



## CSCC Award for Innovation in Laboratory Medicine

*Sponsored by Roche Diagnostics*



*Principal Investigator, GENCOV Study: Dr. Jennifer Taher*

## GENCOV Study

The CSCC Award for Innovation in Laboratory Medicine is presented to a clinical laboratory in Canada that has distinguished itself by outstanding accomplishment through innovation in the field of clinical chemistry, pathology, or laboratory medicine. The 2025 recipient is the GENCOV research study.

The GENCOV study brought together highly skilled teams of clinicians, laboratory professionals and researchers, and it was extensively driven by laboratory data to understand the pathobiology of COVID-19. This multi-year interdisciplinary study ultimately led to an innovative risk score that can transform clinical practice. More specifically, it had a novel study protocol that involved implementation of serological and molecular tools from clinical laboratories and was able to identify critical characteristics of antibody responses, the role of genetic differences in infection severity, and the impact of viral lineages on patient response. Additionally, the study assessed patient-reported outcomes to evaluate the communication and understanding of complex SARS-CoV-2 test results.

The GENCOV study had 3 primary goals outlined below:

1. Identify factors influencing COVID-19 severity and immune response.
2. Identify gaps and strategies to improve public understanding of SARS-CoV-2 test results.
3. Create a framework for returning genomic and antibody results to patients.
4. Disseminate findings to inform public health and clinical practice.

Key findings of GENCOV included identifying patient factors and clinical biochemistry markers associated with hospitalization and mortality to inform the development of a laboratory-based risk score to predict mortality in hospitalized patients. It also contributed to the COVID-19 Host Genetic Initiative by identifying 51 genome-wide loci associated with COVID-19 severity and susceptibility. The engagement with the public was a unique and beneficial outcome as it helped to empower public understanding of complex test results. The work in this study brings positive visibility of lab medicine professionals, and it offers an opportunity to apply improvements for clinical laboratories to optimize return of all laboratory results.

This study involved several clinical laboratories that provided the technical expertise and infrastructure necessary for its success. This included Mount Sinai Hospital's clinical microbiology and biochemistry laboratories that performed PCR and serological testing. Other hospital and community laboratories (Dynacare, William Osler, Mackenzie Health, The Hospital for Sick Children) were involved in biochemistry testing, viral sequencing, genetic sequencing or ancestry estimations. Research laboratories at University Health Network and Lunenfeld Tanenbaum Institute facilitated HLA genotyping and antibody profiling respectively. The clinical laboratories at Mount Sinai Hospital (clinical microbiology, genetics, biochemistry) collaborated with bioinformaticians and clinicians to integrate genomic and clinical datasets, facilitating the discovery of genetic loci influencing COVID-19 severity and immune responses. It also led the implementation of a return-of-results framework, integrating genomic and antibody data with clinical counseling to improve patient understanding of laboratory results and engagement. The lab team involved not only provided this substantial technical expertise but were instrumental in the 8 different publications and over 30 presentations to help in disseminating study findings.

The teams' leadership in innovation, standardization, and collaboration established the GENCOV study as a model of excellence in laboratory medicine. It also provided transformative advantages to Mount Sinai Hospital and the University of Toronto by strengthening its reputation as leaders in cutting-edge research and innovation. The study's success also elevated the profile of the principal investigator, Dr. Jennifer Taher, who was invited to join a \$19-million pandemic preparedness research study based out of Mount Sinai Hospital as the sole representative clinical biochemist. This further highlights the value of clinical lab medicine, and specifically clinical biochemistry in supporting impactful lab medicine research. Dr. Taher, in part due to her successful role in GENCOV, was recognized as one of Canada's Most Powerful Women in 2023.

Congratulations to Dr. Jennifer Taher (principal investigator), Dr. Steven Friedman (co-investigator), and the entire GENCOV team for the success of their research study.