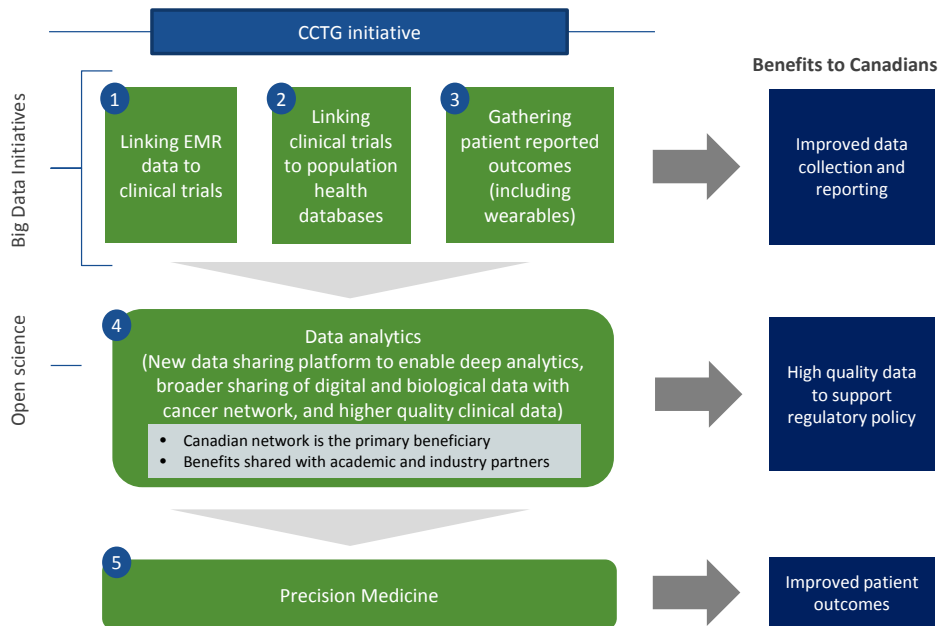


## Executive Summary

Canada can be a global leader in the next generation of pharmaceutical and cancer care innovation. The Canadian Cancer Trials Group (CCTG) is requesting \$39 million in federal funding over five years to modernize and scale a transformational research platform (detailed in the graphic below) for academic and industry research collaboration.



The platform would extend the value chain of cancer clinical research in Canada to commercialize innovation, drive global research and development investment into Canada and deliver better health outcomes for Canadians.

## Introduction

CCTG is putting forward a proposal that would drive Canada's global leadership in applied cancer research, accelerate health and life sciences innovation, and increase domestic and foreign investment activity in Canada.

CCTG is a cancer research cooperative group with extensive private and public sector partnerships. It is the largest clinical cancer research network in Canada and one of the largest globally. CCTG collaborates with more than 80 institutions across Canada, including over 2,100 investigators. Internationally, CCTG collaborates with institutions and networks in over 40 countries. CCTG's partners include pharmaceutical multinational enterprises (MNEs), such as AstraZeneca, Merck, and Pfizer, and Canadian biotechnology companies, such as Oncolytics, Turnstone, and Immunovaccine.

CCTG has almost 40 years of success in developing new standards of care and improving outcomes for Canadians. Its trials have led to marketed drugs and tests and changed practice,

improved outcomes for patients and enhanced healthcare system performance. CCTG has established Canada as a global leader in health and life sciences research and clinical trials with the unrivaled breadth and depth of its operations.

CCTG is the only organization within its international peer network without sustained federal funding. CCTG's core programmatic funding comes from a Canadian Cancer Society (CCS) grant that has been renewed continuously since 1980, most recently in 2017 with a grant of \$23.5M over five years. Other jurisdictions, such as the US, UK and France, are signaling the priority of cancer trials research with dedicated government funding to their national clinical trial networks. Federal investment in CCTG would leverage the CCS' core programmatic funding to extend CCTG's value chain and entrench Canadian global leadership.

In Budget 2018, Canada can strengthen and extend its global standing by driving innovation within its academic and industry research communities through CCTG's initiative on big data, precision medicine and open science; the initiative that would support the federal government's priorities by unlocking nearly 40 years of valuable clinical trial data and connecting it to electronic medical record and population health databases to drive new private and public sector commercialized breakthroughs. This will deliver direct benefits to Canadians and drive greater global investment for new economic growth.

## Challenge

Cancer is a global issue that impacts every Canadian. CCS estimates that 1 in 2 Canadians will be diagnosed with cancer in their lifetimes, and 1 in 4 Canadians will die of cancer (CCS, 2017). In addition to the personal physical and emotional costs on Canadian families, cancer has major economic ramifications. While it is difficult to measure the true cost of cancer, the Public Health Agency of Canada estimated in 2008 that cancer accounted for \$4.4 billion annually in total economic costs. Cancer pulls patients and their caregivers from their jobs, impacting livelihoods and productivity. It is also an enormous burden on the publicly-funded healthcare system.

The 2017 Advisory Council on Economic Growth report identified healthcare and life sciences as a key sector for growth in Canada. Moreover, McKinsey identified oncological research as a key driver of growth for the pharmaceutical industry globally, accounting for an estimated 30% of the industry's pipeline and 25% of its global revenue by 2020.

Canada is a leader in clinical trials and fourth globally in the number of clinical trial sites (Industry Canada, 2016). It is recognized for the quality and expertise of its methodological rigour, research, major medical discoveries, and innovations. Despite this leadership, Canada ranks low on corporate R&D investment. Canada has the 8th largest global pharmaceutical market, yet most MNEs spend less than 1% of their global direct R&D investment in Canada (Industry Canada, 2014). Federal investment in CCTG's platform would provide a tool to increase job-creating private sector R&D investment to Canada through CCTG's growing and extensive partnerships with pharmaceutical, biotech and artificial intelligence (AI) companies.

## Recommendation

CCTG is proposing a federal investment of \$39 million over five years to modernize and scale a platform for pharmaceutical, biotech, academic and AI companies and researchers to commercialize innovation and develop new market-ready drugs, treatments and diagnostics, including precision medicine for cancer treatment. Federal support would accelerate the pace of healthcare system and industry innovation, attracting new investment and jobs to Canada.

Cancer biology is complex and requires a sophisticated approach to determine the most appropriate treatment for each individual to improve their outcomes. Clinicians will need the tools to integrate data from tissue samples, linked to clinical and patient-reported outcomes and population health databases to ensure the treatment has maximum benefit for the patient and the healthcare system. CCTG's platform is one of those tools.

The platform would create a robust IT backbone to collect, connect, and make available invaluable and anonymized data from CCTG's current clinical trials data repositories, real-time cancer trials data from Electronic Medical Records (EMRs) and patient reports (e.g., patient data from online submissions, phone apps and wearables), and population health databases (e.g., Statistics Canada). Centralized access to this data for approved partner public and private sector researchers would strengthen the foundation of open science and high-quality data within Canada.

This platform would advance Canadian leadership in precision medicine cancer trials by increasing collaboration among clinical experts in Canada and enabling a more holistic approach to treatment and disease management.

Moreover, the platform could be extended to other health and life sciences research communities in Canada, which would drive additional academic and commercial innovation and elevate Canada's overall scientific leadership internationally. CCTG has a strong track record of developing innovative proprietary digital products and scaling that innovation for deployment by other organizations in Canada and internationally; for example, CCTG's RIPPLE technology (Member Registration and Trial Delegation Log) is currently adopted in the US.

## Transformative Social Impacts in Canadian Productivity and Standards of Care

Federal investment in CCTG's initiative would deliver the following impact:

**Improved data:** CCTG's initiative would link EMRs to clinical trial data, link clinical trials to population health databases and gather patient-reported outcomes during trials, such as wearable technologies. Making this data available through an integrated platform would enable deep analytics, broader sharing of digital and biological data with CCTG's network and higher quality clinical data to support regulatory policy.

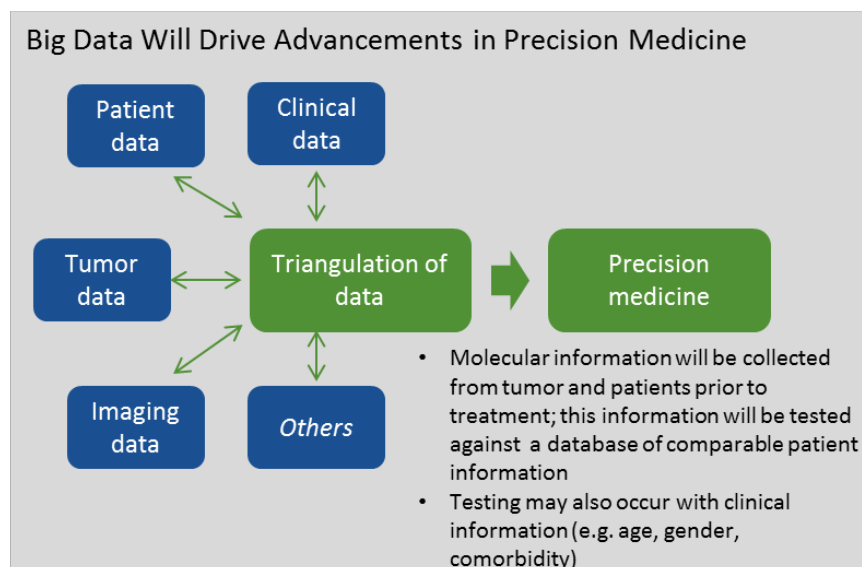
With federal funding, CCTG would see a 50% increase in industry-funded clinical trials within five years and the broadest access to precision medicine trial opportunities for Canadians.

**Improved patient-centred care:** Improved communication facilitated by the platform through

the collection of real-time patient data from EMRs and self-reporting would put the patient at the centre of care, enabling better and more consistent patient monitoring, reporting and protocol compliance. It would also address accessibility issues for patients in remote areas. Canadian families battling cancer would have faster and easier access to treatments closer to home throughout Canada, including northern and remote communities.

**Improved health outcomes:** The platform would enable public and private sector researchers to conduct clinical trials R&D, leading to better rates of survival and quality of life for patients with cancer. Improvements in health outcomes would allow Canadians with cancer to return to a routine not dominated by cancer. They would also reduce the burden on caregiver and support networks, enabling them to return to work.

**Improved quality and earlier access to new treatments:** The initiative would provide CCTG, and its partners, with the tools to develop precision medicine cancer trials to advance Canada's leadership in this emerging discipline.



Precision medicine strategies for treating cancer can ensure those who benefit from specific treatments are receiving them. Clinical trials are a necessary step to prove both patient benefit and cost effectiveness of precision medicine for the cancer system. With the cost of new cancer therapies increasing dramatically, avoiding unnecessary treatments through the deployment of precision medicine may reduce cost pressures in the cancer care system.

**Improved collaboration and a stronger network of innovators:** Increased collaboration with genomic, bioinformatics and immuno-oncology experts and members of scientific networks in Canada through the data-sharing platform would enable a system-wide, holistic approach to treatment and disease management. It would increase the ability of clinicians to make more informed, evidence-based decisions by leveraging data from trials. This would lead to an overall improvement in patient treatment and healthcare performance. Expanded capabilities

through CCTG's platform would enhance the training of the next generation of high quality professional investigators.

## **Entrenching Leadership and Driving Global Investment into Canada**

Cancer research is one key area where Canada can entrench its healthcare leadership internationally and generate greater economic returns for Canadians.

Federal funding for CCTG's initiative would increase private sector R&D investments in Canada. Based on CCTG's history of private sector partnerships, the organization would be able to leverage each federal dollar with a 5:1 return on investment. Investment in this type of activity yields ROIs that rival some of Canada's strongest industries: a study of the economic impact of clinical research in British Columbia found strong returns for GDP growth and jobs that exceeded returns in the Oil and Gas Sector and the Professional, Scientific, and Technical Services Sector ([McMaster, 2015](#)).

The platform would unlock existing data and clinical trials methods that companies can deploy in developing new drugs and treatments. If data is the new 'oil,' CCTG's platform would derive even greater value from historical digital and biological data that can be shared broadly throughout the Canadian economy, including with health research partners.

The clinical research ecosystem around CCTG would benefit from improvements in the research methods and business processes disseminated through CCTG's network, including AI capabilities and process innovation. Federal investment in the platform and the modernization of CCTG's capabilities from it would also deepen CCTG's – and Canada's – innovation capital.

The platform could be extended to other areas of health and life sciences research in Canada, driving similar innovation and investment in those areas.

## **Conclusion**

Federal investment in CCTG's platform would improve outcomes for cancer patients, enhance health system performance, solidify Canada as a leading destination for industry in the high-growth area of oncological research, drive global R&D investment into Canada's economy and build up Canadian biotech companies and their economic output.

No other network has had a greater impact on cancer outcomes in Canada over the last 40 years. That impact extends globally. Federal investment in CCTG is timely and necessary to entrench Canada's leadership role and global competitiveness, and to secure health benefits for Canadians.