric and neonatal care increase the risk of infection, morbidity and mortality. To protect this vulnerable population from infections, both during their hospital stay and after discharge, we need well-enforced infection control practices. In the current pandemic situation, clearly proper knowledge of prevention concepts is needed in all care settings. However, this hasn't been the case.

Despite scientific progress, infection control research is still in its infancy. Grants from the Canadian Institutes of Health Research, or CIHR, are hard to come by. Infection control projects differ from other projects. They're generally transdisciplinary projects involving the social sciences, engineering, and basic and clinical sciences.

These clinical projects, along with other prevention projects, are often less well recognized than projects with a curative focus. They don't receive proper funding. The failure to invest in learning how to change behaviours and prevent antibiotic resistance, to prevent respiratory infections in CHSLDs, or to assess the effectiveness of wearing gloves, in addition to hand hygiene, are just a few examples of the shortcomings that undermine our ability to prevent infections, including the current pandemic.

Many infection control measures and recommendations are provided empirically without solid evidence. This constitutes a major barrier in ensuring that medical personnel take ownership of the recommendations. Prevention measures must be assessed. However, the diversity of monitoring approaches across Canada, along with the difficulties involved in pooling data from province to province, makes the centralization of data on a Canada-wide basis almost impossible.

This makes it difficult to assess prevention measures with a large enough sample size to draw conclusions and interferes with the smooth and timely management of outbreaks. Moreover, this doesn't give us the chance to learn from our successes or failures.

I applaud the CIHR's quick launch of competitions for operating grants for a rapid research response to COVID-19 to address the pandemic issues in real time.

Ironically, in the current pandemic situation, clinician-researchers who serve as infection control officers and who identified relevant research issues as part of their daily work were unable to submit a project as principal investigators in the first CIHR competition. These clinician-researchers were all managing the pandemic in their respective facilities with an increased workload. At the same time, the CIHR cancelled the March competition and asked everyone to apply again for the regular September competition.

However, in the current situation, the researchers involved in the management of COVID-19 will be at a disadvantage, since no preliminary data will be available to improve the application submitted six months later.

Infection control research is critical, whether or not it concerns COVID-19. The research provides the necessary input to the federal and provincial advisory committees, which make recommendations to departments. The departments will ultimately make the decisions. The research also helps improve techniques and approaches used in facilities and in the community.

● (1420)

Lastly, we can't overstate the need for infection control and the associated research to prevent the development and spread of infections in the community and in health care facilities, including CHSLDs. Proper investment in this key health care sector would have saved lives and public money.

We must learn from our past mistakes and take the necessary steps to ensure a proper and quality infection control system. Infection control improved dramatically after the *Clostridium difficile* crisis. Hopefully, further progress will be made after the COVID-19 crisis.

Thank you for your attention.

[*English*]

The Chair: Thank you, Doctor.

Dr. Tremblay, please go ahead. You have 10 minutes.

Dr. Cécile Tremblay (Professor, Department of Microbiology, Infectiology and Immunology, Faculty of Medicine, Université de Montréal, As an Individual): Thank you, Mr. Chair, and thank you to all of the committee members for inviting me to speak in front of the committee.

I am a medical microbiologist and infectious disease specialist at the Centre hospitalier de l'Université de Montréal and full professor and director of the translational HIV research chair at the Université de Montréal, where I led two pan-Canadian cohorts on HIV research. I was the director of the Quebec public health laboratory from 2012 to 2015 and was co-chair of the Canadian Public Health Laboratory Network during this period.

Today, I'm talking to you as a researcher, a clinician and a public health scientist.

Let's talk research. First, I want to congratulate the Canadian government on its rapid response to the pandemic with the investment of specific funds directed at COVID-19 research very early on in February, and then again in the month of May. There was an urgent need to support research teams already in place in order to advance innovation, mostly in treatment and vaccine development, to counter this pandemic. That's the good news, but there is still so much we need to learn to better understand this disease pathogenesis and, as well, to analyze our response to this pandemic and better prepare for the future.

To date, the funding opportunities that were launched were short-term opportunities only—less than a year—yet look at what needs to be done to win this battle. We have to characterize the host responses to the virus, such as, for example, what drives these multisystemic inflammatory responses and how to treat them; understand SARS CoV-2 replication and its genetic evolution over time; characterize the quality and durability of natural as well as vaccine-induced immunity in various populations, such as the immunosuppressed, the elderly and children; and, understand the dynamics of pandemics in terms of what went wrong, and whether we can build tools, models, to better predict the next phases or next pandemics.

All of this takes time—time and money. However, as I mentioned, the last funding opportunity was directed at one-year projects only. Over 1,800 applications were submitted, which reflects the interest and innovation potential of our Canadian research community, but only a few of these will be funded, and then what? There are no more announcements regarding future funding opportunities. The Canadian Institutes of Health Research cancelled their spring competition, and we don't know what will happen with the September competition, which is directed at research projects in all domains outside COVID-19.

It is urgent to invest more funds for COVID-19 research. The government needs to launch a phase three in its COVID-19 research investments. This phase should be directed at gaining three things. They are to get a better understanding of the virus and its complex interactions with humans; to better understand our immune responses; and, equally important for the future, to learn the clinical, social and epidemiological lessons from this pandemic in both the mid-term and the long term.

Furthermore, why not take the opportunity to create a research infrastructure to monitor viral diseases over decades? This observatory would follow a cohort of individuals across the country who regularly would donate blood and clinical data that would become an extraordinary platform to identify, characterize and predict future zoonotic viral illnesses.

● (1425)

[*Translation*]

From a clinical standpoint, I'm concerned about our preparedness for the second wave of the pandemic. Do we have enough personal protective equipment, swabs and reagents for laboratory testing in the fall? What does our stockpile look like right now? Will we be caught in the same unprepared situation as at the start of the pandemic? It seems vital that, both in the short term and long term, Canada be self-sufficient in terms of manufacturing these essential materials to manage an epidemic and protect our health care workers.

In addition, the current epidemic has highlighted the shortcomings of our health care systems, especially the shortage of personnel in all categories, from nursing aides to maintenance workers to nurses. Governments should reinforce training programs that will encourage young people to enter different health care professions, through scholarships, enhanced university programs combined with support for universities, and better working conditions for all personnel. They are the health care system.

Lastly, we've hardly touched on the use of new technology to manage epidemics. It's 2020. Artificial intelligence should be at the forefront of research activities. Tools should be developed to serve public health needs while respecting individual confidentiality. Artificial intelligence should become a research and development priority. The tools should be standardized across Canada to synergize our capacity to control a pandemic.

Many lessons will be learned from this pandemic. Researchers in basic science, public health, social science and clinical fields should play a pivotal role in analyzing the determinants of this crisis and preparing us for the next one. We must review our pandemic preparedness plans. The time has come to invest in research and to train the next generation so that these lessons are based on science and so that the solutions are anchored in evidence and sound scientific thought.

Thank you for your attention.

● (1430)

[*English*]

The Chair: Thank you, Dr. Tremblay.

We'll start our questioning now. We'll do three rounds of questioning. We'll start our first round with Dr. Kitchen.

Dr. Kitchen, please go ahead. You have six minutes.

Mr. Robert Kitchen (Souris—Moose Mountain, CPC): Thank you, Chair.

Thank you, all, for your presentations. They were so short. I wish I could sit down with each one of you individually because I have so many questions and so many angles I'd love to ask you about. I'll try to be as concise as I can. I'll follow in order of who presented.

Dr. Mossman, you talked about N95 masks and talked a little bit about reutilizing the masks by making them sanitary. You may know this as well, that VIDO-InterVac in the University of Saskatchewan is also doing that sort of thing. I'm wondering if you could comment on that for us, please.

Dr. Karen Mossman: We have been working with a number of local companies that have a variety of different devices that they would like tested for the ability to sterilize and reuse N95 masks, because we all recognize that they are in short supply. We have set up the ability to have our engineering faculty members ensure the integrity of the masks, and there are different types of sterilization. Then we have a number of our virologists testing that the methodology will properly sterilize the masks and kill the viruses.

Our engineering faculty is also working on looking at different types of materials that could potentially be used to generate sufficient types of masks.

Mr. Robert Kitchen: That was my next question to you. It's not just N95s that we're looking at, because N95s are more specific respirators versus other masks we see a lot of people using. We're also looking at the material that they're using to see how much it protects.

The 95, as you're aware, indicates purely the percentage of microns that it minimizes. Correct?

Dr. Karen Mossman: That's correct.

Mr. Robert Kitchen: Thank you, Dr. Mossman; I appreciate that.

Dr. Wright, you talked about AMR. I have a background in it, not a great one, but I do have one. A lot of people on the committee may not be aware of it.

When we're talking of antimicrobial research, we're talking about protection from four things: bacteria, fungi, viruses, protozoa. Ultimately, the research is not there, as you've indicated. The concern is that we have people going into long-term care facilities, into hospitals, where the hospitals are using materials, disinfectants, in my opinion not to the strength they should be, such that they're not protecting the public when they go to these facilities. Is that the area that we maybe should be focusing on a little more? We have long-term care practitioners who are only going to one facility now instead of several. They're now changing their clothes when they get there. They're wearing their clothes at work then changing back to their street clothes, etc. Could you comment on that, please?

● (1435)

Dr. Gerry Wright: Certainly you raise a really important point. That is, as health care workers move between facilities, they take with them any organisms that are on them, any bacteria or viruses that they happen to be in contact with, and they can transfer them to other spots. This is one of the big challenges with antibiotic resistance, in that these bacteria can move around on people and on other surfaces.

It is an issue that I think we have to be very aware of. I'm very happy that, at least in Ontario, we're trying very hard not to have people move around among these facilities, because I think it does present an unnecessary risk.

Mr. Robert Kitchen: That's great. Thank you.

Dr. Quach-Thanh, thank you for your presentation. It's tremendous. I look at your research, and I'm interested in a number of things in it.

First of all, if we go back to the issues of 2001, 2005, where we were looking at infections, we started with the concept of infection control teams. Over time—and I think you're alluding to it—we've been left behind. Many of our witnesses have indicated things we've brought up that have not been followed through on. For example, research started up for one or two years after the SARS epidemic, then all of a sudden it seemed to be forgotten.

You talked a little about infection control teams and doing simulation ratios. I think those are part of what PHAC was supposed to be doing. Do you know how many simulations have been done since 2005?

Dr. Caroline Quach-Thanh: It's hard for me to speak at the Canadian level. That responsibility lies with PHAC, but also with provincial public health institutes and with hospitals.

I know that at the Canadian level there have been simulations around pandemics. They did one around Ebola. They did one around the H1N1 influenza pandemic. They were supposed to be doing another one now, but the real thing happened before a simulation could be done.

At the level of our hospitals, I think that most of us have done one or two, whether doing Ebola or now with COVID, but it's not something that we do on an ongoing basis because it requires resources, time, as you can imagine. Yes, absolutely, we should be keeping that in mind and doing more of that so we're not taken by surprise when something like this happens.

In my hospitals we've done some. I was at the McGill University Health Centre before, and we also had them. It should be somewhere on a checklist, that you should be doing them every year or every other year, just to make sure you know how to think through a new pandemic or an outbreak.

The Chair: Thank you.

Mr. Van Bynen, please go ahead. You have six minutes.

Mr. Tony Van Bynen (Newmarket—Aurora, Lib.): Thank you, Mr. Chair; and thank you to all our witnesses for joining the committee today and for sharing their valuable expertise.

I've heard of a lot of collaboration happening out in the field, and I'd like to learn more about the virus and finding the potential treatments, developing the vaccine.

Dr. Mossman, I understand that your findings were a product of collaboration between Sunnybrook hospital and the University of Toronto. I wonder whether the amount of collaboration we're experiencing during this pandemic is something you've experienced in the field prior to the pandemic, and are there any challenges you are facing with respect to collaboration?

Dr. Karen Mossman: We are very fortunate that we have really strong collaborators, especially within Ontario and within Canada. Even at the initial phases, when COVID first started in Toronto and we were working with Sunnybrook to isolate the virus, it was a very natural and very quick collaboration.

What I am seeing that is different as we move through the pandemic is the international collaboration and the willingness of scientists to share information before it is published. That is fairly new, but we were able to very quickly collaborate. I think it's because of that Canadian spirit that we have phenomenal collaborators. We have not seen any challenges with collaborating either with our colleagues in Toronto or across Canada.

● (1440)

Mr. Tony Van Bynen: How can the federal government foster a more collaborative or innovative environment between research groups in order to find and support future treatments, for the vaccine for COVID-19?

Dr. Karen Mossman: One mechanism that has become very useful is the CanCOVID platform. It's a platform that is now linking all COVID-based researchers in a number of different areas. It's very expensive to maintain. I know there have been discussions about having the government help fund initiatives such as that.

The CanCOVID platform really helps you to find the right collaborator, if you don't know who that is, who you should be asking your questions to. The platform allows individuals and individual researchers to find the collaborators and to initiate conversations. It has been a really excellent resource, and funding resources such as that can be very helpful.

Mr. Tony Van Bynen: Thank you.

My next question is for Dr. Wright. It's my understanding that you have received funding from the Canadian Institutes of Health Research as part of the government's investment to fight COVID, to support medical research focusing on targeting genetic and chemical vulnerabilities of the virus.

Could you share with the committee a bit more about your research and how it is supporting the development of treatments for COVID-19?

Dr. Gerry Wright: I'd be very happy to, and again, let me reiterate how grateful I am that we were able to get that money out very quickly, as both other witnesses mentioned.

You were talking about collaboration earlier. This is a collaboration between a virology lab headed by Dr. Matt Miller in our institute, as well as a human cellular biologist, Dr. Mike Tyers, who's at the Université de Montréal. We're trying to tackle the problem by finding drug candidates for the virus itself, as well as to address issues such as entry of the virus into cells, so we can think of drug cocktails to be able to kill the virus and prevent infection.

At McMaster, we have a small drug discovery platform, very similar to what you'd find in the pharmaceutical industry, which we've developed over the years with the support of federal and provincial governments. That's what we're deploying to be able to do this, to tackle at once the virus and the human cells on the other side, and because of the advances that Dr. Mossman's group has been able to make, we have SARS-CoV-2 in our biosafety level 3 facility and we're able to test those drug candidates on the virus directly.

Mr. Tony Van Bynen: We know that handwashing is ideal, but it's not always available as an option when you don't have access to soap and running water, which means that you may not have any choice but to resort to hand sanitizers. I'd like to hear your thoughts on whether there's any way of avoiding antimicrobial resistance, but still protecting yourself from COVID-19.

● (1445)

Dr. Gerry Wright: Certainly. The best way to do that is to use hand sanitizers that have alcohol, and not other compounds that have the ability to select for drug resistance. As far as we know, alcohol-based hand sanitizers have no effect at all on selection for resistance. Those are the ones we should be using. They tend to be deployed in almost all health care facilities.

Mr. Tony Van Bynen: Thank you.

The Chair: We go now to Monsieur Thériault for six minutes.

[*Translation*]

Mr. Luc Thériault (Montcalm, BQ): Thank you, Mr. Chair.

I'd like to thank all the witnesses for their insightful contributions to the hunt for solutions, because solutions are indeed what we are looking for. I'm going to set the scene. Then, I'd like Dr. Quach-Thanh and Dr. Tremblay to comment.

We still don't know much about the virus. We don't have a vaccine. Since the focus has shifted to reopening the economy, some people have told us that we're going to have to learn to live with the virus, much like we learned to live with AIDS. We're turning to antiviral drugs, but we don't have anything meaningful yet. What's more, we still haven't taken full advantage of serological testing. The country isn't self-sufficient. Various parts of the health care system shut down, only now starting to get back on track. Some health care settings have outbreaks. Front-line workers have had to stop working because they've been infected. Lastly, we know nothing about the quality and longevity of natural immunity.

With all those unknowns, it feels as though we have no choice but to buy time to lessen the impact. That's what is referred to as flattening the curve.

What's the safest pace for easing restrictions?

Is Quebec on the right track, or is it following the path taken by countries that have had to shut things down again?

Dr. Cécile Tremblay: As for an appropriate pace, I would say the conditions set out by the World Health Organization, or WHO, for lifting restrictions are appropriate. They include a decline in the number of new cases for a period of at least 14 days and the capacity to test people and prevent the movements of incoming travellers.

In Quebec, two different epidemics are at play: the one affecting the greater Montreal area and the one affecting the rest of Quebec. The WHO conditions were met in the rest of Quebec, meaning, outside Montreal. However, in Montreal, that's taken more time. Although we are now seeing a slight decline, it's actually more of a plateau.

If the easing of restrictions that began today isn't done in an orderly way, there is a risk that the daily number of new cases could be higher than we'd hoped, which could spark new outbreaks and infections more easily.

Overall, then, I think things have been handled well, in that the government waited until certain conditions were met before it began lifting restrictions. As for Montreal, it will be necessary to keep a very close eye on what happens in the next few weeks.

Dr. Caroline Quach-Thanh: I completely agree with Dr. Tremblay. Paying special attention to the situation in Montreal will be crucial. Things are relatively stable in the rest of the province, but the situation isn't the same throughout the Montreal area. The virus has unfortunately stigmatized the most vulnerable segments of the population, highlighting existing social inequalities. Some parts of Montreal are more affected than others.

One of the reasons why the government eased certain restrictions is that people were going out anyways. Knowing people had already started going out, the government thought it better to control, to some extent, the lifting of restrictions than to tell people to keep staying home. That's certainly not without risk, so it'll be important to pay close attention to what happens over the next two weeks.

● (1450)

Mr. Luc Thériault: It's a matter of buying time. We're still not self-sufficient when it comes to producing personal protective equipment. Outbreaks have hit hospital centres and long-term care facilities.

We're still looking at a second wave. At one point, we thought we'd be ready for the second wave. Is there a risk of people coming out of lockdown on their own initiative? Are you worried about people self-lockdown-lifting, so to speak? We don't have much time left, perhaps three months until the second wave is expected to hit.

Dr. Caroline Quach-Thanh: We are trying to buy time. You're right; the second wave is likely to occur in the fall, when kids go back to school and normal activities will have resumed. Until then, reducing close contact with people is a must.

We've learned that the virus spreads when people are in relatively close contact for a relatively prolonged period, so it spreads much more effectively indoors than outdoors. It's probably relatively safe to let people go outside, but they need to stay two metres apart, as much as possible. Even when people are a metre or a metre and a half apart, with dilution, warmer weather and humidity, the virus is a bit less resistant, so it shouldn't be transmitted as easily.

I think people need to get used to wearing a mask in public, but not necessarily outdoors. Wearing one in confined spaces where people can't stay two metres apart the entire time is definitely necessary.

As you said earlier, we have to learn to live with the virus, because it's here to stay in the short term. We have to wait until a drug or vaccine is available in order to protect the entire population.

We know transmission is going to occur, but we have to find ways of reducing it as much as possible. We don't want to have to force people into lockdown all over again because transmission has picked up too much.

Mr. Luc Thériault: Are you optimistic about—

[*English*]

The Chair: Thank you.

Mr. Davies, please go ahead for six minutes.

Mr. Don Davies (Vancouver Kingsway, NDP): Thank you, Mr. Chair, and thank you to all the witnesses.

To whichever witness feels best qualified to answer, what is the most current state of knowledge and information concerning immunity? Are we getting closer to understanding whether or not, once we're exposed, immunity is conferred, and if so how long might that be for?

Dr. Cécile Tremblay: I can start and others may add.

Right now what we know is that most people who have been infected will develop some kinds of antibodies. The amount of antibodies and the quality of these antibodies are not known for sure. They may vary from one person to the other. They may vary on the type of exposure a person has had, whether they've had a severe disease or whether they've had a mild disease, in which case they might not mount a very big immune response.

The jury is still out in terms of the quality of the immune response as to whether it is really very protective against reinfection. We can assume that probably it would be somewhat effective against reinfection.

What is less known is the durability of this immune response, of these antibodies. From a recent study that was published last week, immune responses were evaluated over a period of 35 years in 10 individuals, and all their coronavirus infections were mapped. The conclusion was that the lasting immunity against a coronavirus infection was between six to 12 months.

This is a problem because it's not a very long-lasting immunity. If we want to rely on herd immunity, it would take forever for a society to be 70% totally immune against these types of viruses. That's where we are right now.

Mr. Don Davies: Thank you.

I'll direct another question to you. On May 7, you called the failure to test people who might be asymptomatic COVID-19 carriers a missed opportunity. Given that epidemiological modelling has suggested that asymptomatic or preclinical cases may be responsible for potentially significant transmission of the virus, what do you think when the Government of Ontario and I think even Quebec have so far declined to test asymptomatic individuals? What would be your comment on that?

● (1455)

Dr. Cécile Tremblay: For the last week or so in Quebec, since they've increased the testing numbers, they have allowed for testing of asymptomatic individuals.

There are two ways of seeing this. If you go randomly in the population and test anybody who's asymptomatic, it's not really worth it, because you're not going to find that many who are positive, so that is not a good way to go. On the other hand, if you have a person who is infected and has several contacts, some of whom are asymptomatic, I believe they need to be tested, and it is very important. It should have been done earlier, in my opinion, testing the asymptomatic contacts of symptomatic people.

Mr. Don Davies: Thank you.

Again, generally to everybody, I'm interested in the most current state of knowledge on transmission. We know that COVID—I should call it SARS-CoV-2— is definitely transmitted by droplets.

What do we know right now about its transmission by aerosol or fomites?

Dr. Caroline Quach-Thanh: I'll take this one, if you don't mind.

What we know is that, in certain circumstances, particularly when you're in a hospital and you do medical procedures, you might be able to aerosolize that virus. For instance, if you intubate a patient, if a patient is on CPAP, when you go in the airways, we know that it aerosolizes the virus. That's why we put them in negative pressure rooms. We wear N95 masks and all the rest.

What is still not completely clear is what happens when a person coughs or does physical activity and breathes out very strongly. I think that what seems to happen is that you are able to have smaller droplets that will be suspended in the air for five to eight minutes, but it's not per se for now in aerosol.

Studies are currently ongoing, particularly in long-term care facilities where we're all wondering if airborne transmission is not happening, given the proportion of people who become infected when they just go into those facilities. Air sampling is being done with cultures of air. We know that we are able to find pieces of viruses in the air in long-term care facilities, but we don't know if that's a piece of a virus that's dead or if it's a virus that's still able to replicate.

The studies are ongoing right now, and I think we'll have the results within the next month or so. At that point in time, we'll know. At this point in time, I think daily living will cause droplets that may be suspended in the air for five to eight minutes, like when you sing, for instance, and when you cough very hard, and that is still able to infect the next person. Aerosolization per se for now is not yet approved upon.... The jury is still out, as Dr. Tremblay would say.

The Chair: Thank you.

We'll start round two with Mr. Jeneroux. Please go ahead for five minutes.

Mr. Matt Jeneroux (Edmonton Riverbend, CPC): Thank you, Mr. Chair.

Dr. Tremblay, if you can get a good idea of what our national stockpile looks like, please share. We've certainly tried to get that information over and over again at this committee. Perhaps it's something we can follow up on after this meeting.

The question I want to ask, and I'll probably start with you, Dr. Tremblay, is a follow-up on the question my previous colleague just asked with regard to immunity. The question we receive often is whether people build immunity to the virus once infected.

In a bit of a different angle to what my colleague asked, has there been any progress in answering that specific question and have we seen an example of people becoming reinfected with COVID-19?

Dr. Cécile Tremblay: A lot of labs are working on that to evaluate the quality of the immune response. We can take for granted that there is some kind of immune response and some antibodies are being made following infection. We just don't know exactly the quality and the strength of these antibodies. Are they neutralizing antibodies, the kind of antibody that can really kill the virus when they meet the virus again, or are they just binding antibodies? We still don't have the answer for that.

As far as being reinfected, there have been a few case reports suggesting that some people might be reinfected. We don't know so far and we think it's most probably a person who had been infected. The virus was not totally eliminated from their body although they were not detectable in a couple of PCR tests, and then a few weeks later, they become detectable again. Most likely it's the same disease, but to date we haven't had a study that can definitely rule out that there hasn't been any reinfection. If it is, it is rare.

● (1500)

Mr. Matt Jeneroux: Would any other witnesses like to weigh in on the ability to build immunity to the virus?

Dr. Caroline Quach-Thanh: As Dr. Tremblay just said, there are still so many unknowns around this virus. We know there is an antibody response, but we don't know how long that will last. If you were to look at the last rapid-response COVID-19 CIHR grant, you'd find a couple of people putting that particular question in so that we are able to actually have an answer to it.

Again, as Dr. Tremblay said, most of the people we've seen with relapse, positive PCR, were likely the same patients with undetectable PCR who became positive again. We had a patient like that. They were positive for 65 days, with one bit in between that was negative and where the virus never grew.

We're not exactly sure why this virus hangs around for so long, but it does. It doesn't mean people are still infectious, though.

Mr. Matt Jeneroux: We keep hearing that until there's a vaccine, normal life in terms of social distancing won't...or we'll have to keep up the social distancing. Is there another path that you guys can see without a vaccine—I already see a few of you shaking your head—where we can relax some of the social distancing?

Dr. Caroline Quach-Thanh: Well, you can, but then what happens is that you will have a huge wave. Your health care system will be overwhelmed and you will look like the U.S. or Italy. Yes, there's always a way around it, but until we have a vaccine, or we reach herd immunity, which will not come anytime soon, you have to maintain physical distancing, at least, if not social. Otherwise, we'll transmit it to one another.

Mr. Matt Jeneroux: Right.

Dr. Tremblay?

Dr. Cécile Tremblay: If we had treatment, that would be good too. Unlike HIV, a virus that enters the host genome and then stays within the person, this is an RNA virus. It's wimpy compared with viruses like HIV. If we could have a good antiviral that could reduce its replication and render it much less virulent within the person, that could help too. Outside of that, though, it's going to be social distancing.

Mr. Matt Jeneroux: Committee members have often been directed to public health agencies and publicly available data for up-to-date information. Is that the same information that researchers are using?

I have very little time, so yes or no is probably fine.

Dr. Cécile Tremblay: Yes.

Dr. Caroline Quach-Thanh: Yes. We have nothing more.

The Chair: Thank you.

We go now to Mr. Fisher.

Mr. Darren Fisher (Dartmouth—Cole Harbour, Lib.): Thank you very much, Mr. Chair.

Thank you so much to all of you brilliant minds for being here today and for sharing just a little bit of your wealth of knowledge.

Dr. Wright, in your conversation with MP Van Bynen, you talked a little about how the COVID-19 pandemic could contribute to the rise of AMR. On the other side of that coin, are there any aspects of the response to the pandemic, such as increased infection prevention or control measures in hospitals and in other settings, that might help to combat the rise of AMR?

Dr. Gerry Wright: That's a really good point. We don't know the answer yet. Everything is theoretical. On the one hand, we're concerned about selecting for more drug resistance, but on the other hand, because everyone is all of a sudden washing their hands properly and wearing masks while out and about doing their grocery shopping, the amount of contact that people would normally have with other organisms is decreasing. So the jury is still out.

Inside of hospitals, they will always be nervous about drug resistance, but out in the community, I think we might actually see a decrease. As I said, though, the jury is still out.

● (1505)

Mr. Darren Fisher: Well, I'll tell you, I'm a politician, and I haven't shaken a hand since March 11. So you 're absolutely right.

Sticking with the hypothetical, Dr. Wright, let's say the worst was to happen and the virus never goes away. It becomes endemic in our communities. How would you change how people prepare for a second or third wave? If hand sanitizers create a future risk, what would you recommend to keep our citizens safe?

Dr. Gerry Wright: I think we're doing it right now. We've shown how to do it. We're getting very good at the new normal, which is the physical distancing between people to avoid these things. As I said before, hand sanitizers aren't necessarily a problem if they're alcoholized. People washing their hands, washing door handles, and all sorts of things that are happening much more in our institutions than they used to is the way to prevent the infection.

As Dr. Tremblay said, short of a new drug cocktail that you could take preventively if you were exposed—probably our first way out, by the way, will be not a vaccine but some collection of drugs that we'll be able to deal with—I think it will be the new normal for all of us. It's happening to us. I mean, I'm in my basement; I'm not at work.

Mr. Darren Fisher: Dr. Mossman, your research is fascinating. Congratulations on your grant. At what stage are you in your research right now? I don't think you had an opportunity to fill us in on where you are today.

Dr. Karen Mossman: We're really interested in understanding the pathogenesis of this virus, so we're starting to learn what cell types the virus can actually enter in and replicate in—what cells are permissive. We're looking at immune cells in particular, so we're starting to understand a lot about just the biology of the virus.

Also, then, part of the lab is very interested in comparing human cells and bat cells, because bats, of course, can carry all of these viruses and not get sick. We're starting to understand those very small changes.

Because bats are mammals, their immune system is very similar to ours, and we're starting to understand what those very small changes are. Now we're going to work with colleagues to try to come up with mechanisms, be it drugs or small molecules, so that we can change the human system into the bat system so they would be protective.

Mr. Darren Fisher: Last week, we had Canada's chief science adviser, Dr. Mona Nemer, at our committee. She talked about the importance of promoting open science.

Dr. Mossman, you've talked a bit about that, but I'll go to anyone else who would like to answer. What specific steps have researchers or universities taken in order to share that data?

Dr. Karen Mossman: Aside from many of our researchers now putting their findings online before or during the process of peer review, there are now many mechanisms to put your research online. McMaster has also signed an open COVID IP pledge, which will say that for any findings that we find, the intellectual property will be available for a period of time, such as a year, just to ensure that people can use our findings. It's about the greater good rather than any sort of monetary or commercial value.

Mr. Darren Fisher: That would be a big change since 2003 with SARS, right?

Dr. Karen Mossman: Absolutely.

The Chair: Thank you.

We'll go now to Mr. Webber.

Mr. Len Webber (Calgary Confederation, CPC): Thank you, Mr. Chair, and thank you to all our presenters today for their opening comments.

I want to talk a bit about the research grants that are available out there.

Dr. Mossman, you talked about your funding and how that's being provided by the CIHR.

Dr. Wright, you are very grateful for the funding you're getting, according to your testimony here.

Dr. Tremblay, you congratulate the government for the money that it put toward research, although you've mentioned that short-term funding opportunities have the only available research dollars and you see no more future announcements for funding.

The committee, back on April 14, heard that the CIHR, in collaboration with the provinces, was able to invest $54.2 million to support COVID-19. On April 23, our committee heard that an additional $115 million in funding was allocated as part of a $1.1-billion national medical research strategy for COVID-19.

In hearing from all of you today, some of you are grateful for the funding you're receiving, others not so much.

Dr. Quach-Thanh, you mentioned that it is difficult to obtain grants from the CIHR. I'm just a bit confused here. Some of you are happy with the research dollars and others are not. How many more billions of dollars do we need in order to satisfy the researchers in Canada?

I'll start with Dr. Quach-Thanh, please.

● (1510)

Dr. Caroline Quach-Thanh: Well, as researchers, I think we would always want more money to fund research. I think you knew the answer to that question by asking it.

I think it's the variety of research that is currently happening that makes it so difficult for other good research to be funded. If you look at the scores currently, you can see that some grants that have scored above 4.0, which is amazing, are not even funded.

I understand the competition. I understand all of that, but it depends on how the committees are seeing the importance of each question. As I said, prevention is usually not as sexy as a cure or as genetics. It's not as easy for all the topics to actually float to the surface, regardless of how well you write it. I can't tell you how much money we want. I can only tell you that we want more—

Mr. Len Webber: You want more.

Dr. Caroline Quach-Thanh: It's a political decision. It's not ours to make.

Mr. Len Webber: Yes, exactly.

What areas of research should be prioritized in your view?

Dr. Caroline Quach-Thanh: If I was talking for myself, I think I'd say I want infection prevention to be highlighted.

I think all the domains actually need to be funded. The problem is you never know what research done today will help you tomorrow. When people developed and invented the laser they didn't know what they were going to do with it. At one point in time it became trendy and people were able to use it. To be able to tell you now what needs to be funded is impossible. I think the research community just needs to keep an open mind to all the projects that are coming up, including very obscure, basic science projects, you could say, where you don't see an applicability today but which could be the need of the future.

Mr. Len Webber: Yes, thank you for that.

Dr. Tremblay, can you give us a better idea of the limitations and advantages of short-term funding? Do you have some examples to share?

Dr. Cécile Tremblay: The advantage of short-term funding is what you've seen so far, money given right away to test new drugs and start the vaccine development process. That was very important and was done. What is useful in long-term funding is what you do next. For example, we need to know the durability. We need to be able to prepare for a new pandemic. How do we monitor the viral illnesses, the zoonosis that comes from animals to humans over time? There was a push for research during SARS-CoV and then afterwards nothing more. The research was left in the middle of the development for a vaccine. That was never completed because it was not popular anymore then and it was not à la mode.

You need both. You need infrastructure that will allow us to be prepared for any kind of viral illness that can come and that will be useful for all researchers, and you also need to have specific, multidisciplinary research programs that can lead to collaboration and eventually to innovation.

Just to be correct, there hasn't been a billion dollars put into research for this pandemic. It's the $150 million. Just to fund one clinical trial is $5 million. To give you an idea of how little you can fund for $150 million, if you have 10 clinical trials for vaccines, then a third of your money is gone and you haven't started looking at infection prevention, more basic immunity or other stuff. Unfortunately, you don't go far with $150 million.

● (1515)

Mr. Len Webber: Interesting.

The Chair: Thank you.

Dr. Jaczek, over to you. You have five minutes, please.

Ms. Helena Jaczek (Markham—Stouffville, Lib.): Thank you, Chair, and thank you to all the witnesses for explaining your area of research. It's really fascinating to see all the little pieces hopefully coming together.

I'd like to start with Dr. Tremblay. I was very interested in the cohort that was followed for some 35 years and apparently showed very limited or short-term immunity to coronaviruses. In your view, why would a vaccine necessarily be different in terms of allowing for continued immunity?

Dr. Cécile Tremblay: When you design a vaccine, you design it to produce antibodies that are very specific to the antigen you want to attack. When you test it, you use candidates that will likely generate high levels of antibody and with a very high potency for neutralization. Because you are engineering it, you are developing it, so you can choose what type of antibody response you want to get from that vaccine.

When these researchers looked at the overall duration of the immune responses, it's as I was saying before, the immune response is not equal from one person to the other. Some of them have a very weak immune response. We don't decide what kind of immune response we're going to have. It depends on our genetics and all kinds of virus-host interactions. But, when you design a vaccine, this is what you're looking for and you're engineering it to produce long-lasting....

If you're not successful in producing a vaccine that has a very durable response, you can also boost it—give booster doses. Because it is a virus that does not integrate our host's cells, even if you need to give two or three boosts for the vaccine to be efficacious in the population, it can still be done in a one-year or two-year time frame and then be successful in eradicating the virus.

Ms. Helena Jaczek: Do you remain optimistic, essentially, that there is a solution with a vaccine?

Dr. Cécile Tremblay: Yes, I am very optimistic about the vaccine.

Ms. Helena Jaczek: Thank you.

Dr. Mossman, I was very interested in reading a little about the research you've done, understanding the interactions between viruses and their hosts.

One of the issues with COVID-19 has been that presentation of symptoms has been quite varied from individual to individual to the extent that, even though there is a national case definition, some provinces have tweaked it as more and more becomes known.

From your perspective looking at host cells, as you have explained to us, what exactly are you learning about this particular virus and the variation of presentations? To give you another little piece of background, we've heard from Genome Canada, in terms of the virus mutating and therefore changing as time goes on, and potentially even that an individual's genome might receive the virus differently.

Could you comment on that?

● (1520)

Dr. Karen Mossman: It's a fascinating field because you have to look at both the evolution of the virus, but also the evolution of the immune response against the virus. In many cases it is that back-and-forth evolution.

We know quite a bit from the original SARS as well about which receptors on the surface of a host cell or human cells allow the virus to bind and get in, but we're also learning that there's more than just one. Now that we recognize some cell types don't express the protein that is normally the receptor, it's becoming more interesting to understand what the other receptors are, what particular cell types that protein is on, and that starts to explain some of the other symptoms we're seeing.

We have indications of gastrointestinal potential—and it's still being tested—but we certainly at McMaster, and I know of others, are looking at the possibility of transmission in live virus, for example, in feces from the gastrointestinal tract.

As we understand more about what cells the virus can get into.... In some cells, the virus can't make copies of itself, but the cell will still respond. The cell can still make certain cytokines that will show symptoms, or that can induce certain symptoms even if that cell doesn't allow for viruses to make multiple copies of itself.

The more we get to understand the biology, the more we're starting to very slowly understand some clinical symptoms.

Ms. Helena Jaczek: Thank you.

The Chair: Monsieur Thériault, please go ahead for two and a half minutes.

[*Translation*]

Mr. Luc Thériault: Thank you, Mr. Chair.

I have a straightforward question.

Witnesses have told us that pooling information, basically, in real time is necessary. Montreal just decided not to make it mandatory for people to wear masks in indoor public places, including public transit.

What do you think of that, Dr. Quach-Thanh and Dr. Tremblay? Does that make sense from a public health standpoint?

Dr. Caroline Quach-Thanh: As I've always said, people should wear masks inside. I'm not sure what led to that decision, but there's no doubt that, on a bus or subway, where people might be only a foot apart, everyone should wear a mask to reduce the virus's spread. A mask protects other people, not the person wearing it. That means that, if we want everyone to be protected, everyone should wear a mask.

I don't agree with the decision, and I can't tell you what motivated it.

Mr. Luc Thériault: The argument is that they don't want to turn into a totalitarian state.

Dr. Tremblay, what do you think?

Dr. Cécile Tremblay: I don't think that's a valid argument. Masks should be worn in public places, especially on subways and buses.

People had already started wearing them, so I'm disappointed with the change in position. The reality is that it's not possible to make masks available to everyone. They don't want to make something mandatory when it can't be enforced because of resources. That's what I've heard.

Governments sometimes have to implement public health measures, but that doesn't make them totalitarian states. Public health authorities have the power to impose certain things in order to protect society, so I think it's dangerous to use an argument like that.

Mr. Luc Thériault: A faulty ventilation system may be to blame for the virus spreading in a residential and long-term care centre on Montreal's West Island.

In the greater Montreal area, do you think every school's ventilation system should automatically be inspected?

Dr. Caroline Quach-Thanh: First, it must be shown that the virus can spread in aerosol form, and those studies are under way. That will tell us whether aerosolization of the virus occurred in residential and long-term care centres.

Most schools don't have a ventilation system. They rely on natural ventilation, which means opening the windows. I'm not convinced that schools have actual air exchangers, but I could be wrong.

● (1525)

Mr. Luc Thériault: Some high schools, and general and vocational colleges have no windows at all.

[*English*]

The Chair: Thank you, Mr. Thériault.

Mr. Davies, you have two and a half minutes, please.

Mr. Don Davies: Thank you.

Again, to anybody who feels competent to answer this, I'm starting to read about a connection between COVID-19 and a new multisystem inflammatory syndrome observed in children. Can anybody comment on that potential connection?

Dr. Caroline Quach-Thanh: New York has reported some cases; Montreal has seen some as well. We know that this Kawasaki-like disease exists with what we think would also happen with other viruses. We're currently looking to see if children with Kawasaki-like syndrome have been exposed to the virus before.

What we know so far is that, out of the children we tested in Montreal, the vast majority were PCR negative, and only one had a positive serology. It's a little bit early to say, but there seems to be at least a temporal association. We now need to know if this association is causal or not.

Mr. Don Davies: Again, to anybody who cares to answer, I think Canadians are very curious about this. What is it about SARS-CoV-2 that is making it so much more serious than any similar coronavirus? Is it its propensity to spread, its contagious capacity or its virulence? What exactly is it, if anybody can help?

Dr. Cécile Tremblay: One of the things that makes it the most dramatic is its capacity to create severe illness in elderlies. We were expecting pandemics like influenza, where you know what type of population the virus is going to attack, which is broad, and, of course, more at the extremity of ages. This particular virus, first of all is sometimes more contagious than influenza, but for some unique reason that is still not understood, it kills elderly. In our nursing homes and long-term care facilities, it's a hecatomb.

It's this interaction between host and virus that we still don't understand, because that would be the explanation for why elderly people are so fragile to this virus.

I think this is why we need to do more research on that, because this is unique.

[*Translation*]

Mr. Don Davies: Thank you.

[*English*]

The Chair: That ends round two. We will start round three at this point, with Ms. Jansen.

Ms. Jansen, please go ahead, for five minutes, please.

Mrs. Tamara Jansen (Cloverdale—Langley City, CPC): Thank you so much.

I would really like to thank all of the presenters for all of the fantastic information we're receiving today.

I would like to direct my questions to Dr. Quach-Thanh.

The SARS vaccine took 20 months to get to human testing phase, but was never developed. Now we have human trials beginning at Dalhousie in the next two weeks.

Does that seem too fast for you? Do you think there should be concerns about safety?

Dr. Caroline Quach-Thanh: I think what Dalhousie is starting is really a phase one study, which is exactly to look at what you're talking about in terms of safety.

I think people have been in high gear about bringing the pre-human candidate vaccine to first-in-human trials because that's when it becomes very important.

It would be too quick if we were launching a phase three study or we were going to make this vaccine available for public use, but to have it in phase one, I think is perfect.

● (1530)

Mrs. Tamara Jansen: As part of the government task force, can you tell me whether you see any ethical problems in working with CanSino Biologics on the vaccine that's being developed jointly with People's Liberation Army?

Dr. Caroline Quach-Thanh: I did not think about that particular aspect of things.

The vaccine is actually being tested at Dalhousie under the CIRN group, not under the immunity task force. I think we want to test all vaccines that could be helpful for Canadians.

Mrs. Tamara Jansen: Right.

Do you think we should be working with a company that's foreign, rather than developing the vaccine with a Canadian company?

Dr. Caroline Quach-Thanh: I think there is some research that's happening in Quebec City with a Canadian vaccine. I would hope that vaccine would also make it to the front-runner line for testing.

Mrs. Tamara Jansen: I guess my concern is specifically about the partnership right now with CanSino, as until a few days ago, they hadn't published any of their findings for peer review.

I'm worried about going forward with human trials at Dalhousie. Can I have your thoughts on that?

Dr. Caroline Quach-Thanh: We now have, if I'm not mistaken, published data in The Lancet, which makes it—

Mrs. Tamara Jansen: Yes, that was Friday. Is that correct?

Dr. Caroline Quach-Thanh: Correct.

Mrs. Tamara Jansen: We haven't had a lot of time to really look at any findings. I am wondering why we are going so quickly, if it was only published on Friday.

Dr. Caroline Quach-Thanh: I suspect that the researchers at Dalhousie had some insight into the data. I would hope....

Mrs. Tamara Jansen: Okay.

The National Research Council signed a non-exclusive agreement with CanSino to use the HEK293 cell line to produce this vaccine. I think that was a number of years ago. As such, we don't anticipate any revenue from CanSino's use of this Canadian technology.

Is that correct?

Dr. Caroline Quach-Thanh: I could not tell you. I don't know.

Mrs. Tamara Jansen: The intellectual property for this vaccine belongs to CanSino, so they will be able to make their own decisions as to where they supply the vaccine. That is my understanding.

Is that correct?

Dr. Caroline Quach-Thanh: You know more than I do. I don't know about the intellectual property. I haven't looked at it.

Mrs. Tamara Jansen: Even though Canada is partnering with them, would they have any obligation to supply to us?

Dr. Caroline Quach-Thanh: I don't know. Hopefully, but I don't know.

Mrs. Tamara Jansen: Why are we working with a company that's clearly in bed with a communist regime? Isn't it a no-brainer that they will be supplying their own country with the vaccine first?

Dr. Caroline Quach-Thanh: Sorry, I lost you there. Could you give me the end of your question, because you froze on my screen?

Mrs. Tamara Jansen: I'm just worried that they will be supplying their own country with the vaccine first.

Dr. Caroline Quach-Thanh: Possibly, but hopefully when Dalhousie decided to do this trial with the NRC, there was some impetus to also provide the vaccine to Canadians.

Mrs. Tamara Jansen: I'm a bit concerned. If we want Canadians to take this vaccine, why are we working with a communist regime? We've seen the quality of the PPE they produced under pressure, and it keeps failing time and again. I don't get why we think we can trust that it will be a safe vaccine when we're doing this all in such a hurry.

Dr. Caroline Quach-Thanh: We tend, as scientists, to believe that science is science, that if we do good clinical trials and if this vaccine were to be approved, Health Canada would do its work in looking at the quality of the vaccine produced and not just—

Mrs. Tamara Jansen: Like I say, if you look at the PPE, it's really concerning.

I understand that the HEK293 cell line that they will be using was developed in 1973 from an aborted embryo. Is that correct?

Dr. Caroline Quach-Thanh: Possibly. I haven't looked at the vaccine itself.

Mrs. Tamara Jansen: Is there any other way to develop a COVID-19 vaccine than with this type of cell line?

Dr. Caroline Quach-Thanh: You'd have to ask the scientists. I think that various platforms are being used. Using cell lines is one of those ways. It's not the only vaccine that's using cell lines to replicate a virus. As to whether there are other platforms, there probably are, but this is the first vaccine that is actually ready for human trials.

Mrs. Tamara Jansen: So, I guess—

The Chair: Thank you, Mrs. Jansen.

Mr. Kelloway, please go ahead for five minutes.

Mr. Mike Kelloway (Cape Breton—Canso, Lib.): Thank you, Mr. Chair.

Hello, colleagues.

I want to thank all the witnesses for being here today.

With each of our committee meetings, I'm learning so much about the science behind the virus and the research being done across the country. It's really interesting to hear directly from the experts.

My question is going to be for everyone. Maybe we can go around the horn, as they say. I'm curious to unpack what more you think we could be doing as a federal government to promote open science and data sharing between organizations to fight this virus together. It could be between organizations. It could be among different levels of governments and organizations. We know that it's more money. We've established that, which is great. It's more investment. I wonder if we can unpack what things we could be doing better right now and as we approach a second wave of COVID or perhaps a third.

Someone feel free to start, and then we'll just rotate around the square.

● (1535)

Dr. Caroline Quach-Thanh: I guess I can start.

As I said, I think one of the things that we see is that even surveillance definitions are not harmonized across the country, which makes data difficult to compare. If we could at least have an understanding of what we're talking about in terms of what a death due to COVID is, what's not a death, what a case is.... These are basic things. To do that, because we're a federation of provinces and territories, we all need to sit around that table and make sure that we all agree. It would also be great to have a central repository of data to allow for a good understanding of what's happening in Canada, more than looking at various little points that are available everywhere.

Mr. Mike Kelloway: You're suggesting common literacy, a central repository.

Dr. Caroline Quach-Thanh: Absolutely.

As Dr. Tremblay said, it's hard to do it as we speak, but I think that, to promote long-term collaborations, building infrastructure today that will help us tomorrow to be able to collaborate is something that needs to be done. We have a tendency to try to come up with an infrastructure out of a hat when we need it, but that doesn't work. We have to have learned to work together before, to be able to share data, to know who to call upon if we need help. It doesn't happen by clicking your fingers.

Mr. Mike Kelloway: That's great.

Dr. Tremblay, do you want to chime in?

Dr. Cécile Tremblay: I agree with what Caroline just said. I was also pointing out the necessity to be more acute on the artificial intelligence. We don't use enough of these tools that could help bring together the research community in all kinds of different ways. You have those tools that are used for surveillance. They need to be improved. There needs to be a next generation for that. If we harmonize these tools across Canada, that's going to be very helpful, but more than that, more...other artificial intelligence. We all learned how to communicate through Zoom during this pandemic, so let's think of next steps in terms of communications among researchers.

The other thing is that, right now, everybody is publishing open access. That's fine, but it's going to stop some time. It's still going to cost a researcher $3,000 to pay for a publication because you know that to be published you need to pay now. It's not just that your paper is good; you need to have the money to pay for publication. Something should be done about that to allow for more easy ways to communicate scientific information.

These are a few things.

Mr. Mike Kelloway: Thank you, Dr. Tremblay.

Dr. Mossman.

Dr. Karen Mossman: Certainly at the level of being a vice-president of research, we've had many conversations with the U15 and with Dr. Mona Nemer about the need for a strategy across Canada, a strategy for big science, to fund and have a strategy for infrastructure so that it's not relying on these one-off CFI applications, and also, then, across the country, the need to really think about big science and how you fund long-term big science infrastructure.

Those are conversations that are ongoing. I think a crisis like this just really articulates how important those conversations are.

Mr. Mike Kelloway: It's longer-term funding, then, and not necessarily just focused on project by project?

Dr. Karen Mossman: Yes, and coordinated, coordinated as a Canadian strategy and not just centred on who has the loudest voice and what university can get there first, but a coordinated strategy.

Mr. Mike Kelloway: I've worked at a university. I don't know what you're talking about when you talk about loud voices in university, but thank you.

I'm sorry that I didn't get to you, Dr. Wright, but I appreciate your time. Thank you.

● (1540)

The Chair: Thank you, Mr. Kelloway.

We go now to Dr. Kitchen, please, for five minutes.

Mr. Robert Kitchen: Thank you, Chair, and thank you again to everybody.

We've heard a lot from you about data collection and the challenges. We've heard from other witnesses about the challenges of data collection, including maybe the lack of provision of that data and oftentimes the imperfect data that epidemiologists and scientists have to make their decisions on. I'm glad to hear from you that there is at least some effort there and that people are trying to communicate that.

I saw today that VIDO-InterVac, out of the University of Saskatchewan, just announced on their study of testing a vaccine on ferrets that they're finding some positive results, in order, hopefully, as they go through those steps, to step forward into human testing.

Just recently, Health Canada approved the first serological test on the use of detected antibodies in those who had contracted or may have contracted COVID-19. Do you know how many immunity tests may have been performed on front-line health care workers in Canada? I'm just wondering if any of the researchers would know that.

Dr. Caroline Quach-Thanh: Are you asking how many have been done at this point in time?

Mr. Robert Kitchen: Yes. Are you aware of any that may have been done on front-line health care workers specifically?

Dr. Caroline Quach-Thanh: As far as I know, the tests are still being validated in the various labs, so testing has not started per se. I know that it is one of the priorities of the immunity task groups to know what is the prevalence in health care workers. I know that there was a group in B.C. that tested health care workers to look at that sort of prevalence, but across Canada, for something that's pan-Canadian, we don't have data yet.

Mr. Robert Kitchen: Okay. Thanks. I'm not aware of any, but that's good to see.

Hopefully, that's a group that serological testing is going to be focused on. Would you agree with me?

Dr. Caroline Quach-Thanh: It is, I reassure you.

Mr. Robert Kitchen: That's great.

On May 2, New York state announced the results of a completed antibody testing study of 15,000 people. Are you aware of that study, Dr. Quach-Thanh?

Dr. Caroline Quach-Thanh: Yes, I've seen it.

Mr. Robert Kitchen: You have seen it. Do you have any opinion on it or any conclusions at all from that study that you might want to share?

Dr. Caroline Quach-Thanh: Even though the epidemic seemed to have hit New York City pretty hard, I think the percentage of the prevalence wasn't that high. Again, if we're looking to reach 70%, it's not happening any time soon. Also, I think Canada is even further down, so we haven't seen anything yet and are still very much at risk for a second wave.

Mr. Robert Kitchen: Thank you very much. I appreciate that.

Dr. Quach-Thanh, I was reading about your research support. I'm going to ask you a specific question. I notice that the title of one of the studies you're doing is “Influenza Immunization for all Canadians: Does One Size Fit All?” I realize that the study goes to the end of this month of 2020, but is there anything you could share on that which might be of interest for us to understand?

Dr. Caroline Quach-Thanh: Well, I can tell you that getting data is like pulling teeth out of a mouth, so we're delayed, because the data-sharing hasn't been easy. However, the goal of that study is to look at the differential response to a vaccine in males and females. Our basic hypothesis is that females will answer better and will have better immune response but may also have more adverse events in terms of local adverse events. It just goes hand in hand. The goal was to look at clinical trials that have been done in the past and reanalyze the data on males versus females. As I said, we're having a hard time getting to those data, but it will come.

Mr. Robert Kitchen: Do you see where there might be some potential for a future hypothesis on whether this might relate to COVID?

Dr. Caroline Quach-Thanh: When we look at the first data out, males seem to have more mortality than females, which could also mean that their immune response might not be as strong, but it's very early on. Because we don't have a good denominator, those proportions are always hard to interpret.

It's something interesting to see. The male versus female response to infectious diseases is not the same. A man's cold is actually something that seems to exist.

● (1545)

Mr. Robert Kitchen: Thank you.

The Chair: Dr. Powlowski, please go ahead for five minutes.

Mr. Marcus Powlowski (Thunder Bay—Rainy River, Lib.): This has been going on for a while. In China it started in late December or early January, and I don't know when it hit Italy, February or March. It's been around for a number of months.

There are a number of randomized control trials in Canada. I think these started a lot earlier in places like England. I don't know whether Italy had them, but there are some treatments that sound pretty good on paper. I'll ask Dr. Mossman, because I think she's involved with the use of convalescent serum. Also, remdesivir has been touted by some people in the United States as being a big cure.

If a study is going really well and has shown that one of the treatments is clearly beneficial, and it becomes unethical to continue that study, but all these studies are still going on months later, I'm thinking—I may be wrong—there doesn't seem to be any clear benefit to [*Technical difficulty—Editor*]

The Chair: Dr. Powlowski, you're on mute. I don't think I heard your question.

Mr. Marcus Powlowski: Given that there have been randomized control trials probably for over a month—a couple of months in places like England—yet none of them have been ended prematurely because there has been a clear finding of efficacy, can we conclude from those studies that there's no great cure out there among the existing treatments?

Dr. Karen Mossman: My understanding of the data that's emerging, for example from the study in the States on remdesivir, is that it's okay. It has some efficacy, but certainly, what we know from other viral infections is that, with a single agent as an antiviral, often even with some efficacy, the virus will quickly mutate around that.

I think as we understand what cocktails we can use, similar to how we've used cocktails for HIV, even if each individual antiviral drug is okay and not spectacular, a cocktail approach is often very useful.

As for convalescent serum, I understand there are a number of studies or instances where they've used convalescent serum and seen some efficacy. Certainly, at McMaster and across Canada there's a new study starting called the CONCOR-1 study, which is in more than 60 hospitals. They're specifically going to have sufficient power to be able to really understand the convalescent serum, and along with that, they will also be looking at the levels of the antibodies and trying to understand, not just if there are antibodies, but at what levels and how efficacious they are so that we can better understand if it does work, why it's working and how it works.

Mr. Marcus Powlowski: I think one of the big conundrums with this disease is why children don't seem to be affected very much. There's talk about this being an etiological factor in Kawasaki disease, but that seems unclear at the moment. It seems like a really interesting question why they're not infected, or when they get infections, why they don't seem to get really sick.

Is there any possibility that having had another coronavirus recently protects you from a different kind of coronavirus? We know that coronavirus is a fairly common cause of the simple cold. Is there any cross-protection from one form of coronavirus to another?

Dr. Karen Mossman: There have been some studies that have looked at that, and there are certainly some studies now looking at patients who were infected with the original SARS, so SARS-CoV-1. Again, in those studies the immunity lasts really only for two to three years, so even though there are potentially some low levels of protection, coronaviruses don't generate historically long-lasting protection.

Children have a very high natural immunity. Their immune system is often quite active, whereas that wanes as they get older, so part of the reason children and young adults aren't getting as severely ill could be that they have the most robust and natural or innate immune response.

● (1550)

The Chair: Thank you.

Mr. Desilets, please go ahead for two and a half minutes.

[*Translation*]

Mr. Luc Desilets (Rivière-des-Mille-Îles, BQ): Thank you, Mr. Chair.

I'd like to thank the witnesses for their informative and fascinating remarks. It makes me want to be a student again and go to medical school, something to keep in mind should the voters decide they've had enough of me.

My question is for you, Ms. Quach-Thanh.

We've heard a lot about the challenges around information-sharing and collecting epidemiological data. Which agency or individual in Canada do you think should be responsible for that? Who does that fall to?

Dr. Caroline Quach-Thanh: That's a broad question that I don't have the answer to. If I did, I would have said it by now. That said, my sense is that the Public Health Agency of Canada definitely has a role to play, and I think it's trying to do that. The fact remains, however, that, at the provincial level, data also belong to the provinces.

I know all the parties have tried to reach agreements in the past, including the multi-lateral information sharing agreement, or MLISA for short. It doesn't seem to allow for data transfer, at least not in real time. Eventually they are transferred, but not until they've been validated, often nearly a year later. I'm not well versed enough in Canada's Constitution to say how a direct transfer should work. All I can tell you is that it doesn't work for those of us on the receiving end.

Mr. Luc Desilets: Some sort of strategy is warranted, then. We've been told that repeatedly. You, too, seem to think that's important.

Montreal is in a pretty unique situation, Do you think it's at greater risk of being hit by a second wave, or peak, of COVID-19?

Dr. Caroline Quach-Thanh: What we all fear is that the second peak will hit quickly. If the lockdown isn't lifted in the right way, meaning, we follow the example of some of the southern states—Texas, Georgia and Alabama, where the number of cases has started to climb back up—and if people don't continue to wear masks and respect physical distancing guidelines, the number of cases could start rising again.

Testing is very important, but the public absolutely must abide by the recommendations. We shall see what happens.

Mr. Luc Desilets: If I ask Dr. Tremblay—

[*English*]

The Chair: Thank you, Mr. Desilets.

[*Translation*]

Mr. Luc Desilets: Very well.

Thank you very much.

[*English*]

The Chair: Mr. Davies, please go ahead for two and a half minutes.

Mr. Don Davies: Thank you.

Dr. Quach-Thanh, you have stated that a challenge trial is what will give, from a scientific point of view, the quickest answers to all kinds of questions, whether on the effectiveness of a vaccine or the risk of reinfection or what the immune response is.

Could you briefly tell us what a challenge trial is and where Canada is at with respect to conducting them?

Dr. Caroline Quach-Thanh: In opposition to a regular randomized controlled trial, in which you would vaccinate a patient and wait for that person to be exposed to the disease to see whether the vaccine would be then protective, in a challenge trial you actually squirt the virus directly into the nose of a person who's been either vaccinated or not, to see if those who are vaccinated are more protected than those who are not.

We haven't done any challenge trials in Canada thus far with any virus, but two challenge units have been built as part of a CFI, one in Dalhousie, where they are doing that first phase one study, and one at the MUHC in Montreal. Those challenge units were built to do studies on influenza vaccines after vaccination, but there haven't been any. I think that to do a challenge trial, you would need to be in at least phase two or three of a vaccine, because before that you would still be studying the safety of the vaccine and its immunogenicity, but instead of vaccinating and then just letting people be and hoping that they would be exposed soon enough to see whether that vaccine works, you would have a challenge trial.

They've also done that for norovirus vaccines.

● (1555)

Mr. Don Davies: Do you know whether anybody in the world is using a challenge trial process right now?

Dr. Caroline Quach-Thanh: For COVID, no, not yet, but papers were published for gastroenteritis vaccines.

Mr. Don Davies: Okay.

Finally, Dr. Bonnie Henry, British Columbia's chief public health officer, stated recently that there has never been, in history, the case of a pandemic that did not have a second wave.

If that's the case, can each witness tell us what their number one priority would be to help prepare for that inevitable second wave?

Perhaps we could start with Dr. Tremblay.

Dr. Cécile Tremblay: I would make sure that our nursing homes and long-term health care facilities be totally transformed before the second wave.

We haven't finished the first wave, we're still seeing mortality in these centres. If there is a second wave, nothing is going to change because nothing has changed in personnel ratio, preparedness, ventilation.

This pandemic has been deadly for this patient population. Not for the rest of society, not for us. It's been deadly for elderly people. We need to do something quickly for these people.

Mr. Don Davies: Dr. Wright?

The Chair: Thank you, Mr. Davies.

That brings round three to a close.

I'd like to thank all our witnesses for sharing so much of your time with us today, and for all your presentations and your excellent information.

Thank you to the members.

The meeting is adjourned.