

Predictors of SARS-CoV-2 IgG antibody levels following TWO COVID-19 vaccine doses

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Artwork: Kristin, 8 years old, Richmond, BC





CHILD COVID-19 Research



Reorienting existing research platform: CHILD 2008-2020

Pre-Pandemic: Health & Environment Profile

Microbiome Profile Other Biomarkers Infection History* Immune Profile*

Health Status

Outdoor Environment Home Environment **Health Behaviours** Neighbourhood

Socioeconomic Factors

12,000 Individuals 4 Provinces: BC, AB, MB, ON

Aim 1

Aim 2

New project within established infrastructure: New Data & Testing 2020-21

During Pandemic: New Data & Samples

BiWeekly Symptom Survey by text message

Vaccines

Quarterly CRISIS Survey: health status, behaviour/lifestyle • Testing changes due to pandemic, emotions/worries + body weight • Coping

> **Repeated** Seroprevalence Testing at home ...on dried blood spots collected at home

 Adherence to public

health measures

Aim 3

*To be analyzed in this grant from existing samples

Harmonized data collection

Rapid Translation

Real-time data to inform **Predictive Modeling & Public Health Response**

- Prevalence of infection
- Transmission dynamics
- Persistence of immunity
- Predictors of susceptibility and severity
- Inequities

Direct Impacts: SARS-CoV-2 Infection

Symptomatic:

transmission, absenteeism, illness, death

Asymptomatic:

covert transmission







Healthcare Access/Utilization,

Economic impact

Healthcare utilization

Adherence to policies

Prevalence of mental

health problems

Real-time data to inform

Pandemic Management &

Health/Economic Policy

- High risk groups
- Inequities

Indirect Impacts: COVID-19 Pandemic

Social Isolation, Food Insecurity, Stress, Over-Sanitation, Physical Inactivity, Restricted Unemployment

Physical & Mental Health

Post-Pandemic: Long Term Impacts

Future Direction

Rapid Translation







While vaccination remains the best defense against COVID-19, vaccine-induced humoral immune responses vary amongst individuals

Study Aim



To evaluate persistence of SARS-CoV-2 IgG antibodies and the predictors of antibody production following COVID-19 vaccination

SARS-CoV-2 serology testing



Dried blood spots collection kit for parents and their children

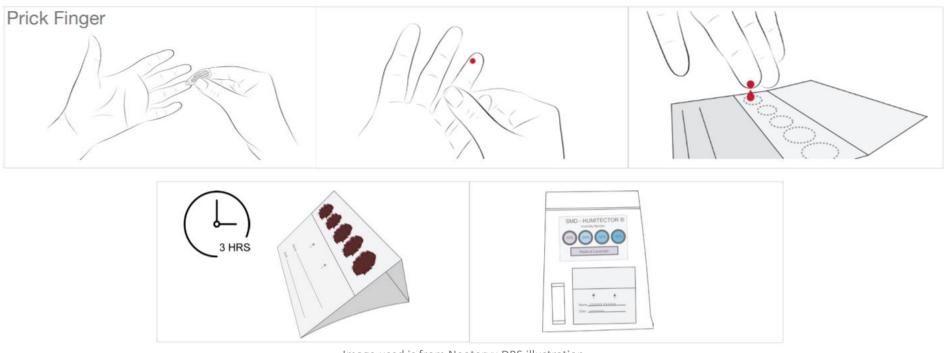
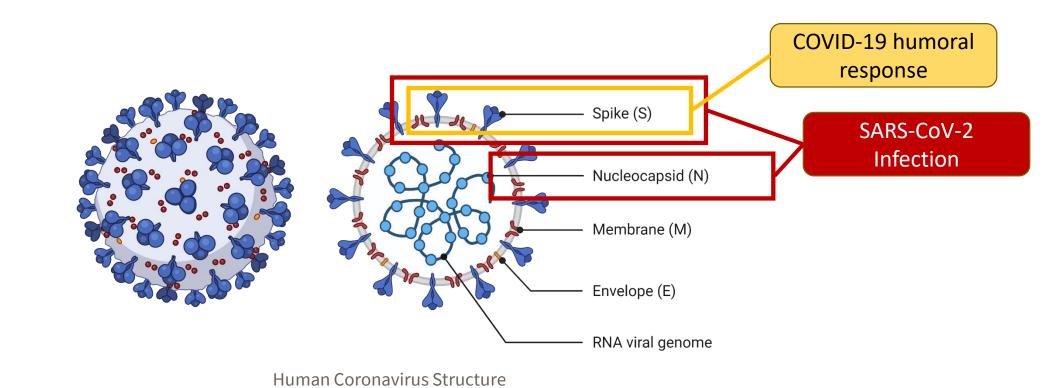


Image used is from Neoteryx DBS illustration

- 1. Blood samples were collected by participants using in-home dried blood spot sampling kids and returned by mail
- 2. SARS-CoV-2 IgG antibody serology testing was performed by the Marc-André Langlois Lab, University of Ottawa

SARS-CoV-2 serology testing





The IgG antibody assay targeting the Receptor Binding Domain of the SARS-CoV-2 spike (S) protein and Nucleocapsid protein (N)

SARS-CoV-2 infection *case definition*



Positive SARS-CoV-2 test from <u>self-report</u> (obtained from the biweekly and quarterly surveys)

Positive SARS-CoV-2 test from DBS testing



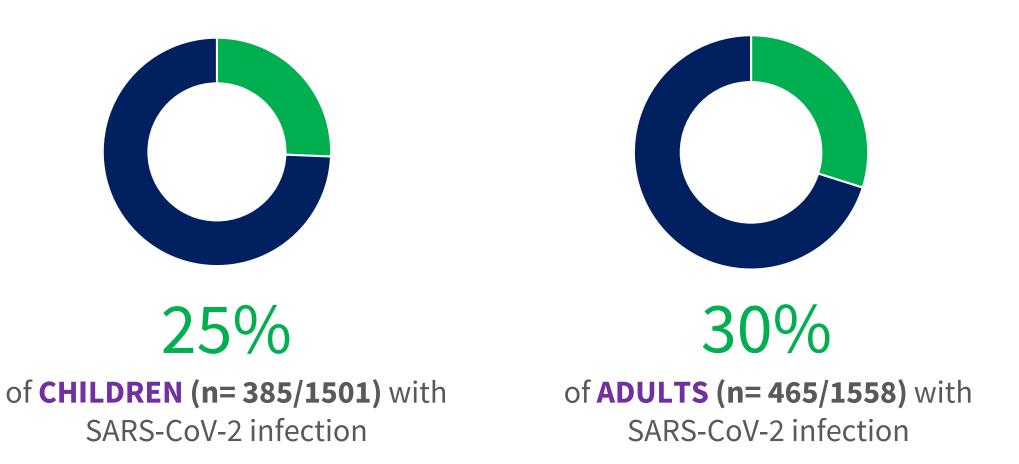
Anti-Np IgG Anti-Spike IgG

Positive SARS-CoV-2 test result from either self-report OR positive DBS serology

Positive SARS-CoV-2 infection

SARS-CoV-2 infection among participants

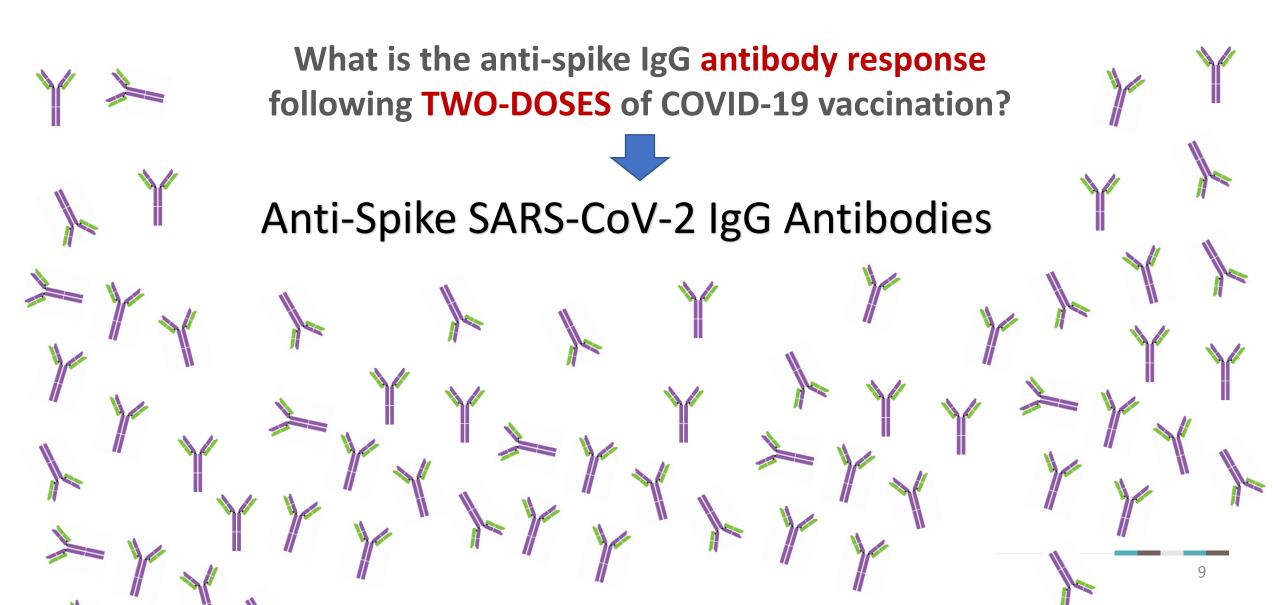




^{*}Prior SARS-CoV-2 infection: positive report of SARS-CoV-2 infection from DBS serology, biweekly or quarterly questionnaires DBS samples obtained from March 2021 – January 2022

Research question





Hybrid immunity slows the decay rate of anti-spike IgG



Antibody levels after TWO COVID-19 vaccine doses

Hybrid immunity
helps maintain antibody levels
and slows the 'decay' rate

Children demonstrate higher anti-spike SARS-CoV-2 IgG production compared to adults



Antibody levels after TWO COVID-19 vaccine doses

For both
CHILDREN and ADULTS,
the highest antibody levels
were observed around
3 months post-vaccination

mRNA COVID-19 vaccines are associated with the greatest anti-spike SARS-CoV-2 antibody production



Antibody levels after TWO COVID-19 vaccine doses

HIGHER antibody
levels were observed
in ADULTS who received
mRNA vaccines for both doses
compared to
AstraZeneca Oxford

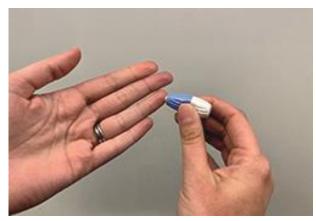
Lessons Learned – In Home Biological Sampling





Health Canada

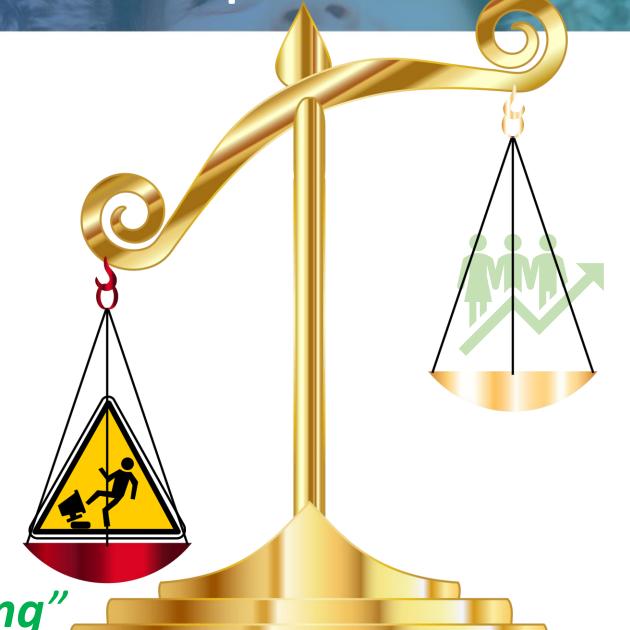




- In-home blood collection device choice was not approved by Health Canada for diagnostic purposes and resulted in study delays
- Serology Blood Sampling
 High- vs Low-Flow Lancets:
 - High-flow blood draw (blue) finger-prick lancets resulted in adequate samples but were considerably too painful for most participants.
 - Low-flow pink lancets were less painful but likely increased the number of insufficient samples collected for serology

Lessons Learned – Participant Burnout





"This is too long"

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