NEWS FROM CARTaGENE

The CARTaGENE voice

www.cartagene.qc.ca

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CARTaGENE wishes you Happy Holidays!

The year 2023 represents **CARTaGENE**'s **14th year** of activities! 14 years of health research that would not have been possible without you.

Your data and samples are being used by **201 research groups**. These researchers work in public health, epidemiology, molecular biology, genetics and other related fields. To date, they have published more than **115 scientific articles** based on data from CARTaGENE. Within these research groups, at least 36 students wrote and published theses based on projects using **CARTaGENE**. **CARTaGENE** is also used by government health organizations such as the Institut National de la santé publique (**INSPQ**) and **Health Canada**.

CARTaGENE for the health of Quebec

Source image snowflake: Iconfinder.com

Moreover, population studies on cohorts are particularly important during this time of pandemic. Many of you participated in the COVID-19 study. Your data and samples have helped and continue to help decision makers in guiding public health policies. Thus, your continued commitment is essential for the future of CARTaGENE and for the health of Quebecers.

CARTaGENE thanks you for your involvement and your trust. **CARTaGENE** is you!

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2022, third year marked by COVID-19

CARTaGENE continues to contribute to the fight through our study on COVID-19

From the start of the pandemic, in the spring of 2020, CARTaGENE and its Canadian partners in the CanPath consortium began a major longitudinal study on the effects of COVID-19. The Government of Canada funded the study through the COVID-19 Immunity Task Force (CITF) and the Canadian Institutes of Health Research (CIHR).

CARTaGENE participants were invited to complete questionnaires with the purpose of collecting various data (infections, symptoms, hospitalizations, health status, sources of contamination, employment, mental health, financial situation, etc.) which would help to understand the situation of the population during the pandemic. The questionnaires were modified during the study to reflect changes in context, such as vaccination status, as vaccines became available.

Given the pandemic context, the data collected was shared, throughout the study, with the decision-makers. This data was always coded and transferred following the highest security standards. Recognizing the importance of reliable data to inform public health policy, the government has provided additional funding on several occasions. These funds allowed for additional data and biosamples collection phases.

Data and biosample collection for the CARTaGENE COVID-19 study concluded during the fall of 2022. More than 8,000 CARTaGENE participants contributed to at least one of the five collection phases of this study. Participants answered at least one questionnaire about the effects of COVID-19 on their health. Some participants also provided one, two or three blood samples for serology testing.

The analyses, which are still in progress, have helped decision-making in matters of public health.

Real results to inform decision-makers and guide public health policies

The CARTaGENE and CanPath study is part of current national (and international) efforts aimed at solving the COVID-19 crisis. Specifically, the data is used to study, longitudinally, exposure factors (vaccination status, number of doses, time since last dose, product received, etc.), risk factors (age, sex, comorbidity, type of work, etc.) based on outcomes such as infections (positive results) and their seriousness (hospitalizations, etc.). Serological analyses can also be used to assess antibody levels.

Here are some findings from the data analysis from the COVID-19 study:

- The majority of infections (56%) are diagnosed using rapid tests,
- About 49% of infections are asymptomatic,
- The risk of infection with the Omicron variant is 23 times higher than the risk of infection by the original strain.
- Three doses of vaccine reduce the risk of infection with Omicron by 61%.

In addition, the results of serological analyses showed, among other things, significant differences between antibody levels according to age, with weaker immune responses in the elderly. Also, people who were infected with COVID-19 in the past had a stronger immune response. The results showed that antibody levels decrease over time after receiving the second dose of the vaccine, and antibody levels increased following booster doses. These results made it possible to confirm to the health authorities the importance of booster doses.

Furthermore, the results indicated that stronger antibody responses were elicited by complete vaccination with an mRNA vaccine (Pfizer, Moderna) compared to the AstraZeneca vaccine. This finding has influenced public health guidelines. In fact, during the vaccination campaign, people were suggested to follow the AstraZeneca vaccine with a second dose of an mRNA vaccine.

(Source: CanPath Webinar. COVID-19 Antibody Study Results.)

Numerous studies have shown the effectiveness of vaccines against COVID-19, particularly in reducing the severity of symptoms. However, some people show vaccine hesitancy (a delay in acceptance or refusal of vaccination despite availability of vaccination services). Dr. Rodolphe Jantzen from the CARTaGENE team took an interest in this phenomenon and the associated factors. His findings are published in the scientific journal Frontiers in Public Health. Using CARTaGENE data collected during the vaccination campaign in Quebec (spring 2021), Dr. Jantzen attempted to identify sociodemographic factors associated with vaccine hesitancy. According to his analyses, the rates of vaccine hesitancy were rather low in Quebec compared to other high-income countries. However, he identified these two groups of people where hesitancy is somewhat higher:

- People born outside Canada and with a family income of less than $100,000 per year (rate of hesitancy is 28%);
- People with a family income of more than $100,000 per year, without a university degree and who suffered a loss of income during the pandemic (rate of hesitancy is 19%).

The socioeconomic factors identified could be useful to public health authorities in creating personalized messages to explain and promote vaccination among certain groups.

Source : https://pubmed.ncbi.nlm.nih.gov/35372193/

A big thank you to all the participants of the CARTaGENE COVID-19 study!

A few examples of your contribution to research

Dr. Sarah Gagliano

Université de Montréal

Project: Development of sex-specific prediction models for cardiovascular and neurological health

Summary: Heart diseases and neurodegenerative diseases affect millions of women and men in Canada. In many ways, they affect women differently than men. Predicting who is at high risk is critical for improved prevention, diagnosis and treatment. However, given current knowledge and the differences between women and men, women are often receiving an inaccurate diagnosis and inappropriate treatments. The researcher proposes to apply artificial intelligence methods to several large cohorts

using detailed data (genetic, clinical and others) to create prediction models that are tailored to differences between the sexes. The goal of these efforts is to increase knowledge and improve the cardiovascular and neurological health for Canadians in general, and women in particular.

Dr. Stuart MacGregor

QIMR Berghofer Medical Research Institute, Australia

Project: Gene mapping and genetic correlation across complex traits

Summary: The researcher proposes to extract information on a wide range of traits measured by CARTaGENE and to combine it with genetic data to study various chronic diseases (e.g., cardiovascular diseases, cancers, autoimmune diseases, etc.). The goal is to identify new genes that influence a person's risk of disease. Models for predicting the risk of developing these diseases will be constructed using the identified genes. Information on family history will be taken into account to improve the prediction models. These models will open the door to personalized disease prediction and precision prevention.

Dr. Denis Giguère

Université Laval

Project: A new light on the diagnosis of Lyme disease using carbohydrate sensors

Summary: Lyme disease (LD) is on the rise in Quebec and Canada and the population is increasingly concerned about exposure to ticks carrying the *Borrelia burgdorferi* bacteria. Effective diagnosis and treatment of LD depend on the ability to recognize its symptoms. Improving current tests and finding new biomarkers are a priority for health authorities, and a simplified procedure would facilitate the interpretation of results and improve the sensitivity of the test during the early stages of infection. The researcher proposes to develop a rapid test for detecting antibodies directed against carbohydrates. The goal is to develop a rapid and robust analytical method for the detection of *Borrelia burgdorferi* antibodies and to give patients access to a diagnostic test at the early stage of the infection.

For the complete list of projects, visit : www.cartagene.qc.ca/en/participants/projects .

CARTaGENE in numbers!

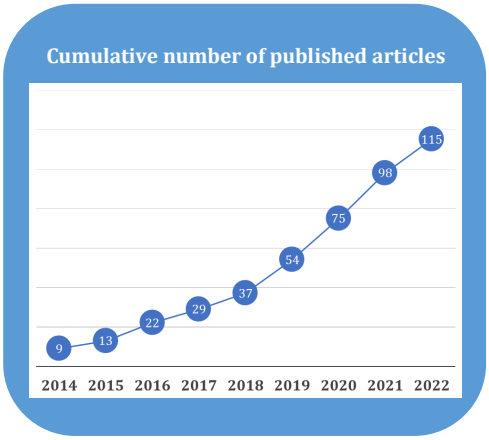
100 health research projects approved,
75 of which are still in progress!

Data used by 201 research groups in Quebec, Canada and around the world!

14 years of advances in research that will have major impacts on our health.

115 articles published in scientific journals!

36 graduate theses !



Thank you for keeping your information updated

Have you moved, retired, changed your email address or phone number? Take a moment to send us your new contact information. Even if you move away from Quebec or Canada, you can still stay involved! Keeping in touch with you is essential for the success of this project!

Contact us

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