HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Health

HESA • NUMBER 079 • 1st SESSION • 42nd PARLIAMENT

EVIDENCE

Tuesday, November 21, 2017

Chair

Mr. Bill Casey

Standing Committee on Health

Tuesday, November 21, 2017

● (1535)

[*English*]

The Chair (Mr. Bill Casey (Cumberland—Colchester, Lib.)): Ladies and gentlemen, I'll call the meeting to order.

Welcome to meeting number 79 of the Standing Committee on Health. This is our fourth meeting on antimicrobial resistance.

We welcome our witnesses today. We have, from the Alliance for the Prudent Use of Antibiotics, Jane Kramer by video conference from Boston, Massachusetts. From the TB Alliance, we have Willo Brock, senior vice-president, external affairs, by video conference. From the World Bank Group, we have Dr. Timothy Evans, senior director, health, nutrition, and population. As an individual, we have Gerard D. Wright, professor, department of biochemistry and biomedical sciences at McMaster University.

Welcome, all.

We're going to offer each of you the opportunity to make a maximum 10-minute statement, an opening statement, and then we'll go to questions from the panel.

Ms. Kramer, you can start off for 10 minutes.

Ms. Jane A. Kramer (Director, Alliance for the Prudent Use of Antibiotics): Thank you, Mr. Chair.

It's an honour to address the committee today. I want to compliment the staff and thank the clerk for his graciousness.

Let me start by taking a moment to explain what our organization is about. We were founded in 1981. We are the pioneering organization that first identified antibiotic resistance as a problem and the crisis that I think is broadly recognized today. We were founded as an education and advocacy group that is global in scope. Our mission is to recognize that there should be...to develop new medicines and new rapid diagnostics to detect microbes in the environment.

Let me launch into what the perspectives are internationally. There's an excellent template at the WHO website with a step-by-step guide for developing a national action plan. I won't go through it in any detail, but I commend it to you. All its elements represent our perspectives, which are stewardship, collaboration, the need to develop and innovate new medicines, and diagnostics. But it doesn't address animal food production, nor does it address the secret ingredient that is key to a nation's success in this area, which I will address towards the end of my quick talk here.

Antibiotic stewardship is a systematic effort to educate and persuade prescribers about antimicrobials and follow evidence-based prescribing in order to stem antibiotic overuse and thus antimicrobial resistance. We need to continue developing mechanisms for international communication that may signify new resistance trends with global and animal health implications, which is why our group has established chapters around the world. We've long had those chapters around the world, and they facilitate communications on a regional basis to identify trends in resistance.

Towards the essential goal of encouraging development of new medicines and rapid diagnostics consistent with and as enunciated in the U.S. national action plan, there is the CARB-X global partnership. This is a public-private partnership aimed at funding innovation. CARB-X stands for combatting antibiotic-resistant bacteria biopharmaceutical accelerator. This is a plan for $250 million over five years.

The group is comprised of the Wellcome Trust, the AMR Centre, Boston University law school, the Allergy and Infectious Disease Centre at the NIH, the Broad Institute, and also BARDA, which you may know. They have already amassed a handsome portfolio of early-stage pharmaceutical and biotech companies in just a couple of years of existence.

I want to move on to food and animal production. As you may know, antibiotics for growth promotion in poultry is declining in the U.S. and in Europe to a degree, but the BRIC countries are expected to boost consumption with their burgeoning middle class and their preference for meat in their diets.

● (1540)

Antibiotics-free meat is a result here in the U.S. of consumer demand, but what happens abroad affects all of us. This is a tragedy of the commons. It is a little frightening to think about that. As much as antibiotic use in poultry production is declining here, it's being boosted abroad.

Let me conclude by noting, and this might not sound altogether..., but Portugal was able to achieve near-universal elimination of hepatitis C. The secret ingredient that I mentioned before is something that Canada has. In thinking about the paradox of AMR, antimicrobial resistance, I am reminded that Canada is a leader in social responsibility with its diversity, its intellectual depth, its resources, its scale, and its progressive national health system.

Canada can be the world's model for managing the complex interplay and causes that would otherwise disrupt biodiversity. I think Canada is uniquely positioned to really solve, to stem, antibiotic resistance.

I look forward to your questions. Thank you.

The Chair: Thank you very much.

Now we go to Mr. Brock, from New York.

Mr. Willo Brock (Senior Vice-President, External Affairs, TB Alliance): Good afternoon, members of the committee. Thank you for the invitation to speak about antimicrobial resistance and its link to TB, tuberculosis. I'd like to begin with a short summary of that issue globally.

TB is the only major drug-resistant infection in existence that is transmitted through the air. All you need to do to contract it is to breathe. TB was declared a national and global health emergency in 1993. Since then, we've had 50 million people die from that disease. Another 28 million will die within 15 years, which is the time frame set globally for its elimination by the sustainable development target. At the current rate of progress, however, it will take 10 times as long to to get to that point of elimination.

The economic and human toll along the way for eradicating TB and the antimicrobial resistance that exists within TB is devastating, so the first lesson I want to convey is that the price of inaction in AMR is enormous.

In infectious diseases, TB is the leading killer in the world, with 1.7 million people dying from it in 2016. Of that number, and relevant for our discussion, are the 240,000 people who died from drug-resistant TB. The worrying fact in TB is also that the majority of new drug-resistant cases are now caused by primary infection, meaning that drug-resistant patients are directly infecting new patients. As a conclusion, I note that TB is responsible for almost one-third of the deaths globally that are caused by antimicrobial resistance.

New diagnostic tools and testing strategies are necessary and essential to find and treat the millions of cases of people with TB. The WHO estimates currently that nearly 40% of TB patients and 75% of all drug-resistant TB cases go undetected and never get diagnosed properly and put on treatment. Presumptive diagnosis is used rather than confirmed testing for TB, and the inappropriate use of drugs that evolves from that has increased drug-resistant strains of the disease, so another lesson to learn in the AMR debate is that testing and treating go hand in hand.

Treatment of TB with antibiotics is very complicated, unlike many other infections. It takes six months to nine months, with a regimen of at least four different drugs—four different antibiotics—that need to be adjusted based on body weight. Treatment is not always compatible with HIV antiretrovirals, which is a serious problem given that TB is the largest killer of people living with HIV. Treatment for multidrug-resistant TB requires almost 14,000 pills and 240 injections. Even then, the WHO reports only a 50% treatment success globally. Due to this complexity, treatment for the most drug-resistant patients can cost up to $1 million in a place like Canada.

In addition to the devastating effects on people in their most productive years, TB jeopardizes economic and social development. An analysis released last week and done by KPMG estimates that in 15 years' time, during the period of 2000 to 2015, TB-related mortality caused the loss of $616 billion for the global economy. If action is not taken, future TB-related mortality may lead to a further loss of almost a trillion dollars. Again, the cost of inaction is massive.

Also, no country is exempt. Forecasts indicate that the greatest human toll from TB will actually be in low- to middle-income countries in southeast Asia and Africa; however, the G20 countries will be the ones most affected economically, bearing almost two-thirds of the economic devastation of this disease. It's estimated that by 2050 drug-resistant TB may cause a lost economic output of almost $10 trillion inside the G20, and another $6 trillion outside the G20.

The latest WHO reports from 2016 show clearly that progress is too slow to reach our goals of eradication, but with a strengthened global commitment to research and development, I believe we can find new and highly innovative TB diagnostics and drugs that can bring the most devastating disease in history to an end. For exactly that reason, developing new drugs and regimens that can cure all forms of TB is why the TB Alliance, where I work, was established in the year 2000.

I would like to take a minute to update you on the progress we have made in that global fight since 2000, and what we can accomplish together in the next five to 10 years or so.

At TB Alliance, we now coordinate, as a public-private partnership, the largest pipeline of drugs, containing everything from early-stage candidates to treatments ready for registration in the next five years. We are actually on the doorstep of a major breakthrough in treating all forms of TB, including all drug-resistant forms. When we get sufficient investments, we can introduce for every person with TB an effective treatment that takes no more than six months, even to treat the most resistant forms of the disease, without the side effects, mortality, and failure that we currently see in treatment.

● (1545)

We've also made significant progress in highlighting the path that over the next 10 years will allow us to treat all patients, however they are currently diagnosed with resistance, in three months or less with the same once-a-day, all oral, highly effective, safe, and affordable TB treatment.

This means we can eradicate drug-resistant TB in the next 10 years. Science is not holding us back, but a lack of funding and political will is. The current glacial pace of TB research funding is well-documented and is costing both lives and livelihoods.

To succeed, I think we can learn a number of lessons in antimicrobial resistance in the wider sense because we've been fighting TB for such a long time.

First of all, I want to mention as a conclusion that we cannot address antimicrobial resistance without dealing with TB. The global response to AMR is fundamentally incomplete if it neglects TB.

We also need global coordinated and pooled investments into research. Product development is expensive and can best be done globally and in a coordinated manner to share risk and broaden transparency. It requires a global action plan and investment, whereas many national R and D plans and grants are strictly linked to national R and D capacity and economic interests.

Despite recognizing TB as the cornerstone of the global fight against AMR, it has often been excluded from health funding programs, for instance the new CARB-X program that my previous colleague talked about. However, I would like to call out JPI-AMR, which is a funding scheme for early research in antimicrobial resistance where Canada participates as a funder and that has announced for the first time in 2018, it will include TB in its portfolio of potential diseases it will allow funding to go to. I want to recognize that, and mention that TB needs to be included in all such AMR programs in the future.

Another point I would like to stress is that academic research is obviously very important, but it is not the same as product development. Many governments believe that their significant investment in academic research and early discovery will be translated into products by effectively using the pharmaceutical industry. However, TB is a poverty-related disease and doesn't have a market. In antimicrobial resistance, one of the things we want to do is use the antibiotics we have as little as possible. That's in effect exactly against what a pharmaceutical company would look for in a market, and therefore, there's very little interest from industry to go into this market space.

In addition to direct benefits to patients, we need to invest in tomorrow's cure as the ethical imperative. In dealing with TB and AMR, it's vital to provide universal health coverage and boost economic prosperity. New technologies will not only save millions of lives but also boost economic prosperity. It will lead to dramatically lower costs for health care systems, given the price we currently pay for dealing with drug-resistant TB. It will drastically reduce the burden on our overworked health care providers and free up resources for overstretched government budgets.

I would like to end by indicating the critical role Canada has in having, fulfilling, and realizing G7 and G20 commitments that were made this year, in 2017, specifically to support increased investments in research and product development. Canada will host the G7 in 2018 and should be building on prior commitments and acting to make research and product development an integral part of the search for solutions in AMR. This should include supporting new or enlarged mechanisms for the development of new drugs, diagnostics, and vaccines working against TB. The recommendations in the recent OECD report on “Tackling Antimicrobial Resistance: Ensuring Sustainable R&D” should serve as a guideline. The report suggests that to improve the R and D pipeline and bring four new antibiotics to the market over the next 10 years, we need an additional globally pooled fund of $500 million U.S. per year, and TB should be included in such a plan.

In conclusion, I would like to share my belief that the major limiting factor to a world without TB is a stronger commitment from the global community, including all of you. Without sufficient investment, we will fall short in our combined efforts to once and for all eradicate TB.

I would like to thank you and the committee for providing this opportunity for dialogue, and obviously I would be open to any questions you may have.

● (1550)

The Chair: Thank you very much.

Now we go to the World Bank Group, Dr. Timothy Evans, for 10 minutes.

Dr. Timothy G. Evans (Senior Director, Health, Nutrition and Population Global Practice, World Bank Group): Thank you very much.

Thanks for the opportunity to appear before the committee on this issue and to provide an international perspective.

As a Canadian who grew up on a farm, did a graduate degree in agricultural economics, practised medicine, and has spent the last two decades working in global health on the frontiers of west Africa and south Asia as well as with multilaterals such as the World Health Organization and the World Bank, I will say it is a great privilege and honour to be allowed back into Canada to share some perspectives on this issue.

It goes without saying, but I'm going to say it nonetheless, that antimicrobials represent one of the greatest marvels of modern medicine. In less than a century, billions globally have benefited from antimicrobials, and hundreds of millions of lives have been saved. The benefits, however, have been far from equitably distributed, and far too many people, especially in poorer countries and communities, remain without access to these invaluable life-saving commodities. The magnitude of this shortfall is non-trivial. Many of the deaths of over two million children due to pneumonia and diarrhea every year could be prevented if health systems were able to provide timely access to good-quality, low-cost antimicrobials.

The access deficit we're all concerned about in making sure people have access to life-saving medicines is actually being accelerated by antimicrobial resistance. We just heard about the case of tuberculosis, which is really the *cause célèbre* in terms of the driver of AMR globally. But in the context of concerns about AMR, the World Bank, with support from the Public Health Agency of Canada and from other governments, undertook a study on the economic costs and impact of AMR, entitled "Drug-Resistant Infections: A Threat to Our Economic Future", which we published in March 2017.

This report simulated the costs of AMR to the global economy using scenarios, and in the optimistic case of low impact, AMR by 2050 would amount to a reduction of 1.1% of global GDP. By 2030 this would shave about $1 trillion off global GDP annually. In the high-impact scenario, the reduction of global GDP in 2050 would be 3.8% with an annual shortfall of $3.4 trillion in global GDP as of 2030.

To put this in perspective, at their worst, the costs could be as great as the losses incurred during the 2008-09 financial crisis. However, the AMR impact is much worse for two reasons: one, the GDP loss would be expected not once but annually over the 20-year period 2030-50, and, two, it would disproportionately affect lower-income economies.

A critical dimension of the cost relates to international trade, especially with respect to livestock and livestock products, with reductions of as much as 11% projected in low-income countries. Along with that, we would anticipate costs of health care to rise—from taking care of much more complicated patients—by as much as 25% in low-income countries.

If we look at the aggregate impact against the World Bank's primary goal of eliminating extreme poverty, in the high-impact scenario, 28 million people would be impoverished by AMR by 2050, the large majority of whom live in low-income countries.

AMR is not just a health care issue; it is a development issue, which if unaddressed threatens to derail economies and the achievement of our most fundamental development goal at the World Bank, which is to eliminate extreme poverty.

The report not only spelled a picture of doom and gloom in terms of the costs of inaction but also looked at why investing in AMR makes good sense. We used two standard metrics to assess interventions. One is the net present value. We found that between $10 trillion and $26 trillion of benefits could be realized with a $0.2 trillion investment globally over the period 2017-50. When we look at the other investment criterion—expected economic rate of return—that would be somewhere between 31% and 88% depending on how effective the interventions were on an annual investment of $9 billion. It's a very good EER or expected economic rate of return.

● (1555)

If the benefits of action make good health and economic sense, what's the way forward? Recognizing the growing political consensus to tackle AMR, let me just touch on a few areas where the World Bank is actively engaged.

In the area of health, we are actively promoting an agenda of universal health coverage, together with the WHO. There are three reasons why this is good for AMR.

The first reason is universal immunization. If all children in the world had access to pneumococcal conjugate vaccine, not only would this save millions of lives, but this would be an incredibly cost-effective investment to stem antibiotic resistance to pneumococcal infection. The World Bank, as a co-founder of Gavi, the Vaccine Alliance, to which the Government of Canada is a major contributor, introduced an advanced market commitment in 2008 as an incentive to vaccine manufacturers to produce pneumococcal conjugate vaccine in sufficient quantities with a guaranteed price. The impact of the AMC has been to accelerate introduction of PCV in low-income countries. However, we're still well short of 100% coverage.

The second reason is to look at how we finance health systems. Universal health coverage means moving from systems of health financing, where patients pay for care when they're ill, to systems that prepay and pool resources through insurance or tax. There are lots of reasons why this makes sense as an equitable and efficient way of financing health systems, but it also makes good sense for antimicrobial resistance.

In pay-as-you-go financing systems, antimicrobial resistance rates are much higher and in pooling systems, they're much lower when you compare across countries. We're looking at ways in which we can accelerate the move toward prepayment systems for universal health coverage, in particular, working through our global financing facility for "Every Woman Every Child", which is also an initiative supported by the Government of Canada, which aims to transform financing of health systems in low-income countries.

The third reason is to make sure that we secure essential public health capacity everywhere. The Ebola crisis in west Africa in 2014, like SARS in 2003, alerted the world to the dangers of turning a blind eye to the systems necessary to keep the public's health safe. Chief among these essential capacities are laboratories for disease surveillance. We've found that regional networks of laboratories in Africa provide particularly cost-effective ways of building AMR surveillance.

Two weeks ago, I was in Uganda and saw a reference laboratory for tuberculosis that was receiving sputum samples from as far away as Liberia and Somalia. They were doing highly sophisticated drug-susceptibility testing to monitor TB resistance in these countries. The scale efficiencies in establishing networks of core public health capacities are a designated focus of IDA. IDA is the World Bank Group's fund for the poorest countries, to which the government of Canada is a major contributor.

Beyond health, we're also investing through our agricultural global practice and recognizing the ubiquitous use of antibiotics as growth promoters for livestock and aquaculture. Building on the One Health principles, we've adopted a three-pronged strategy in agriculture: mitigate to reduce use, adapt to reduce the need, and innovate to optimize the use. We're encouraged by recent evidence that restricting the use of antibiotics in food-producing animals is associated with a reduction in AMR. Similarly, we are inspired by the innovative use of vaccines for salmon that has decreased dependence on antimicrobial use in the Norwegian salmon farm industry.

However, given the complex realities of livestock and aquaculture systems in low-income countries, we believe that more basic information and innovation are required. In that regard, we're working very closely with IDRC, the International Development Research Centre, to pioneer an interdisciplinary research agenda that could generate a much better understanding of current patterns and trends on AMR use in livestock production and stimulate innovation towards lower- or no-use antimicrobial systems in low-income countries.

● (1600)

With that, I would like to close and thank the Government of Canada for the opportunity to provide this perspective. I congratulate the committee for considering how to accelerate more concerted action on AMR, both at home and abroad.

Thank you.

The Chair: Thank you. I appreciate your stopwatch.

Now we go to Dr. Wright.

My notes here say that when you are not doing research at Harvard or McMaster, you are a drummer in a rock band, so we're looking forward to your presentation.

Professor Gerard D. Wright (Professor, Department of Biochemistry and Biomedical Sciences, McMaster University, As an Individual): Thank you. At the end, I can do a little presentation for you.

The Chair: Thank you very much.

You have 10 minutes.

Prof. Gerard D. Wright: Thank you very much, Mr. Chairman, and thank you for the invitation to come and speak here today.

For some background, I am not just a drummer in a rock band. I am the director of the Michael G. DeGroote Institute for Infectious Disease Research at McMaster University, where we are bringing together a multidisciplinary team of over 30 clinicians, microbiologists, chemists, biochemists, and mathematicians, and over 200 young people training in this area as undergraduates, graduates, and post-doctoral fellows. Our objective here is to change the challenges you've just heard about so eloquently from the other presenters.

I've been working in this field for 27 years. I started as a post-doctoral fellow at Harvard Medical School, working on vancomycin resistance when it first emerged in the Boston area, and I was involved in the team that actually figured out the biochemical mechanism of this. Before that, vancomycin was known as an “irresistible antibiotic”. That is, we thought there was no way bacteria could become resistant to it. It turns out, of course, that this is false. It is false for all antibiotics. All antibiotics are susceptible to resistance. There is no such thing as an irresistible antibiotic.

Since I came back to Canada, my team and I have published over 250 publications in this area. We are working incredibly hard to solve this problem. We have also discovered a brand new compound from a soil sample in New Brunswick that actually inhibits resistance to carbapenems, and this is now in preclinical development. We are trying to do the whole gamut, at McMaster.

Antibiotics have really changed the way we die. Prior to the antibiotic era, almost half of us would die of an infectious disease. Now only 3% to 4% of us do. This is a remarkable achievement.

Antibiotics are also very special molecules in a different way. An analogy that is often used is that antibiotics are like fire extinguishers. Fire extinguishers are great for putting out fires, and that's what we use antibiotics for when we have an acute infection. However, fire extinguishers are also great just in case you have a fire. Antibiotics are there to enable us to do all sorts of incredibly risky procedures in medicine that, prior to the discovery of antibiotics, we simply couldn't do. We couldn't ablate someone's immune system to treat their cancer, safely transplant a heart, put in a new hip, or take care of preterm infants without infection control—in particular, the acute infection control given to us by antibiotics.

The other thing that's special about antibiotics is that they are unique among drugs. They are susceptible to evolution. You will never evolve resistance to your blood pressure medicine, your birth control pills, or your cholesterol-lowering agents, but bacteria will always evolve resistance to antibiotics. It's just part of the world of biology. We have discovered, in my lab, that antibiotic reaches deep back in time. We have identified resistance elements in Yukon permafrost. This has been around for a long time, and there is no way we can actually solve this problem completely. This is something we have to continue to fight on a regular basis.

This is where the crisis comes from. The drugs we have relied on, which were discovered mostly in the 1950s and 1960s, are no longer working.

I have some personal experience with this. I actually got a blood infection caused by a salmonella that was resistant to ciprofloxacin, which was the first drug I was put on when it was revealed that I had this thing. I know first-hand what it's like to have an antibiotic fail. I also know first-hand what it's like to have an antibiotic in an IV bottle that actually works, and the difference that 24 hours will make when you have this situation is stunning.

We, in Canada, have to address this crisis with the intensity it deserves.

You've heard all these predictions of the economic impact in the future, the current economic impact, and the impact it has on lives, but let me tell you a story right now. In our hospital at McMaster University, one of our clinicians, whom I was talking to yesterday, is dealing with a patient who has multidrug-resistant pseudomonal isolates in the lungs and also recently got a multidrug-resistant klebsiella infection. The chances are this person is going to die. They are going to die because we have drugs that no longer work. They wouldn't have before, but the resistance is causing this problem.

● (1605)

So what are we going to do? The reality is that the pharmaceutical companies, as you've heard before, cannot be relied on to solve this problem. We're going to have to solve this problem ourselves.

The AMR framework that was released by Health Canada is a great road map. It emphasizes stewardship, surveillance, and innovation in discovery. I want to speak in particular to the innovation in discovery element. Just to calibrate, in Europe the effort to stimulate antibiotic discovery is being resourced by the innovative medicines initiative to the tune of 700 million euros. We heard about CARB-X, and that approach is $500 million U.S. Canada is nowhere to be found on this scale yet. We have to do something about it.

To deal with this, my colleague, Bob Hancock, who is at the University of British Columbia, and I have collected researchers and academics in small and medium-sized companies across Canada in governments and not-for-profits working in this area in Canada. We call this network the Canadian anti-microbial innovation network. What we're seeking to do is raise awareness to this problem and also provide an opportunity for investment in what we are good at in Canada.

One of the things that was discovered in Canada is a compound called tazobactam. It is an inhibitor of drug resistance. It was discovered at the University of Alberta in the 1980s. Tazobactam is given to patients all around the world. It was created here in Canada, and I bet you have never heard of it.

We need to do more of this. We're good at inhibiting resistance. We're good at finding alternatives to antibiotics. We're great at finding new vaccines and in using modern genomics to solve this problem, in particular in surveillance.

At McMaster, we've created the comprehensive antibiotic-resistance database that is used every day by researchers and clinicians around the world. It is the most accessed antibiotic-resistance database in the world, and it has no funding.

The other thing I want to leave you with is that we have to continue to invest in this area, and Canada has to take its place on the world stage in this area. We have the ability to make a significant contribution in this area. We have the talent. We have the young people who want to make a difference in this area. We have the infrastructure that has been the legacy of things such as the Canada Foundation for Innovation. We are all set to go.

Just as Churchill said to the United States government back in the early 1940s, give us the tools. Give us the tools and we will do great things.

I'll finish there. Thank you.

● (1610)

The Chair: Thank you very much.

Now we'll go to our seven-minute round of questions. Some will be in English and some in French. We have translation facilities if you require them.

We're going to start with Dr. Eyolfson, for seven minutes.

Mr. Doug Eyolfson (Charleswood—St. James—Assiniboia—Headingley, Lib.): Thank you, Mr. Chair. Thank you all for coming. It's very interesting.

I worked in emergency departments for almost 20 years as an ER doctor. I'm familiar with much of what you're saying and have seen this wave coming for a number of years.

Dr. Kramer, you mentioned early on in your presentation that certain countries are still using antibiotics. I didn't catch the word you used before “countries”.

Ms. Jane A. Kramer: I said BRIC countries: Brazil, Russia, India, and China.

Mr. Doug Eyolfson: Thank you very much.

Do you know if in North America we're importing significant amounts of meat from these countries?

Ms. Jane A. Kramer: It's not terribly significant, no.

Mr. Doug Eyolfson: Thank you.

To your knowledge, are the antibiotics that are used in humans being used other than for illnesses in agriculture right now in North America?

Ms. Jane A. Kramer: It's probably 25% of the grand proportion.

Mr. Doug Eyolfson: That's interesting, because we've heard from others, particularly in the agricultural industry, who are saying something to the effect that no antibiotics that are important in human biology are being used in agriculture in North America.

I had a little trouble with that statement, but you're confirming something that I thought was the case.

Ms. Jane A. Kramer: There's a larger percentage used in swine production. Certainly, it's used widely for growth promotion in swine production. There's great controversy about how the animals are grown, or produced, in close confinement. I know you had as witnesses the animal producers, as well as veterinarians; I looked at the testimony and the briefs. When they're grown in close confinement, the possibility of more disease is greater. Therefore, you need to use it to prevent disease. However, growth promotion is the greatest use. That is the reality.

Mr. Doug Eyolfson: Okay, and do you know what kinds of antibiotics are being used in North America, particularly in the swine industry?

Ms. Jane A. Kramer: No, I don't. It's just not my expertise. Sorry.

Mr. Doug Eyolfson: No problem. Again, this is my experience with human medicine. I have very little experience with veterinarian medicine, but as a general rule, we find that other than very specific, rare cases, using antibiotics prophylactically is not good medical practice.

For instance, if there's an outbreak of some bacterial illness at a day care, you generally don't give antibiotics to all the kids who are there. We know it doesn't work and creates more problems than it solves. If you have animals in close quarters, is there actually a scientific basis for preventing disease by using antibiotics in these animals?

Ms. Jane A. Kramer: We would be skeptical about that. You have a big industry in Canada for food production. You might consider convening the industry and the veterinarian community and having it out, just really discussing it. That's really what I was referring to. This is something you can put your arms around and manage. I really think it's generally manageable in your country. With Guelph, the other universities, and the industry, you could manage it productively and effectively.

It's something where you have a discussion. We would help facilitate it if you wanted, maybe with other non-profits and NGOs, just to facilitate the agenda, together with members of the committee maybe.

● (1615)

Mr. Doug Eyolfson: All right. Thank you very much.

Dr. Brock, you talked about antibiotic-resistant tuberculosis. Are you familiar with what the incidence of AMR TB is in Canada?

Mr. Willo Brock: I don't know the exact numbers. I know there's a very low percentage of cases of drug-resistant TB in Canada. There are only a handful. However, as I mentioned, given the expense and complexity of treating TB, even a couple of cases—25 cases a year—is an incredible pressure on the health care system. As I mentioned, people being in treatment for two years, being hospitalized, often needing to be brought to specialized centres and therefore being away from families and economic opportunities, is really a great burden. The number I mentioned—of an extensively drug-resistant patient possibly costing up to a million Canadian dollars for treatment—is obviously a massive issue.

In addition to the public health issue, the infectious nature of the disease makes the patient not just an issue for the health care system, but also raises concerns regarding the confinement of that patient, avoiding further outbreaks, and finding potential family members and community members who may have been infected through that patient in the time before they were diagnosed.

It's a relatively small problem, but it's already at the point where even a handful of cases becomes seriously problematic.

Mr. Doug Eyolfson: Thank you.

I believe that's my time.

The Chair: Thanks very much.

Now we go to Mr. Webber.

Mr. Len Webber (Calgary Confederation, CPC): Thank you, Mr. Chair. Thank you to the presenters for being here today.

Dr. Wright, you caught my attention with the fact that you went through a bit of an infection and took quite some time to deal with it. I have a very similar story as well with a blood infection that I had about three years ago that took two months of antibiotic use, through an IV pump on the side of my hip, to get rid of that darned infection that came from hand-shaking. Yes, it's a very dangerous career.

Prof. Gerard D. Wright: I was just going to say you're in the wrong business.

Mr. Len Webber: Did you catch your infection in a lab, researching?

Prof. Gerard D. Wright: No, I did not. I should have been clear. I got the infection through food contamination. It started as gastroenteritis, and then it ended up as a bloodstream infection. We are very careful in the lab. We've never had any issues at all.

Mr. Len Webber: One thing that my doctors were very cognizant of is the fact that they started off with a low dose, and if that didn't take care of it they'd continue to increase the dosage until they got to the super-antibiotic that they threw in me, which took care of it. But that was a two-month process. Would it not have been best to lay it all out and shoot it all into me right at the start, and eliminate it?

Prof. Gerard D. Wright: Well, you don't want to do that, necessarily, at the beginning, because all these drugs come with side effects. What you want to do, obviously, is to start with something where you have the best chances of success with the lowest number of side effects.

Your specific issue, though, is very similar to mine, in the sense that one thing we have a challenge with in treating drug-resistant infections is diagnostics. Oftentimes infections, like a bloodstream infection, show up as general symptoms as opposed to a specific bug giving you a specific infection, so a lot of treatment is empirical. As a result, you have this issue, in particular when it comes to drug resistance, trying to figure these things out.

As we move forward into the future—and we've heard this, I think, from almost all the speakers today—molecular diagnostics is the way of the future, at least in these kinds of situations. It's harder to do, obviously, in resource-poor areas, but certainly that's an area where there's tremendous opportunity for innovation and big data, and all that kind of stuff.

● (1620)

Mr. Len Webber: Interesting.

You mentioned also that you are working with other researchers around the country, the Canadian Anti-infective Innovation Network. Is it strictly Canadian research going on there? What about around the world? Are you collaborating with other researchers around the world and sharing your studies and your results?

Prof. Gerard D. Wright: Yes, of course. Science is, by nature, a collaborative effort. We have partners across the globe we work with. We have partners in Nigeria, in Europe, and in the United States that we work with. The idea of the Canadian Anti-infective Innovation Network was really to coalesce researchers and stakeholders within this area within Canada, to give us a voice, to say that this is a really significant issue and we have some great people who can help solve it.

Mr. Len Webber: Excellent.

You mentioned the AMR framework as well that was developed here by the Government of Canada, earlier in 2017. Were you engaged in that at all, putting together this framework?

Prof. Gerard D. Wright: I wasn't on any of the panels, but I was involved. I was consulted tangentially, yes.

Mr. Len Webber: Right. Does it address the critical components of AMR?

Prof. Gerard D. Wright: Absolutely. It has all the pieces; it only needs an implementation strategy.

Mr. Len Webber: Quickly to Ms. Kramer, is it Dr. Kramer or Ms. Kramer?

Ms. Jane A. Kramer: I'm not a doctor. I'm a lawyer.

Mr. Len Webber: All right, Ms. Kramer. On your website you explain that your organization works with a number of organizations in the United States, the Infectious Diseases Society of America, the American Medical Association and such, to promote U.S. public policy and legislation that will maintain incentives for pharmaceutical antibiotic development and appropriate use.

Can you describe some of the existing incentives that are out there right now for pharmaceutical antibiotic development and appropriate use in the United States?

Ms. Jane A. Kramer: Yes, sir. What I did describe was the CARB-X project in my quick talk. The other is the GAIN legislation. It's called the GAIN Act. That provides longer intellectual property and different reimbursement incentives for antibiotics. That's something to think about. It's a little bit complex. That's really primarily it, the incentives. GAIN is an acronym, and I don't remember what the acronym stands for, but I will send it to you after this session so everybody knows what it is.

That's really what it is. It's longer intellectual property and it's slightly better reimbursement. Essentially it asks for the drugs not to be used or to be used extremely judiciously so that there is stewardship of the antibiotics.

As you may know, there hasn't been a new class of antibiotics. Dr. Wright can confirm this for me, but I think there hasn't been a new class of antibiotics since the 1980s. What we need are new classes of drugs to deal with the new microbes that are out there, or the evolving microbes that are out there. That's what these incentives are designed to do. We want to encourage drug makers and biotech firms to keep attempting to innovate.

I'm well aware that because of your health system, which I strongly support, there is a great need to limit reimbursement of medicines in Canada. It's something that may be somewhat in conflict with your system, but it is really something that you need to consider and you need to look at. You really do need to think about it. It's a balance you need to strike.

● (1625)

Mr. Len Webber: Thank you.

The Chair: Thanks very much.

Go ahead, Mr. Davies.

Mr. Don Davies (Vancouver Kingsway, NDP): Thank you, Mr. Chair.

Thank you to all the witnesses for being with us.

Dr. Brock, I'm going to drill into tuberculosis a bit, if I can. It's my understanding that we have a problem with tuberculosis, particularly in Canada's north and among our indigenous communities. It think there's a domestic interest that I'd like to explore a bit with you.

What is the difference between multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis? How common are those two variations?

Mr. Willo Brock: First of all, like my predecessor, I'm not a doctor but an administrator at best. There's a difference between multidrug resistant and extensively drug resistant. In the current first-line treatment, if you have regular TB, you treat that with four drugs in a regimen that lasts six months and those four drugs were developed in 1976 when that regimen came together. We've been working for the last 50 years with that treatment.

If you're resistant to at least two of the first-line drugs, you're considered multidrug resistant. There's a class of mono-resistance, and what is currently being recognized by WHO is that even people who are resistant to just one of the four drugs are already significantly worse off in their treatment outcomes than patients who are resistant to at least two drugs. But if you're two drugs, you're getting into multidrug resistance and what is going to be used then is what's called second-line drugs. These are drugs that have some known activity against TB, but they are significantly worse off. As I mentioned, you need daily injections for six months. Your prior esteemed colleague talked about walking around for two months with an injection. Multidrug-resistant patients go to a clinic every day for six months to get an injection, and on top of that take five or six pills. You see behind me here on the picture a hand that is holding one day of drugs for multidrug-resistant TB.

When you then also have resistance to one of those second-line drugs, you come into the territory of extensively drug-resistant TB. That's the third layer of resistance where even the second-line drugs, our fallback drugs that are already absolutely not great and only have 50% success rate around the world in terms of treating patients, are no longer working. Then you really get a kitchen sink of any type of antibiotic that might have some degree of success, which means that you're working between normally three and five years if you're lucky enough to survive. About 30% of patients survive extensively drug-resistant TB around the world, so 70% of patients die. Those are the three levels.

How common is it? Around the world, around 9% of patients now are multidrug-resistant. As I mentioned before, the number of deaths is about 240,000 but the number of new patients every year is about 600,000, according to the World Health Organization, out of the 10 million people infected every year. Sorry, that's about 6%. Within that group, about 30,000 new infections globally are with this extensively drug-resistant TB, so these are the patients who are the worst off, who are the most infectious because we have no way to treat them and therefore they will remain infectious.

In Canada, a case of XDR would be extremely rare. I think there has been one or two cases in the last five or six years. Multidrug-resistant TB is a bit more common. There's a handful of cases every year. However, obviously with that complexity, it makes dealing with that situation extremely hard. As you mentioned, an indigenous community in the northern territories actually has a rate of TB that is very comparable to some parts of Africa.

It's only because Canada is such a big country and has such a great health care system overall that the number of patients in the indigenous communities is not recognized for the effect it has. They are actually in a fairly severe situation, and your prior colleague mentioned one of these issues as trying to actually diagnose that, diagnosing patients, and then diagnosing their resistance pattern so that we can treat them well.

● (1630)

Mr. Don Davies: I understand that there may be a link between extensively drug-resistant tuberculosis and HIV/AIDS. Why in some places is extensively drug-resistant tuberculosis linked with HIV?

Mr. Willo Brock: HIV and TB are linked anyway, irrespective of the resistance pattern behind it, because HIV suppresses your immune system. That's exactly the environment where TB thrives, so a suppressed immune system significantly increases the risk of TB. About one-third of the world's population has a latent form of TB in their body. Your normal immune system will allow you to fight that latency and possibly never have it come up. When you get HIV and your immune system goes down, the bug becomes active and you get TB.

Obviously, when you then have multidrug-resistant TB or extensively drug-resistant TB, you're fighting it harder. In cases like in Africa where there's a very large undetected pool of people living with HIV—because they are not diagnosed for HIV—because they're not put on antiretrovirals, their immune system goes down and therefore you will see that there are a lot more patients with TB. The combination of HIV and TB care needs to be very closely aligned.

Mr. Don Davies: What advice would you give the Canadian government in terms of taking effective action both domestically to help address TB, and particularly the drug-resistant forms of it, and as an international player on the world stage?

Mr. Willo Brock: I'm absolutely no expert by any stretch of the imagination on high-income countries dealing with TB, but domestically one of the things that is very obvious from what I have read is that there is an issue on equity with the northern communities, and then there is an issue of identifying those people living with TB potentially, or diagnosing those. Enhanced testing for latent TB and enhanced testing for active TB, and TB services in northern communities would be, I think, widely recognized as needed in those types of remote, underserved communities.

As one of my colleagues mentioned, Canada has a role to play globally in investing in the innovation, the R and D that is needed to get new products. We can't rely on the pharmaceutical industry. People with HIV generally are poor. This is true in Canada as it is around the world, so globally pooled investments to avoid duplication of investment in new drugs and new diagnostics is required.

Canada has played a large role in funding TB programs, TB implementation and control programs, around the world. It has always shied away from significant investments in research and product development. I would hope to call on the Canadian government to consider an investment in that area.

Mr. Don Davies: Thank you.

The Chair: I just want to clarify. What percentage, did you say, of people have TB who carry the...?

Mr. Willo Brock: Sorry, I didn't get the first part of your question.

The Chair: What percentage of people...? You said a certain percentage of people have TB.

Mr. Willo Brock: Globally, it's believed that about one-third of the population on the planet has a latent form of TB. That's obviously significantly lower in high-income countries, because if TB is controlled in a place like Canada, there will be many generations that have now grown up without TB in their environment. Their chances of being latently infected are much less, but if you're looking at places like Africa or Asia, a good one-third of the population is at risk of developing TB because they already have the bug in their body in a latent form.

The Chair: Thanks very much.

Mr. McKinnon, you have seven minutes.

Mr. Ron McKinnon (Coquitlam—Port Coquitlam, Lib.): Thank you, Chair.

I have been following this study for a number of weeks now and we've learned a lot about antimicrobials. I've learned that antimicrobial resistance has been around as long as antimicrobials have existed, or that we've known about them. We're talking about decades here. There are all kinds of organizations out there doing research, organizations doing education. I guess I'm trying to figure out where we fit into this equation. As a committee of the Parliament of Canada, we will be making recommendations to Parliament that we hope will inform health policy down the road.

Where is the best place for us? Dr. Wright, what is your first best ask for a policy recommendation from us?

● (1635)

Prof. Gerard D. Wright: I think the AMR framework that has been adopted by Health Canada is an outstanding road map to solve this problem. What has to happen is more than just a nice, shiny paper on a website. It has to actually come with action plans, in particular with resources that will actually collect the investigators working in this area from across sectors. That includes as well the fledgling private sector that is trying to help develop, for example, new drugs or new diagnostics, or technologies to help deal with this.

One of the areas that Canada has not done very well compared with other countries is helping especially small countries bridge the valley of death. The valley of death is "What do you do once you discover something and how do you actually develop it?" Drug development is very lengthy and incredibly expensive and challenging to deal with.

Other countries have developed...as I noted before, the IMI in Europe, and the CARB-X in the United States. They are, in particular, tackling this problem head-on because we used to get them from the pharma industry. The pharma industry is not going to do this for us anymore. Unless they can find a way to make as much money as a new blood pressure medicine out of an antibiotic, we're not going to see a significant amount of investment in that area. We have to help develop an ecosystem that will facilitate this.

I think the framework is an outstanding document to help do that, but what we need is innovation in all of those areas: innovation in stewardship, innovation in surveillance, and innovation in discovery.

The Chair: I think Mr. Brock would also like to make a comment.

Mr. Ron McKinnon: By all means....

Mr. Willo Brock: One thing that triggered me, hearing you, is that in TB we've done this. We have done this for 15 years. One thing you could do is ensure that Parliament is aware of the long time it needs to develop those drugs and develop those new diagnostics. Those processes, because of the way in which pharmaceutical development works, take 10 to 15 years. That's true in pharmaceutical companies. It's our experience in a product development partnership as a non-profit. I think one of the important items is not being surprised that this is taking so long but basically planning for the length of investment that is required to deal with this issue.

Mr. Ron McKinnon: Would you say that extending the IP on antibiotics in particular would be a significant contribution to solving this problem?

Mr. Willo Brock: That's an interesting discussion. My colleague from the U.S. will probably go into this. The problem with the extension of IP is that you're going to pay a lot more for this antibiotic when it's being reimbursed through your Canadian health care system. It is an incentive for sure to allow pharmaceutical companies to be more interested in that market. At the same time, if you don't rely on a private health care system, I'm not sure any analysis has been done on whether in the long run that is a good return on investment.

I think things like prizes and the grant system to help pay for the research and in return request good stewardship and lower prices for the end products that are paid for by the taxpayer are things that need to be considered.

Mr. Ron McKinnon: Thank you.

Dr. Evans, you mentioned that a $0.2-trillion investment globally could pay off with a net present value of $10 trillion in benefits. How would we mobilize that kind of money? What sort of organization would do that? How would it be managed and controlled?

Dr. Timothy G. Evans: That's a global assessment of looking at what are deemed to be good value for money investments to stem or address the problem of antimicrobial resistance. You need to put that in perspective. Number one, about $8 trillion to $9 trillion per year is spent on health globally. This study was covering a period through to 2050. When you look at the total amount spent on just health alone over that period of time, that's a very, very large number. This is a fraction of the total cost in health.

The investment set of interventions relates to specific things in the health care sector related to good surveillance, more judicious procurement of good-quality medicines, the training of clinicians in prescription practices, and things like that. In terms of the package of interventions that were costed up, most health care systems are doing those interventions to one degree or another. The problem is that we're not doing them universally at scale, so the coverage is very patchy. You may have a centre of excellence in Hamilton, Ontario, that's doing everything right in the McMaster health care system, whereas you may find that over in Stoney Creek or Burlington there's no compliance or consistency with those measures.

● (1640)

Mr. Ron McKinnon: Is there any international organization, perhaps, that is situated to coordinate such an effort?

Dr. Timothy G. Evans: I think there are a number. I think the UN resolution to improve action on antimicrobial resistance, which was taken in September 2016, is an excellent start. It brings together the World Health Organization, very importantly, but also the food and agricultural organization, something called OIE, which deals with veterinary health problems. There are a set of institutions that I think are recommending good plans for scaling up approaches to addressing the issue.

I think the point is that those are extremely good value for money. From your perspective as a member of Parliament, what's good value for money in your development assistance? I think the question "To what extent is Canadian development assistance being used to stem the problem of antimicrobial resistance?" is one that would be very good to ask.

I say that in part because there are over 120 diasporas that make up Canada, and as we've seen in other parts of the world, people, relatives are travelling back and forth. The issue of antimicrobial resistance is a global one. The Canadian borders are not in any way impermeable to any of the bugs that travel with planes.

I think that you should be looking at how that development assistance budget is being used, recognizing that some of those investments are tiny fractions of what it would cost to try to address the issue as if it only needed to be addressed in Canada.

Mr. Ron McKinnon: Thank you.

My time is up.

The Chair: Now we go to our five-minute round, starting with Mr. Van Kesteren.

Mr. Dave Van Kesteren: Thank you. That's fine.

I wasn't expecting to be next on the list, but I'm ready.

Thank you all for attending. I listened with interest.

Mr. Wright, you mentioned the "valley of death". Of course, you are referring to angel financing. For those who are wondering what he was talking about, that is the period that you're in when you are developing drugs and you have nobody to finance you. We used to refer to those who financed those individuals as the three Fs; they were the family, friends, and fools. I don't know if you knew that.

This is the dilemma that's experienced in the drug industry. Of course, big pharma companies are the ones that produce our drugs. Generics are then able—once the patent runs out—to copy that drug, in essence. They can break it down.

We keep talking about the urgency to develop new drugs, but how much of that is really the problem that we experience today? There just isn't the market for big pharma to produce these drugs. Some of these drugs cost billions of dollars. The payback just isn't there if we readily spread these drugs about.

I think that happened in Africa with AIDS. There was a real push for the drugs to help eradicate that situation in Africa. Many of the big pharma companies just backed off and said, "Listen, if we're not going to get paid for this stuff, we're certainly not going to develop it." How much is that?

I want to go to you, Mr. Brock, because I think you mentioned, or at least someone on the video mentioned, that we need to step up as a nation. As a small country, we're relatively prosperous. We're one of the G7, but nevertheless, we're not the Unites States of America. We're not even China or some of the others that have produced these drugs.

Maybe you could just comment on that. Tell us what other countries are doing, too.

Are you, sir, from the Netherlands?

● (1645)

Mr. Willo Brock: Yes, you've deduced that correctly from my accent. Indeed I am.

Mr. Dave Van Kesteren: I've hung around enough Dutch people to pick it up I guess.

Mr. Willo Brock: With a name like yours, you must have the same heritage.

In reverse order, of the countries that are currently investing in TB and drug research and are prominent, one is the U.K. One of the things they have done that is interesting is to create a rule that 3% of the development budget across the board will be invested in innovation and R and D. Every program, whether it's in health, agriculture, or anything like that, does spend 3% of the total development budget. If you're looking at the numbers, given the amount of money that even a small country like Canada spends on development co-operation, that would be a significant amount of funding.

Other countries that are active in this case, next to the U.K., are Ireland, the Netherlands, Germany, Australia, and the U.S. We are very heavily reliant on foundations, especially the Gates foundation, which is a really big actor in this field.

The good news there is that in TB we have a valley of death that starts literally from the lead identification and goes all the way down to the patients. We are used to dealing with valleys of death. We have shown that in a public-private partnership, with sufficient government support, next to private initiative, you can create a new value chain that allows you to do the innovation that we've traditionally relied on fully from pharma.

I don't think there's a case to make for pharma being in or out. The connection is how we can organize ourselves globally in such a way that you can add the capacity for the academic community—the sorts of innovations that happened at McMaster that were mentioned—with pharmaceutical knowledge that can be in either a non-profit or a for-profit environment, with biotech and medium and small enterprises, and then bring together donors like Global Affairs Canada.

In terms of the money we're talking about in a disease like TB, as I mentioned, the OECD came out with the estimate that another $500 million a year would be needed to come up with four new antibiotics. If you take that in the context of the G20, that's $25 million a year. That's not a whole lot of money, even for a small country, to be honest, to set aside for investment in AMR innovation and research. Even that sort of money could go a long way already.

Mr. Dave Van Kesteren: Thank you.

We know that much of the infection is spread through sexual transmission, but what about the consumption of animals and passing on the germ that way? We talked about that at length too. Also, for instance, what about the lack of clean water? What would be the percentage? I guess what I want to know is where most of the infection is coming from. Is it from infections from the operating rooms? Is it from the way we treat our animals?

Would someone want to jump in on that? Mr. Evans?

Dr. Timothy G. Evans: I think it's a good question, which is, as you say, what are the primary drivers of AMR globally? I think, first, the way in which tuberculosis is managed in low-income countries is the biggest driver, and the reason you have so much resistance is that health systems are not geared to supporting people for treatment completion. That relates to the fact that they haven't discovered the lesson learned in this country, that when you're ill, you have to pay, and in order to pay, you have to sell the farm. That's what led to the 1962 Saskatchewan medicare act, which prevented that from being the case.

We've moved to a system in Canada of prepayment, and in so many countries of the world, when people are sick, they have to find the money to pay, and finding the money to pay for four drugs for six months for TB is near impossible. But if the message is that all countries need to move toward UHC, which is what WHO is advocating, then the likelihood that people are going to buy drugs one week and not get them the next—which is the fastest way to accelerate resistance—is going to go down.

To me, Canada's leadership on this is.... Everybody globally loves the health care system in Canada. I'm proud to say I'm from Canada. People say, “Oh, you guys have got a great health care system.” But we should be advocating that other countries, other governments, make the same sorts of reforms that we did in the 1960s to ensure that people have access to care, because the correlation across countries is very clear. The more a system promotes universal access, the lower the rates of antimicrobial resistance. That's number one.

Number two is the ubiquitous use of antibiotics as growth promoters. We see that not only in Canada. We see that all over the world, and this is dangerous. This is really dangerous because we have seen in China this jump of resistant strains to very important antibiotics like colistin from animals to humans. This was documented in 2011.

If you don't look and see that there's a need to move towards antibiotic-free livestock rearing and aquaculture, then that's being blind to another huge area.

The opportunity, I think, is an immense one. The knowledge agenda here—and Gerard represents this most fundamentally in this group—is perhaps one of the most exciting science frontiers there is, but it's not limited in geography to McMaster. It's a global knowledge challenge, so I think, then, if you say we need to solve this problem collectively, there needs to be efforts by the Canadian Institutes for Health Research, the Canadian Institutes for Advanced Research, and other bodies to join up with the alliance for TB drugs and other efforts, and use Canadian resources in a way that is going to give value, not only to Canadians but to global citizens.

I think there's a huge opportunity to address the science agenda on that front, which would be a third effort to tackle this problem.

● (1650)

The Chair: We have to move along now to Ms. Sidhu.

Ms. Sonia Sidhu (Brampton South, Lib.): Thank you, Chair. Thank you for a very informative session.

My question is for Dr. Evans.

Dr. Evans, in your view, how knowledgeable are individuals about AMR? Is there a need for greater public awareness of this issue in the agricultural industry? What types of steps do we need to take to increase awareness about AMR?

Dr. Timothy G. Evans: That is a great question. I think one of the things we're seeing—and I think our first witness mentioned this—is that there's a shift in demand toward foods that are antibiotic free. I think this is growing awareness that having foods laced with antibiotics is not necessarily a good thing. I think awareness of consumer preference on that front and educating consumers with respect to the dangers of ubiquitous use of antibiotics are extremely important.

Second, I think it's very important that consumers understand better that sometimes not getting an antimicrobial when you see the doctor for a fever is actually the best thing. It's very tough as a clinician when people come in with a fever that looks like a viral infection, which will be self-limited and is likely to go away, but the patients say they're not leaving unless they have an antibiotic. It's a very tough thing, and I think consumer education on that front will be particularly important.

The third is consumer education that, when you're prescribed a course of antibiotics, you need to take it as recommended. We see a lot of this, and I'm guilty of it myself. You start to feel better and you say you don't really need those drugs, but we know that poor treatment adherence is another driver.

Those are three areas where I think consumer awareness and mobilization of demand for change would be effective.

● (1655)

Ms. Sonia Sidhu: Dr. Wright, in Canada, are there particular population groups or...?

What type of research needs to be funded to address AMR both in Canada and globally?

Prof. Gerard D. Wright: Do you mean in terms of education?

Ms. Sonia Sidhu: No, I mean research that needs to be funded.

Prof. Gerard D. Wright: What kind of research? I think again we've heard a lot about it already, and it is really in the area of diagnostics, in particular. One of the things Dr. Evans just mentioned is asking if you have a viral infection or a bacterial infection. Do you really need this antibiotic? The reality is that at the pointy end of the stick, which is the family doctors seeing 30 people a day, a lot of times they can't really tell. We need innovation in that area.

Ms. Sonia Sidhu: What kind of a gap is there in AMR and AMU surveillance done in Canada? Can you describe what additional data needs to be collected at the national level?

Prof. Gerard D. Wright: Right now, there is a patchwork of surveillance data across the federation, as I'm sure you know, because of the jurisdictional issues we have in Canada that are particular to the country. I think there are voluntary surveillance collections where provinces and hospitals provide the federal government with information on a lot of antibiotic resistance. That really needs to get tightened up. That's something that we need to know, what bugs are out there. We just have to know this. This is critical to our health, and in a lot of cases, we just don't.

Ms. Sonia Sidhu: Dr. Evans, we have a pan-Canadian framework. You mentioned financing the health system. AMR surveillance uses a sputum sample in Uganda. What kind of diagnostic testing should be the first step in Canada if we have to do that?

Dr. Timothy G. Evans: I don't think I can give advice on what the system for surveillance should be. I think it's something that benefits, as I said, from scale efficiencies. Rather than having each province have special laboratory capacity for antimicrobial resistance, there's probably a division of labour and reference laboratories that would be a much more cost-efficient organization of high-cost diagnostics for drug susceptibility testing for antimicrobial resistance.

What would be important in the design of laboratory networks is to think about how you can take advantage of scale efficiencies and modern technology, which is instantaneous in the digital age, and avoid creating expensive infrastructures that will be difficult to sustain in the long run and not necessarily the best use of public resources.

Ms. Sonia Sidhu: Thank you.

The Chair: Your time is up.

Now we'll go to Ms. Kusie.

Mrs. Stephanie Kusie (Calgary Midnapore, CPC): Thank you very much, Mr. Chair.

Thank you to all of our guests for being here today.

Ms. Kramer, you mentioned that you felt that Canada, specifically, was well-positioned for AMR response, and I want to know a little bit more about that. Why do you think Canada, specifically, is so well-positioned for AMR response?

● (1700)

Ms. Jane A. Kramer: At the risk of flattering you too much, it's because I think, culturally, there is a special quality about Canada. As I mentioned, I think you're a leader in social responsibility. I think you have intellectual, scientific qualities. You clearly have the commitment to embrace this issue, this problem. You're spending a lot of time on this right now. You're reaching out to different resources now.

I think what's needed to address this is a public-private partnership among the academic community, the scientific community, the commercial enterprises that are involved in this, the food production community, the agricultural community, because it truly is.... This is a very complex issue. Our founder, Dr. Stuart Levy, who I'm sure Dr. Wright must know, wrote a book called *The Antibiotic Paradox*. This problem is a paradox. Antibiotics are a miracle, but they have caused a crisis. This is a crisis that we're talking about here, and if it's not addressed, it's going to kill us. We'll be in a post-antibiotic era.

One of the problems I'm sure you're all aware of now is that if we solve the problem in North America, we still have to deal with the rest of the world. I mentioned CARB-X earlier. CARB-X is a global initiative. It's not U.S.-centric. It's global. Organizations and companies around the world can participate if they have the right inventions.

With regard to your question, I think Canada is small enough and large enough at the same time to address this effectively. I mentioned Portugal because Portugal is tiny, but it has the equivalent to Health Canada. It has a small, nationalized health system where it's able to identify every single patient in the country, where it can solve HCV —hepatitis C—and eliminate it, effectively.

I know that you all know about its decriminalization of its drug abuse problem, and that's why it essentially doesn't have any addicts anymore. It can take on certain health problems that other countries can't because it has health registries there. Canada is much bigger than Portugal is, but Canada can take on somewhat bigger problems and be a model in a way that other countries can't because the truth is that Canada is more sophisticated than other countries are. Also, I think Canada has a bigger conscience than other countries do, and as I said, Canada is diverse. That diversity doesn't exist in a lot of countries. It's a blessing. It's wonderful. It's magnificent.

Mrs. Stephanie Kusie: It's also a curse. That's a lot of pressure, Ms. Kramer.

Some hon. members: Oh, oh!

Ms. Jane A. Kramer: I know. I tried to look this up—

Are we out of time?

The Chair: You have 10 seconds.

Ms. Jane A. Kramer: I tried to look it up, to see if there was a word for people who love Canada but aren't Canadians. There isn't a word for it as far as I can tell, but that's me. That's how I feel about Canada.

The Chair: Thanks very much.

I'm sorry your time's up. It was a great contribution.

Mr. Ayoub.

● (1705)

[*Translation*]

Mr. Ramez Ayoub (Thérèse-De Blainville, Lib.): Thank you, Mr. Chair.

I am honoured to hear your testimony. You are experts, leaders in the field, and you have worked on these issues for many years. That said, I have the impression that this is work in progress that we'll never see the end of. We must learn to cope with this phenomenon and establish a plan of attack. This is what we are trying to do together. The testimony we've heard so far has given me the impression that the work was done in a vacuum. It's very difficult in terms of communications and interrelations, whether it's here, at home or elsewhere. Indeed, I have the impression that it is a global scourge.

What are the global consequences of not addressing antibiotic resistance or not addressing it adequately?

I would say, in my own words, that there are outbreaks worldwide, possibly in the third world, where antibiotic resistance is triggered.

Canada is one of the developed countries that has strategies in this regard. But I would like to know what it costs us not to help developing countries with insufficient strategies and action plans they can't implement effectively. As you told us earlier, people don't take all of the medication they have been prescribed, or they take too much because they want to find a quick fix to their problems, which could be solved otherwise.

My question is fairly broad, but I would like Mr. Wright and Mr. Evans, in particular, to respond. If the other witnesses want to add something, I would like them to feel welcome to do so.

Mr. Gerard D. Wright: I'll answer in English because my French is a bit rusty.

[*English*]

Mr. Ramez Ayoub: And we only have five minutes.

Prof. Gerard D. Wright: It's a big question. You're absolutely right. We know this really well. We dealt with SARS. We saw exactly what happened. We're only a plane ride away from these issues, and our laboratory and our group is in southern Ontario. We're 40 minutes away from Pearson, one of the biggest hubs in all of Canada, with lots of people visiting from all over the place, and people bring the bugs they have to Canada.

The practices in other countries are very challenging, as Dr. Evans said. Colistin, for example, is an antibiotic that was discovered in the 1950s. It's a terrible drug, but we've run out of all the other drugs so we needed to use it. They're using it by the tonne in China for pig production. As I said before, the bugs evolve resistance.

I think we heard a lot already about what we can do. Canada is in a unique position. We're part of the G7. We're part of the G20. We can help develop policies. We can help develop countermeasures here in Canada, export them to those countries, and share that information. There's no reason at all why we can't do a lot of really positive work here and then share it directly or work with these companies and steer these agencies that we have connections to already.

[*Translation*]

Dr. Timothy G. Evans: That's a very good question. I, too, will avoid making the members of the committee suffer. Indeed, my accent leaves something to be desired.

Mr. Ramez Ayoub: It's perfectly fine.

[*English*]

Dr. Timothy G. Evans: It's an excellent question. I think this was a little bit what we tried to do in this report. The cost of inaction is dear. It's huge. The cost of action is actually not that great, especially when you look at the return on investment.

Number one, you're looking at, from whatever economic perspective.... You take this to your Minister of Finance, and this competes with other places for high return on investment and therefore budget priority.

Number two, I think political advocacy is important. Professor Kramer made the point on how Canada is regarded from outside. As a Canadian in exile, I can tell you that Canada has a wonderful reputation, and particularly now, the leadership is being listened to. So work the top Canadian leadership to take this up, advocating that every country should have a universal system that entitles people to access to care without having to pay for it at the point of service. That's a fantastic political advocacy. It comes from what I deem to be our proud Canadian heritage, and it's a message that is absolutely fundamental in terms of value for money.

First, prepayment is more effective and equitable than paying when you're ill. It's a simple message, and governments need to be recognizing that responsibility the world over. There is no country that is too poor to move towards a universal system based on prepayment. That's a simple political advocacy statement, and I think Canada's leadership is perhaps in the best position in the world to make that very strong point.

Second is the value of smart multilateralism, recognizing that together we can achieve things in terms of preserving our global health security that alone we will be hopeless at. Look at the way in which not only the Canadian action plan on AMR but the WHO plan of action on AMR can actually come into focus and into action in the UN in 2018. There are lots of feet that can be marching and taking this agenda forward. It requires that commitment, and significant but not expensive resources to fuel those engines that are ready to go.

I think Willo Brock from the global TB Alliance has a massively cost-effective opportunity there. Five or ten million dollars from Canada, as part of a consortium of countries in the G20 and beyond —the OECD—that have said this is good value for money is going to allow this agenda to move forward without any single donor feeling like they're carrying too much of the weight.

I think those are opportunities in order to avoid those

● (1710)

[*Translation*]

scourges. They won't go away.

[*English*]

The Chair: Okay.

We have to move to Mr. Davies now for the final question.

Mr. Don Davies: Thank you.

Ms. Kramer, I feel, in some ways, that as I get to the end of the study I'm back to the beginning. I find myself unsure of the extent of the problem of antimicrobial resistance and what the causes are.

I'm going to ask whether you can quantify the problem for us and also identify the leading causes of antimicrobial resistance, and antibacterial resistance too.

Ms. Jane A. Kramer: At this point, we think it's clearly overuse for growth promotion in animals. It's that, because the food we eat is transferred to your hands and to your cooking. For the longest time, it was overuse in over-prescribing. The doctors can weigh in, but I think with the guidelines for physician use, the physicians are more careful in their use these days.

However, it's definitely in our food production.

Mr. Don Davies: How serious a problem is it? Should we be panicking about this? Is it urgent that we deal with this? I have people who express concern that they could get an infection for which there is no successful antibiotic. If that develops, we could be left with an extremely serious, widespread health problem. Is that a reasonable fear?

Ms. Jane A. Kramer: It is a reasonable fear. Let's bear in mind that the UN held a meeting about this, about a year and a half ago now, and it was only the fourth time in the history of the UN that they had a meeting about a health issue. The time before that was about Ebola. They would not take up a health issue unless it was that consequential. HIV was one of those issues. So yes, and I think that's why it's made your agenda.

● (1715)

Mr. Don Davies: Willo, I'll give you my last question. I'll start with a negative and a positive. For the negative, former UN special envoy for HIV/AIDS, Stephen Lewis, has been highly critical of international response to the resurgent threat of tuberculosis. He has, in particular, criticized developed countries for making and then breaking promises on international aid and global public health.

On a more positive note, global momentum seems to have been building in the fight against TB and AMR, including the G20 declaration last July and the recent ministerial declaration on TB in Moscow, both of which made commitments to addressing TB as a component of the global fight against AMR. How can Canada best help build on this global momentum as we move into the G7 and UN high-level meeting on TB next year?

Mr. Willo Brock: I'd mention a couple of points.

First of all, Canada has traditionally done a lot globally. I think its current level of funding global development is at an all-time low. A growth in global solidarity could be combined with an investment in this area, which I think is important. First of all, I think Canada has room to step up. I know there's been a little bit of a declaration of love towards Canada, but let me just point out a little criticism. There are places where I think there's an additional piece of work to be done.

Canada, next year, hosts the G7. This year the G7 and the G20 both committed, with Canada in there, to increase their work against AMR and against tuberculosis and to find more global coordination, more investment for the fight against AMR and TB. Canada will have that leadership and will be the one looked upon to create that momentum. If we let declarations like this sit....

As I'd mentioned in my introduction, in 1993 the WHO declared TB a global health emergency, similar to what happened to Ebola a couple of years ago. We've lost 50 million people to this disease because of inaction, because of everyone coming up with lofty political declarations with no action plans behind them, with no monitoring, and by not keeping ourselves responsible. I think Canada can create that environment of accountability by taking its leadership position and setting an example in this area by putting some money where its mouth is.

As you mentioned, we do have new drugs in TB. We have a new treatment. We can now treat XDR patients, hopefully, in the next couple of years, with six months of treatment, with a 90% success rate, as we have for current first-line treatments. The solutions are there. We just need to act.

Mr. Don Davies: Thank you.

The Chair: Time's up.

That concludes our day. Once again, on behalf of the committee—

Mr. John Oliver (Oakville, Lib.): Sorry, Mr. Chair, but I don't think the World Bank Group's 2017 report has been submitted as evidence. Could we receive a copy of it so we have it for our report?

Dr. Timothy G. Evans: Certainly.

The Chair: Thanks very much.

I want to commend the members of the committee. You proposed we do this study. When we started the study, I didn't even know what it was about. You've raised such an important issue. A little while ago Ms. Kramer referred to it as a crisis, but it's almost an unknown crisis. Our challenge as a committee is to write a report that raises awareness and puts it at the level our witnesses have described.

The drafting for this report is next Thursday, so everybody bring your ideas for the drafting. I do hope it reflects the seriousness of what witness after witness after witness has testified.

I want to thank the witnesses very much. You bring so much to this committee. We get the best witnesses of any committee on Parliament Hill, and today is a perfect example.

I have one final note to the members. Tomorrow is the last day for witnesses for the food guide study. If you have witnesses who want to come to that, we have to have the names tomorrow.

Again, thank you very much to the witnesses. You've provided us with a great deal of valuable and understandable information, which is very good.

The meeting is adjourned.