Experts call for coordinated approach to combat superbugs

Panel: Beating Superbugs: Innovative genomics and policies to tackle AMR
Organized by Genome Canada

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Panelists: **Dr. Natalie Brender**, National Director, Genomics in Society, Genome Canada; **Dr. Rainer Engelhardt**, Former Assistant Deputy Minister/Chief Science Officer, Public Health Agency of Canada; **Bonnie Henry**, Deputy Provincial Health Officer, Province of British Columbia; **Dr. Stephen Hoffman**, Associate Professor, Faculty of Law, University of Ottawa; **Dr. Gerry Wright**, Director of the Michael G. DeGroote Institute for Infectious Disease Research, McMaster University; **Dr. Craig Stephen**, Executive Director, Canadian Wildlife Health Cooperative

Takeaways and recommendations

- ✓ Surveillance requires open access to data and sharing data across sectors, provinces and countries
- ✓ Shift priorities of Canadian Food Inspection Agency from industry promotion to surveillance (from “farm to fork”)
- ✓ Reform how farmers and people use antibiotics to ensure sustainable use
- ✓ Train more experts in bioinformatics who understand and can use genomics data
- ✓ Focus on AMR policies that emphasize harm reduction, health promotion and resilience
- ✓ Coordinate policies nationally and globally to combat AMR
- ✓ Identify proven models and expand them to other provinces and territories

The policy issue: Antimicrobial resistance (AMR) is a global health threat fueled by overuse of antibiotics by humans and in agriculture for livestock health and growth promotion. Englehardt referred to 2014 review on AMR prepared for the U.K. government that modelled the impact of this post-antibiotic era. It predicts that drug resistant microbes could cause the deaths of 10 million people a year and cost the global economy $60 trillion to $100 trillion by 2050.

“Even right now, the cost of antimicrobial resistance in hospitals in North America is roughly $11 billion. It’s a complex problem … that requires a ‘one health’ approach,” said Englehardt.

In May, the World Health Assembly endorsed a global action plan to tackle AMR. Canada is also taking steps to prevent, limit, and control the emergence and spread of AMR through its recently released Federal Action Plan on AMR and Use, which focuses on three primary policy drivers: surveillance, enhanced stewardship and innovation.

However, one of the biggest challenges remains a lack of coordination and collective action among many sectors and actors—globally, nationally, provincially and municipally—including human and veterinary medicine, agriculture, finance, environment, and consumers. “These actors don’t easily work together,” said Englehardt.

Despite the enormity of the threat and the pressure by international organizations such as the World Health Organizations and the G7 to act, AMR is still not a top-line priority in Canada’s health systems or livestock systems where antibiotics continue to be over-used.

The options: Canada has 13 health systems (national, provincial and territorial) that are not linked, nor are they integrated with animal health and environmental issues. The result, said Henry, is a piecemeal system with competing policy priorities and inconsistencies in how antimicrobials are used across the country among physicians and other prescribers like dentists and naturopaths.

“We have the pieces of a pan-Canadian coordinated approach but we need build that into a coherent approach that builds on a federal framework,” said Henry.

Where effective models have been identified (e.g. the “Do Bugs Need Drugs?” community program in British Columbia), Henry said they should be adapted and expanded to other provinces and territories “with funding, leadership and human expertise”.

The panel agreed surveillance is key, but there are challenges. They include a lack of funding, a paucity of bioinformatics experts who can analyze the results from genomics tests, and a need for bedside tests that can accelerate diagnosis, treatment and big-picture surveillance.

The data also need to be freely accessible and shared across sectors, government departments and countries. Another issue is stable funding for data collection. Wright said this has been an ongoing issue with the Comprehensive Antibiotic Resistance Database housed at McMaster.

On the stewardship front, Wright said the focus should be on prescribing “the right drugs for the right bugs. That means changing practice in clinical settings and changing how farmers and people use antibiotics”.

CSPC delegates heard how innovations in basic science and genomics are needed to solve the AMR crisis, possibly through the development of antibiotic adjuvants, anti-virulence therapies, vaccines and probiotics and prebiotics to strengthen human and animal immune systems and modulate the microbiome. But one of the big challenges is that few drug companies are interested in developing new antibiotics: the issues are regulatory (how to conduct effective clinical trials for drug resistant pathogens), economic (how to ensure return on investment) and scientific (the pathway to new drugs is not obvious).

As such, there’s a need for countries to step up to fill the gap. “How do we treat antibiotics as global resources that all countries put money into developing?” Wright asked.

Stephen described AMR as a “wicked” public health problem because of its chronic policy and system failures and biological complexities. He suggested that not enough focus or funding has been put on the link between the livestock industry’s use antibiotics as growth promoters and human AMR. “We don’t have veterinary public health offices in most provinces or at the federal level so we can’t break AMR into these sub-systems.”

To ensure a level playing ground among livestock producers, Hoffman said an international agreement is needed that establishes global rules, and thus a level competitive field, for antibiotic use.

Hoffman concluded by supporting the idea of a Manhattan-type project (modelled on the US military’s project in the 1940s to produce a nuclear weapon) that focuses not just on developing new antibiotics, diagnostics and genomics science, but for determining the best approach to global governance of AMR.

“We can’t just tackle the biological and clinical manifestations of this problem we also have to tackle a more difficult political economy of inaction,” she said. “We need a science of global strategy for achieving collective action.”

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