HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

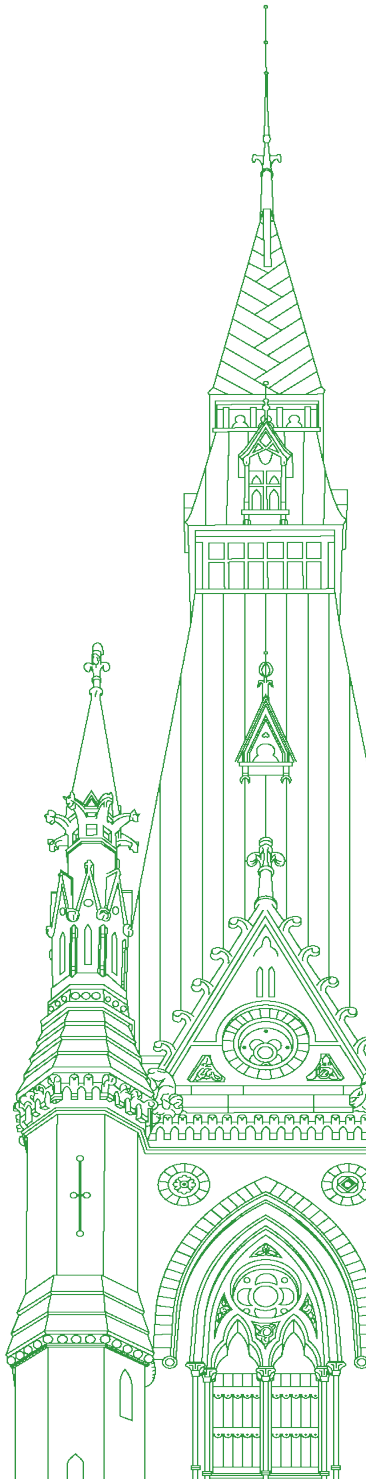
45th PARLIAMENT, 1st SESSION

Standing Committee on Science and Research

EVIDENCE

NUMBER 010

Wednesday, October 22, 2025



Chair: Salma Zahid

Standing Committee on Science and Research

Wednesday, October 22, 2025

● (1630)

[*English*]

The Chair (Salma Zahid (Scarborough Centre—Don Valley East, Lib.)): I call this meeting to order.

Welcome to meeting number 10 of the Standing Committee on Science and Research. Pursuant to the House motion of June 18, the committee is meeting to study antimicrobial resistance.

I would like to make a few comments for the benefit of the witnesses and the members.

Please wait until I recognize you by name before speaking. For those participating by video conference, click on the microphone icon to activate your mic, and please mute yourself when you are not speaking.

For those on Zoom, at the bottom of your screen, you can select the appropriate channel for interpretation: floor, English or French. For those in the room, you can use the earpiece to select the desired channel.

As a reminder, all comments should be addressed through the chair.

I would like to welcome our three witnesses for the first panel and thank them for appearing before the committee today.

Joining us by video conference, we have Dr. Louis-Patrick Haraoui, associate professor at the faculty of medicine and health sciences at the Université de Sherbrooke; Dr. Gerry Wright, professor at the Michael G. DeGroote Institute for Infectious Disease Research at McMaster University; and Professor Kevin Outterson, the founding executive director of CARB-X.

Welcome to all of the witnesses. You will each have five minutes for your opening remarks, and then we will go to our rounds of questioning.

We will begin with Dr. Haraoui. Please, go ahead.

Dr. Louis-Patrick Haraoui (Associate Professor, Faculty of Medicine and Health Sciences, Université de Sherbrooke, As an Individual): Good afternoon, Madam Chair and members. I'm very grateful for the invitation to speak to the House of Commons Standing Committee on Science and Research about Standing Order 108(3)(i).

Drawing on my own research, I would like to share what I hope to be useful elements contributing to the answer to one of the four questions listed in this standing order: What is driving an increase in antimicrobial resistance, or AMR?

To do so, I would like to focus on armed conflicts. Since 2017, together with Canadian and international collaborators, I have been leading research on the interplay between AMR and armed conflicts. In 2018, I organized a symposium on this topic in Geneva, Switzerland, where the keynote address was delivered by Dr. Tedros, who was then and is now Director-General of the World Health Organization.

The momentum generated by these early efforts was unfortunately interrupted by the COVID-19 pandemic, yet the problem has not only persisted; it has worsened. The number of active armed conflicts is now at its highest level since the Second World War, with a marked concentration in low- and middle-income countries, where the global AMR burden is already greatest.

Armed conflicts were among the first settings in which AMR was recognized as a novel phenomenon in the 1940s. Although research has since largely shifted toward peacetime and civilian contexts, resistant pathogens continue to emerge and spread rapidly in war zones. This trend has intensified as warfare increasingly unfolds in densely populated urban areas and targets civilian populations, including vulnerable groups such as children.

Military operations in Iraq and Afghanistan earlier in the century—the latter involving Canadian personnel—brought renewed attention to this issue after severe antibiotic-resistant infections were observed among wounded soldiers. The medical evacuation of American troops to hospitals in Germany and the United States subsequently facilitated the spread of AMR to civilian health care systems. The war in Ukraine has further underscored this threat, as refugee-hosting countries have reported outbreaks of drug-resistant bacteria.

With accelerating urbanization, cities have increasingly become the primary theatre of war. This shift has transformed not only the conduct of warfare, but also its environmental and public health consequences. Urban combat often devastates housing and critical infrastructure—as has been evident in Gaza over the past two years—releasing heavy metals, asbestos, petrochemicals and other toxic substances into water and soil, and exposing bacteria in these ecosystems to these toxins. Like all living organisms, bacteria are affected by such toxins and must evolve adaptive mechanisms to survive. These same mechanisms drive the emergence, persistence and spread of AMR bacteria.

Contrary to prevailing views that treat AMR in armed conflicts as a marginal topic, I contend that these environments merit close scrutiny as powerful drivers of AMR and as unique sites for studying its dynamics. Just as the Arctic stands at the front line of climate change, so too do armed conflicts represent hotspots where biological, environmental, social and infrastructural disruptions converge to accelerate AMR.

The mistake would be to assume that rising resistance in war zones remains confined to them. Emerging infections and pandemics remind us time and again that microbes respect no borders. As we enter an era of growing geopolitical tension marked by the highest number of active conflicts since World War II and rising global military expenditures, it is imperative to address the intertwined crises of AMR and armed conflicts.

Canada has a strong record of leadership in tackling global health challenges such as AMR. It is time for the Canadian government to renew that leadership by championing international efforts to make the intersection of AMR and armed conflicts a global health and security priority.

I thank you for providing me with the time to contribute to the work of this committee.

I welcome questions or comments you may have.

[*Translation*]

Thank you.

● (1635)

[*English*]

The Chair: Thank you.

We will proceed to Dr. Wright.

You will have five minutes. Please go ahead.

Dr. Gerry Wright (Professor, Michael G. DeGroote Institute for Infectious Disease Research, McMaster University, As an Individual): Good afternoon, Madam Chair and honourable members. I'm quite grateful for the opportunity to speak to you as a Canadian academic working on the causes of and solutions to antibiotic resistance.

I'm a professor of biochemistry and biomedical sciences at McMaster University, where I have led a research team on AMR and antibiotic discovery since 1993. I founded the Michael G. DeGroote Institute for Infectious Disease Research and the David Braley Centre for Antibiotic Discovery. I have advised industry, government and not-for-profits on antibiotic innovation for 25 years. I also founded a spin-out company based on assets discovered in my lab, to further develop new products.

The committee's attention to AMR is both timely and essential. I was a member of the Council of Canadian Academies expert panel that produced the 2019 report “When Antibiotics Fail”. We found that AMR cost Canada $1.4 billion in direct health care expenses and caused 5,400 deaths in 2018 alone. AMR poses an existential threat to Canadian health and prosperity.

My role as an academic researcher is to uncover the molecular basis of AMR, discover potential solutions and train the next generation of scientists. For over 32 years, I've trained more than 100 master's and Ph.D. students, post-doctoral fellows and technical staff, yet very few remain in Canada or continue to work in AMR research. Why is this? The reasons are structural. Canada currently has limited biotech and pharmaceutical R and D capacity, especially in antibiotic discovery. Rather, graduates are drawn abroad to vibrant biotech sectors in Boston and California and Europe.

In universities, building and sustaining an internationally competitive AMR lab in Canada is very difficult. Academic scientists work like small businesses. We have to recruit talent. We have to generate product, which in our case is high-impact, internationally competitive research, and we have to fund it. We do this through securing grants. In Canada this is primarily through the CIHR.

It's instructive to understand how these grants are given out. These are reviewed by volunteers in panels organized by scientific discipline. At the CIHR, however, there is no AMR panel. Instead, AMR projects are lumped in with projects in bacterial physiology, fungal biology and parasites. Contrast this with areas like cancer and cardiovascular disease. Even behavioural scientists enjoy multiple specialized panels. This structure disincentivizes young investigators from pursuing AMR work. Despite the global urgency, Canada risks losing academic capacity in this field.

What happens if you discover something exciting in a lab that might turn out to be a new medicine? Well, there we're very challenged as well. Decades of experience have shown that the biotech sector emerges from discoveries made in academic labs, yet Canada lacks early-stage funding mechanisms to bridge the gap between discovery and application. You'll hear about programs like CARB-X, which help internationally, but their domestic opportunities are scarce. Advancing discoveries sufficiently to be attractive to agencies such as CARB-X requires different resources.

A proven model that's worth emulating, I think, is the U.S. small business innovation research program, the SBIR. This provides competitive, non-dilutive grants to support start-ups commercializing academic discoveries. A Canadian SBIR-style program would foster biotech entrepreneurship, create jobs and accelerate AMR innovation. As an illustration, my lab recently discovered a new antibiotic, which we published in the journal Nature last spring, that targets several pathogens on Health Canada's priority list. We want to develop it in Canada, but without early-stage push funding and downstream pull market incentives, these assets risk moving abroad, along with their economic benefits.

In closing, I want to urge the committee to act on two priorities. I would ask you to support an increase in overall CIHR funding and create a dedicated AMR research stream to strengthen Canada's scientific foundation in this area. Second, I believe we need to establish a Canadian SBIR-like equivalent to ensure translation of discoveries from academia to industry and to ensure that Canadians benefit from homegrown innovation. I think Canada could lead in the global response to AMR and protect both our public health and our economy.

Thank you very much for this opportunity.

● (1640)

The Chair: Thank you, Dr. Wright.

We will now go to Professor Kevin Outterson.

Please go ahead. You have five minutes for your opening remarks.

Professor Kevin Outterson (Founding Executive Director, CARB-X): Good afternoon, Madam Chair and honourable members of the standing committee.

My name's Kevin Outterson. I'm the Austin B. Fletcher professor of law at Boston University and the founding executive director of CARB-X, which is the world's largest non-profit partnership supporting the development of treatments, vaccines and diagnostics to combat AMR. CARB-X is proud of the fact that Canada has supported CARB-X since 2023.

I'm going to focus my remarks today on point four—Canada's role in financing innovation, a complementary mix of push and pull incentives to support new antibiotics—but I have to say that the first two witnesses were excellent, and I support what they said as well.

For more than a decade, reports from around the world, including the review on AMR from the United Kingdom, official communiqués of the G7 and the G20, and, most recently, reports from Global AMR R&D Hub—of which Canada is a board member—have all emphasized the importance of combining both push and pull incentives to accelerate innovation and fix that broken market for antibiotics.

In most therapeutic areas, like cancer or something, the best new drugs are rapidly and widely used by doctors and patients. That leads to robust sales, because people want to use the new, innovative drug, but for antibiotics, we take a very different approach. We keep the best new drugs on the shelf for the first five to 10 years, so resistance is delayed. We prioritize preserving their precious power through stewardship. Now, this is excellent for public health, and it's the right thing to do, but it drives the companies behind these drugs into bankruptcy if we pay them based on only the volumes used, especially in those early years.

I served as a member of a different Council of Canadian Academies expert panel, with the “Overcoming Resistance” report issued two years ago. It built on the prior CCA report, including the one that Dr. Wright was on, and the pan-Canadian action plan. The consensus from that report is that without new incentives, the antibiotic innovation pipeline remains perilously thin, and Canadians will lack access to new antibiotics...worse than any other G7 country. It also concluded that both push and pull incentives were needed to restore health to this pipeline and to protect the foundations of modern medicine from assault from these bacterial infections.

Push and pull incentives effectively address different parts of the same problem. Push incentives, like what Dr. Wright was just calling for, SBIRs in Canada, reduce the cost and risk of developing new antibiotics. CARB-X is an example; SBIRs or basic research funding are other examples. Pull incentives, on the other hand, reward successful development—something that makes it to approval—but ensure that the companies can sustain production and support stewardship once the antibiotic reaches the market. The United Kingdom today has the best working example of a pull incentive. Both of these are essential. They work together.

Canada has already begun to act on this challenge on many levels, including through the Public Health Agency of Canada's—PHAC's—investment in CARB-X over the past two years. CARB-X is supported by six G7 governments, including Canada, and three charities. Our important role has been recognized by the G7, G20 and UN General Assembly. Twenty-two of our supported products, so far, have entered human clinical trials, which is a remarkable success at this stage.

We hope that our important partnership with the Canadian government continues—it's been represented by PHAC in the past but, now, also by the newly established Health Emergency Readiness Canada, HERC—and that it will continue at a level commensurate with other G7 governments. This would be approximately $6 million Canadian per year from Canada. The U.S. government contributes about $55 million Canadian per year, Germany $15 million and Italy about $12 million.

Push incentives lower the cost of R and D, but we also need the pull. They replace revenues lost, because we're careful with these antibiotics in the early years, but they need to reflect the broader social value of these antibiotics. They're necessary to keep these late-stage investors—as we'll hear from Dr. Skinner in the next panel—coming into the market.

Earlier this year, with colleagues, I published a paper in one of the Lancet journals, talking about the fair share gap in antimicrobial innovation. It calls for each member of the G7 to pay their fair share of the innovation costs without free-riding. Currently, only two countries across the EU and G7 have achieved fair share: the United Kingdom and Italy. Canada, I'm afraid to say, came in last place, because the two drugs evaluated are not available here in Canada yet. The paper calls for Canada to contribute its fair share, which I calculated, in that paper, to be approximately $13 million U.S. in revenue per new drug, per year, in Canada, out of the global total of $363 million U.S.

● (1645)

If we do this and continue the efforts of both push and pull, I'm confident that Canada can help to address its part in solving this global problem.

Thank you.

The Chair: Thank you.

Thanks to all three witnesses for their opening remarks.

We'll now proceed to our rounds of questioning.

We will start the first round with Mr. Baldinelli.

Please go ahead. You'll have six minutes.

Tony Baldinelli (Niagara Falls—Niagara-on-the-Lake, CPC): Thank you, Madam Chair.

I'd like to thank the witnesses for being with us this afternoon.

There were very interesting comments from our witnesses today. It's interesting to get their comments on how we can better incentivize the work that needs to be done, particularly here in Canada.

Dr. Wright, as an alum from McMaster, I welcome and thank you for everything you're doing, including the work at the Global Nexus School for Pandemic Prevention and Response.

Recently, we heard from a couple of witnesses who spoke about the concern from the Health Canada special access programs in terms of the development of the antimicrobial therapies. They mentioned that only three out of 18 new antibiotics launched worldwide are available here in Canada, and the notion of what that impact is. On Monday, we had a Dr. Hamelin come forward. She said that Canada is last in the G7 in providing access to medicines. She indicated that that's for all medicines, and I think that touches on some of the comments you made with regard to push and pull.

You mentioned, Dr. Wright, the notion of funding for the research side. You indicated the work that you—among many—have done and the $1.4 billion that this is costing our provincial health care systems, yet we're spending only $1.25 billion at the Canadian Institutes of Health Research right now, prior to a budget in a couple of weeks. We've heard indications from the government that they've talked to their agencies and departments and are asking them to find savings of 15% over the next three years, so precious dollars could be limited in that capacity.

It's quite concerning to consider that they're estimating a budget deficit of about $68 billion to service our debt, when we're spending only $52 billion on health care. In fact—I repeated this earlier—what's more shocking is that the Province of Ontario spends—for the province—$80 billion, while we're spending only $52 billion for an entire country.

I'd like to ask a question with regard to how we go about furthering those push incentives and opening up the availability through the Canadian Institutes of Health Research to ensure that more research dollars flow to the AMR side, as opposed to other initiatives, because you're saying that under peer review it seems to be that the larger issues of concern, such as cancer, get more of the funding than, say, an AMR study would.

Dr. Gerry Wright: I can speak to this only in the sense that what we don't want to do is rob Peter to pay Paul. I think it's important to realize that this is not a zero-sum game for us. We need to fund AMR commensurately, the way we do other really important biomedical and clinical research problems.

I'm not suggesting that we should take money away from other areas to support AMR, but I do think it's important for everyone to realize that we use most of our antibiotics in the hospitals to help cancer patients, for example, and to help patients who undergo cardiovascular surgery. AMR plays a vital role in all of these areas. I think it's just incumbent on society as a whole to understand that this fundamental research is funded in Canada through the CIHR, and that what we want to be able to do is support that to a greater extent than we are right now.

● (1650)

Tony Baldinelli: Any potential cuts in funding to CIHR could have health consequences down the road if that's an avenue that sees reduced funding in the next couple of years.

Dr. Gerry Wright: I think that's fair. That's where our fundamental medical research comes from. If you cut that fundamental medical research, there will be consequences.

Tony Baldinelli: You indicated in your remarks the development of a new drug, I think, or a therapy. What precluded it from getting to the actual development stage? Can you explain that? I remember that McMaster was working on a nasal vaccine development during the COVID time period. How did that come about?

Dr. Gerry Wright: That vaccine is currently in stage two clinical trials. It's still a going concern. We're very excited about those opportunities, not just for COVID but also for the delivery of many other vaccines for respiratory infections going forward. That intellectual property and that strategy are still here with us at McMaster. We're excited about it.

With respect to some of the other challenges in making drugs, the short answer is that drug discovery is very hard and can fall apart in many ways. In discoveries that we've made, getting them down towards additional development is where you start to realize unexpected toxicological issues. This is why drug discovery is so expensive. It takes a lot of money, and it's not terribly exciting discovery science that students want to do. It's very careful analysis going forward, and that's one of the challenges that we have here.

In our case, a lot of that was funded by the NIH in the United States, not CIHR. For the current drug candidate that we're trying to move forward, we're looking mostly to Europe to get funding for that, but we're also being supported by the NIH right now.

CIHR funded the initial discovery, but once that discovery has been funded, there's really no mechanism in Canada to move these things forward so that we become attractive to, say, Dr. Outterson's CARB-X.

Tony Baldinelli: That's a great line.

The Chair: Thank you.

We will now proceed to MP Rana for six minutes.

Please go ahead.

Aslam Rana (Hamilton Centre, Lib.): Thank you very much, Madam Chair.

Thank you very much to all of the witnesses for being here with us on this Wednesday evening.

Dr. Wright, you are from McMaster University, which is next to my riding. I really appreciate that your university is doing a lot in different fields, especially at Innovation Park and in isotope production, for patients around the globe.

Along with that, McMaster University has developed a globally recognized program dedicated to antimicrobial resistance. What key factors contributed to the successful launch of this initiative?

Dr. Gerry Wright: Thank you for that, and thank you for highlighting this concentration of antibiotic research that's at McMaster, which I think is unique in the country.

To be perfectly honest, the way that happened was through the benefit of philanthropy. We, at McMaster, have benefited from families and individuals who have given to this area, understanding that it was underfunded, understanding that there was a research gap, and understanding that the talent and the solutions were actually here to be exploited. That has been game-changing for us.

The other part of this story that I think is worth putting on the table is the absolutely transformative effect that a Canadian program called the Canada Foundation for Innovation, the CFI, has had. The CFI is how we bring research infrastructure into our labs, into universities across Canada. We have benefited tremendously from that. My colleagues around the world are in envy of the CFI. I think it's important to recognize that we really want to maintain that, because it's been game-changing for us to be globally competitive in this field.

● (1655)

Aslam Rana: Thank you very much.

You're familiar with the David Braley Centre for Antibiotic Discovery at McMaster University, I know. It is at the forefront of Canada's fight against antimicrobial resistance. With a focus on cutting-edge research and global collaboration, the centre plays a vital role in addressing one of the most pressing health challenges of our time.

What led to the establishment of the David Braley Centre for Antibiotic Discovery at McMaster University, and why was Hamilton the right place for it?

Dr. Gerry Wright: This, again, was the philanthropic donation of Mr. Braley, who, unfortunately, passed a few years ago. He was a local Hamilton businessperson who really wanted to invest in McMaster, understanding that we had critical opportunities here to do good things. With his help, we've been able to create a critical mass of researchers who are working on AMR and—in broad strokes here—things like the vaccine that we talked about before. This was one of those really important roles that individuals can play in shifting the research landscape, the scientific landscape, within their communities.

For us, folks like Mr. Braley and folks like the DeGroote family have been just absolutely game-changing.

Aslam Rana: How has government support been critical in advancing the centre's research on antimicrobial resistance?

Dr. Gerry Wright: We've been able to leverage provincial support with some of the Braley money, which has been important. That was several years ago. I mentioned, as well, the Canadian Foundation for Innovation. There's a core laboratory at McMaster that's absolutely second to none in the world and is focused on antibiotic discovery. That would not exist without the Canadian Foundation for Innovation. It's simply a non-starter. That has been mission-critical for us.

Aslam Rana: What are the biggest bottlenecks in antibiotic discovery, and how can we address them?

Dr. Gerry Wright: As I touched on in my brief, the biggest one I see is how we keep our brightest people here in Canada working on this problem. Can we find a way to fund the translation of discoveries that are made in the lab further down the development pathway?

As Dr. Outterson told us, this is an area where private equity is not going to be the solution, at least not in the short term. We need some help if we're going to be able to move this forward. Keeping the talent here is mission-critical, and finding a way to keep the funding going is critical.

Aslam Rana: Thank you very much.

Mr. Kevin Outterson, how important is international coordination for tackling AMR?

Prof. Kevin Outterson: This is not a problem that any one country, even wealthy G7 countries, can address on their own. It requires international work, because none of us is capable of doing it by ourselves.

If we're going to do a pull incentive, it makes no sense for the United Kingdom to do it by themselves, even though they've done an excellent job. It won't have impact unless the rest of Europe, the rest of the G7 and, eventually, the U.S. join.

If I could mention international co-operation with Dr. Wright, I've been to McMaster several times. I've been their guest for a day in which there was a lecture series. I know the world-class scientists they have there. Their sources of funding, in addition to Canada, are the U.S. NIH and European sources. I hope Dr. Wright's new molecule from Nature applies to CARB-X in the near future.

These things, in order to work.... He's identified this lack of an SBIR in Canada. Most U.S. applicants and many European applicants have received a couple of hundred thousand dollars after they've spun out in order to get their data lined up for an application to something like us. We're a charity. We don't take equity, but we require certain amounts of data. It's hard to do that without this extra translational device called an SBIR in the United States. It goes by different names—

The Chair: I'm sorry for interrupting. The time is up for you, MP Rana.

We will now proceed to MP Blanchette-Joncas.

Please go ahead. You will have six minutes.

● (1700)

[*Translation*]

Maxime Blanchette-Joncas (Rimouski—La Matapédia, BQ): Thank you, Madam Chair.

I want to welcome the witnesses joining us today.

Dr. Haraoui, you made the connection between contemporary wars and the spread of bio-resistant organisms to Canada. Migratory movements resulting from such conflicts, be it soldiers, workers—

[*English*]

The Chair: I'm sorry for interrupting.

There is no translation. We'll stop.

[*Translation*]

Maxime Blanchette-Joncas: Thank you very much, Madam Chair.

I'll start over.

[*English*]

The Chair: Please go ahead. Start from the top.

Can you start again, MP Blanchette-Joncas?

[*Translation*]

Maxime Blanchette-Joncas: Thank you, Madam Chair, for showing respect by carefully listening to your colleagues during this important committee meeting.

Dr. Haraoui, you made the connection between contemporary wars and the spread of bio-resistant organisms to Canada. Migratory movements resulting from such conflicts, be it soldiers, humanitarian workers or asylum seekers, foster the spread of these bacteria.

Since Quebec is a place that receives the highest number of asylum speakers per capita in the country, does that actually put it at the forefront of antimicrobial resistance in Canada?

Louis-Patrick Haraoui: Thank you for the question.

You're correct in saying there could be a connection between population movements and the spread of resistant bacteria. When discussing this subject, we want to avoid stigmatizing populations or minimizing complications associated with population movements. These are often vulnerable populations with good reasons for coming here.

That said, there are already protocols in place, certainly in Quebec, and across Canada. For example, when people are hospitalized, a sample is taken to see if they carry resistant bacteria in order to reduce the spread.

Above all, my comments were intended to counterbalance those expressed by Professor Wright, for example, whom I salute. He's an eminent researcher, and we greatly appreciate his contributions.

The development of antibiotics seeks to address a problem. What I was also trying to express in my comments is that prevention is possible. The best way to prevent the increase in antibiotic resistance is to first recognize the factors that contribute to it and, second, to intervene.

For example, a few years ago, I took part in a project funded by the Grand Challenges Canada organization. We implemented a telemicrobiology program to support labs in northern Syria, in armed conflict zones. That allowed individuals who received virtual training to detect resistant bacteria and subsequently treat people.

The problem in all these conflict zones and regions where people earn low and precarious incomes is that diagnostic capabilities are extremely limited. We want, then, to increase surveillance among populations most affected by conflicts, such as those living in conflict zones, and among populations that wind up in other countries due to immigration and seeking asylum.

Maxime Blanchette-Joncas: Thank you, Dr. Haraoui, for sharing these experiences.

You said Canada should show leadership in the field of antimicrobial resistance. The president of Innovative Medicines Canada, who recently testified before committee, acknowledged that it hadn't shown any whatsoever. We know that Canada cut its R and D investments in recent years and that it was the only G7 country to do so for a sustained period, lasting 20 years.

Is this really surprising, given the chronic underfunding of R and D in Canada?

Louis-Patrick Haraoui: Indeed, research in Canada is significantly underfunded. Professor Wright expressed this very well. Proposals for support cruelly fail to take into account certain stages of research development.

The purpose of our interventions, including mine, is to emphasize the importance of demonstrating leadership in this regard. We know that Canada has done so in the past. As Mr. Outterson mentioned, this isn't an issue that can be addressed by a single country or by certain organizations alone. It requires international coordination.

Unfortunately, this leadership is sometimes lacking, and we want to encourage governments and institutions to seize this opportunity to remedy this situation and take advantage of the current momentum to accelerate these international collaborations and respond to the pressing need for research.

● (1705)

Maxime Blanchette-Joncas: Thank you.

Professor Wright, you mentioned there was a gap, particularly at the Canadian Institutes of Health Research, because these institutes haven't established a committee for antimicrobial resistance research.

I'd like you to enlighten me about that inconsistency.

Today, the Minister of Industry, who is responsible for the three granting agencies, announced funding. According to her, "[t]hrough this support, Canadian researchers continue to lead globally in groundbreaking innovations to maintain competitiveness in a rapidly evolving research landscape."

You're telling me that there's a shortfall, while the minister says we're global leaders. You also talked about a brain drain.

What's the reality on the ground? The government seems to be saying the complete opposite.

Gerry Wright: Thank you for the question.

[*English*]

The short answer is certainly that in certain parts of research, we are world-leading. In fact, I would argue that the labs around the country that do work on antibiotic resistance are lean, mean fighting machines that are internationally competitive. It's just a small community. My point here is that we need to be able to make sure we have the resources specifically for this area, which I think we could all agree—

The Chair: I'm sorry for interrupting, Dr. Wright. The time is up. You can quickly wind up in four or five seconds if you want to.

Dr. Gerry Wright: Yes. It's a good question. I think it's really just a matter of density, in this case, of individuals.

The Chair: Thank you.

We will now proceed to MP Mahal for five minutes.

Please go ahead.

Jagsharan Singh Mahal (Edmonton Southeast, CPC): Thank you, Madam Chair.

Thank you to all the panellists and all the witnesses who spared the time and came to this important testimony.

I would start with you, Dr. Wright. You stated in your testimony that AMR is the next existential threat to Canada and to the world.

We have seen mismanagement during COVID and in other times, when the money was spent on things that were not necessarily helping out Canadians in the way they should have helped.

Do you think Health Canada is doing enough to get medication approved for AMR and for antimicrobial-resistant drugs? Also, how fast is it? Is it fast enough, or are there delays?

Dr. Gerry Wright: I think the evidence speaks for itself. Of the 15 new antibiotic entities that have been brought to market over the last 10 years, we have access to only three. That's not a great ratio.

There are a number of reasons for that. For one of them, I think we have to remember that Canada is a very small market for these drug companies. The barriers to entry for bringing an antibiotic that has received approval by the FDA, say, or the EMA, for example, into Health Canada involve some bureaucracy. That bureaucracy, I think, has to be measured against the potential market size in Canada and the distribution across this great, vast country. That is part of the issue that's being faced.

Of course, what we want to do is ensure that all the barriers to getting these medicines to Canadians are reasonably removed, so that we're not artificially stacking the cards against ourselves.

● (1710)

Jagsharan Singh Mahal: Thank you for the answer.

Everybody talks about the difficulties that you as developers, as scientists, face when it comes to federal funding, when it comes to bureaucracy and when it comes to red tape. That has been the case for the last 10 years when it comes to making funds available for this vital research. Do you believe that enough of our federal dollars are being pushed to CIHR for AMR-related drugs in that context?

Dr. Gerry Wright: The short answer is no. We need to do more. If we want to be competitive—if we want to pull our weight, as Dr. Outterson said, on an international stage—we have to invest more.

Jagsharan Singh Mahal: Thank you.

How can we compare Canada's federal funding on AMR and for those bacterial researchers to support them in the face of a real crisis, God forbid, which can come at any time, at any point, as we're talking about...? How critical do you think Canada is, if we have to draw a comparison with other jurisdictions?

Dr. Gerry Wright: Certainly, most other G7 countries fund research as a percentage of GDP much better than Canada does. I don't have the numbers at my fingertips to be able to tell you what percentage goes to AMR research in all these different countries, but there are a lot more AMR researchers outside of Canada than inside Canada. I can tell you that.

Jagsharan Singh Mahal: Thank you so much.

During your testimony, in answer to the question of one of my colleagues, you shared the pain a young Canadian scientist would face if they did not.... As the system is right now, the funding and red tape are so tough. The approval and getting to market are nearly impossible. You say that they would likely find other markets to explore.

How do you feel about that, when you train those scientists and they are not able to serve Canadians, in the place where they have taken their education and received their funding? How do you want to reply to that concern you shared?

Dr. Gerry Wright: That's the reason I'm testifying today. It's because one of my major roles, as I indicated, is to train the scientists of the future. I would love to see them having successful careers here in Canada, and I would love to see them continuing the work in this field that we've trained them in.

They're doing outstanding work as they're being trained, and we are internationally competitive, especially in the labs at McMaster, but it is heartbreaking to see that talent migrate to other places.

The Chair: The time is up. Can you please quickly wind up?

Dr. Gerry Wright: Yes, I'm done. Thank you.

The Chair: Thank you.

We will now proceed to MP Jaczek for five minutes, please.

Go ahead.

Hon. Helena Jaczek (Markham—Stouffville, Lib.): Thank you so much, Madam Chair.

Again, thank you to all of the witnesses.

You're not quite done, Dr. Wright, because my first question is for you.

We've heard a lot about your requests and some of your strong feelings related to funding, but I'd like to go back a little more to the process of approval. Your institute is developing new products. We have heard, during the course of this study, some criticisms of the length of time that Health Canada takes—Canada's Drug Agency as well—in terms of approval of new medications in general. Given your experience, could you give us any recommendations as to how, perhaps, the process might be sped up?

Dr. Gerry Wright: I'm a fundamental researcher in many universities, so I haven't had the opportunity to face the Health Canada challenges in getting drugs approved.

I have been, obviously, involved in this field for a really long time, and I understand that there are significant barriers to making these things happen. As I said, because Canada is such a small market for the companies that have these antibiotics to sell, I think there needs to be some recognition of that and some way to incentivize. I don't know how that would be, to be perfectly honest, to in some way incentivize Health Canada to be able to recognize that it's a challenging clinical area that requires solutions, and that there is a really significant need going forward. Now's the time for us to figure out how to streamline this.

● (1715)

Hon. Helena Jaczek: Thank you.

Professor Outterson, perhaps with your knowledge of what happens globally and in various G7 countries in terms of drug approval, is it just a financial issue, or are there process issues that we could learn from other jurisdictions in terms of approvals?

Prof. Kevin Outterson: The regulatory authorities talk together a lot: FDA, EMA and Health Canada. They do coordinate. I was the author of the paper that Dr. Wright mentioned about how Canada's last within the G7 in actual approvals of these drugs.

I don't think that the primary problem is the bureaucracy within Canada. I think the primary problem is that the price is low compared to the size of Canada, so it's not an attractive enough market for the company to go to the trouble of doing that. A lot of these failures to get approvals in Canada are because no one tried, because the market's too small.

If Canada had a pull incentive at the levels I've described, I guarantee you that every company would come to Canada and the rest of the G7, with that as the carrot for them to bother with the registration.

Hon. Helena Jaczek: Perhaps you could describe this pull incentive a little more clearly. How would it be allocated? How do you see this working in terms of multiple companies, perhaps, competing? Just describe this, perhaps.

Prof. Kevin Outterson: Yes. The shortest answer is that the “Overcoming Resistance” report issued by CCA two years ago describes this all in great detail. I was one of the 10 co-authors of that report.

It would be a revenue guarantee. Canada would say that if you come to Canada, you will receive at least $13 million U.S. per year for this drug for making it practically available here. In the first year, maybe there are small sales. By year six, the projections are that the sales in Canada would exceed that number, so the revenue guarantee wouldn't cost the federal government any money whatsoever. It's a federal guarantee. The drug is still available and used in the provinces and territories, and it's paid for in the ordinary way that happens in those areas.

It's my understanding that the government is working now on a pilot to operationalize this, but the details of that are not known to me. It's been under way for some time, since the CCA report.

Hon. Helena Jaczek: Would you have any idea of which organization within government would administer this type of pull incentive?

Prof. Kevin Outterson: It's my understanding that it will be at the federal level within Canada, but I do not know which agency. It has not been announced that the pilot is public yet. Surely someone in Ottawa knows: It's just not me.

The Chair: Thank you.

We will now proceed to MP Blanchette-Joncas for two and half minutes.

Please go ahead.

[*Translation*]

Maxime Blanchette-Joncas: Thank you, Madam Chair.

Mr. Outterson, your work shows that inaction on antimicrobial resistance could cost the global economy trillions of dollars by 2050. However, the required investment would amount to a few billion dollars per year.

In your opinion, why is it taking so long for Canada to act, despite such an economic performance?

Do you have concrete estimates on what an effective investment plan would yield compared to the cost of inaction?

[*English*]

The Chair: Who are you directing the question to?

[*Translation*]

Maxime Blanchette-Joncas: My question is for Mr. Outterson.

[*English*]

Prof. Kevin Outterson: I apologize: I missed that it was directed to me.

For the Canadian pull incentive, you're probably talking about two or three drugs at a time, given that it's likely to not be needed after five years. That's a guarantee of $13 million U.S. Really, on average, only about half of that would be spent per year.

CARB-X has asked Canada for something in the range of $6 million Canadian per year. That would cover our pull incentive as we provide charitable, non-dilutive help to companies worldwide, taking them from the hit-to-lead stage to the end of the first-in-human stage.

On the proposal from Dr. Wright, there are two of them that I can think of.

One is to create a specific committee within CIHR, which funds AMR, and increasing that. The second was his request for something like an SBIR. Really, that's less than $1 million or $2 million per year, because these awards are typically $200,000 to $300,000 U.S. There aren't that many companies that actually would use them.

Together, that's a pretty comprehensive program. It would guarantee Canadian research continuing, going forward, and make sure that these new drugs are actually and practically available in Canada without financial barriers to patients.

● (1720)

[*Translation*]

Maxime Blanchette-Joncas: Thank you, Mr. Outterson.

Professor Wright, you talked about the brain drain in research centres.

Do you have any concrete solutions to retain talent in Canada and avoid the exodus?

[*English*]

Dr. Gerry Wright: Yes. It's the same answer as Dr. Outterson's in this case.

What we need to do is have sufficient resources so that people can have careers here, whether those are in the academic sector or in the biotech or pharma sectors. People just want to lead their lives and bring up their families, and they need to be employed for that. That's what's needed.

The Chair: Thank you.

We will now proceed to MP Holman for five minutes.

Please go ahead.

Kurt Holman (London—Fanshawe, CPC): Thank you, Madam Chair.

Thank you to all of the members of the committee, including the witnesses, for coming here on a busy Wednesday night.

Recently, the Parliamentary Budget Officer's report concluded that the government's projected borrowing requirements will begin to exceed the maximum amount in 2026-27 as the debt crosses the $2-trillion mark. The PBO bluntly told Canadians, “The government will need to make choices to either [raise] revenues or cut spending in order to [stop] this unsustainable path that we're on.” Already the Liberals are spending more on interest payments for their debt than they are on health care.

AMR is a health care issue. Cutting health costs will cause concerns about the spread of AMR, especially in neighbourhood health centres and also possibly in hospitals.

My question is for Mr. Wright.

You mentioned in your briefing that Canada does not have AMR labs or research. You said, “There is no AMR panel.” It's bundled in with fungal and pesticide research. You mentioned that Canada risks losing academic talent in research on AMR, and that Canada lacks early-stage research. Can you please expand on that?

Dr. Gerry Wright: Yes, sure.

Let me just qualify that by saying that we have some outstanding AMR researchers across the country. There are a lot at McMaster, but you're going to hear from some from McGill in the second panel. There is an excellent group or cadre of individuals who are working in this area.

Our reality is that we are challenged to keep new, young investigators here who are going to find the solutions of the future. This how science works: It's the young people who drive it, and we need to keep that talent here. What I'm suggesting is that, for not a lot of money, you could maintain the excellence we have and expand on it. Then, in particular, I'm extremely committed to ensuring that discoveries get translated into solutions for Canadians. Translation is a huge gap that's missing here in Canada, and it's something that I think could benefit not just AMR but also all other fields of biotechnology.

Kurt Holman: Thank you, sir.

Mr. Outterson, you mentioned in your introduction, in relation to CARB-X, Canada's role in the opportunity to research AMR, ports of global AMR research and the fact that Canada is on this panel.... You mentioned with regard to fair-share funding that only two countries from the G7, I understand, do this completely: the United Kingdom and Italy.

Is Canada's lack of funding a cause for concern in solving the global problem with regard to AMR?

Prof. Kevin Outterson: Canada's economy is about 3.5% or 4% of the G7 plus the European Union, so you're a small but important part of that. If Canada chooses to not do a pull incentive and the rest of the G7 does, the innovation solution will probably be achieved, but the drugs will not be available in Canada. For a relatively small amount of money, done collectively with other G7 partners, there could be a great solution.

One other thing I'd like to say, Mr. Holman, is that we have to remember that this saves a lot of money. If we don't address AMR, every surgery becomes more dangerous and more risky—every caesarean section, every hip or knee replacement, every cancer treatment. The number two cause of death with cancer is infection, not cancer. This is an investment in saving money going forward. I understand that the budget issues are difficult, but this is an area in which prevention is really remarkably cost-effective.

● (1725)

Kurt Holman: I have a follow-up question for you, Mr. Outterson.

You mentioned that Canada is a small market for AMR drugs, but there are smaller countries in Europe. Are you implying that they're more profitable? Is Canada's being a smaller market due to the lack of funding from Canada or possibly due also to the bureaucracy from within Canada?

Prof. Kevin Outterson: Within Europe, there are many countries that are much smaller than Canada. It is a unified market, and Europe is working right now on a pull incentive for all of Europe. It should be announced in November, next month, in Denmark, under the presidency of the European Council. They are also working on this and are trying to make sure that there's access to the smaller countries of Europe, in addition to major markets like Germany.

The Chair: Thank you.

We will end this panel with MP Rana for five minutes.

Please go ahead.

Aslam Rana: Thank you, Madam Chair.

I'm sorry, Dr. Wright. You are not done yet. My question is for you.

You have been working with a lot of grant panels and consultants. Based on your experience, where do you think the funding for AMR research changed over time?

Dr. Gerry Wright: I can give you a concrete example of this.

There was a significant investment in AMR and bacterial diseases funding in the 1990s and early 2000s through something called the Canadian Bacterial Diseases Network, which was part of an investment in several network centres of excellence dedicated to certain disease areas or areas of biotechnology development, in partnership with small and large businesses. This was game-changing for a lot of folks like me, who were trying to build out their careers at this time. That program, unfortunately, sunsetted in the mid-2000s, leaving only CIHR able to make up that change. There are not a lot of other opportunities out there right now, and that's where our challenge lies.

Aslam Rana: Thank you.

With respect to government funding, what policy or structural changes would you recommend to better support AMR research and antibiotic development in Canada or globally?

Dr. Gerry Wright: I think you've heard a lot of them today.

My interest would be to fund the front end, which would be to make sure we invest more in the early-stage investigations, fundamental research and discoveries, through places like CIHR.

I think an SBIR-like program would help us push some of these discoveries out of the lab and make us competitive for agencies like CARB-X, which Dr. Outterson runs and Canada supports financially. That ecosystem has an opportunity to be fleshed out. I think that would be optimal for the country and for the health of Canadians going forward.

Aslam Rana: Thank you.

Where do you think we are doing well? Where do we still have to improve in AMR research?

Dr. Gerry Wright: Honestly, we have an outstanding public health service here, which is working tirelessly in areas like surveillance and trying to really make sure we're staying on top of AMR in hospitals and on farms.

We're doing quite well in that area. We're doing very well in fundamental, discovery-based work. We're punching well above our weight in that area, despite the challenges we face.

Where we're falling down is in moving those discoveries out of the lab and trying to do more to develop a biotech sector around infectious disease, which I think will actually help move the needle in this field.

Aslam Rana: Thank you.

What role do you think partnerships between government, industry and researchers play in advancing AMR research in Canada?

● (1730)

Dr. Gerry Wright: Certainly government is playing a role.

One of the challenges in this field, which has changed dramatically since I entered it in the early 1990s, is that the large pharmaceutical industries have abandoned this field. The people who used to make drugs in this field—the Mercks and the Pfizers of the world—are not in this business, for all the reasons that you've heard before. The return on investment is too low.

That means we must, as a society, invest in this area if we're going to prevent the challenge that Dr. Outterson just noted, which is having every medical intervention be more dangerous than it needs to be.

Aslam Rana: Are there any collaboration models that you think are working well or not so well?

Dr. Gerry Wright: There are great examples of this in a number of areas where governments and industries have come together, with each bringing capital to the project to be able to move things forward in areas such as vaccinology and some areas of drug development. We've seen this in manufacturing, for example.

There's good reason to think that we could do the same in this field.

Again, I just want to caution that one of our challenges in this field is that large pharmaceutical companies that we used to see as being able to help fund some of these programs are simply not in this field anymore.

Aslam Rana: Thank you very much, Dr. Wright.

I'll see you soon at McMaster University. I've already been three times over the year. I'll see you soon over there.

Dr. Gerry Wright: Great. We look forward to seeing you.

The Chair: Thank you.

This panel has come to an end.

I really want to thank all the witnesses for coming today and providing your important testimony for this study.

I will suspend the meeting for a few minutes, so that the witnesses for the second panel can come in.

Thank you once again. The meeting is suspended.

● (1730)

_____(Pause)_____

● (1740)

The Chair: I call the meeting to order.

I would like to make a few comments for the benefit of the new witnesses for the second panel.

Welcome to all the witnesses for this panel. Thanks a lot for appearing before the committee.

Please wait until I recognize you by name before speaking. For those participating by video conference, click on the microphone icon to activate your mic, and please mute yourself when you are not speaking.

For those on Zoom, at the bottom of your screen you can select the appropriate channel for interpretation: floor, English or French. For those in the room, you can use the earpiece and select the desired channel.

I remind you that all comments should be addressed through the chair.

For this panel, we are joined by Dr. Henry Skinner, chief executive officer of AMR Action Fund GP. We are also joined by the Deans Council for Agriculture, Food and Veterinary Medicine, represented by Dr. Joseph Rubin, professor, department of veterinary microbiology, Western College of Veterinary Medicine, University of Saskatchewan, and Dr. Maud de Lagarde, assistant professor, faculty of veterinary medicine, Université de Montreal. Our fourth witness for this panel is Dr. Dao Nguyen, founder and director of the McGill AMR Centre.

All of our witnesses are appearing by video conference.

Welcome to all of the witnesses. Thanks a lot for coming and appearing before the committee. All of you will have five minutes for your opening remarks, and then we will go into rounds of questioning.

We will begin with Dr. Skinner.

Please go ahead. You have five minutes for your opening remarks.

Thank you.

Dr. Henry Skinner (Chief Executive Officer, AMR Action Fund GP): Thank you.

I want to thank the Standing Committee on Science and Research for inviting me to testify today. My name is Henry Skinner. I'm a microbiologist, a life science investor and the CEO of the AMR Action Fund.

The AMR Action Fund is the world's largest venture capital fund solely dedicated to late-stage antimicrobial research and development. It was created in 2020 through a collaboration between the pharmaceutical industry and philanthropic organizations like the Wellcome Trust, which recognized that AMR is a fast-moving threat that imperils the health of everyone and could cost the global economy trillions of dollars.

My fund is trying to mitigate this threat and protect patients by investing in small and mid-sized companies that are developing urgently needed therapeutics for the most dangerous drug-resistant bacteria and fungi, which the WHO and the CDC call “priority pathogens”.

I have been investing in biotechnology companies for 25 years, and the decline in investment and innovation in the field of antibiotics is alarming. Like most venture capital funds, we are structured to exist for approximately 10 years, which we hope is enough time for policy-makers around the world to enact appropriately sized incentives and to correct the market values that make discovering and developing new antimicrobial treatments nearly impossible, as highlighted by the Council of Canadian Academies report of September 2023.

We focus our investments on biotechnology companies that are conducting clinical trials in humans to test for safety and efficacy, which is the stage of drug development where the costs are highest and where the need for external funding is most acute. While the fund has approximately $1 billion U.S. under management, a single clinical trial can cost several hundred million dollars, so we must be extremely selective with our investments. Our goal is to bring two to four novel antimicrobials to market by 2030. So far, we've made 12 investments and have obtained one antibiotic approval. To date, however, we've not invested in any Canadian companies, and that's not a reflection of Canadian innovation. In fact, there are some promising R and D programs across the country, especially in the earlier stages, with labs leveraging machine learning and AI to aid antibiotic discovery efforts.

However, all antimicrobial developers, whether they're based in Edmonton, Boston or Lyon, are up against extraordinary market challenges that make it exceedingly difficult to attract investors. In all other therapeutic areas, the market rewards innovation through sales volume, which means delivering cholesterol pills, cancer medicines or obesity shots to every patient who could benefit. Due to the way bacteria and fungi evolve, though, clinicians are instructed to use new antimicrobials only when absolutely necessary in order to preserve the drug's effectiveness, and they hope that resistance takes longer to build. This is necessary for public health, but it makes it exceedingly difficult for investors and companies to justify spending money on antibiotic research and development. Antibiotics are not blockbusters. Sales of the top 10 antibacterial products don't even add up to $1 billion. In comparison, a single cancer drug can generate more than $20 billion in sales in a single year.

Antibiotic research and development is incompatible with the fiduciary responsibilities of private investors, who need to generate returns. Each year, venture funds invest tens of billions of dollars into biotech companies, but less than 0.1% of that money is invested in companies developing antibiotics. This represents the classic tragedy of the commons, which only government policy, including Canada's, can address. At the same time, it will make their biotechnology sectors more attractive to private investors. Policies known as pull incentives can change how antibiotics are valued and reimbursed, and they can reward companies that take the risk and are successful in developing new, urgently needed antibiotics for patients in need.

Pull incentives have been successfully piloted in England over the last several years for two novel antibiotics, and a permanent program will now cover more antibiotics and expand across the United Kingdom. As Italy finished its G7 presidency last year, the Italian Senate authorized the use of up to 100 million euros for higher reimbursement of innovative antibiotics. To date, eight medicines are included in that program.

However, a pull incentive in the United Kingdom or Italy alone is not sufficient to attract investment in antibiotic drug developers. The programs in the U.K. and Italy must be joined by other G7 markets like the U.S., Japan and Canada, as well as the entire European Union. Only then will pull incentives reach the size necessary to assure investors and drug developers that antibiotics are a financially viable field of medicine.

● (1745)

As you know, in the Government of Canada's 2023 budget, Canada committed to develop a pilot program to secure access to new antimicrobials for the people of Canada. It is important that the Government of Canada move this forward and make a financial commitment that truly rewards innovation. By valuing these new projects appropriately, the program would encounter greater participation in the pilot and lay the groundwork for a sustainable national program. Canada has a moral responsibility to contribute its fair share as a G7 member and high-income country. I feel the same about Japan’s inadequate pilot program.

I believe the design of the pilot should address barriers at the hospital level to providing access to new and newer antimicrobials. Taking pressure off the hospital budget, coupled with the appropriate stewardship protocols, would ensure that the program would succeed in getting the right drug for the right patient at the right time.

Effective antibiotics are essential to a functional and efficient health care system in each province and territory. When used appropriately, they enable and reduce the cost of providing high-quality health care.

Thank you very much for inviting me to testify. I look forward to answering your questions.

The Chair: Thank you, Dr. Skinner.

We will now proceed to Dr. Rubin.

Dr. Rubin, you have five minutes for your opening remarks. Please go ahead.

Dr. Joseph Rubin (Professor, Department of Veterinary Microbiology, Western College of Veterinary Medicine, University of Saskatchewan, and Deans Council for Agriculture, Food and Veterinary Medicine): Good afternoon, Madam Chair.

I'd like to thank the committee for the opportunity to testify and share my perspective. My name is Joe Rubin. I'm a veterinarian and microbiologist and a professor in the Department of Veterinary Microbiology at the University of Saskatchewan. I've been working on antimicrobial resistance, primarily in companion animals and food products, for nearly 20 years. My current roles are as an educator of veterinary students in the areas of bacteriology and infectious diseases and as a researcher, where I study the problem of AMR from a number of perspectives.

There are three areas I would like to highlight today where I can see a need for additional support: first, research into evidence-based antimicrobial stewardship for companion animals; second, support for global collaborations to tackle resistance in low- and middle-income countries; and third, support to harmonize diagnostic testing in veterinary labs, with the goal of improving both passive surveillance and antimicrobial stewardship.

With respect to the first topic, the committee has heard testimony about the importance of stewardship to improve how and when antimicrobials are used, so that we can preserve their efficacy. Antimicrobial stewardship necessarily looks different in each context where it's applied. What might work in a large human hospital may or may not be appropriate in the diverse environments or for the patient populations that veterinarians care for. An individually owned dog is quite different from a dairy cow, a barnful of broiler chickens or a hive of bees. The stewardship approach to each of those situations is necessarily different. In veterinary medicine, more data is needed to support stewardship in companion animal practice.

The goal of stewardship is to change prescriber behaviours. This is quite a difficult thing to do. For companion animal practitioners, we've largely relied on passive antimicrobial stewardship, which essentially consists of providing knowledge and information through continuing education conferences and workshops. In the context of human infectious diseases, we know that more active approaches have a bigger impact on prescriber behaviours. Furthermore, there are areas in which we lack data to inform how antimicrobial use can be optimized. For instance, reducing the duration of therapy can greatly impact the amount of antimicrobial that an individual animal is treated with. At a population level, this can multiply to make a big difference.

With respect to the second topic, the committee has heard that AMR does not respect borders and that the threat of resistance is global. Through international travel and trade, resistant bacteria and resistance genes can be easily transported intercontinentally. It's therefore in our best interest to assist low- and middle-income countries to build regulatory, diagnostic and stewardship capacity in the veterinary and human health sectors. Meeting the threat of resistance where it's most rapidly emerging will not only protect Canadians but also reduce the burden of resistance on vulnerable individuals, such as small-scale sustenance farmers, who may be disproportionately impacted.

Finally, in Canada there are improvements that should be made in veterinary diagnostic microbiology. While our domestic diagnostic labs are doing a good job in providing services to veterinarians, changes could be made that would have both surveillance and stewardship benefits. First, national harmonization of the antimicrobial susceptibility test methods used will ensure that all the data these labs generate as part of their routine work can be directly compared across the country, facilitating passive resistance surveillance. Second, developing a harmonized strategy for how lab results are reported would advance stewardship goals. For instance, including relevant data from current treatment guidelines, such as the veterinary Firstline application that was mentioned previously, along with lab reports that go to prescribers would provide additional context to help veterinarians optimize their therapy.

In conclusion, as other witnesses have testified, antimicrobial stewardship is essential in our fight against AMR. In companion animals, more resources, including grants, are needed to support the development of effective strategies to help veterinarians optimize their use of antimicrobials and ensure that current best practices are implemented. Second, we must take a global perspective and work with our colleagues internationally to combat the emergence of resistance in low- and middle-income countries. Finally, I suggest providing support to develop harmonized susceptibility testing and reporting protocols amongst Canada's veterinary diagnostic labs.

Thank you very much for this opportunity.

● (1750)

The Chair: Thank you, Dr. Rubin.

We will now proceed to Dr. Nguyen.

Please go ahead. You will have five minutes for your opening remarks.

Dr. Dao Nguyen (Founder and Director, McGill AMR Centre): Good evening, Madam Chair and members of the science and research committee. I would like to thank you for the opportunity to testify to you today.

My name is Dao Nguyen. I speak to you as a physician working at McGill University's teaching hospital as a professor of medicine and microbiology, as a researcher who studies difficult-to-treat bacterial infections and, last, as the founding director of the McGill AMR Centre and a new AMR Quebec network, where I lead the efforts to structure and mobilize a diverse ecosystem of over 150 academic researchers at McGill University and across Quebec with government, public and private partners across the human, animal and environmental health sectors.

First, I would like to paint a brief picture of what AMR looks like through the lens of a physician. I would like you to imagine that a loved one is diagnosed with cancer, which is curable but requires chemotherapy. During chemotherapy, which significantly weakens one's immune system, you develop a fever, a typical sign of infection. For this, you are immediately prescribed antibiotics, for which I might do a test to figure out what kind of infection you have. If the infection is caused by bacteria not resistant to the antibiotic prescribed, it will likely work. This will take a few days of antibiotics, and no one will think twice about it.

However, if you have an infection caused by a drug-resistant bacteria, particularly one resistant to carbapenems, a powerful type of antibiotic that is considered a last resort, then the initial antibiotics will not work. With the current diagnostic tests at hand, it may take three to five days to get an answer, if at all, about what microbes caused the infection and whether the microbes are drug-resistant. During this time, the infection can overwhelm the body, with the risk of dying increasing to upwards of 50% with treatments that are more toxic and complicated, if available at all.

The scenario could happen to any patient who has surgery, gets a pacemaker, develops pneumonia or suffers a wound. All of these important medical interventions carry a risk of infections and complications, and they could be jeopardized if prevention or treatment of infections were no longer effective. At best, this means an average of a one-week-longer hospital stay for each case of infection, and at worst, this means risky and unsuccessful procedures or treatments or deaths for countless conditions, from hip replacements to cancer. The rates of these carbapenem-resistant bacteria—that is, a resistance to a last-resort antibiotic—have already reached 70% to 80% in certain regions of the world today, as we speak. In Canada, the rates are much lower, but the trends are alarming, with rates having gone up as much as tenfold in the last 15 years, so the AMR crisis is knocking at our door, and we're not equipped for this.

To respond to this, we are in dire need of innovative solutions. We need new treatments to deal with the drug-resistant bacteria; we need diagnostic tests that are much faster and more accessible to know when we are dealing with drug-resistant infections and what antibiotics to use, and we need surveillance systems that are more comprehensive and timely. To get there, research and innovation done in a collaborative manner are essential to the solutions to addressing the AMR crisis. This is recognized by the pan-Canadian action plan, numerous national action plans globally, and reports, including from the WHO.

Where do research and innovation largely come from? Academia: With our community of researchers and teachers, we are a major asset and an important part of the solution.

First, academic research is a critical source of innovation. For example, McGill ranks first in North America as the university that has launched the greatest number of research-based start-up companies. In 2023 alone, there were 28 companies, most of them in the life sciences and medical technologies sector. This speaks to the potential for AMR, but the research and development ecosystem in Canada to nurture early discoveries is largely lacking, as you have already heard from Professor Wright earlier this afternoon. Beyond Canada, we know that academic inventions and founders are responsible for more than a quarter of all medicines approved in the last 20 years, with trends going upward in the last 10 years. For certain medical conditions, this represents over 80% of treatment.

Second, as a researcher myself, who interacts with and mobilizes hundreds of my colleagues around AMR, I can say that academic research in Canada has notable strengths and existing initiatives upon which we need to build. For example, in Quebec, Mila, a world-class AI institute founded by Professor Yoshua Bengio, whom many of you may know as the grandfather of deep learning in AI, has an incubator that has launched over 50 start-up companies and projects that bring AI tools to antibiotic discovery.

Last, academic communities are important conduits to mobilize and structure the AMR ecosystem. Our experience with the AMR Quebec network is a good start and an example.

What do we need now? We need to build and support an AMR ecosystem that integrates academic research and innovation with government and public stakeholders, industry and end-users.

● (1755)

To get this, we need strong leadership and persons and entities dedicated to AMR with a specific mandate to mobilize political will and resources and to coordinate activities across sectors and jurisdictions.

We need somebody who can be heard by both decision-makers nationwide and professionals; we need a government structure to organize this AMR ecosystem, and we need resources commensurate to the problem of AMR—

The Chair: I'm sorry for interrupting, but your time is up.

We'll now proceed to our round of questioning. You can always bring your points forward in the rounds of questioning also.

We will now start our first round with Mr. Baldinelli for six minutes, please.

Go ahead.

● (1800)

Tony Baldinelli: Thank you, Madam Chair.

Before I go to my questioning, I just want to place the following motion on notice. It deals with artificial intelligence and goes to the government's announcement from September, when it launched the AI strategy task force. There are the consultations that are taking place this month, and then the task force is supposed to be sharing some of those bold ideas they have gathered in November.

I want to table this notice of motion:

That, pursuant to Standing Order 108(3), the Standing Committee on Science and Research undertake a study of no fewer than four meetings on the federal government's approach to artificial intelligence, considering the committee's mandate to study matters related to science and research, which includes AI technology, and that the committee invite:

(i) the Minister of Artificial Intelligence and Digital Innovation to appear for one meeting for no less than two hours,

(ii) federal officials from Innovation, Science and Economic Development Canada, and

(iii) a range of AI industry representatives and experts; and

that the committee report its findings and recommendations to the House.

Madam Chair, we have sent that notice of motion to the clerk, and that will be shared with all the colleagues.

Thank you for that. With that, I will begin my line of questioning.

I'll start with Dr. Skinner.

Thank you for your comments, which were quite illuminating in a sense. I've seen some of your comments and you talked about AMR now killing nearly 1.3 million people a year. We've had other panellists appear, talking about the cost to the provincial health care systems at about $1.4 billion a year. We've heard from other panellists again, witnesses, talking about the difficulties here to get therapies to market. In regard to the Health Canada special access programs, in terms of antimicrobial therapies, it was mentioned that only three out of 18 new antibiotics launched worldwide are available here in Canada.

I want to get to some of what your comments were. I feel that right near the end of your comments you were running out of time. You were talking about the 2023 pilot program and moving this forward, and the notion everyone's been talking about today—about the push and pull incentives—and you talked about real incentives and barriers at the hospital level. I just wonder if you could expand on that, please.

Dr. Henry Skinner: I'm happy to.

I think our work is supporting biotechnology companies that are bringing these important medicines to patients, or trying to. A number of them have gone bankrupt. They have raised hundreds of millions of dollars, approaching $1 billion, and brought the drug through successful clinical trials into approval, only to go bankrupt because they couldn't afford to keep the lights on after the drug was approved. That's how difficult this market is. That's how challenging it is.

We're not even talking about what it costs to then expand into other jurisdictions. To get approval in the U.S., maybe a first step to then getting approval in Canada and to getting approval in other jurisdictions, is absolutely necessary to bring it to patients where the need is, yet the companies don't have the resources to do that.

This has become so challenging that other investors simply refuse to consider investing in this field any more. We've heard that large pharmaceutical companies have left the field, and that has created a whole series of challenges in supporting innovation here.

All those things conspire to keep these needed drugs out of the innovation pipeline and unavailable to patients around the world. If we don't create these pull incentives so there's a market to keep the drugs available once they've been approved, there simply won't be any more coming.

Tony Baldinelli: Thank you.

Dr. Nguyen, you spoke right at the end of your remarks about creating the AMR ecosystem that's required. I think it was during our first meeting.... Our briefing notes that the analysts prepared talked about 14 departments, agencies and programs working on the whole AMR side. From a bureaucratic standpoint, 14 departments, agencies and programs all having a voice and trying to provide input as part of that ecosystem.... How do we address that?

I don't know if you had an opportunity to hear some of Dr. Wright's testimony earlier, but I found it quite enlightening with regard to his two asks to government: developing a way to keep our talent in Canada, and having a translation of the discovery that's done here into downstream implementation.

Can you follow up and expand on your comments on this notion of creating this ecosystem?

● (1805)

Dr. Dao Nguyen: You've pointed to the ecosystem as being incredibly complex, not only in terms of the department and agencies but also in terms of the jurisdiction. Above and beyond that, the consensus that has come through our work with stakeholders is that one of the key things that are lacking is strong leadership, leadership that transcends agencies and transcends sectors to try to coordinate and see the big picture.

An example that has come to the audience is Dame Sally Davies—you know, somebody who has the ability to wield political power and has the resources and who also can make the sectors—human health, animal health and veterinarian—speak to each other.

From there on, governance for the different needs will have specificities. In terms of the research and innovation ecosystem, I would argue that that's a challenge of integrating the academic research, the industry and then, perhaps, government-supported research.

The leadership and governance are something that we need to think about broadly in terms of a path forward.

Tony Baldinelli: Are you finding the same situation as Dr. Wright in the excellent work that you're doing, that you're losing talented researchers to foreign countries because of the better opportunities there, because of the investment opportunities and the investment climate in other countries?

Dr. Dao Nguyen: Absolutely, I think that, whether it is lost to other countries or to other fields, that means that one may have a very talented young scientist working on antimicrobial resistance, and once they've—

The Chair: I'm sorry for interrupting. Time is up for Mr. Baldinelli. Maybe you will get an opportunity in the second round to answer that.

We will now go to MP McKelvie for six minutes.

Please go ahead.

Jennifer McKelvie (Ajax, Lib.): Thank you, Madam Chair.

Dr. Rubin, you mentioned a term I hadn't heard before: “harmonized susceptibility testing”. I'm hoping you can outline more what the recommendations would be regarding that and also regarding surveillance in general and how we can do better.

Dr. Joseph Rubin: When bacteria are tested for antibiotic resistance, it's essential that this testing is done in a highly standardized way. In veterinary medicine, there are quite a number of organisms for which we don't have internationally agreed-upon testing guidelines. This has left diagnostic labs in many cases to work around these gaps, which has led to some fragmented approaches across the country in terms of how some bacteria are tested and characterized.

I think that, working together, we could come up with some more harmonized approaches for how this might be done, whether it's in terms of interpreting the test results or actually conducting the tests themselves.

Animals are infected with many bacteria that aren't widely encountered in human medicine as well, so these are bacteria that are under-researched. There is less information known about them, so we lack some of those standardized methods.

With respect to surveillance, having standardized methods allows us to directly compare what's done in my lab with what's done in a lab on the other side of the country. We know that both researchers or both diagnosticians would get the same result if working with the same organism when using standardized conditions. It really facilitates the use of routinely generated diagnostic data, which is paid for by someone else. It's paid for by the end-user, the client who has requested those tests or the veterinarian who has requested those tests. It gives us a window into what's going on from a resistance perspective without having to put in as many financial resources as are required for active surveillance.

● (1810)

Jennifer McKelvie: Dr. Rubin, who would be our best international partners on such approaches? Is it the WHO? Who do we need to be working with better?

Dr. Joseph Rubin: The perspective of surveillance is a bit outside of my area of expertise. Certainly within Canada we actually have a lot of our own domestic knowledge and some very well-respected researchers and scientists within the Public Health Agency of Canada. As we heard from Dr. Wright, there's a lot of strength there.

Within the agricultural animal and food sector, the CIPARS program does fantastic work and is really an international model for how to do resistance surveillance.

I think a lot of that expertise is really homegrown and easily available to us here in Canada.

Jennifer McKelvie: Thank you.

Dr. Nguyen, you mentioned the human, the animal and the veterinarian...and that collaboration.

Looking internationally, are there other countries that are having those groups talk together in a good way that we could use as a model?

Dr. Dao Nguyen: I can speak perhaps from the research standpoint. I think that Sweden is certainly an example, and Denmark is an example of where they have done remarkable work in integrating research in the policy-making and the industry, as well as in how to integrate human, animal and environmental health together.

Jennifer McKelvie: Great.

Dr. Skinner, you really eloquently laid out that it's easy to focus on the low mortality, bulk and organisms where you can mass produce, and how there's maybe not as much investment into rarer or more deadly.... Then you mentioned some international participation around pull incentives.

I was wondering if you could lay that out a little more. How do we ensure that we're focusing on the most problematic micro-organisms?

Dr. Henry Skinner: That's a great question.

Simply put, there are a number of organizations around the world that look to address this. The World Health Organization semi-annually produces a report that identifies the most dangerous drug-resistant organisms. It surveys around the world and does surveillance to understand those that are the greatest risk for humans. That's published semi-annually and prioritized into the highest concern, middle concern and lower concern but still of great concern. The CDC does something similar. Other jurisdictions do likewise.

With the surveillance in hospitals to understand the morbidity and mortality that these organisms cause, the lack of effective antibiotics is pretty clearly identified, so the pull incentives ought to be and have been designed to incentivize antibiotics that treat these most dangerous pathogens. It's important to keep that in mind. [*Technical difficulty—Editor*] that, and I believe the pilot would do exactly that.

Jennifer McKelvie: I have only seven seconds.

I get another round. I can ask more questions later.

The Chair: Thank you.

With that, we will now proceed to MP Blanchette-Joncas for six minutes.

Please, go ahead.

[*Translation*]

Maxime Blanchette-Joncas: Thank you, Madam Chair.

Dr. Nguyen, you mentioned the disastrous economic consequences of inaction on antimicrobial resistance. However, Canada is the only G7 country that invested less in research and development over a sustained 20-year period in proportion to its GDP.

In your opinion, could the failure to make bold investments in prevention, which is one of the five pillars of the One Health project, cost significantly more in the long run?

Dao Nguyen: I'm not an economist. I don't think I'm the best person to talk about specific economic costs. However, I'd say there's unrealized potential in that regard.

For example, in Quebec, we have a lot of work to do, including mobilizing political will. We could simply begin with a national action plan on antimicrobial resistance, or AMR.

In my opinion, that's where we need to start. Then, we could truly mobilize the necessary actions.

● (1815)

Maxime Blanchette-Joncas: Thank you. I understand your message quite clearly.

Experts agree that there'll be other pandemics, amplified by antimicrobial resistance, in particular, and by climate change. Yet the current government is betting on energy projects, including a pipeline that will cost $34 billion. I am referring to the Trans Mountain pipeline.

As a scientist, do you believe this vision is compatible with the fight against antimicrobial resistance?

Dao Nguyen: In my opinion, Canada should think much more broadly about the future. To maintain health and national security, both in terms of population and economic health, it's absolutely essential to respond to the AMR crisis.

In the past, we've seen that Canada is capable of investing. For example, around 2004, when HIV and AIDS first appeared, Canada established a Canadian strategy promoting annual investments of $80 million in the fight against HIV. Today, it still invests $43 million per year to combat HIV and hepatitis C.

Canada is therefore capable of investing. If it's also capable of seeing AMR as something that must be addressed to ensure its present and future security, as well as the health of its population and national security, I believe that political will could set in motion the changes that will make a difference.

Maxime Blanchette-Joncas: Thank you, Dr. Nguyen.

Your comments could give rise to a new slogan during the next election campaign: Where there's a will, there's a way.

You recommend that the scientific ecosystem be better funded and given greater consideration. I mentioned the fact that, for 20 years, research and development in Canada has been chronically underfunded compared to other G7 countries and other countries in the Organization for Economic Co-operation and Development, or OECD.

What role could universities play in combatting antimicrobial resistance, without necessarily having the means to do so?

Why do you think their contribution is essential to the implementation of a national strategy?

Dao Nguyen: As I said in my introductory remarks, when it comes to innovation, we often forget that the seed is planted at university. Statistically, there are a huge number of innovations that originate in universities, in all sectors, including health. However, there's not enough water to make them sprout.

There is also the ecosystem. The university community trains the experts and scientists of the future. We need that future. The university community is also a mobilizing force that perpetuates a tradition of collaboration. As we see in Quebec, through university communities, there is a way to mobilize government, public and industrial sectors to foster the creation of an ecosystem.

I'd say that the university community represents both the solution and the vector for the solution to the AMR crisis.

Maxime Blanchette-Joncas: Your comments are extremely interesting. You've taken the words right out of my mouth because, at present, we're seeing the government promoting economic and industrial diversification. However, research is the foundation of all technological innovation. There can be no innovation without research. Today, we seem to be overlooking research and thinking that we'll still make great technological advances. It's like trying to grow a plant without watering it.

Could you tell us what lever we need to activate to better leverage the strengths already present in Quebec and Canada in this area?

Dao Nguyen: There are already strengths in research and innovation. I mentioned artificial intelligence, for example. In Canada, there are individual researchers and world-class teams working on AMR. I think we first need to allocate financial resources to nurture these seeds and turn them into small plants.

We then need leadership, a clear vision carried by an entity that truly has the power to transcend territories and break down the many barriers, some of which are administrative and political in nature, in order to restore the initiatives. There is already a multitude of initiatives, some of which are of excellent quality, but—

● (1820)

[*English*]

The Chair: I'm sorry for interrupting. Time is up. Maybe you will get another opportunity for questions in the next round.

We'll now start our second round, with Mr. Holman for five minutes.

Please go ahead.

Kurt Holman: Thank you, Madam Chair, and thank you to all the witnesses who have joined us tonight.

Recent AMR stats in Canada can be compared only against 2018 stats referenced by the pan-Canadian action plan on AMR. The current stats referenced are very outdated.

My question is for Dr. Skinner.

Do you feel, since 2018, with regard to Canada and AMR, that it is getting worse, or is it stable? How bad is it in Canada?

Dr. Henry Skinner: I think that's a question that really demands data, and, to your point, with data from 2018, it is very difficult to understand what that means today, seven years later.

I can tell you that around the rest of the world, based on reports that are recently out, including one from the WHO this month, AMR has become significantly worse over the past seven years. We know that, during COVID, AMR got worse in the United States. It's hard to believe that it didn't get worse every place else.

It is a growing problem. A genie out of the bottle is very difficult to get control of, even with all the tools we have. We need to dedicate more work to that holistically, in everything from infection prevention to proper diagnostics, antibiotic stewardship and delivering the right antibiotic to the patient at the right time.

Kurt Holman: I have some follow-up questions, sir.

Outside of the United States, what countries suffer the most from AMR, what countries suffer the least, and what is the regional spread of AMR across Canada?

Dr. Henry Skinner: The answer to your last question is also very challenging. That demands surveillance across the geographies, and surveillance is more easily done in urban centres and tertiary hospitals than it is in rural communities. That's true in Canada, that's true in the United States, and that's true around the world.

The global burden of AMR is highest in many of the low- and middle-income countries. India reports a very high burden. Parts of Africa and Southeast Asia have extremely high burdens, and they are growing. We know that eastern Europe has high burdens relative to western Europe. We know that the Nordic countries do extremely well with respect to antimicrobial resistance due to a number of policies they have, including understanding who enters the hospital carrying a drug-resistant microbe and being very active in containment of those patients and the like.

It varies widely across the world. It varies substantially within jurisdictions, between rural and urban settings and between cities.

Kurt Holman: As the leader of the AMR Action Fund, how do you feel about the state of AMR research, innovation and commercialization in Canada?

Dr. Henry Skinner: There is first-class research in Canada, and we've known that for a long time. I've worked in the biotech and pharmaceutical industry and been investing for many decades; I have invested in Canada.

I think the challenge in the AMR space specifically is that the market is broken, so investors are lacking. Trying to take innovation coming out of academia, advancing that, translating that into drugs and bringing those to patients is really the critical shortfall. Good ideas are just not financeable when investors won't invest, and that's the current state of affairs. That's why we need the pull incentives we've been talking about to make sure that there is a financial incentive in Canada and around the world to bring investors back into the field to ensure that innovation can advance and that we can have the new drugs that patients need desperately.

Kurt Holman: Is Canada reliant on foreign countries to manufacture cures?

Dr. Henry Skinner: I think the short answer is yes, and I think that is true for the U.S. as well.

Innovation has been moving to other jurisdictions, where it exists at all. China is becoming ever more active in research and development in antimicrobials as well as the manufacture of drugs. That is the challenge we see with some frequency in shortages around the world for antibiotics, due to a number of factors. It could be a storm that damages a factory in the U.S., Europe or Canada, and that may be one of two factories that produce this drug for the world. If we damage one, the supply chain is fractured, and it can take months or years to rebuild that.

We've seen that with shortages, and I think we see that with branded pharmaceuticals as well, particularly in the anti-infective space.

● (1825)

Kurt Holman: Do Canadians have access to enough cures and antibiotics? How does Canada's access compare to the AMR cures and—

The Chair: I'm sorry, but your time is up. Thank you.

We will now proceed to MP Noormohamed.

Please go ahead. You have five minutes.

Taleeb Noormohamed (Vancouver Granville, Lib.): Thank you, Madam Chair, and thank you to the witnesses for being here.

Let me start with Dr. Nguyen.

You struck me with what you said. This is for all of you, but I would like to lead off with you, Dr. Nguyen, in terms of the solutions that we need to be thinking about and the way in which we need to be thinking about this problem.

If there are concrete, specific things you think we should be doing differently or that Canada should be doing, what would those be? Maybe you could give us your top one or two, so we can take those back.

Dr. Dao Nguyen: In terms of the solutions, first I would like to emphasize that it has to be a holistic and multipronged approach, including stewardship, better access to antibiotics, diagnostics and better surveillance.

What I wanted to highlight was that throughout all of those major interventions, there needs to be innovation. Just better using the tools that we have today wouldn't be enough. From that point of view, we need to have better innovation to show that the surveillance can be rapid and in real time, and to have diagnostics that do not take three to five days—rapid diagnostics. It's the innovation we need to invest in so that these multipronged interventions can work.

I do not think there is a single silver-bullet answer to that, so if one were to have one intervention, it would be to increase the resources so that we are able to implement these multipronged interventions.

Taleeb Noormohamed: You enumerated other countries and other regions where things are being done or where there is an opportunity to collaborate. Who would you say is our best comparator? Which country would you say is the gold standard in how to address AMR? Are there lessons we should be taking away from that?

Through these conversations, we're hearing a lot of interesting recommendations. We've heard that Canada is last in certain areas and leading in certain areas. That is core. I think our job and our objective is really to figure out how we take what others are doing and what we've learned to figure out exactly how we end up leading on this. If there are gold-standard countries or best practices that you think we're missing in Canada, I would love your thoughts on that.

Then I'm also going to go to a couple of the others with the same question.

Dr. Dao Nguyen: An example we could perhaps find inspiration in is probably Scandinavia. There are many parallels between Canada and Scandinavia, like universal health care, a relatively modest population-to-geography ratio, and the ability to integrate different sectors, whether we view it from the one health perspective sectors of human, environmental and animal or as sectors where academia and the public and private sectors have been able to work together.

Perhaps it's not at the avant garde, but it certainly has been a strong proponent in advocating for the role of the countries and the importance of AMR within their policy.

Taleeb Noormohamed: I'm going to go to Dr. Skinner next with that question, but before I do, Dr. Nguyen, do you think the complexity that we see in Canada versus the Scandinavian approaches to some of this is because there are 13 different jurisdictions that are trying to also play their own individual roles in the management of AMR? If so, how would you think about this in the context of the federated system that we have, such that we can alleviate some of those issues and risks without, of course, the federal government saying, “We're taking over health care,” which, of course, nobody wants us to do. I'm just thinking about how that would work.

● (1830)

Dr. Dao Nguyen: Absolutely. I think that our federate structure is the core of the incredible complexity that we're dealing with in the separation of health care versus animal health or drug approval, etc.

I do not know that I have a solution, but as food for thought, in 2021 there was a report chaired by Dr. Wright and Dr. Andrew Morris about the idea of what the AMR network might look like. One of the proposals was to have this hub-and-spoke network structure in which there is leadership both at the provincial level and across provinces, and each province with its own leadership would come together under a larger umbrella of leadership.

This is a complex structure but something that is really worth thinking about.

The Chair: The time is up for MP Noormohamed.

We will now go to MP Blanchette-Joncas.

Go ahead. You have two and a half minutes.

[*Translation*]

Maxime Blanchette-Joncas: Thank you, Madam Chair.

Ms. de Lagarde, you studied antibiotic use and antimicrobial resistance in dairy herds in Quebec. Quebec's a leader in this field with its 2022-25 interdepartmental action plan on AMR, which extends an initial plan adopted in 2017. The goal is to apply the One Health approach by integrating human health, animal health and environmental health.

In this context, to what extent could the importation of animal products, whether dairy or poultry, from countries with different standards from ours compromise Quebec's efforts to combat AMR?

Maud de Lagarde (Assistant Professor, Faculty of Veterinary Medicine, Université de Montréal, Deans Council - Agriculture, Food and Veterinary Medicine): That's an excellent question.

It's difficult to answer it because we don't import a huge number of products yet. We'd need to compare the different products to find out which resistance genes they contain. This would need to be done prospectively.

We don't have enough data to answer this question yet.

Maxime Blanchette-Joncas: In your opinion, if Canada were to defend a supply management system that promotes local products and better regulates the use of antibiotics, would that also be a way to protect public health?

Maud de Lagarde: Regulating the use of antibiotics in animals will ultimately help public health.

Even though the link between the use of antibiotics to treat farm animals and antibiotic resistance in humans is relatively weak, and only a small portion of human antibiotic resistance is due to the use of antibiotics to treat animals, this small portion could still be targeted by this type of measure.

Maxime Blanchette-Joncas: Thank you very much.

[*English*]

The Chair: Thank you.

Now we will end the panel with two minutes for MP Mahal and two minutes for MP McKelvie.

MP Mahal.

Jagsharan Singh Mahal: Thank you, Madam Chair. I would address my question to Dr. Nguyen.

You just mentioned during your testimony that AMR is as critical as HIV and other life-threatening diseases. I think that also resonates with the concern that Dr. Bettina Hamelin raised the other day when she was saying that AMR is a present threat. It's not something we can leave to the future.

My question for you is this: How satisfied are you with the current funding that is available for AMR research in Canada when it comes to the development of medicine and its availability and marketability to Canada and Canadians?

Dr. Dao Nguyen: I think it is grossly insufficient. Just as a point of comparison, since we're talking about HIV, currently in 2025, where the HIV epidemic is, we are at $43 million per year for research in HIV and hepatitis, whereas for AMR, since 2021, there has been $28 million plus $6 million over five years. It is almost multiple orders of magnitude.

The resources are grossly insufficient.

● (1835)

Jagsharan Singh Mahal: We understand that when we talk about drawing a comparison between a single jurisdiction and multiple jurisdictions.... From your practical experience, do you see an actual cause, or is it just simply explained by the situation or the lack of will, as you mentioned in your previous statement? It's not about the research and talent that we have at the lab level but a lack of political will and a lack of leadership.

Which one is it?

Dr. Dao Nguyen: Are you talking about—

The Chair: The time is up for MP Mahal, so if you can respond to this in writing, that would be really great. It will be circulated to all the members.

We will now end this panel with MP McKelvie for two minutes. Please go ahead.

Jennifer McKelvie: Thank you, Madam Chair.

My question is for Dr. de Lagarde.

I know that you study antimicrobial-resistant E. coli in animals. I was just wondering if you could speak to the interface with the environment, environmental reservoirs and waste water.

Our colleague mentioned climate change and changing environments and how those might have an impact. Do we need to do more research in that regard?

I point that out because I realize that we're these nice, warm, nutrient-rich bodies, and typically these organisms have not liked our Canadian environment. How does that interface with international travel in other environments as well?

[*Translation*]

Maud de Lagarde: We definitely need to do more research on the role of the environment in the spread of resistance genes. E. coli is truly a good sentinel bacterium. It's everywhere, in humans, animals and the environment.

We have very little data on the role of the environment and the impact of new climatic events attributable to global warming on the spread of genes within microbial populations, either within or outside hosts. We really need to do a lot more research at this point.

Environmental aspects should indeed be added to surveillance programs. Currently, environmental samples aren't being studied, either in Canada or in most surveillance programs around the world.

[*English*]

The Chair: Thank you.

With that, I want to thank the witnesses for appearing before the committee today. If there is anything you want to bring to the committee's attention, you can always send it to us in writing. We always incorporate that, and it will be distributed to the members.

Thank you once again to the witnesses. If you want to leave, you can leave. I have to make some announcements for the members for the upcoming meetings. I will take two minutes.

Our next meetings will be on Monday, October 27, and then on Wednesday, October 29. We will commence and continue our study on how best to promote and grow private sector investment in research and development in Canada.

I want to thank all those members who have submitted their partial list of witnesses. I want to remind members that the committee adopted a motion to receive the full list of the witnesses by tomorrow, that is, Thursday, October 23.

I want to let everyone know that we are in touch with the chief science adviser to schedule her, but currently she is out of the country. She is in Paris, and then she is going to Japan. We are in communication and are trying to schedule it for as early as possible. I will update you once I have some more news.

The last thing I wanted to bring to everyone's attention is that the documents received by the committee for the criteria study have been sent to the translation bureau. A very early assessment estimates that it could take them no less than six months. They will come back to the clerk with a more precise time frame as soon as they can.

Those are the updates I wanted to bring to your attention.

Is it the will of the committee to adjourn the meeting?

Some hon. members: Agreed.

The Chair: Okay. The meeting is adjourned.