

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

Larisa Lotoski, PhD

Research Associate

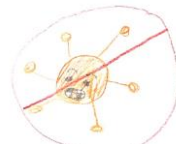
THRiVE Discovery Lab

University of Manitoba

Children's Hospital Research Institute of Manitoba

larisa.lotoski@umanitoba.ca

<http://www.thrivediscovery.ca/>

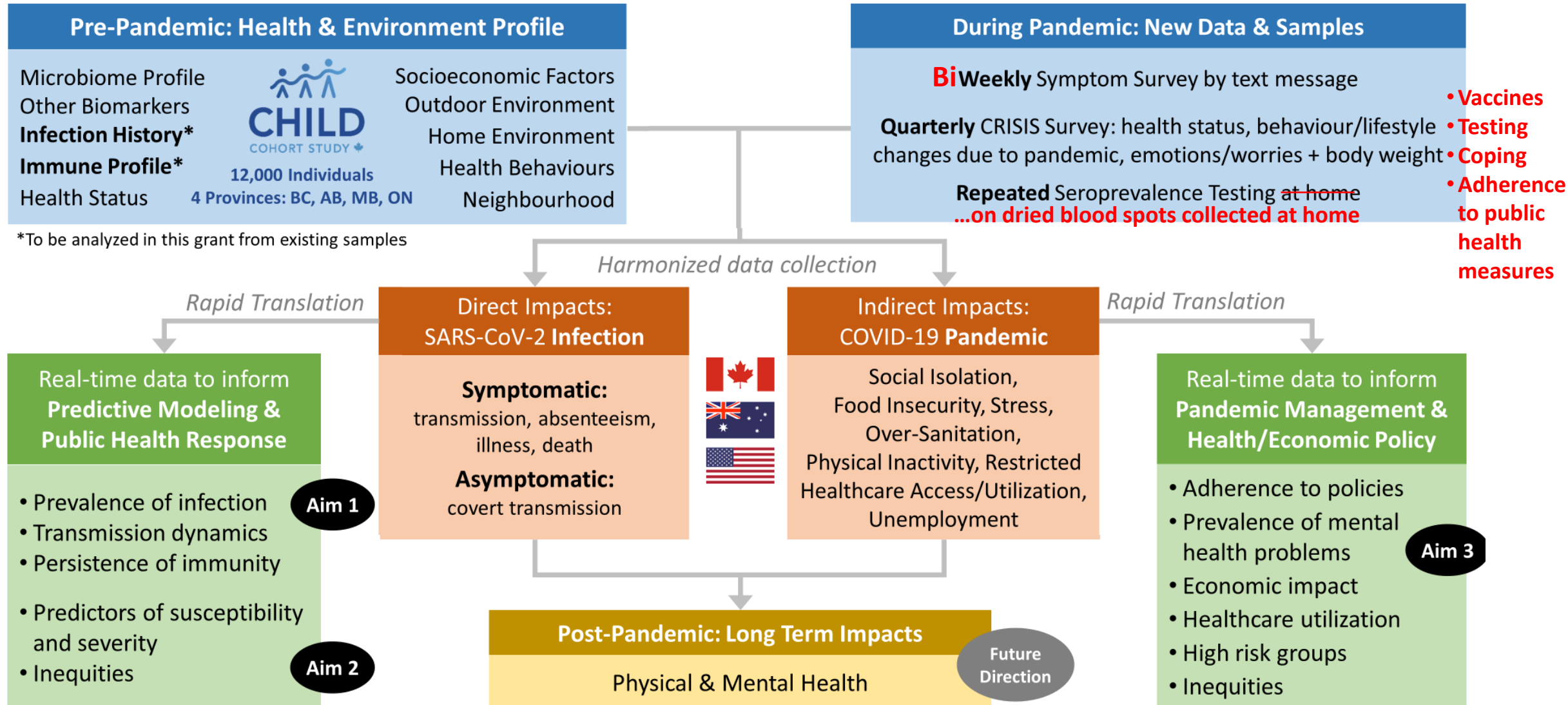


CHILD COVID-19 Research



Reorienting existing research platform: CHILD 2008-2020

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





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

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

Dried blood spots collection kit for parents and their children

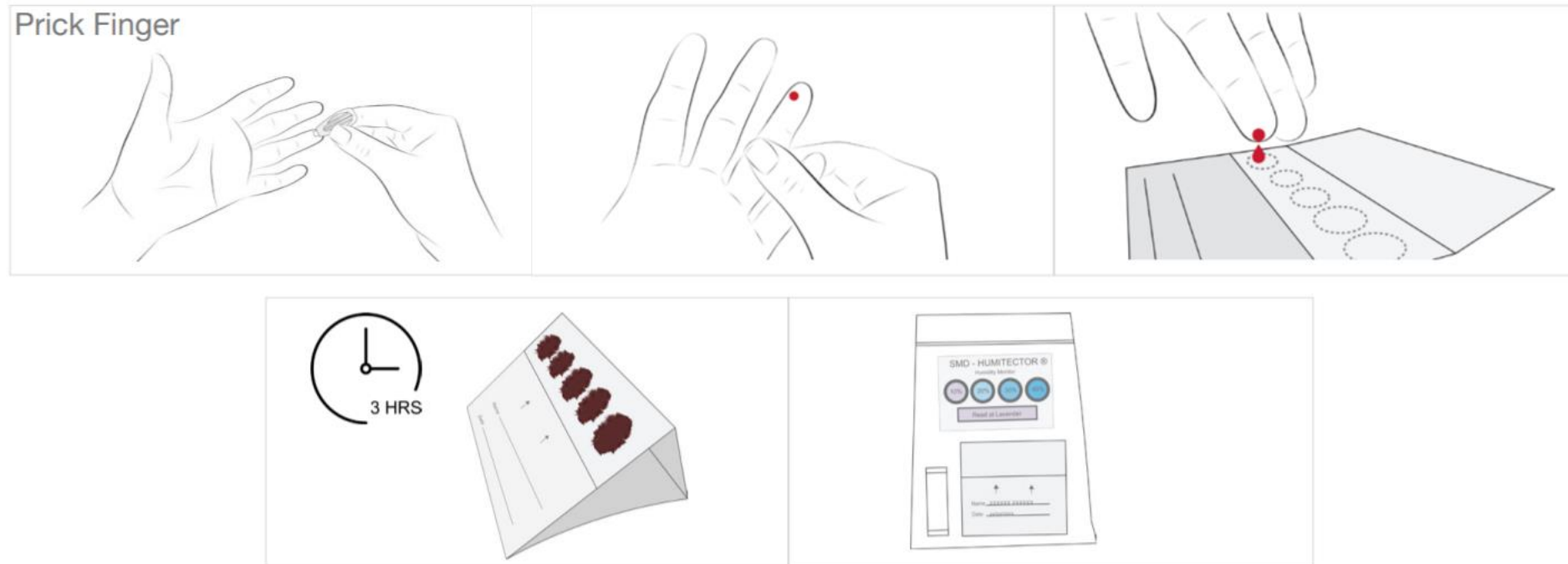
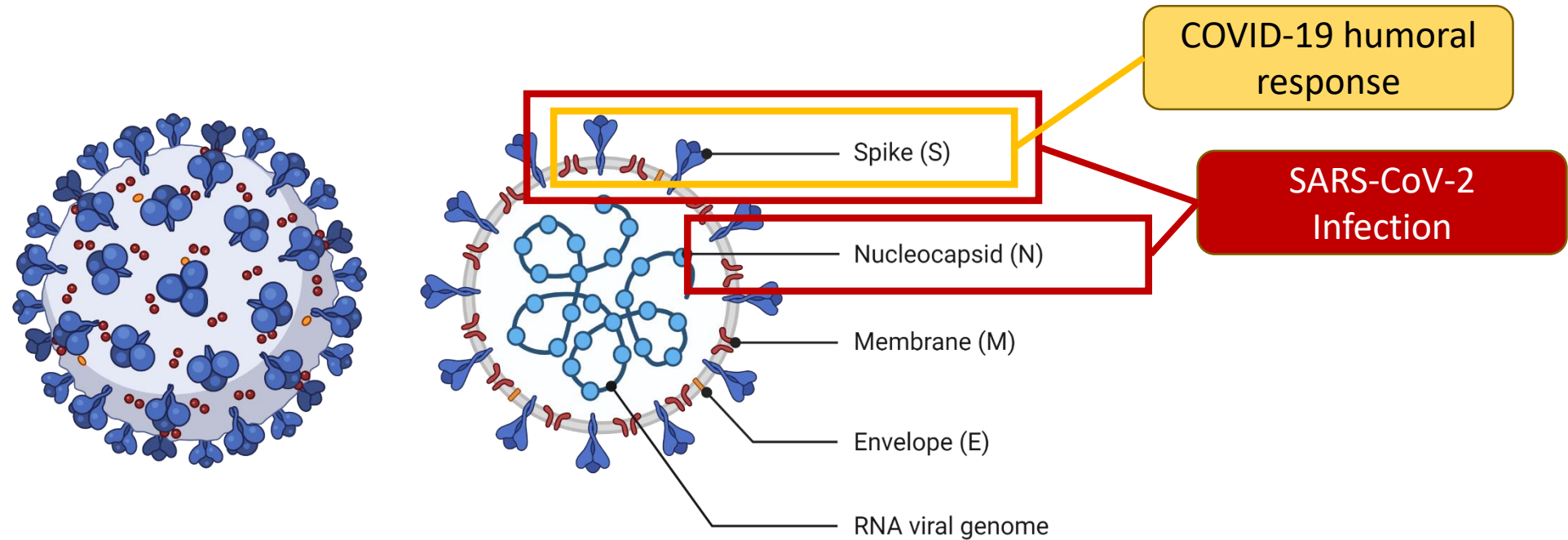


Image used is from Neoteryx DBS illustration

1. Blood samples were collected by participants using in-home dried blood spot sampling kits 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





Human Coronavirus Structure

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 self-report
(obtained from the biweekly and quarterly surveys)

Positive SARS-CoV-2 test from DBS testing

 +  = **SEROPOSITIVE**
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



25%

of **CHILDREN** (n= 385/1501) with
SARS-CoV-2 infection



30%

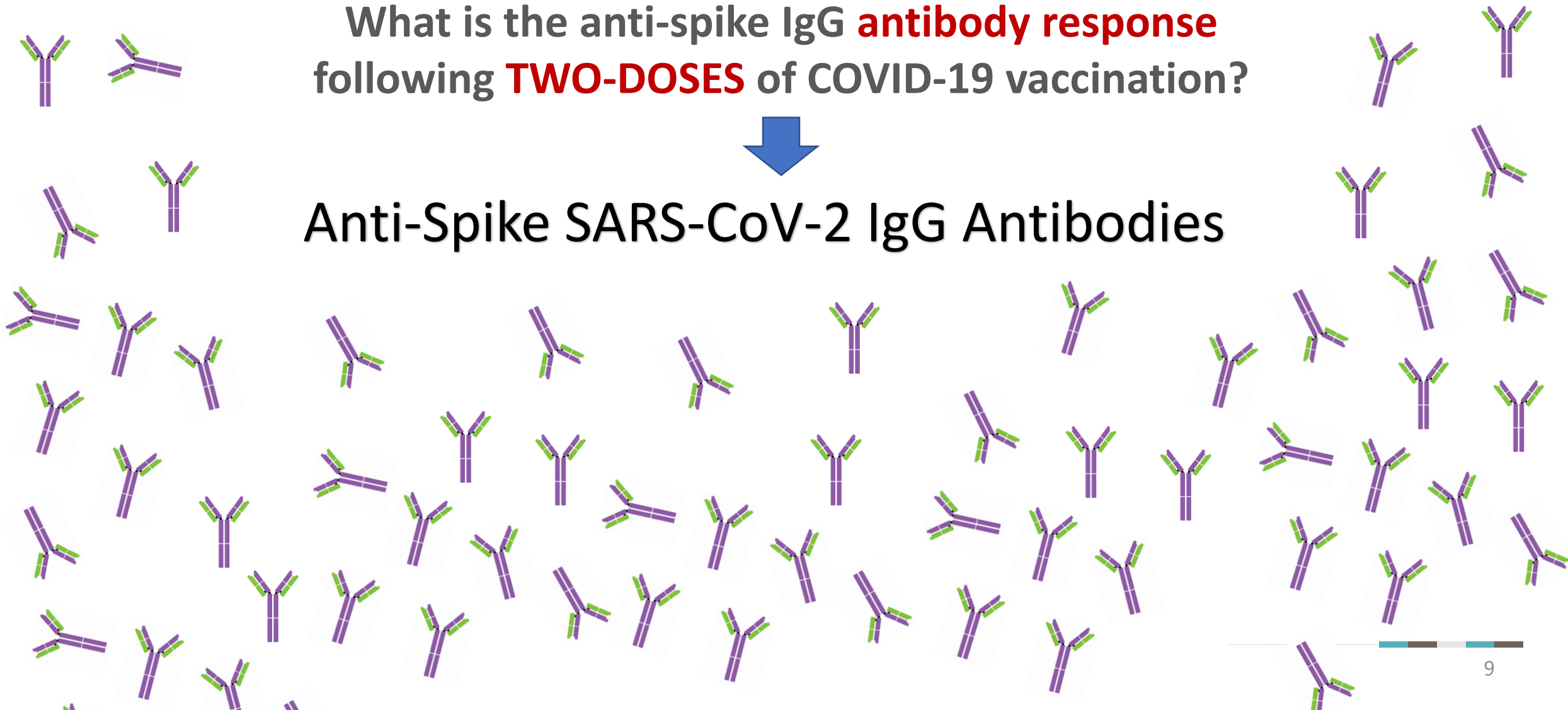
of **ADULTS** (n= 465/1558) with
SARS-CoV-2 infection

*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

What is the anti-spike IgG **antibody response** following **TWO-DOSES** of COVID-19 vaccination?



Anti-Spike SARS-CoV-2 IgG Antibodies



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

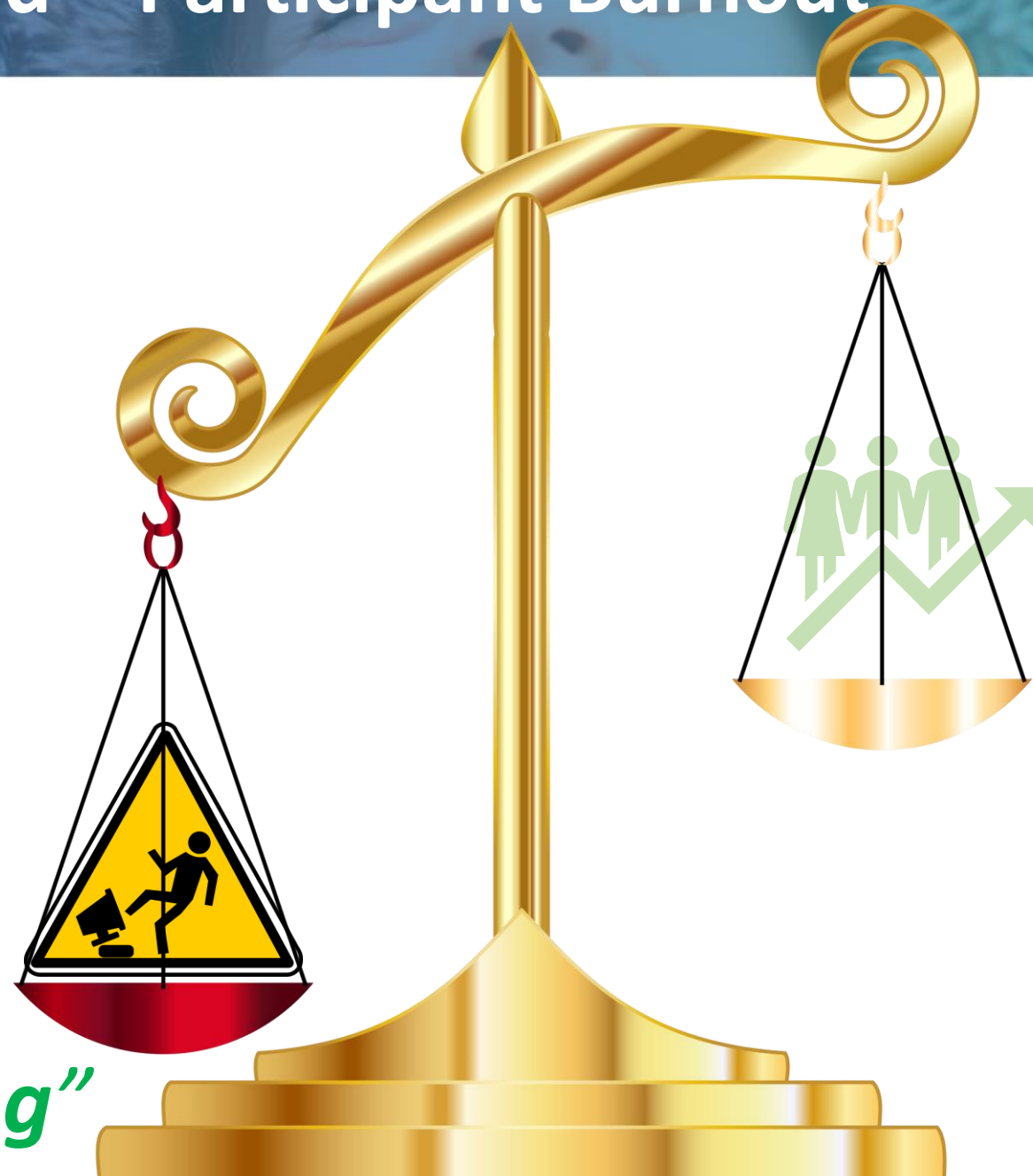


Health
Canada



- **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”

Acknowledgements



This work was
performed by:
Rilwan Azeez,
MD, MSc (2023)



THRiVE Discovery: Meghan Azad (Principal Investigator), Natalie Rodriguez, Stephanie Goguen



PJ Subbarao, Aimee Dubeau, Tyler Freitas, Kim Wright, Marshall Beck, Myrtha Reyna, Maria Medeleanu (SickKids)

Stuart Turvey & Linda Warner (UBC)

Piush Mandhane & Joyce Chikuma (U Alberta)

Theo Moraes & Yaminee Charavanapavan (SickKids)

Elinor Simons & Scarlet Salas (U Manitoba)

Collaborators

Leslie Roos & Emily Cameron (U Manitoba)

Geoff Winsor & Fiona Brinkman (Simon Fraser University)

Marc-Andre Langlois (U Ottawa)

