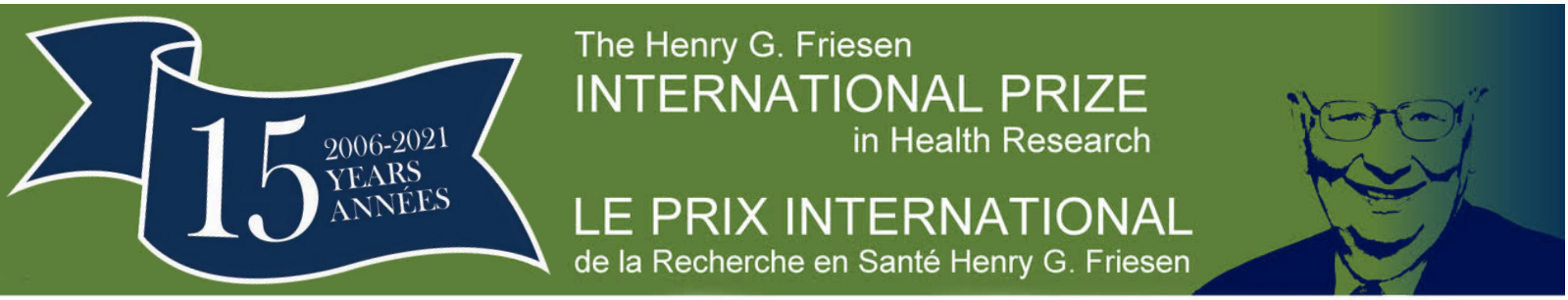

2021 Friesen International Prize Program

"Pandemic Preparedness: Science Informing Policy"

Proceedings of a Policy Roundtable

Dalla Lana School of Public Health and Massey College, University of Toronto,

December 7, 2021

Dalla Lana School of Public Health

Amis des instituts de recherche en santé du Canada
FCIHR/AIRSC
Friends of Canadian Institutes of Health Research

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FRIESEN ROUNDTABLE
PANDEMIC PREPAREDNESS: SCIENCE INFORMING POLICY

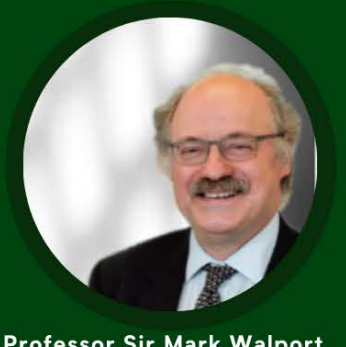
CO-CHAIRS:

Adalsteinn Brown
Dean, Dalla Lana School of Public Health

Chris Simpson
Cardiologist, Executive Vice-President, Medical - Ontario Health

Welcome and Introductory Remarks

KEYNOTE:



Professor Sir Mark Walport, 2020 Prizewinner
Past Government Chief Science Adviser, UK and Chief Executive, UKRI

Science advice to government - when science meets values

SPEAKERS:

Kwame MacKenzie
Professor, Department of Psychiatry, University of Toronto CEO - Wellesley Institute, Director of Health Equity - CAMH

Advocacy and Resistance

Carolyn Tuohy
Professor Emeritus, Distinguished Fellow Munk School of Global Affairs and Public Policy

Improving the Logics of Science-Based Advice

Samira Mubareka
Asst. Professor - Faculty of Medicine, University of Toronto
Clinician-Scientist, Sunnybrook Research Institute

Risk Assessment for Novel Viruses

David Naylor
President Emeritus, University of Toronto
Professor of Medicine, University of Toronto

Beyond Adequate. Can Canada do better next time?

Tuesday December 7 2021
9:15 - 11:15 a.m.

Register to receive the Zoom link.

REGISTRATION:

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UNIVERSITY OF TORONTO
DALLA LANA SCHOOL OF PUBLIC HEALTH

2000 - 2021 21ST ANNIVERSARY OF FCIHR

Table of Contents

The Procceedings are Published Courtesy of The Friends of CIHR
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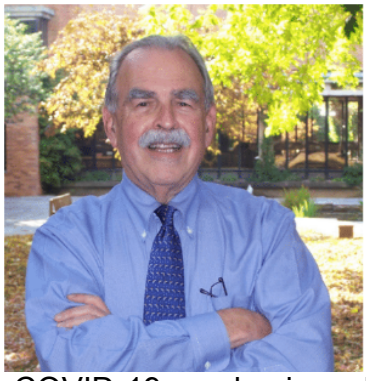
Message From The Friends of The Canadian Institutes of Health Research



Dr. Aubie Angel
CM., MD, MSc, FRCPC, FCAHS, President of Friends of CIHR

On behalf of Friends of CIHR and Massey College, we are delighted to join with the Dalla Lana School of Public Health for this virtual Roundtable on December 7, 2021 to explore an important area of tension where facts, science and values intersect with the development of government mandated policies. This issue has been brought to the fore during the current COVID-19 pandemic and is worthy of discussion in a Roundtable format.

Roundtables have become a signature feature of annual Friesen Prize Programs, as they provide an opportunity to enlist local scholars and authorities to elaborate on the theme of the Friesen Lecture and enhance its impact. Published Proceedings of Roundtable discussions also inform a wider community about significant advances in health policies.

Thank you, Steini, for your interest and collaboration in organizing this Roundtable on: “Pandemic Preparedness: Science Informing Policy”.

Our Roundtable participants have much experience in their chosen fields and are often invited to share their scientific and professional opinions as advisors to governments. They are particularly well positioned to address the issue of how facts relate to policy development and decision-making.

The Keynote speaker is Sir Mark Walport, who will address the theme: “Pandemic Preparedness: Science Informing Policy”, based on his experience as a former Senior Advisor to the UK government. Professor Sir Mark Walport is our 15th Friesen Prizewinner since 2006. He is a visionary health research planner and a champion of fundamental science in health research, engineering, technology and innovation. His talk will be followed with brief presentations by Roundtable members, who will elaborate on Sir Mark Walport’s comments and on the theme of this conclave.

This Roundtable was livestreamed and is available at: https://youtu.be/Ul5PXdxj3JA

MASSEY COLLEGE

Dr. Aubie Angel
Massey College
December 7, 2021

Roundtable

“Pandemic Preparedness: Science Informing Policy”
Message from the Co-Chairs

Co-Chair

Dr. Adalsteinn Brown
Dean, Dalla Lana School of Public Health, U of T

Co-Chair

Dr. Chris Simpson
Executive Vice-President, Medical, Ontario Health

Adalsteinn Brown: Welcome everyone. I'm Steini Brown, I'm the dean of the Dalla Lana School of Public Health, and it's my real pleasure for the school to be able to partner with Massey College, with the Friends of CIHR and with Dr. Aubie Angel to host today's session. I'm going to just make a very couple of quick remarks and then turn it over to my co-chair, Dr. Chris Simpson, whom I will introduce. And then we'll work through the program at today's events and make sure that we get everyone out well on time this morning. Look, I think science has risen in a way that is really, I think, both remarkable and reassuring, and it sometimes actually shows the great challenges still through science during the pandemic, particularly in the way that it informs policy. I had the chance to chat with some colleagues in the UK yesterday, and one of the points they made was the survey data that now shows scientists have risen in trust. Clinicians have always been high, but scientists have risen in trust. So I think this points to the importance of science advice. Importance of science and a science adviser really thinking about how we respond to a global crisis like pandemic. But it also, I think, kind of prompts what we do next and how we start to think about the next time, whether it be the next pandemic or just how we continue to make sure that science informs a stronger and a more just society and health system.

I'm joined today with my co-chair Dr. Chris Simpson. He's the executive vice president of Ontario Health, where we work together. He's been instrumental in guiding the provincial response to COVID 19. He also works clinically as a cardiologist at Kingston Health Sciences Center, where I believe he is today and is a professor at Queen's University Department of Medicine. Among many other things, Chris has been the president of the Canadian Medical Association and the Canadian Academy of Health Sciences, and he's held a number of previous positions, including being head of cardiology and a vice dean at Queen's Faculty of Health Sciences and medical director at the CMO. And you may not know this, but he's also an accomplished and by this, I mean professional level musician. Chris, let me turn it over to you.

Chris Simpson: Thanks very much, Steini. Thanks and welcome to all of our speakers today, as well as to all of you who've joined in remotely. I just wanted to take a couple of minutes to reflect a bit on the past couple of years that have been defined in many ways by the pandemic and by the considerable death and disruption that it has wrought. It'll be many years, I think, until we really fully understand the totality of the impact on our society, on our economies, on our social constructs and social order, on our politics and our freedoms, and on the health of of all of our citizens in our health system. We've seen a prolonged disruption that I think we would all agree has been like no other in at least a generation with every wave of the pandemic as it has waned.

Our health system planning has tried to turn from crisis management to recovery, thinking at first about recovering the care deficits that have been accrued. Things like the missing cancer screening, the deferred surgeries and procedures. The childhood immunizations that were missed, the new symptoms like shortness of breath or chest pain that were set aside because of hesitancy to access health care or to be in health care venues or the surges in conditions that require more attention and resources. The tragic increase in opioid related deaths, for example, the increases in anxiety and depression and eating disorders.

But recovery, I think, really is so much more than that. It's perhaps not so much about what we intend to recover *from*, but what we want to recover *to*. There's no doubt that all of us feel a collective urge to do whatever we need to do to return to the psychological safety, if you will, of the status quo. We just want to get back to normal. We want to return to our normal lives. But the pandemic has taught us, I think, some lessons that we would be wise to pay attention to.

The most important one, I think, is how the pandemic has exposed historical health inequities. We've all known that they were there pre-pandemic. We've appreciated this

intellectually, even scientifically. But now I would submit we feel them differently because there they are, with all the sharp edges exposed and we've seen in real time how the crisis has made them even worse.

And we're also seeing how the gap will not be closed unless there's a deliberate, specific plan with objective measurement and accountability.

So we don't want to return to the way things were. We want to recover to something better, to a system that's truly worthy of the confidence and trust of all of us, not just those who have enjoyed privilege.

And the pandemic has also exposed the folly of silos in our system. We speak of health care sectors. We organize our system as a series of encounters that require transitions as though our bodies are a federation of organs that require individual care plans by different providers for each individual thing that's wrong with us. And of course, it's at these transitions where mistakes are made and where inefficiencies are generated and where suboptimal outcomes are born.

So we don't want to return to the way things were. We want to build a more integrated system that delivers a more integrated care experience for those we serve. And then finally, there are plenty of challenges, not the least of which is that the pandemic is not done with us yet that we're all watching the omicron story, of course, with baited breath. Will this mean that we'll have a bump in the road or are we going to have a significant setback or something in between? This is something we won't know for a few more weeks. And the burnout in our health care workforce. This was a problem before the pandemic. Now I would say it's a crisis and in the context of recovery, no matter what angle we take to discuss and plan recovery. All roads and I mean all roads lead back to health, human resources, and there are many questions we'll need to answer. What is to become of virtual care? How will we pay for recovery? And are we brave enough to embrace social care as a key component of the plan to achieve the best health in all of our people?

So I'll just finish by suggesting that this time of disruption and these big hairy challenges provide fertile ground for bold thinking and bold action. And I'm very much looking forward to hearing from our speakers today on the critical role that science and science leaders can and should play at this very important moment in our historical evolution. Back to you, Steini.

Dr. Adalsteinn Brown, Dr. Chris Simpson
Co-Chairs of Roundtable

Roundtable

"Pandemic Preparedness: Science Informing Policy"

Keynote

Professor Sir Mark Walport
2020 Friesen Prize Winner, Past Government Chief Science Advisor, UK, and Chief Executive, UKRI

Professor Sir Mark Walport obtained his clinical and PhD degrees at Cambridge University and trained clinically as a rheumatologist. Prior to entering government, Sir Mark was professor of medicine and chair of the Division of Medicine at Imperial College London Hammersmith Hospital. In 2013, he was appointed the UK government's chief scientific adviser and head of the government's Office of Science. In this role, he provided advice to the UK government at the highest level on a range of crucial scientific topics, including climate change, digital infrastructure and agriculture. In 2016, Sir Mark became the first chief executive of UK Research and Innovation, which brought together research funding agencies with a total budget of $12 billion Canadian. Sir Mark has also been an ardent supporter of the arts, is a popular spokesperson on TV for science and innovation and most recently on the state of COVID mitigation. He has been the recipient of many honors and prizes, including 10 honorary degrees and a knighthood in 2009. In June 2020, he was awarded the 2020 Henry G. Friesen International Prize in Health Research. Prof. Sir Mark Walport's Friesen Lecture may be viewed at:
https://youtu.be/m5-lIuxD4ek

"Science advice to government - when science meets values"

Thank you so much indeed. I'm delighted to be here and participating in this interesting seminar. I want to pick up some of the comments that have just been made in the introduction. The first of these is the point that surveys show a high level of public trust in scientists. One has to be very careful about general surveys of trust, because trust is actually entirely context specific. Scientists are definitely trusted by public audiences when they're talking about basic scientific discoveries such as the Higgs Boson. If a physicist goes on television or radio and talks about the Higgs Boson, they will likely get criticism from other physicists about the accuracy or otherwise of their description, but the public will trust them implicitly. Journalists and politicians are occupations that are amongst the least trusted in occupational surveys. But we trust journalists to tell us the

hockey scores completely. And many Members of Parliament are very well trusted by their constituents. So trust is entirely contextual.

One of the things I discovered rapidly when I became the UK government's chief scientific adviser is that scientists are much less trusted when they start talking about things that affect people's human lives or where the science conflicts with personal values. When scientists start talking about the culling of badgers to control bovine tuberculosis or the use of neonicotinoid pesticides to improve crop yields, they suddenly find they are much less trusted than physicists talking about Higgs bosons or paleontologists talking about the discovery of a new dinosaur. And as the very distinguished philosopher Professor Onora O'Neill notes, trust depends on trustworthy behaviour. This a really critical issue for science and science advice.

Moving on, I want to pick up three aspects of the Chair's introductory remarks about the current pandemic that relate to the challenges that arise when scientific advice about evidence and uncertainty meets politics and policy. The first relates to the 'trade offs' between minimizing the direct impacts of the coronavirus on health on the one hand versus all the indirect impacts on health and well-being from the measures needed to control the pandemic. So great efforts have been made to minimize the serious health consequences of Covid-19 infections and deaths and to stop health systems becoming overwhelmed. But these measures have brought with them adverse mental health consequences from isolation and social distancing. People have not presented for early diagnosis of cancer. Childhood vaccinations have dropped. So there are immediately policy questions that are for our representative governments to resolve about the balance between the strictness of the measures to control the spread of coronavirus in relation to all of the other consequences for health and society. Loss of jobs causes substantial harm and long term economic consequences for individuals, their families and society at large. Loss of education has huge long term consequences for young people.

Secondly, the Chair raised the issue of about health inequities in relation to the pandemic. It is striking how the differential impacts of Covid-19 infection on different people have exposed starkly the social determinants of health and disease that were described so well by Sir Michael Marmot and colleagues at University College many years ago. I think one of the most important lessons of the coronavirus pandemic is that we have neglected public health systems in very many countries for a very long time.

As I commented in my talk yesterday, one of the challenges is that we talk about health systems, but they're largely disease systems that have little focus on public health. So when there are queues of people waiting for cancer treatment or for cardiac

surgery or for anything else, that is highly politically salient. Money follows quite rapidly. When public health interventions are considered that may affect health twenty years or fifty years later, these are less immediately politically salient, and a consequence is that less money devoted to public health care. Current discussions across the world about “building back differently” as part of pandemic recovery are political discussions, because scientists and medical professionals can't fix public health systems based on scientific and medical principles alone.

We’re immediately into the territory where science meets politics. In Canada, the U.K. and other democracies, policymakers are ultimately the people that we elect as politicians. When I became the UK Government Chief Scientific Adviser in 2013, I spent a lot of time learning and thinking about the relationship between science advice and policymaking. Winston Churchill put it quite nicely when he said that “scientists should be on tap, but not on top”. Policymakers, when they make policy decisions, look through three lenses. The first of these is: what do I know about the evidence relating to different policy options? That is where science and other research advice from the ‘scientists on tap’ is important. The second lens is: if I make a policy, can it be delivered? People are always coming up with great ideas for policies. But many of these ideas are absolutely undeliverable in practice. The third lens that policymakers look through is: how does this policy fit with my values - my personal values, social, religious and political? How does it fit with the values of my friends and colleagues? And how does it fit with the values of the people that have elected me and have the power to re-elect me or to eject me from my elected position? It is often the view through this third ‘values’ lens that trumps the others.

Now it's perfectly true that in an emergency, political values are usually less in the fore than they are in consideration of long term social policies, for example. But some of the things that we’re discussing in this session, such as health inequities, are highly political. Indeed, many of the solutions to public health lie outside the traditional levers of health departments. So public health is about education, it's about housing, it's about transport, it's about provisions for social care. Policy decisions in all of these domains are strongly influenced by “Party political” values.

So it's important for scientists and other researchers to work out how to engage with policy makers in the most effective way and particularly for those in the role of a scientific adviser to understanding the precise nature of the role. I have being been frequently asked, “how do you cope with politicians regularly neglecting your advice?” And the answer is that they were elected, I was not. They always listened very carefully to the advice they received, which they frequently accepted but sometimes did not. That was their prerogative.

There was also regular pressure on me as Government Chief Scientific Adviser to publicly criticise government policies. However, the Government Chief Scientific Adviser in the UK is a Civil Service appointment, subject to a strict code of behaviour. It came with the privilege of direct access to the most senior government ministers and other senior officials. In practice, the role of a science adviser to politicians becomes immediately compromised if they start to broadcasting their advice to government via the media.

So whilst other scientists and researchers often wanted me to shout at government through the radio, the television and newspapers, I would have completely lost any possibility of being an effective scientific adviser if I'd done that, because I would have lost trust with those who had actually appointed me to advise them. They did listen, but they didn't always do what I would personally have done if I was a politician. But I wasn't a politician.

Another question that frequently came up was "why aren't there more scientists, engineers, technologists in Parliament?" And I suspect that's a significant issue in Canada as it is in the UK. The answer to this question is that you can't blame the people that are in Parliament because they've stood for election. You can only blame the people that haven't stood for election. And a major issue for scientists and physicians is that by and large, we're culturally unprepared to become politicians. That's not a career expectation. This raises another interesting question which is, I think, a challenge to those responsible for the education, training and career development of scientists and other researchers.

I should clarify when I talk about science advice that I'm using this as a shorthand for the whole breadth of research advice, and this includes the social sciences, the arts and the humanities, all of which are important for policy making.

One of the greatest scientific achievements in the response to the coronavirus pandemic has been the successful development of highly effective vaccines at record speed. But these have been met by opposition from significant numbers of people to the administration and uptake of vaccines, so-called 'vaccine hesitancy'. Vaccines are one of the two most successful interventions in public health, the other being the separation of the water we drink from the water we excrete. Nevertheless opposition to vaccines is nothing new and can be traced back to the time of Edward Jenner. So this and all of the other issues concerned with the social and behavioural responses to the pandemic, require input from the social sciences and from historians.

Returning to the education of scientists and other researchers, if we are to have more

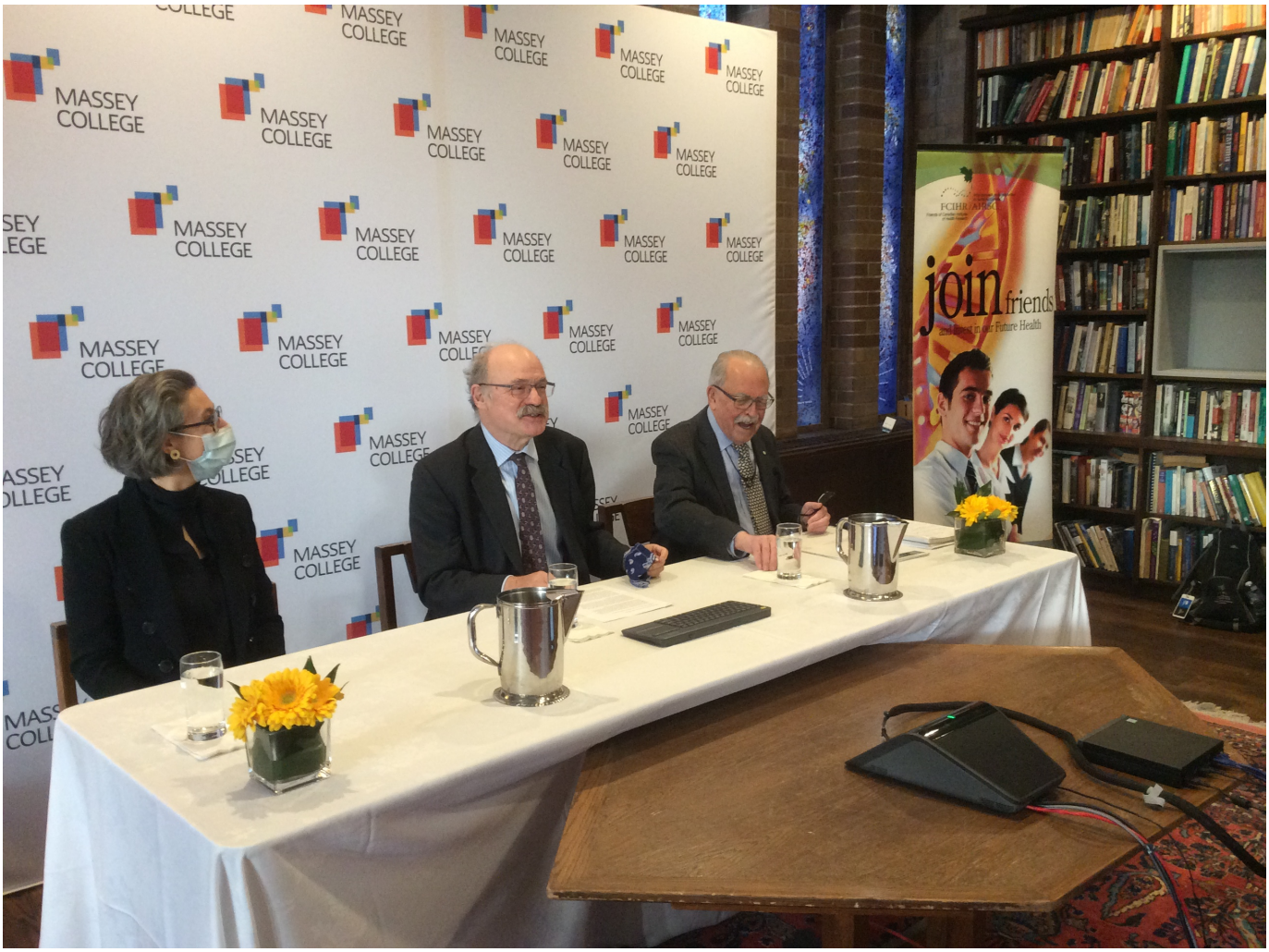
researchers participating in politics then we need to be much more thoughtful about their education. If one of our children goes to university to read history, no one says, “I gather you are going to become an historian.” History is recognized as an ‘education for life’. On the other hand, one of our children goes to university to read chemistry, a common response will be, “I gather you are going to become a chemist.” And the truth is that they are more likely to be correct! We tend to treat science as a vocational education, whereas actually science ought to be an education for life. We need scientists to participate in all walks of life. The reality is that science and also medical educations provide educations for life at least as effectively as educations in the arts and humanities. A good science education equips young people to be numerate, to be questioning, to be sceptical, to have rigorous values and integrity, and to communicate effectively. These are the very skills that are needed to succeed in almost every walk of life, including politics.

To sum up, there are many lessons that we need to learn from the Covid-19 pandemic, of which the most important, in my view, is that we have neglected public health for so long. When you look at the demography of the harms of coronavirus, they correlate with poverty, poor education, poor housing, and with all the other factors that Sir Michael Marmot and others have described as being important for increased susceptibility to and impact of chronic disease and are equally important in infectious disease as well.

If as medical scientists and researchers we want to change things in the future, then we need to be good scientific citizens. But must be very careful that we don't claim any form of scientific superiority. Science alone does not determine policy. We need to be humble but vocal citizens presenting the evidence clearly and as far as possible, unemotionally. We should participate fully in the democratic process. If we want to become policy makers, then the most effective way to achieve this is to either become an official where you can influence policy from inside government or formally become a policy maker by entering the world of politics.

My final remark is that I think the other inequity that has been exposed by coronavirus and is also a huge inequity associated with climate change and environmental degradation is intergenerational unfairness. In the case of coronavirus, the young have suffered educationally and socially as a consequence of our public health efforts to protect the most vulnerable, who are overwhelmingly the old. In the case of climate change and environmental degradation, it is the young who will suffer the worst consequences whilst the old are slow and reluctant to take the necessary policy decisions to prevent, mitigate and manage the consequences of the huge anthropogenic harms to the environment of many of the living organisms on planet Earth. Our

generation, more perhaps than any other in recent centuries, has taken a lot from our childrens' futures. And sadly, young people don't have the same inclination to express their democratic voice to the same extent as older people, at least when it comes to exercising the democratic right to vote. And so, in ageing societies in the richest countries on the planet, the old have disproportionately much more political power than the young. And, on that note I will end, having hopefully been sufficiently provocative. Thank you.



Virtual broadcast of Roundtable at Massey College, Upper Library, on December 7, 2021.
Left to Right: Dr. Samira Mubareka, Professor Sir Mark Walport and Dr. Aubie Angel.

Roundtable

Pandemic Preparedness: Science Informing Policy

Dr. David Naylor
President Emeritus, University of Toronto;
2018 Friesen Prizewinner

Dr. C. David Naylor is one of Canada's most preeminent health scientists, who has made major scholarly and policy contributions that influenced health service delivery, public health and health research funding. He is currently Professor of Medicine and Emeritus President, University of Toronto (2005-2013). Before that, he was Dean of Medicine at U of T. He obtained his MD at U of T and as a Rhodes Scholar, earned a DPhil in social and administrative studies at University of Oxford. He initiated and led the Institute of Clinical Evaluative Sciences (ICES), Canada's largest independent network of health care investigators, research trainees and students. He is the author or co-author of over 300 publications with a major interest in cardiovascular care. Naylor Chaired Canada's National Review of Public Health after the 2003 SARS outbreak, which led to the creation of the Public Health Agency of Canada. In 2016-2017, he Chaired the Federal Review of Support for Fundamental Science and produced the "Naylor Report". He is the recipient of many major awards and was elected FRSC (2004), CAHS (2005), Officer of the Order of Canada (2006); inducted to the Canadian Medical Hall of Fame (2016) and the Henry G. Friesen International Prize in Health Research (2018). Dr. Naylor provided national leadership during the pandemic as the Co-Chair of the federally appointed COVID-19 Immunity Task Force (CITF).

"Beyond Adequate. Can Canada do better next time?"

Thank you for the kind words, Mr Dean. We have six minutes to try to do justice to a difficult topic, so I'm going to start with a telegraphic summary. We're still dealing with this pandemic day to day. But what I would like to do in these brief remarks is reflect a bit on where we've been, and how we might later take stock -- gather data and generate advice for decision-makers in a way that really does help us to do better next time.

I have to start by congratulating Sir Mark Walport for adding the Henry G. Friesen International Prize in Health Research to his many laurels. Sir Mark, thank you for crossing the Atlantic in this period of uncertainty and renewed travel friction. I enjoyed

your illuminating remarks on Monday and again this morning.

Like Professor Walport, I have spent a lot of time in policy advisory capacities to governments through the years. I think my first outing in that regard was thirty-four years ago, but I've never been on the payroll, and so never in the bowels of the beast, so to speak. Sir Mark, that's one experience that you have that none of us can match this morning in quite the same way. I want to echo Sir Mark's remarks in one respect, and that is what happens when you give advice to politicians and senior bureaucrats. Like clinicians, they are making decisions on the basis of a triad of factors. There are the facts or the evidence that we try to generate and share with them. There are the values or preferences often conditioned by political ideology. And then there are the contexts or circumstances. As those of us know who've been close to that machinery, the electoral cycle is one of those contexts or circumstances that has a big weight on how advice is taken or not.

Also similar to clinical decision making, politicians deal with many gray zones where the evidence is conflicting or incomplete. Now, it's pretty obvious that in a pandemic of this proportion, we have many uncertainties. Thus, as Sir Mark said, the emergency imperative drives the science to the fore. However, as all of us have seen, it's also a period where, despite the remarkable generation of real-world evidence and some wonderful experimental evidence gathered along the way, there have been a lot of twists and turns and uncertainties int the scientific narrative. And so I want to turn to the title of the brief remarks, and that is "Beyond Adequate".

Let me start by emphasizing that "adequate" is not how I describe the Canadian public's response. I think our fellow citizens have been brilliantly compliant. They've been patient, and they've been resilient. A lot of the success that this country has had in combating COVID-19 is due to the way Canadian citizens have risen to the challenge. And obviously, that isn't how I describe the response by frontline health care workers and public health teams, or the amazing community partners and volunteers who have helped so materially during the pandemic.

That term "adequate" is what comes to mind when I think of how Canada's governments, national and subnational, have done. I would like to be more generous, but the words that come to mind aren't superlatives. They are very Canadian adjectives: good, fine, solid, per the title of this talk, adequate.

Let me emphasize that adequate is the average. We range from some very fine federal-provincial/territorial cooperation early in the pandemic, to the usual fractiousness for almost a year now. We've gone from a relative dearth of vaccine in the first quarter of

2021 to an abundance of effective and safe vaccines. That is based meaningfully on fine recommendations from an expert panel – the COVID-19 Vaccine Task Force. That was sound advice given and taken seriously, as evidenced by very strong procurement work by Minister Anita Anand and her team.

We've seen some very good, non-ideological decision making in the Atlantic provinces as they responded to the pandemic. But, if I may be direct, we've seen some bad decisions by multiple provinces at different times that cost lives. We can't sugarcoat that. Some of our fellow citizens are dead because government did not take advice or because advisers were co-opted by governments that were driven by nonscientific considerations.

As has already been mentioned, many were sickened or died as the pandemic took a highly differential toll on society. Stark evidence of an inadequate response to the social determinants of health – a point to which both Dr Chris Simpson and Sir Mark Walport alluded. I would add that public health measures – the so-called NPIs – themselves had differential impact on those who were less advantaged. A Catch-22 and unhappy side effect of steps taken to combat the pandemic.

With that as a very brief and doubtless biased stock taking, let me address the question of how, in the months ahead, a full and fair assessment can be made so that we can do better next time.

One issue that will need revisiting is how science advice is organized and given. It is reasonably clear that, at times, expert advice has been ignored with tragic consequences. As a matter of fairness, however, I want to acknowledge what Sir Mark said yesterday and again today: Those of us who give advice don't have to face the electorate. Most of us don't have to make the tough policy decisions or listen to the blowback from stakeholders or from the experts after those decisions are made. Nor do we have to contemplate how those decisions will be perceived by voters when next they go to the polls. So as Mark Walport warned, we can all imagine that, were we in public office, we would make different decisions. But I sometimes wonder just whether we would be able to withstand some of the pressures and the crosscurrents were we all sitting in a ministerial seat. In any case, one way or another, mechanisms for giving science advice need to be reviewed and very likely revised.

We've also seen very starkly the inadequacy of some of our machinery or infrastructure for public health surveillance and practice. That concern clearly extends to our digital infostructure. We must do far better on those fronts next time if Canada's response is to be better than adequate. And here I want to return to something that Sir Mark said in

Monday's Friesen lecture: Most countries are much better prepared for the last disaster than the next one. Wise words.

Obviously the most urgent science advice right now is what's required to manage the twists and turns of the current pandemic, throttle back SARS-CoV-2 so that it constitutes a low level endemic threat – a primarily seasonal illness, leading to serious disease in a very small number of citizens here and in every other nation on the planet. But the most important science advice may well come as we take stock and rebuild and reset so that we're better prepared for the next pandemic.

I repeat: That review or set of reviews has to be honest, full and fair. It has to avoid glossing over what's happened. As I've said publicly in the past, we also need reviews that are both federal and national. We can't simply accept a set of provincial or territorial reviews in the usual Canadian way of building silos. We have to put the whole picture together and see how inter-governmental collaboration did or did not occur, and how subnational jurisdictions varied in their responses from sea to sea to sea.

I also believe that those reviews should be led by international experts who can call things exactly as they see them with full independence and open access to the relevant records. Why internationally led? Because, frankly, the pandemic has engaged so many of us coast-to-coast who are interested in and involved with epidemiology and public health and infectious disease. We are all conflicted in some ways. Thus, international leadership will ensure that the panel takes an objective look at what has been done, and that leadership will also help ensure that the review panel locates Canadian decision-making in a global comparative context.

After the big reviews are done, we all must remain vigilant about the implementation of those recommendations and the maintenance of a response capacity. I think we already have ample evidence that, in recent years, our federal public health agency and some of our provincial agencies were not given the level of support and attention they needed and that the public interest demanded. Ongoing advocacy, however, can't be just rote reinforcement of what the immediate post-pandemic reviews recommended. There has to be improvement and adaptation to avoid the pitfalls Sir Mark highlighted, i.e. preparing for the last epidemic, not the next one. And as others have said, a future priority for preparedness must be ensuring that the social determinants of health In Canadian society are carefully weighed. In brief, whatever reviews are done and whatever they recommend, ongoing vigilance and advocacy are going to be an integral responsibility for all of us who hope that Canada’s response to the next pandemic can be better than adequate.

Roundtable

"Pandemic Preparedness: Science Informing Policy"

Dr. Samira Mubareka
Assistant Prof., Dept. of Laboratory Medicine and Pathobiology, University of Toronto; 2021 Janet Rossant Lecturer

Dr. Samira Mubareka completed her fellowship at the Mount Sinai School of Medicine in 2009 and since continued to study viral transmission and spread of disease through multiple lines of inquiry, and in the early days of the pandemic, Dr. Mubareka and her colleagues isolated the SARS-CoV-2 virus. her work in the level three containment facility is now the principal source of SARS-CoV-2 to most academics in Canada. Not surprisingly, she serves on the Chief Science Advisor of Canada's COVID 19 expert panel, multiple committees, and on the Ontario COVID 19 Science Advisory Panel. In 2020, she started the Sunnybrook Translational Research Program for Emerging Respiratory Viruses to focus on viral genomics, transmission and the development of medical countermeasures.

“Risk Assessment for Novel Viruses”

I wanted to talk to you today about assessing risk in terms of novel viruses. This is something that is not new at all for those of us who have been working with influenza virus and other emerging influenza viruses, but tends to be overlooked until the risk has declared itself. There are a number of tools used to understand the potential risks conferred by novel viruses. Given the global virome both within and around us, there is no question that we will continue to identify new viruses.

Surveillance is absolutely essential, and we have largely neglected pre-emergence in our surveillance efforts and programs. Here, I am referring specifically to wildlife reservoirs. We are quite good at doing human surveillance. That is something that we do on a seasonal basis every year with influenza and other viruses. We're also not bad at looking for viruses in animals that are of economic importance, including agricultural animals, such as poultry, swine, etc. However, we have neglected wildlife at our own peril. There are a number of different reasons for this.

There are substantial challenges around doing this type of work. It has been significantly underfunded for decades. Also, the technical tools historically limited for virus detection, relying principally on serology, which is an indirect measure of exposure. More recently, we have used molecular techniques such as PCR and genomics.

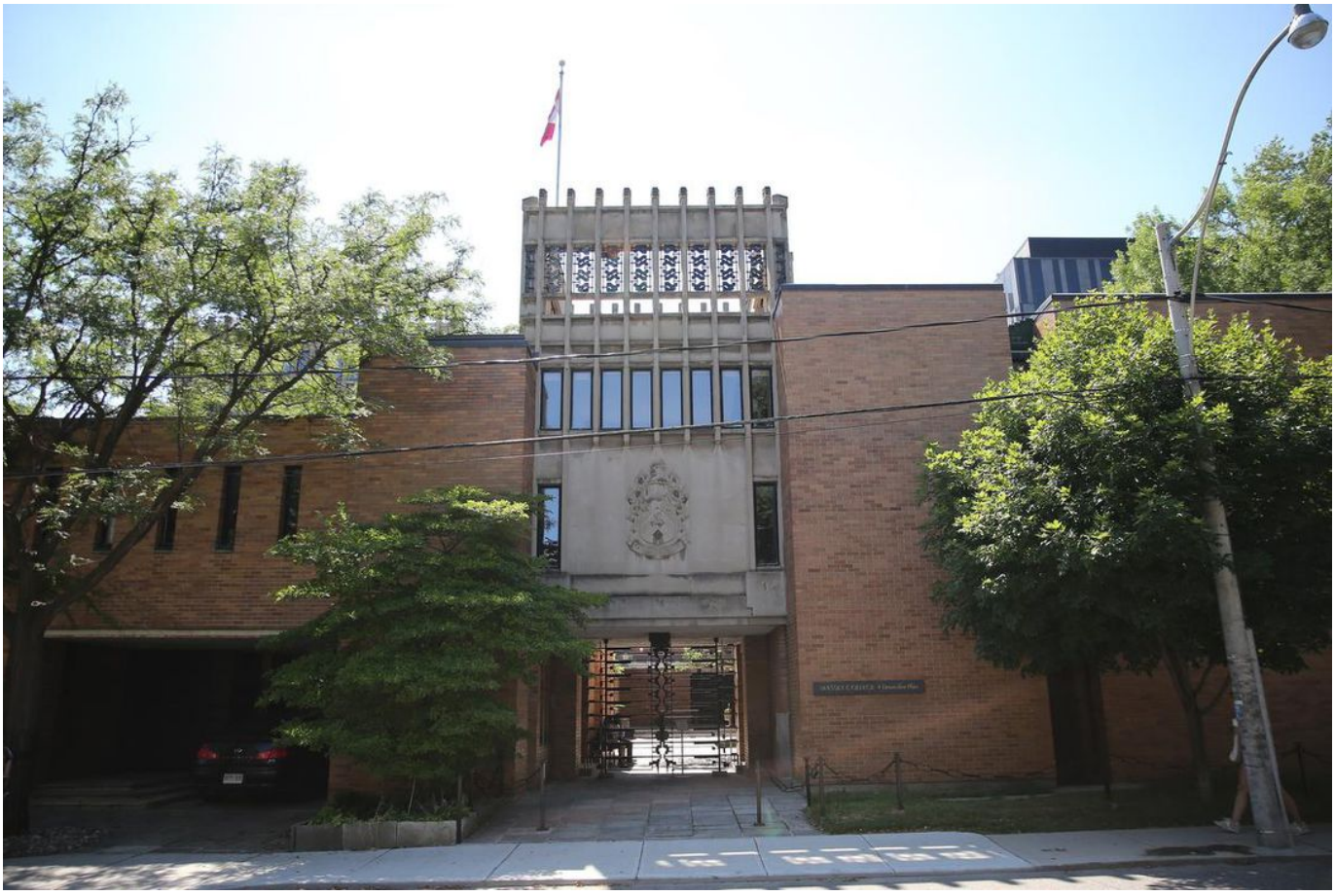
As mentioned, this is not a novel challenge. A number of avian influenza viruses that are new subtypes have emerged over the last couple of decades. Both the WHO and the CDC have established tools or frameworks to assess the risk associated with novel influenza virus subtypes. The TIPRA tool for influenza pandemic risk assessment has key risk elements that can also be applied to other novel viruses; we will certainly be detecting new coronaviruses in the coming years, and paramyxoviruses such as Nipah virus risk emerging further.

The importance of a multidisciplinary approach merits highlighting. We can't address pre- emergence and risk assessment without collaboration. Three different elements or groups of elements looking at the clinical implications, epidemiological implications and biological information are absolutely essential to addressing the detection and mitigation of viral zoonoses. And as I was listening to Dr. Simpson and Sir Mark Walport, I understand that one thing that is lacking from conventional approaches are the social elements. How can you really do a fulsome risk assessment if we're not including those aspects? These are essential to consider.

Clinical disease severity is obviously essential to understand some of the epidemiological features of novel pathogens, as is a) population immunity, b) geographic distribution across different species, and c) the biological understanding of a). There will be far more non-pathogenic viruses that don't have the potential to become human pathogens because the biology doesn't fit. Understanding things like host cell receptor and cell and host permissiveness are essential. I am also including molecular changes, such as those in the SARS-CoV-2 Omicron genome. The reason we understand some of the risk from this particular virus is because of the data that we've already generated from preexisting variants of concern. Thus, we understand the significance of when we find a new variant that has changes at amino acid positions 501 or 484 or 681 of the spike protein. We are building on existing knowledge, and we need to continue to do that. It is one thing to understand the human context, but what about the broader context? When we find something, it's most likely going to be in a wildlife or animal reservoir. What are the implications in this case?

We can use the example of the first case of SARS-CoV-2 detected in Canadian wildlife. Dr. Simpson alluded to the folly of silos, and I think this is where it's important that we

really need to actively break down these silos. In a collaboration with Canadian Food Inspection Agency and the Public Health Agency of Canada and provincial wildlife biologists, we were able to detect SARS-CoV-2 in deer. We were able to sequence it and determine infectivity. This is something that we did as a group collaboratively and organically. One of the key messages here is that although we were gain knowledge and insights from this perspective, we really don't have a broader sense of the implications long term. Most likely, these are going to reveal themselves with time. We are compelled and committed to ongoing surveillance in deer now that we have found SARS-CoV-2 in these populations, due to the possibilities of spill back into humans, evading medical countermeasures, including vaccines, and also the broader implications for populations who depend on these animals, for country foods and food security. These important potential secondary impacts must be addressed as well.



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Roundtable

Pandemic Preparedness: Science Informing Policy"

Prof. Carolyn Tuohy
Professor Emeritus and Distinguished Fellow, Munk School of Global Affairs and Public Policy

Dr. Carolyn Tuohy is a hugely well-read and influential scholar with books in many classrooms and bookshelves around the world. Carolyn Tuohy specializes in comparative public policy, particularly social policy. She holds a B.A. from the University of Toronto, and an M.A. and Ph.D. in Political Science from Yale University. Her publications include Remaking Policy: Scale, Pace and Political Strategy in Health Care Reform, Accidental Logics: the Dynamics of Change in the Health Care Arena in the United States, Britain and Canada, and Policy and Politics in Canada: Institutionalized Ambivalence, a treatment of Canadian public policy in comparative perspective. She is the co-editor of Policy Transformation in Canada: Is the Past Prologue?.

In addition she is the author of numerous journal articles and book chapters in the areas of health and social policy, professional regulation, and comparative approaches in public policy, and has consulted for government and related agencies on public policy matters. From 1992-2005 she held a number of senior administrative positions at the University of Toronto, including Deputy Provost and Vice-President, Government and Institutional Relations. She is a Fellow of the Royal Society of Canada, and was Founding Fellow of the School of Public Policy and Governance, a precursor of the merged Munk School of Global Affairs & Public Policy.

"Improving the Logics of Science-Based Advice”

Thanks very much, Steini. That's a very generous introduction, and it's a real pleasure to be part of this rich conversation. So thank you for including me.

I was a bit surprised when I saw the title of my talk in the email advertisement for this panel, as it wasn't exactly the one that I had submitted. But whoever it was who chose the title knows that I've written a lot about institutional logics. So the title makes some sense, and indeed I want to talk about how we can improve the institutional logic of science in Canada.

Why should science advice be “institutionalized?” Institutional logics are about expectations. I'm a fan of my colleague Kathy Thelen's definition of institutions, as sets of collectively enforced expectations. We need consistent expectations about what science advice for policy actually is and how it should be provided in a context when we need to act, when we can't wait for definitive results. Institutions also exist over time, and provide continuity and opportunities for learning.

Canada has some advantages in institutionalizing science. We've talked quite a bit on this panel about trust in government to use science, and I'll refer to the recently published Welcome Trust study on trust in government across nations or confidence in government. And we'll see that in the international landscape, Canadians are reasonably well positioned in terms of the degree to which they trust not only science and government, but trust government to use science. We also have a non-politicized public service, which is a not insignificant benefit – in contrast to, for example, the US or even increasingly the UK, although not nearly to the extent of the US – and we have a deep pool of scientific talent.

But we also have challenges. Our expectations about the role of science, both in the broad public and among policymakers and among scientists themselves are inconsistent. We have a relatively limited receptor capacity in government. We have adopted a generalist view of talent at the senior levels of the public service, which has considerable advantages, but it also means that there is limited receptor capacity for specifically scientific advice. Of course, the Canadian context is marked by federalism and intergovernmental fragmentation that comes along with that. We also have fragmentation within governments and different agencies, and our networks of decision making are relatively loose. If we look at countries like certainly the Netherlands or to a lesser extent, the U.K., we can see fairly strong networks of personal relationships that link scientists, the public service and broader sectors in society.

So in thinking about how to institutionalize expectations, I want to offer two key concepts. What is it that science offers the policy process? It is what Sheila Jasanoff calls a “serviceable truth.” It is a state of knowledge that satisfies tests of scientific acceptability and supports reasoned decision making in other words. But it is it is not primarily aimed at furthering scientific research and knowledge. It's aimed at providing a basis for action in the face of remaining uncertainty. And it requires recognition that dissent lies at the heart of scientific inquiry. And there is therefore a need to organize that dissent among advisers to mobilize a sufficient consensus to lead to an actionable result. So two tests for advice: can it withstand scientific scrutiny, but does it also provide a basis for timely action? So the first concept then relates to the product: the serviceable truth. The second concept relates to the process as one of continuing “boundary work.” I

take this phrase from a set of Dutch colleagues who studied the Dutch Health Council, a very deeply institutionalized advisory body in the Dutch context. And they demonstrate and they argue that defining the boundary between science and policy and bridging the boundary is an ongoing process of negotiation. There is no bright line. Science that is too detached from policy can't really contribute, but science that has a pronounced political message risks becoming a part of political infighting. Scientists, like others, have preferences that lead them to study certain dimensions of experience. It requires an ongoing conversation with policymakers to navigate this boundary.

So we're reasonably well positioned to think about institutionalizing science, and learning from our experience during the pandemic. These are the data from the Wellcome Trust to which I referred. They're actually survey data from late 2020, although the study was only recently released. And you can see that along the y axis, we have belief in our confidence in government to actually use science and on the x axis, we have confidence in government in general. You can see, of course, there's a relationship and you can see that Canada is in a reasonably good spot. There are differences in what Jasanoff calls “civic epistemologies” across nations. Canada's civic epistemology is fairly supportive of the use of science by government, more so, for example, than in the UK. Sir Mark, I don't know if that corresponds to your experience. So we're reasonably well placed, but our advisory agencies are fragmented, sometimes competitive and incongruent with the essential mandates of various agencies.

I'm just going to focus at the federal level with this. If you think of various functions: think about discovery research in health and the Canadian Institutes for Health Research; think about the public health function actually delivering public health services; and think about the broader realm of science advice to government with the Chief Science Advisor. In the case of COVID, there has been overlap between these bodies - I would say actually unhelpful overlap – and some competition. CIHR was recently, in April 2020, funded for a centre for pandemic research, which makes good sense, except that there's also an advisory function in their mandate. The Chief Scientific Advisor I'll show you in a moment has been quite active in the area of pandemic advice and of course, the Canadian Public Health Agency. So here is a screenshot from the Chief Science Advisor's website, which lists multiple initiatives and multiple expert panels and task forces on COVID 19. Here is a slide from the Public Health Agency of Canada outlining the Pan-Canadian Public Health Network governance structure, which is a 17 member council, very much an example of our federal provincial territorial machinery, co-chaired by the Chief Public Health Officer of Canada and a chief medical officer of one of the provinces. And this slide, I would say, brings somewhat more coherence to the process than actually exists on the ground. The Public Health Network has a dotted line

relationship to the Council of Chief Medical Officers of Health at the provincial level and much is embedded in that dotted line. A recent study by three colleagues of mine for the Royal Society interviewed a number of participants in this process across Canada and observed that:

> “Early on, federal provincial territorial governments appeared to be active and collaborating and sharing data, but co-operation eventually gave way to partisanship. “It was unclear to our interviewees if public health officers from across orders and government were even meeting regularly or of first ministers and health ministers were continuing regular exchanges. It seems that the broader problem was a lack of a coordinating mechanism at the center of government.”

So why don't we think about a new institution - and I know, I can imagine eyes rolling: “yes, let's establish yet another agency in this mix.” But let me see if I can persuade you that it's actually not a bad idea. Suppose we had an ongoing institute or agency or council for science advice for health emergencies. Sadly, we know this is not the last. It would draw upon representation from these other spheres, but it would have a specific mandate. It would not be involved in discovery research. It would be involved in providing serviceable truths. It would draw upon the broad concepts of science advice to government, but it would be specific to health. And it would be closely relevant to the Public Health Agency, but it would not be a delivery agency, it would be an advisory agency. It could draw representation from each of these other realms, but it would have its own specific mandate focused on serviceable truths and navigating the science policy boundary and be able to build up experience and learning over time. It would have distinctive expectations. It would have distinctive expertise with distinctive networks. It would have the potential to learn from elsewhere: we have the Scientific Advisory Group on Emergencies in the UK; we have the Dutch Health Council. But it would be conscious of the Canadian context and the particular networks that we have. We have specific networks in Canada, in the scientific community, that I would argue can serve as the connective tissue across jurisdictions and that are not entailed with the jurisdictional protectiveness of a federal, provincial and territorial governments. So let's use our scientific community as that connective tissue and build a new institution specific to health emergencies. Thanks very much.

Roundtable

"Pandemic Preparedness: Science Informing Policy"

Dr. Kwame McKenzie
CEO of the Wellesley Institute; Professor, Dept. of Psychiatry, University of Toronto

Dr. Kwame McKenzie is the CEO of the Wellesley Institute, a full professor in the Department of Psychiatry at the University of Toronto and an international expert on the social causes of illness and the development of effective, equitable social policy and health systems. He is the director of health equity at Center for Addiction and Mental Health and a practicing psychiatrist. He is also a productive scholar with over 240 papers and six books. He is a past BBC radio presenter and columnist for The Guardian, Times Online and most recently, the Toronto Star. He holds an African Canadian Achievement Award for Science, a Harry Jerome Trailblazer Award and Dominican of Distinction Award. During the pandemic, Dr. McKenzie convened a broad coalition of academics, clinicians and communities that drew attention to the inequities, impacts of the pandemic and the need for functional use of social demographic data. This work has been credited with changing pandemic strategies and has attracted international acclaim.

"Advocacy and Resistance”

I would like to start by thanking Professor Walport for his comments, Dr. Naylor for his wise words, Dr. Mubarak for her spectacular demonstration of how to make complex things accessible. And, of course, Drs Brown and Simpson for framing the subject in our experience of the pandemic and recovery, but also because of the prominence of equity in their comments.

I am going to make three provocative points for discussion. I am going to make them in a slightly lighter way.

The three things I will talk about are:
First, we may want to be more emotional and understand values;
Second, we need to spend more time thinking about our relationships; and,
Third, if we actually drop the ball on equity, if science drops the ball on equity, then it brings science into disrepute.

So first, be more emotional?
I am really interested in science fiction, so I am going to talk about Star Trek.

As you know, Star Trek is an 11 billion dollar franchise, which has been with us for 55 years. Star Trek is about morals and values. In each episode the crew of the USS Enterprise boldly goes where no person has gone before. But, ignoring the new worlds, where they are really going to is from one moral dilemma to the next.

Fundamentally, Star Trek is about what it was to be human at the end of the Cold War.

The sub-narrative is the relationship between Spock, who is part of Vulcan and so governed by rationality and science, and Captain Kirk, who is a values-driven, emotional American. And, though Spock's rationality is often the brunt of the joke, the resolution is usually that Kirk needs Spock's rational strategic scientific mind in order for the mission to be successful.

This is really the same triad as Dr. Naylor so eloquently stated. The leader is human values. The foil is science and the context changes as they boldly go from one world to another just like the political landscape.

This triad is important for anybody who wants to inform policy, especially during difficult times. It is not only the tension between science and values, the context is important. It reminds us of Robert Wright's book The Importance of Public Ideas because we all know that it is easier to move policy forwards if it can be attached to an existing public idea. The social narrative is important and the current zeitgeist is that we are only ready to be led by Spock when in extremis and temporarily, then we are back to normal. Science is not usually expected to drive the bus.

And there is actually science to support that this balance is important. Psychological research demonstrates that we make better decisions when we engage emotional and cognitive elements of the problem. We make better decisions when we understand and reconcile the difference between what the best thing is to do, what the right thing is to do and what we want to do.

The classic tension between Spock, Jim and context is seen in covid-19. We used emotions and values in a haphazard way to push forward public health strategies. We at times scared people into compliance, but we lacked real collective understanding about how to use the science of emotions and how we understand values in order to produce change. And I don't mean behavioral change. I mean, the sort of cultural change that we

to keep things done in a non-divisive way. These are things we haven't been thinking through. We've focused on getting things done rather than how to maintain them. We need to be much cleverer in how we understand the science of managing emotions and the world of values if we're going to be able to give advice that helps our population not run the sprint but run a marathon and if we are going to be able to give advice on dealing with the things that are coming to us now, such as community resistance, industry resistance and government reluctance. I think we might find a better way forward if we understand emotions and values.

The second thing I will talk about is managing relationships. About six or seven years ago, in order to improve my mental health, I bought a farm. And, also in order to improve my mental health, I don't farm the farm. There's a farmer who farms. I was trying to explain to the farmer what we do at Wellesley. I used an analogy. I said that we have these ideas and these ideas are like seeds. We grow those ideas through doing research projects and then we create out of them a policy idea. And then once we create the policy idea, we take that out to market. We go to our stakeholder groups and we go to the policymakers and we go to governments and we shop the policy ideas around.

The farmer's eyes glazed over. And I thought, "I've lost him here. He doesn't really understand." And then he stopped and looked at me, and he said, "You know, it really doesn't make any sense to me." I said, "what do you mean?" He said, "Well. I would never put a seed in the ground if I didn't know what the market was. We would not plant things on spec and then take things to a market. We understand our markets, we understand what we can and can't do, and we grow our produce to meet the market."

So this was his challenge to us, and the challenge that we took up with the Wellesley Institute. We started thinking much more carefully about how we build relationships, not just with government, with community stakeholders. And we tried to develop clarity about how we produce change based relationship leverage. The right information is important, but the leverage comes when it comes from a trusted source and we developed more understanding about how we develop that position as a trusted resource. And how we maintain that is really important for our mission of trying to improve health and health equity.

And that is why I really love some of Sir Mark Walport's comments because it is my view that, in some places in the world, science is seen as much more trustworthy. But, in many other places, science is considered less trustworthy, and that is something we have got to reconcile.

And the last of the three areas I wanted to speak about is equity. As everybody has already said, the pandemic has taught us a lot about our societies, and it has taught us that we are most vulnerable nationally and internationally when there are inequities. COVID feeds on our inequities.

It has taught us as a country that we talk a lot about decreasing inequities, but there is a huge gap between the positions we take and our intentions. We say inequities are important, but their importance seems never to be as big as other things. And, so we have presided over significant international, national and regional inequities in the impacts of COVID 19. And this is partly politics, but we also see it in science, and this underlying theme is something that we have to think about if we are going to make the world a safer and fairer place. And it is something that science has to deal with if we think we are going to be a unifying force or a unifying language so that the world will get behind. We have to understand that science has the ability to increase inequities and it usually does. Unless decreasing inequities and improving human rights are key to the scientific endeavor, we could continue to make the world arguably a better place, but not necessarily a more equal place. That will bring us into disrepute.

People are arguing that climate change, the economic system, modern warfare, including drones and nuclear weapons, are all by products of science. People are arguing that the media is undermining traditional values and is a major problem. People are arguing that poorer nations are doing worse out of this, and people are arguing that we need less science and more tradition. I do not agree with that, but I hear it more and more.

And so, I would argue that if we want to be central to the future, we actually have to prove ourselves to be a force for equity. We have to understand how to do that while developing our relationships with community and those who make policy, and we need to understand how to balance our knowledge of science with that of emotions and, as Sir Mark has said, with values.

"Co-Chairs' Summary"

Thanks to everyone. This is probably the best two hours we have spent in quite a long time, and we have spent a lot of pretty interesting two-hour periods over the last couple of years. So thanks to you all and to everyone who's joined in to listen and participate. Lots of really good stuff here. We are particularly interested in the issues around trust and how complex and layered an issue that is the notion that scientists don't have a monopoly on wisdom and that we need to understand policymakers' roles, what the policymakers need from us, understanding the lenses through which they see the world. In this context, we must think of equity as a goal where we need to move beyond virtue signaling and into real action and using our channels and our knowledge generation processes to feed that agenda. It will be important to develop new processes and maybe even new institutions to help set us up for future success. How to be vocal citizens, but not noisy citizens, is the way to summarize the conversation around the Pandemic and health crises in an increasingly polarized and we'll say, noisy, advocacy environment.

The last few comments around young folks are also critically important. We know that a lot of our younger scientist colleagues are still being asked by us to wait their turn and earn their stripes and get their promotions and get their awards. And we need to really have a fundamental conversation. We think about the importance of wisdom, which is something we all arguably have versus, you know, the kind of power that can be brought with disruptive knowledge generation and the younger generation are very good at that, with things like hackathons and other sort of unconventional ways of having discussions and generating new knowledge. So thanks again to everyone, this has been very enlightening.

Dr. Adalsteinn (Steini) Brown, Dean, Dalla Lana School of Public Health, U of T
Dr. Chris Simpson, Executive Vice-President, Medical, Ontario Health

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