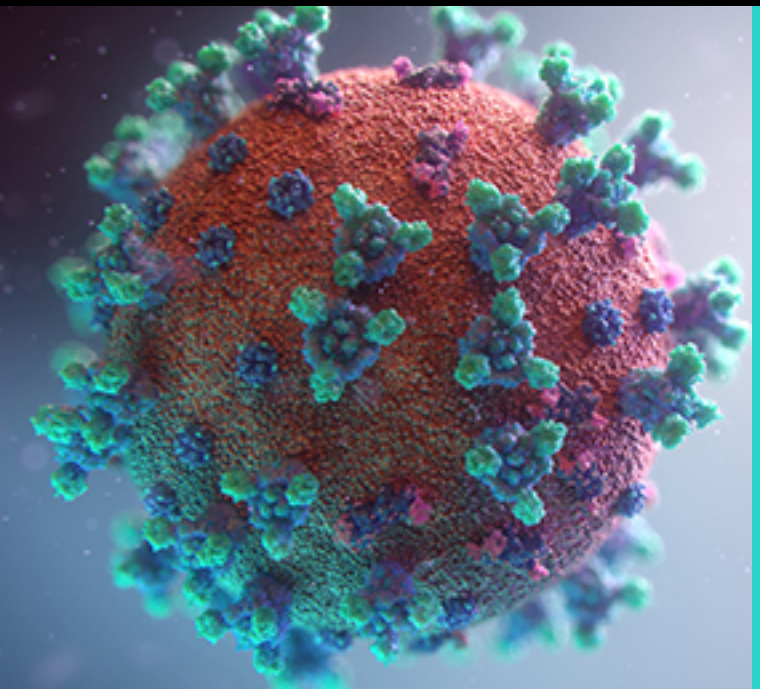
Health Intelligence

Shift HEALTH



COVID-19 and the Future of Health Research and Innovation

May 2020

Executive Summary

What does COVID-19 mean for the future of health research and innovation?

The end of the beginning of health digitalization	COVID-19 has become a data crisis—and is setting the stage for a futureproofed data ecosystem that will dramatically enhance the productivity, agility and impact of science and innovation.
Regulations and practices at the intersection of safety, quality and speed	COVID-19 represents an opportunity to examine and optimize research regulations and practices that *both* preserve the highest standards *and* accelerate the pace of science and innovation.
Nimble and intrepid collaborative models designed for the urgent pace of innovation	COVID-19 has created a context for action that is rapidly expanding and evolving models of collaboration in research and innovation, shifting how we create value together in the future.
Public trust and accountability propelling citizen-engaged science	COVID-19 has made science the star, helping to reinvigorate the relationship between the public and the scientific establishment, awaken science literacy and restore our faith in fact.
Growing focus on the global interconnectedness of science, innovation and human health	COVID-19 has magnified tension between global imperatives of innovation and the globalization risks that fuel protectionism, forcing us to reckon with two sides of the globalization coin.

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COVID-19 is altering—perhaps irreversibly—the health research and innovation ecosystem.

COVID-19 is compressing into mere weeks structural and system-level adaptations that might otherwise have evolved over a multi-year, if not generational, timescale.

- We are mainstreaming previously marginal or avant-garde approaches to science, collaboration and interdisciplinarity.
- We are confronting the limitations of prevailing models of data collection, information-sharing and public engagement.
- We are revisiting sacrosanct regulatory and peer-review rules and conventions to enable unparalleled agility.

Is this crisis-induced response a transient 'wartime' improvisation, or have we let the genie out of the bottle?

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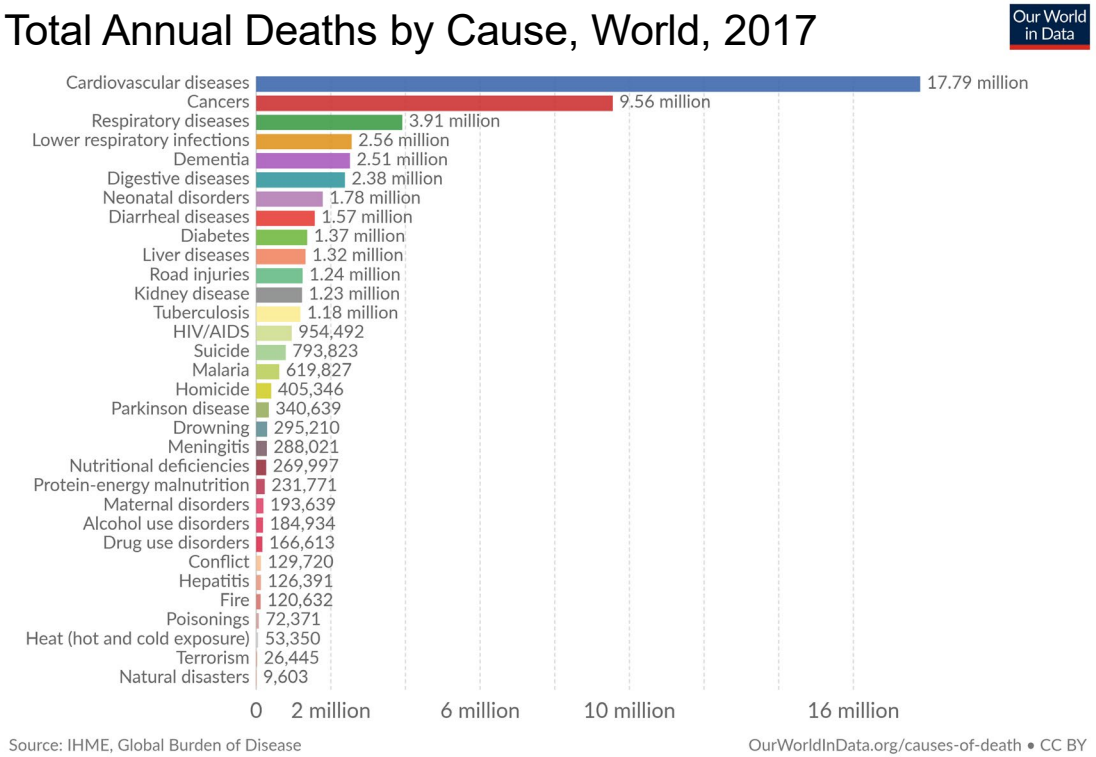
Can and should science ever be ‘at peace’?

- COVID-19 invites reflection on what our ‘wartime’ response might mean for our ‘peacetime’ innovation system—and whether science should ever be at peace.
- Indeed, ischemic heart disease, stroke, cancer, respiratory disease, and Alzheimer’s and related dementias will each kill vastly more people worldwide this year than COVID-19—and will account for the majority of the ~$8T the world will spend on healthcare.
- We often talk about the war against these growing epidemics, but COVID-19 shows us what is possible when we put such a mindset into action.



COVID-19 is shaping and sharpening our perspective on the future of health research and innovation.

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COVID-19 is accelerating trends and bending approaches with long-term implications for health research and innovation.

COVID-19 has proven that our research and innovation system has the potential to perform with far greater agility, alacrity and ambition, inviting reimagination of the rules, conventions and practices that will guide us into the future. We call attention to five phenomena with long-term implications:

The end of the beginning of health digitalization

Regulations and practices at the intersection of safety, quality and speed

Nimble and intrepid collaborative models designed for the urgent pace of innovation

Public trust and accountability propelling citizen-engaged science

Growing focus on the global interconnectedness of science, innovation and human health

We elaborate on each of these phenomena—what we're learning and what it might mean for the health research and innovation system—in the sections that follow.

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Phenomena

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The COVID-19 pandemic has emerged as a crucible of invention and improvisation across the health data ecosystem.

- Data and digital tools have enabled real-time decision-making, driven innovation and empowered patients.
- The pandemic is also exposing—in stark relief—the work that remains to extract the full potential of digitalization to improve health research and innovation:
  - We are not yet collecting data consistently and comprehensively, resulting in a superficial or incomplete picture of the pandemic that overlooks sub-populations, risk factors, geography, among other variables.
  - Much of our data are disparate, disconnected and incomplete, limiting our ability to build the scale needed to extract insights that can drive research.
  - Using large, integrated datasets requires stakeholders—most notably the public—to reach consensus on a clear position with respect to issues of privacy and security.

The COVID-19 crisis has become a data crisis—and is setting the stage for a futureproofed data ecosystem that will dramatically enhance the long-term productivity, agility and impact of health research and innovation.

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The COVID-19 pandemic is shedding light on the power of data and digital tools to support research and generate health insights.

COVID-19 is driving greater attention to—and investment in—health data infrastructure.

Ontario MINISTRY OF HEALTH

The Ontario government is investing in a new integrated health data platform that will help scientists improve modelling and research to support better health system planning and responsiveness.

Studying COVID-19 is increasingly relying on real-world data contributed by civilians.

South Korea activated a novel approach to tracing infection by combining findings from patient interviews with cellphone location, CCTV, credit card transaction and medical facility visit data.

Systems are adapting legal parameters to enable data analytics and accelerate insights.

NHS Digital

NHS Digital has been given legal direction to deliver new services to enable delivery of care, and collect and analyze data more efficiently to understand the illness and identify patients with, or at-risk for, COVID-19.

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We must not forfeit the opportunity to advance systemic changes in the regulation, management and structure of our health data ecosystem.

Realizing the potential of digitalization means:

- Being clear about the attributes we expect to see in a resilient, accountable and impactful health data ecosystem.
- Evolving from rigid interpretations that hold privacy sacrosanct to an understanding of privacy as an enabler.
- Recognizing that the benefits of sharing personal health data (and the risks of not doing so) far outweigh the risks of error, and that risks can be curtailed by taking full advantage of existing and emerging technologies to protect the security and privacy of health data.
- Leveraging the power of AI to analyze complex datasets and extract insights that will guide science and lead to better, more equitable care.
- Designing data systems that are interoperable and interconnected.
- Re-engineering regulatory and reimbursement systems to accept and adapt to real-time, real-world evidence and digital innovations.

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COVID-19 has created pressure to accelerate research and expedite the development and validation of interventions without risking human safety.

- The pandemic is generating regulatory innovations that will expedite COVID-related R&D during the crisis—and potentially research more broadly over the long term.
- While this accommodating spirit of exceptionalism has the potential to reduce time and costs, it must be balanced against the imperative of protecting human safety and upholding scientific quality, reliability and utility; a focus on speed can be costly, as evidenced during the 2014–2015 Ebola outbreak where decisions to forego proven research methodologies, such as randomization and placebo controls, led to inconclusive research findings.
- Establishing research policies and practices that strike an appropriate balance among safety, quality and speed will be critical to our response to the current COVID-19 pandemic, to preparing for future emergencies, and to optimizing our system of research and innovation over the longer term.

The pandemic represents an opportunity to examine and optimize research regulations and practices, with a view to *both* preserving the highest standards *and* accelerating the pace of science and innovation.

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The pandemic is challenging traditional models of scholarship and testing unconventional approaches to validating health innovations.

COVID-19 has triggered greater use of preprint and open-access platforms.

F1000Research Open for Science

WHO Bulletin posts manuscripts online within 24 hours, with peer review conducted in parallel; **F1000 Research** is expediting review of COVID-19 research; it is estimated that ~50% of COVID-19 science has been released in preprint.

Large-scale adaptive trials executed under master protocols aim to accelerate vaccine and therapeutic testing.

World Health Organization

By enrolling subjects in a single trial and rapidly altering trial parameters based on emerging results, the WHO-led **Solidarity Trial** and US-led **"Operation Warp Speed"** aim for dramatic acceleration of vaccine and therapeutic development.

More lenient regulations for diagnostic tests have already illustrated the challenge of balancing speed with quality.

FDA

The FDA was forced to reverse an **unprecedented decision** to allow labs to use tests before the agency reviewed validation data after the market was flooded with **ineffective** and, in some cases, **outright fraudulent** diagnostics.

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The effectiveness of the scientific response to COVID-19 will influence the likelihood that current exceptions become the new standard.

- Experts have long discussed approaches to rethinking the way that we assess scientific research and develop, test and procure health technologies, with a view to mitigating gratuitous regulatory burden and accelerating access to life-saving innovations.
- The current crisis has motivated stakeholders to pilot some of these long-standing recommendations to eliminate any delays to the development and adoption of critical COVID-19 interventions.
- Whether these approaches will continue to be employed when the current crisis subsides will likely depend on the extent to which they:
  - Avoided unacceptable safety risks;
  - Generated trustworthy data that could be confidently used to make decisions; and
  - Yielded notable cost and time savings that empowered us to better manage the pandemic.

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COVID-19 has accelerated experimentation with new models of collaboration in health research and innovation.

- Collaboration—between sectors, among competitors and across borders—has been invaluable to achieving the speed, scale and scope required to address the COVID-19 public health emergency.
- Rather than competing *with each other*, public and private sector researchers are joining forces to compete *with the problem*, prioritizing shared success—the best science, diagnostics, therapeutics, preventatives—over exclusive credit or ownership.
- Demonstrating that global challenges require global partnerships, COVID-19 is exposing in real-time and with dramatic effect the trade-offs among speed, resource efficiency and data exclusivity.

COVID-19 has created a context for action that is rapidly expanding and evolving models of collaboration in research and innovation, leading us to reflect on how we create value together in the future.

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Collaboration is driving rapid discovery, development and public health impact in the race to control COVID-19.

Collaborations are increasing the speed of development of treatments for COVID-19.

The Gates Foundation, Wellcome Trust, Mastercard and 15 pharma companies have joined forces to share proprietary compound libraries and accelerate identification and development of therapeutics for COVID-19.

Clinical trial teams are achieving cost efficiencies by sharing data and study arms.

TransCelerate BIOPHARMA INC.
ACCELERATING THE DEVELOPMENT OF NEW MEDICINES

TransCelerate, a collaboration of 21 global biopharmaceutical companies, is leveraging its cloud-based platform to share deidentified, anonymized preclinical and clinical data, including control arm data from ongoing and planned COVID-19 clinical studies.

Many COVID-19 research funding initiatives incentivize cross-sector collaboration.

NRC·CNRC Canada

The National Research Council of Canada's COVID-19 Pandemic Response Challenge Program will drive the formation of diverse teams to develop solutions in rapid detection and diagnosis, therapeutics and vaccine development, and digital health.

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Sustaining and embedding new models of collaboration will require us to re-evaluate how we share risk, reward and recognition.

- Undoubtedly, the global appetite for collaboration during the pandemic is—at least to some degree—a matter of survival during a crisis that has impacted so many, so quickly and so indiscriminately.
- But having demonstrated the astounding potential of unencumbered collaboration, stakeholders—including the public—will expect to see other health and societal challenges and priorities benefit from the innovative capacity of diverse stakeholders coming together.
- Sustaining collaboration in research and innovation will require us to re-evaluate the boundaries of the pre-competitive space; pilot and learn from new approaches to IP ownership; rethink the alignment of incentives and risks; and reconsider whether *together* we can go farther or be bigger or be better than if we go alone.

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COVID-19 may be ushering in a post-‘post-truth’ era.

- The COVID-19 pandemic is arriving at a precarious time for science and truth. Today, objective facts often carry less weight in public discourse than the emotional pleas and wanton partisanship that shape opinion, underpinning what is often referred to as the ‘post-truth’ era.
- Yet, the mortal terror the pandemic has unleashed, the economic toll that millions are experiencing and the social distancing that billions are practicing have made COVID-19 a visceral and existential experience, compelling individuals to be vigilant about how they appraise and connect with knowledge.
- The stakes are clearly high—inviting recalibration of our relationship with ‘truth’, driving a deeper search for reliable information and creating a stronger need for engagement.

COVID-19 has made science the star, creating an opportunity to reinvigorate the relationship between the public and the scientific establishment, awaken science literacy and restore our collective faith in fact.

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In only a short period of time, we are witnessing change in the public's appreciation for, engagement with and trust in science.

Our confidence in leadership is shifting toward the scientific and medical community.

In a poll, 60% of respondents trusted Dr. Fauci's COVID-19 comments, while only 36% trusted those of President Trump, indicating a favorable view of expert opinion that is further exemplified by an increase in **CDC website traffic**.

Our faith that science will provide solutions to end the COVID-19 pandemic is growing.

The **willingness of the US public** to use a vaccine against COVID-19 has grown from 53% to 66% between February and March, potentially indicating that vaccine hesitancy may be waning.

Our recognition that we all have a role to play in advancing COVID-19 science is strengthening.

A **COVID-19 Citizen Science** initiative has launched to gather daily information from participants through their phones to understand how the virus is spreading and ways to reduce infections.

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We are at a turning point for science and truth. We must seize the opportunity afforded by a resurgence in the public's faith in fact.

- While these trends are positive developments, they also place enormous burden and responsibility on the scientific establishment to get this right. The goodwill we've engendered should instill a sense of humility, not hubris.
- Indeed, we cannot take the apparent renewal of public trust for granted; COVID-19 has also energized science skeptics, lionized discredited scientists, and conflated the antivaccine movement with the broader petition for individual liberty.
- If we encourage continued engagement, integrate safeguards to protect against misinformation, and remain frank and transparent with the public, we can maintain this momentum into a post-COVID world, leaving us better able to prepare for the next pandemic and address other pressing health challenges.
- To do so, the scientific establishment must respect and be accountable to the public's expectations; must give genuine consideration to the public's viewpoints throughout the innovation process and in shaping the scientific agenda; must exhibit a deeper commitment to—and skill in—communicating science; and must aspire toward a humanized science that is not revered as monolithic and remote but, like all human endeavours, is understood to be fallible, alive and a collective responsibility.

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The COVID-19 pandemic and its repercussions have cast a spotlight on our increasingly connected global systems of health and innovation.

- The very markers of progress that define ‘modernity’—population growth, urbanization, industrial farming practices (among other human activities)—are believed to be major drivers of the evolution of COVID-19.
- Moreover, the rapid *spread* of COVID-19 across the globe is a reflection of just how connected we’ve become through, for example, increased rates in travel and migration and interlinked economies.
- Our research productivity and systems of innovation have in many ways benefited from these trends; however, COVID-19 has also exposed vulnerabilities, including supply chain dependencies, sovereign health security challenges and the impact of disrupted ecological balances on our health.

COVID-19 has magnified the tension between the global imperatives of health innovation and the globalization risks that fuel protectionism. The health innovation system is reckoning with two sides of the globalization coin.

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These tensions span the innovation continuum, from the prioritization of research questions through to manufacturing of technologies.

Calls for greater integration of planetary, animal and human health in research are growing.

>300 multidisciplinary experts and major funders across the globe have **set research priorities** for COVID-19, which includes animal and environmental research to understand the origins of the virus.

The advantages of decentralized supply chains may be outweighed by COVID-19 risks.

Spurred in part to reduce costs and increase competition, reliance on a single, foreign source for crucial APIs **is fueling calls** for greater domestic capacity in Europe and the US.

A lack of local biomanufacturing capacity threatens sovereign health security and innovation.

A **report** indicates Canada lacks the capacity to produce vaccines and treatments when a COVID-19 solution is developed—a gap that also disadvantages local innovators by arresting scale-up in Canada.

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While our connectivity may have contributed to the pandemic, it will also be fundamental to resolving it.

- Despite calls for centralization of processes and greater national control of the biopharmaceutical industry, we must not underestimate the economic and practical advantages that our interconnected innovation systems afford us in the context of resource efficiency, competitiveness and downstream access to medicines.
- And while there is unquestionably a need to adapt in order to address sovereign health security vulnerabilities and create more resilient supply chain redundancies as safeguards, we must also seize COVID-19 as an opportunity to accelerate and amplify globally interconnected innovation priorities.
- No jurisdiction alone can resolve the COVID-19 crisis; future pandemic crises; the burden of chronic disease; and the looming impact of climate change on health, environmental sustainability and socioeconomic wellbeing. Health security is a global responsibility, and everyone is vulnerable unless all regions, and most notably the world's poorest countries, have the resources to protect their populations.
- We need global commitment and collective action; we need to embed the linkages between human health and the sustainability of social and ecological systems in the questions we ask; we need to focus on global health justice for all; and we need to elevate the transdisciplinary models of research and innovation critical to this work.

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Takeaways

COVID-19 has created an urgent opportunity—and imperative—to learn and do better in the future.

- ***Data.*** How do we build on this watershed moment for our health data ecosystem and our use of digital tools?
- ***Regulation.*** How do we renew regulations and practices to uphold standards and accelerate the pace of innovation?
- ***Co-operation.*** How do we enable a research environment that benefits fully from both competition and collaboration?
- ***Democracy.*** How do we continue to earn public trust and foster an accountable, citizen-engaged science?
- ***Globalization.*** How do we optimize the global connections central to research, innovation and planetary health?

COVID-19 represents an inflection point for the health research and innovation system. There has never been greater recognition that "science is the solution", and there has therefore never been a more fertile moment to reinvigorate investment in health research and innovation and create the best system possible. We will not return to 'normal'. Shaping the 'new normal' will require unprecedented courage, creativity and collaboration.

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About Shift Health

Overview of Shift Health

Shift Health brings a science mindset to strategy consulting for the health research and innovation ecosystem. We blend scientific depth, sector leadership and global perspective, tackling our clients' most challenging questions with curiosity, rigour and courage.

Rigorous

We approach questions with discipline and clarity, generating meaningful, evidence-based insights that our clients can trust.

Creative

Our clients are unique, and we design innovative approaches and original solutions that reflect our clients' specific goals, questions and contexts.

Collaborative

We invite our clients to view us as peers, committed to achieving a shared vision of success.

Delivering sharp insights and customized solutions, we're helping to create the future of healthcare.

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Our Team

The experience and expertise of our team enables us to deliver comprehensive, original, evidence-based strategies that generate results.

>85 years of collective strategic health research and innovation consulting experience

100% of our team has an advanced life sciences degree, **93%** at a PhD-level

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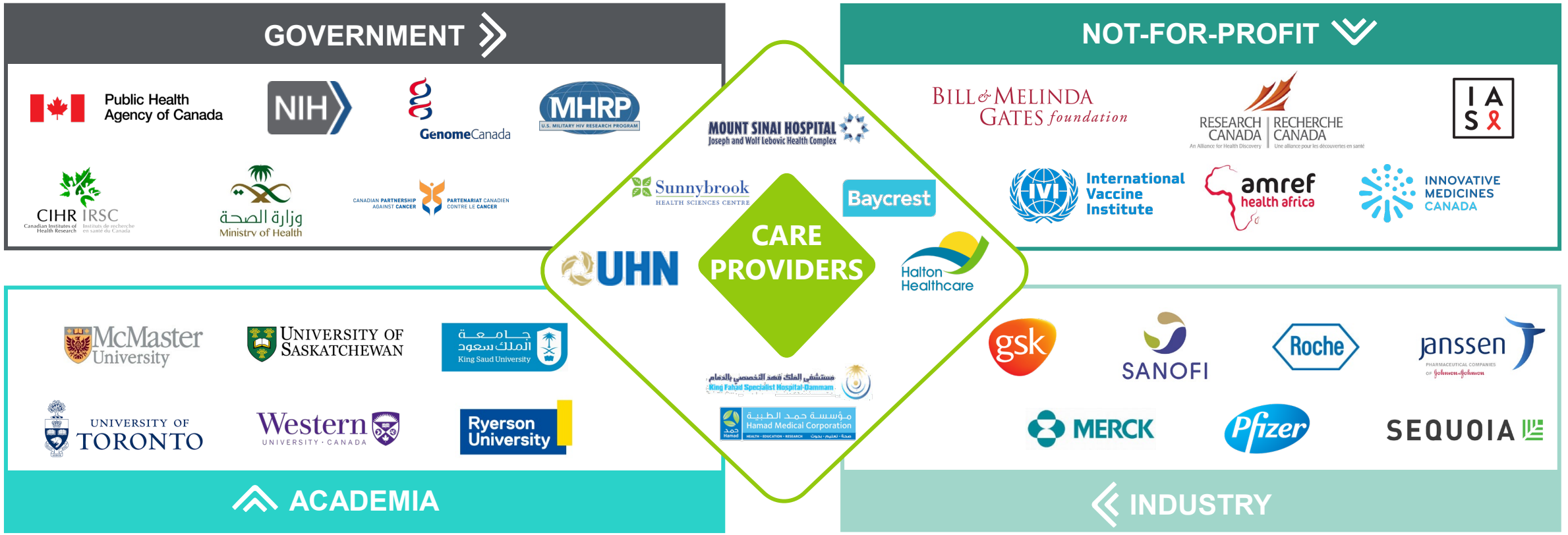
Our Sector Expertise

Resolutely focused on serving the health research and innovation ecosystem, we work with leaders from Government, Academia, Industry, Not-for-Profits and Care Providers on complex strategic initiatives that move ideas, knowledge and technologies from concept to impact.



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Service Offerings

Corporate Strategy

Planning for organizational growth and leadership

Research Strategy

Research leadership in the context of scientific and technological change

Product Strategy

Positioning development programs for commercial success

Opportunity Assessment

Life sciences investment analysis

Policy Strategy

Creating a policy environment that supports innovation

Partnership Strategy

Development and management of R&D alliances

Program Evaluation

Performance and impact assessment

Proposals + Pitches

Investment attraction for strategic initiatives

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Track Record Highlights

20
YEARS
supporting health research and innovation globally

300+
CLIENTS
across the health ecosystem

$2B+
RAISED
to support health R&D efforts

50+
R&D
PARTNERSHIPS
successfully implemented

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