Genomics on a mission:  
A pan-Canadian approach to fight COVID-19  
In the fight against COVID-19, genomics data is one of the strongest tools we can deploy towards short-term containment and long-term health-care response and management. When the virus broke out in early 2020, it quickly became clear that a coordinated national effort was needed to generate, share and scale up COVID-19 sequencing activities across Canada focusing on the virus and host genomes.

Genome Canada activated our community immediately, with rapid time to impact. We launched the Canadian COVID Genomics Network (CanCOGeN) in April 2020, building on 20 years of investment in genomics in Canada, ongoing collaborations and existing infrastructure.

CanCOGeN is committed to generating accessible and usable genomics data to inform public health and policy decisions, as well as to guide treatment and vaccine development.

Latest news

As CanCOGeN approaches the two-year mark since inception and funding will wrap up in April 2022, transition plans are underway for the two lead projects within the initiative:

- **CanCOGeN VirusSeq**, originally tasked to sequence up to 150,000 viral genomes from people testing positive with COVID-19, and
- **CanCOGeN HostSeq**, whose role was to sequence up to 10,000 patients exposed or affected by the virus.

The viral sequencing work is ongoing, reaching 362,000 viral sequences in February 2022. Genome Canada and Public Health Agency of Canada’s National Microbiology Laboratory (NML) are drafting a transition plan with the NML leading the coordination of future viral sequencing, and both organizations collaborating to maintain the data sharing and the ongoing work of the Canadian VirusSeq Data Portal.

The host sequencing work continues, with 7,000 host sequences completed by February 2022. Genome Canada is seeking a 12-month extension from Innovation, Science and Economic Development Canada to allow adequate time to finalize the original funding objectives, and this work will continue to be funded by the CanCOGeN budget.

The vast expertise, the capacity built across Canada (equipment and personnel), the extensive knowledge generated, and the valuable partnerships built over the last two years will be harnessed to promote the key role of genomic surveillance and pandemic preparedness on a national—and global—level. We will do this through a range of ongoing collaboration mechanisms, such as working groups, discussion forums, speaking engagements and events.

Who’s involved?

CanCOGeN is a Genome Canada-led consortium of Canadian federal, provincial and regional public health authorities and their healthcare partners, academia, industry, hospitals, research institutes and large-scale sequencing centres. This coordinated pan-Canadian approach aligns us with global sequencing efforts and enables the sharing of knowledge, discoveries and best practices internationally.

[Click on map for names and links to all CanCOGeN partners.]
Impact on Canadians

Why we study the virus
Genomics-based tracking and analysis of the evolving traits of the COVID-19 virus across Canada provides critical information for:

- Public health and policy decisions
- Testing and tracing strategies
- Virus detection and surveillance methods
- Vaccine development and effectiveness
- Drug discovery and effectiveness of treatment
- Understanding susceptibility, disease severity and clinical outcomes

CanCOGeN by the numbers

$40M
in federal funding

24-month
project

67
COVID-19-related clinical studies being recruited into HostSeq

362K+
viruses sequenced* through VirusSeq

7K+
patient sequences completed* through HostSeq

2
implementation committees

9
sub-committees and groups working on data sharing, capacity building, ethics and more

3
large HostSeq sequencing centers participating

9
provinces now sequencing in-house: B.C., Alta., Ont., Que., Sask., Man., N.S., N.L., N.B.

1
case study on lessons learned

*as of February 2022

Impact on Canadians

Why we study the hosts
Sequencing the genomes of COVID-19 infected individuals (“hosts”) and identifying the underlying genetic factors that contribute to disease response helps us understand:

- People’s susceptibility to the virus
- Clinical variability in disease severity
- The complex interaction between pathogen and host
- Why some people get infected and not others
- Why the virus affects people differently
- Why some infected people are asymptomatic

Different clinical presentations of COVID-19 in hosts

Building future readiness and models
In addition to providing critical information to guide the current public health and policy response to COVID-19, CanCOGeN is now providing real-time data for outbreak analysis. Further, we are poised to use the data to study cases of reinfection as well as to support post-vaccination surveillance. Beyond COVID-19, CanCOGeN is helping build the capacity and infrastructure for a much-needed national genomics and health data platform to prepare Canada for potential new pandemics.

Read the latest news on CanCOGeN at [www.genomecanada.ca/cancogen](http://www.genomecanada.ca/cancogen)

WANT TO GET INVOLVED? HAVE ADDITIONAL QUESTIONS?
Contact Catalina Lopez-Correa, Executive Director of CanCOGeN at clopez@genomecanada.ca