

The SPRING Study: Severe acute respiratory syndrome-related coronavirus 2 prevalence in children and young adults in British Columbia: an observational study

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Introduction

- Pediatric COVID-19 cases are generally less severe than in adults with a varying proportion considered asymptomatic
- Differences in clinical presentation complicate estimates of disease burden by age based solely on reported surveillance data

This study aims to:

- 1) Estimate age- and sex-specific prevalence of SARS-CoV-2 infection in children and young adults <25 years of age in BC based on presence of serum anti-SARS-CoV-2 IgG antibodies
- 2) Define asymptomatic and symptomatic infection rates to support predictive modelling in BC and Canada

Methods

- Electronic survey conducted using REDCap
- Mailed a kit to provide a self-collected finger or heel prick dried blood spot sample
- Assays conducted at the provincial reference laboratory at the BCCDC

Prospective observational study across two phases

- PHASE 1: December 2020-March 2021
- PHASE 2: Since June 2021 (ongoing)

Inclusion Criteria:

- Parent/guardian/participant willing and able to give informed consent and/or assent
- Age <25 years
- Resident in BC
- Phase 2: Unvaccinated kids ages 0-9; vaccinated youth ages 12-24

Exclusion Criteria: none specific

Demographics

Phase 1

- 2535 participants enrolled; 2129 samples sufficient to analyse
- Gender: Female 56.5%; Male 43.5%
- 83% had no underlying health conditions
- Ethnicity: white 84%, Chinese 4%, South Asian 3%, Mixed 14%, Unknown 17%
- Geographic distribution: VCHA 33.7%, Fraser 26.3%, Interior 6.2%, Northern 2.3%, Island 8.8%

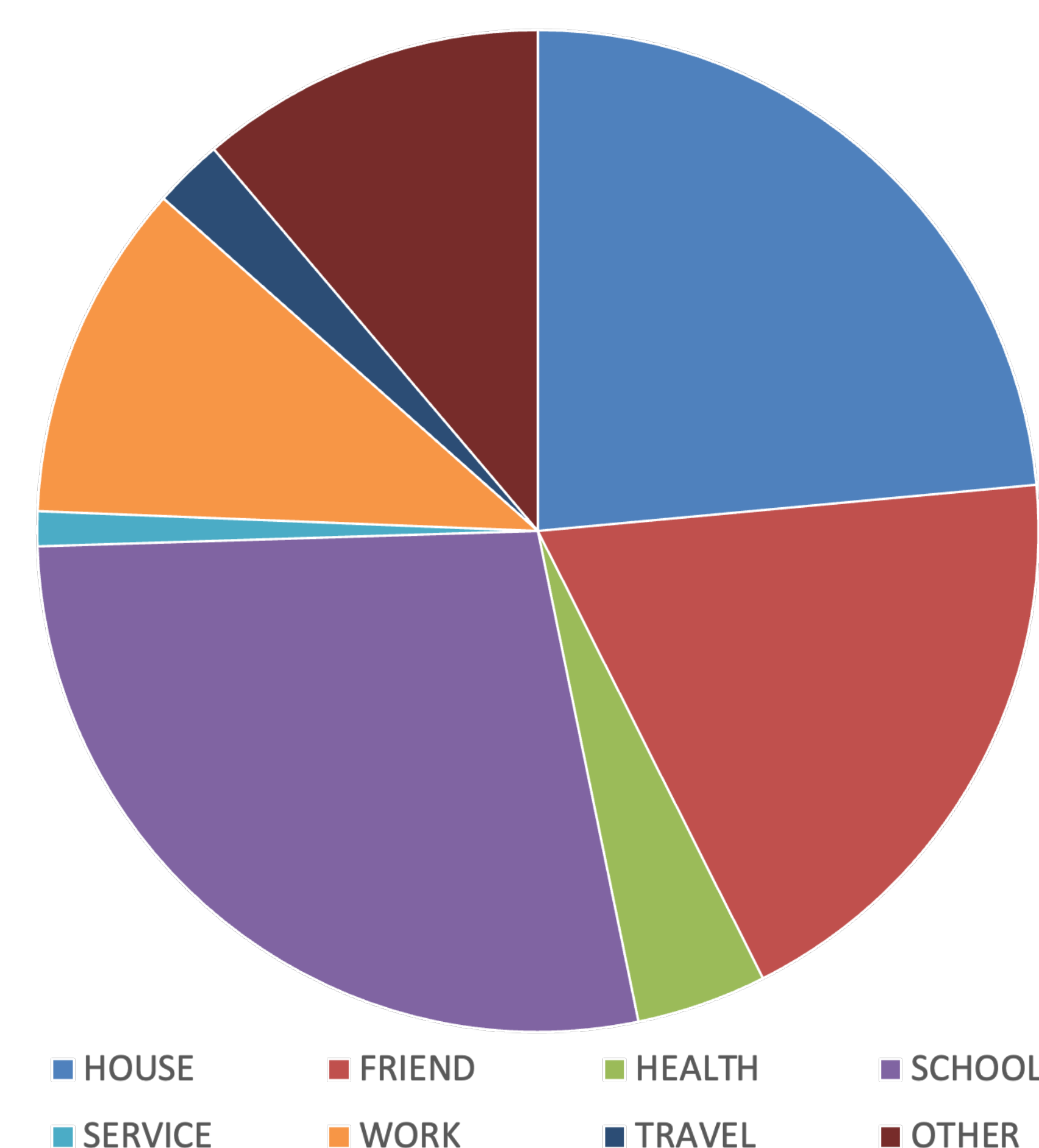
Phase 2

- 2040 participants enrolled
- Analysed 933 participants ages 0-9yo

Phase 1 Exposure Sources

- 89% of participants reported no known COVID-19 exposures

Figure 1: Exposure Sources (if known)



Seropositivity

Phase 1

- 4.4% of participants were seropositive
- Higher seropositivity in young adults 20-24yo (Table 1)
- In comparison: BCCDC data from April 3, 2021, showed approx. 1% of children under 10yo were seropositive (Table 2)

Phase 2

- Overall, 6.29% of participants <10yo were seropositive
- In comparison: BCCDC data from February 26, 2022, showed approx. 6.2% of children <10yo were seropositive (Table 2)

Table 1: Seroprevalence by age

Age	Phase 1 Seroprevalence (95% CI)	Phase 2 Seroprevalence (95% CI)
0 - 4	3.17% (1.78, 5.59)	7.65% (4.52, 12.64)
5 - 9	4.09% (2.57, 6.45)	5.72% (3.84, 8.44)
10 - 14	3.24% (1.97, 5.28)	-
15 - 19	3.84% (2.44, 5.98)	-
20 - 24	7.22% (5.21, 9.92)	-

Table 2: Comparison of study and BCCDC data

	Phase 1 Seroprevalence (95% CI)	Phase 2 Seroprevalence (95% CI)
SPRING: 5-9yo	4.09% (2.57, 6.45)	SPRING: 0-9yo 6.29% (4.58, 8.59)
BCCDC (Apr 3, 2021): <10yo ¹	1.09%	BCCDC (Feb 26, 2022): <10yo ² 6.2%

BCCDC Data representative of case counts on noted dates out of the total population of <10yo children cited periodically in the BCCDC COVID-19 Situation Reports.

Phase 1: Detailed analysis

- Overall higher seroprevalence:
 - Traveled internationally (6.71%, 95% CI: 4.47, 9.95)
 - Known exposure to an individual with COVID-19 (14.1%, 95% CI: 10.22, 19.14)
 - Certain ethnicities: South Asian 10.89% (95% CI: 6.19, 18.46), West Asian 25% (95% CI: 8.89, 53.23), Filipino 14.63% (95% CI: 6.88, 28.44)

Only known exposure to an individual with COVID-19 sustained into Phase 2

Both Phases

- No difference between health authorities (Table 3)

Table 3: Seroprevalence by health authority

	Phase 1 (All ages) Seroprevalence (95% CI)	Phase 2 (<10yo) Seroprevalence (95% CI)
FHA	5.85% (4.2, 8.1)	7.78 (4.61, 12.86)
IHA	2.92% (1.14, 7.27)	4.44 (1.23, 14.83)
NHA	1.96% (0.35, 10.3)	7.14 (1.27, 31.47)
Unknown	3.55% (2.23, 5.61)	7.36 (4.26, 12.43)
VCHA	4.22% (2.99, 5.92)	4.17 (1.92, 8.79)
VIHA	4.5% (2.39, 8.33)	5.13 (1.42, 16.89)

Discussion

- Higher seropositivity in study data compared to provincially reported data
- High seropositivity amongst young adults, certain ethnicities in Phase 1 compared to other age groups

Limitations

- Sample is disproportionately white; numbers in some ethnic groups are relatively small
- May have unintended selection bias in who volunteered to participate in the study
- Over-representation of VCHA and FHA (69-78% of participants vs. 63% of BC population)
- Children & youth living in the north and identifying as Indigenous not adequately represented in cohort