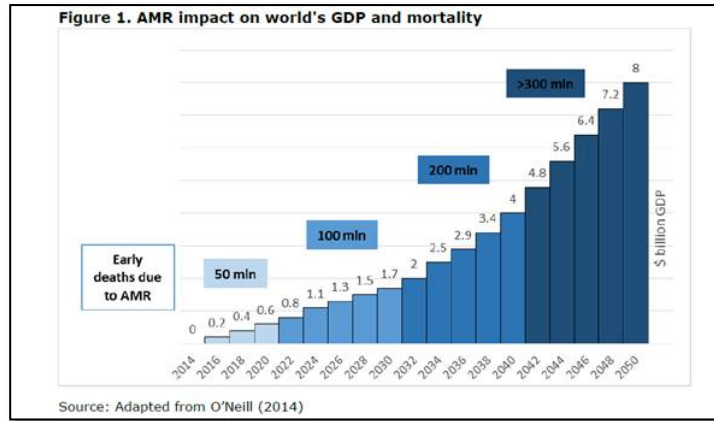


Biomedical Innovation in Antimicrobial Resistance (AMR): Fostering a Canadian Approach

Background

Since the discovery of penicillin in 1928, antibiotic therapies have saved millions of lives and contributed to substantial improvements in medical care around the world. However, wide and inappropriate use or over prescribing has resulted in some bacteria developing resistance to commonly used antibiotic drugs making these therapies less effective or ineffective. Antibiotic resistance is one of the greatest threats to human health in Canada and around the world. Antibiotic resistant infections add significant risk and cost to medical procedures, including chemotherapy, solid organ and bone marrow transplants, joint



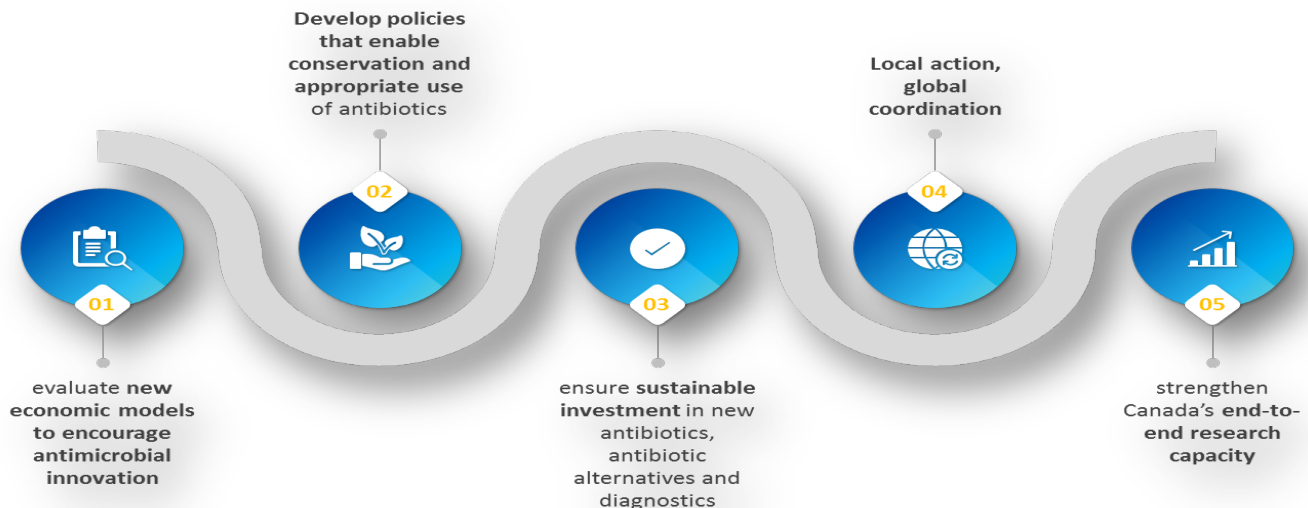
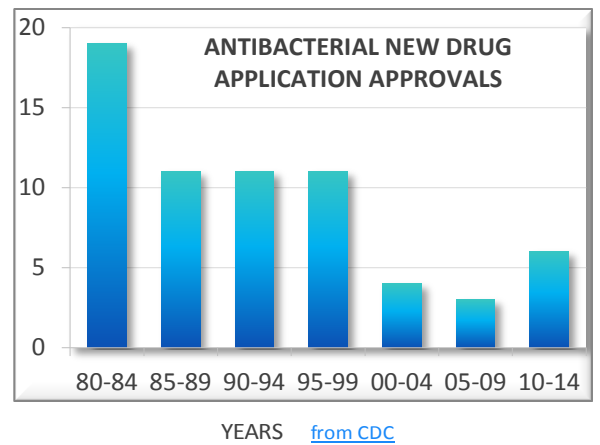
replacements and other surgeries. In Canada, total medical care costs associated with antimicrobial resistant infections have been estimated at [one billion dollars](#) and the estimated global impact on our world's GDP has created concern among international organizations including the World Bank, OECD and UN. It is important to remember that Louis Pasteur identified and issued an early warning in the late 19th century: **«Ce sont les microbes qui auront le dernier mot.»** **«It is the microbes who will have the last word.»**

Issue

Antimicrobial resistance is a complex problem that requires a multi-faceted solution which includes investments in surveillance and data collection, antimicrobial stewardship, research and development of new antibiotics, alternatives to antibiotics, rapid diagnostics and regulatory readiness to bring new products to market quickly. In order to effectively deal with this issue, a One Health Approach needs to be applied that encourages appropriate use of antibiotics in animals and humans.

Meanwhile, as existing antibiotics lose their effectiveness, not enough new drugs are being created to replace them due to various scientific and commercial barriers. Though the need is great for new products, sustaining investment in antimicrobial R&D poses significant challenges resulting in fewer new antibiotics to market. Novel antibiotics are undervalued relative to their societal benefits and are often used as a last resort in effort to preserve their effectiveness. The development pathway for alternatives to antibiotics (vaccines, immune-modulators) is uncertain.

Diagnostic devices that encourage appropriate use of existing and new antibiotics are in their infancy and public health systems and hospitals are not incentivized to use them. R&D focused on improving speed and accuracy of diagnostic testing, moving testing and decision making closer to the point of care, and the development of anti-infectives is critical. Governments and payers must implement policies that promote sustainable investment in ongoing innovation in therapies and diagnostics to combat AMR and drive appropriate use.



A Path Forward for Canada

Tackling antimicrobial resistance will not be possible without further biomedical innovation and cross-sector collaboration to address system barriers to adoption. Canada has an opportunity to become a world leader in AMR innovation, by supporting an end-to-end approach that covers basic research to product commercialization, and clinical trials to market adoption/procurement. Canada is home to an array of exciting start-up companies, an experienced research network, and engaged multi-national pharmaceutical and medical device firms.

[Canada's Pan-Canadian Framework](#) for AMR is an important starting point for fostering Canadian innovation in AMR. Canada's biomedical innovation sector can collaborate with government to address key priorities for tackling AMR. Given the complexity of this issue, collaboration between government and interested stakeholders is key to exploring a multi-faceted solution.

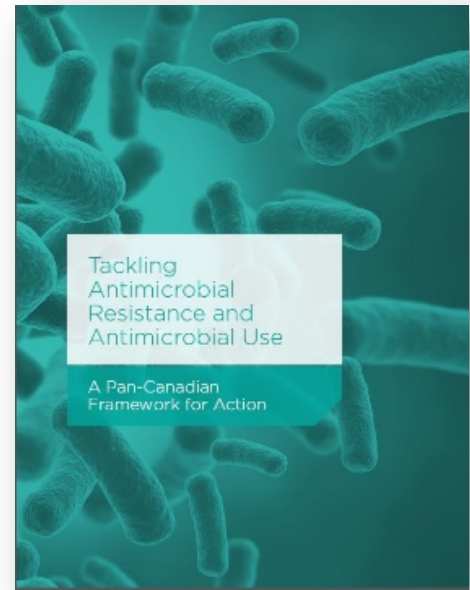
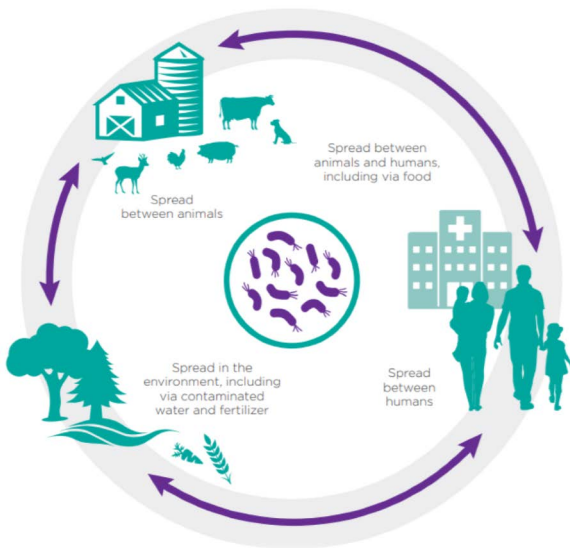


Figure 2: **One Health Linkages of Antimicrobial Resistance**



Request:

Establish a Multi-sector Working Group to pursue joint goals under the Pan-Canadian AMR strategy and strengthen Canada's end-to-end research capacity in AMR