

# Factors associated with SARS-CoV-2 testing and test positivity in children and parents: a longitudinal cohort study

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## Introduction

Children and families are important contributors to community transmission of Covid-19.<sup>1,2</sup> Few studies have examined risk factors for SARS-CoV-2 infection in children and their parents or evaluated the contributing features of child preventive behaviours and family contexts.

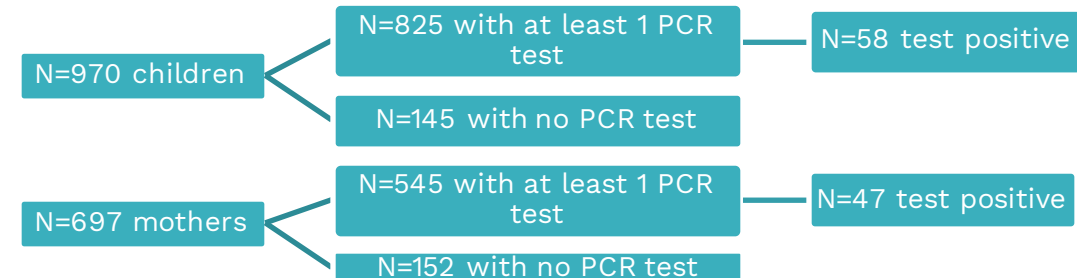
## Objective

To determine risk factors associated with time to test positivity and time to testing for both children and their mothers.

## Methods

A longitudinal cohort study was conducted in healthy children aged 0-10 years and their mothers through the TARGet Kids! COVID-19 Study of Children and Families in the Greater Toronto Area (April 2020 –April 2021) and linked SARS-CoV-2 PCR testing data from provincial laboratory systems at ICES. These datasets were linked using unique encoded identifiers and analyzed at ICES. The primary outcome was time to first PCR test positivity for SARS-CoV-2 infection. The secondary outcome was time to PCR test. Risk factors investigated included adherence to public health measures, sociodemographic factors, and Covid-19 vaccination status. Cox proportional hazards models and Andersen-Gill models were used for the primary and secondary analysis respectively.

## Results



## Results

**Table 1.** Demographics of study sample (n=970)

Factor	Mean (SD)	n (%)
Child age at baseline	4.6 (2.6)	
Mother's age at baseline	39.4 (4.8)	
Maternal ethnicity	East Asian - n (%)	61 (6.3%)
	European - n (%)	520 (53.6%)
	Others - n (%)	122 (12.6%)
	South/Southeast Asian - n (%)	90 (9.3%)
Maternal education	College/University - n (%)	845 (87.1%)
	Public/High School - n (%)	39 (4.0%)
	Not reported - n (%)	86 (8.9%)
Household income quintile	1 - n (%)	168 (17.3%)
	2 - n (%)	186 (19.2%)
	3 - n (%)	206 (21.2%)
Household essential worker status	4 - n (%)	161 (16.6%)
	5 - n (%)	131 (13.5%)
	No - n (%)	439 (45.3%)
	Yes - n (%)	251 (25.9%)

## Factors associated with test positivity among participants who tested for SARS-CoV-2

**Table 2.** Factors associated with test positivity in children (n=825)

Factor	Adjusted HR
Maternal infection	Infected [vs. not infected] 5.50 (4.37, 6.92)
Maternal education	College [vs. University] 1.37 (1.09, 1.72)
Weekly PHU cases	Per 1000 increase in cases 1.04 (1.01, 1.07)
Handwashing	Per increase in adherent days/wk 0.63 (0.40, 0.99)
Maternal ethnicity	East Asian [vs. European] 0.44 (0.27, 0.73)

Model also included child age, mother's age, child sex, household income, maternal education (apprenticeship/trades, high school, <high school vs. university) number of people in household, child health behaviours (staying home, limiting visitors, avoiding contact with others, keeping a distance), mother's vaccination status, child vaccination status  
PHU= Public Health Unit

## Conclusions

- ▶ SARS-CoV-2 infection in the family and community were associated with time to infection in children and mothers. Social determinants were associated with testing for SARS-CoV-2.
- ▶ Investment in equitable access to testing and population-level interventions may reduce SARS-CoV-2 transmission in families.

**Table 3.** Factors associated with test positivity in mothers (n=545)

Factor	Adjusted HR
Child infection	Infected [vs. Not infected] 7.44 (5.49, 10.09)
Maternal education	Apprenticeship/trades [vs. University] 2.97 (1.73, 5.10)
	College [vs. University] 1.48 (1.18, 1.86)
	High school [vs. University] 1.82 (1.37, 2.41)
Maternal ethnicity	East Asian [vs. European] 0.38 (0.21, 0.69)
	South/Southeast Asian [vs. European] 1.58 (1.26, 1.98)
Num people in household	Per person increase 1.32 (1.14, 1.53)
Weekly PHU cases	Per 1000 increase in cases 1.04 (1.01, 1.07)

Model also included child age, maternal age, child sex, household income, number of people in household, child health behaviours, and child vaccination status

## Factors associated with SARS-CoV-2 testing

**Table 4.** Factors associated with testing in children (n=970)

Factor	Adjusted HR
Maternal vaccination	Vaccinated [vs. Unvaccinated] 1.14 (1.02, 1.28)
Weekly PHU cases	Per 1000 increase in cases 1.15 (1.10, 1.19)
Maternal Education	College [vs. University] 0.84 (0.75, 0.94)
	High school [vs. University] 0.74 (0.62, 0.88)
Maternal Ethnicity	East Asian [vs. European] 0.80 (0.70, 0.92)
	Other [vs. European] 0.84 (0.76, 0.93)
	South/Southeast Asian [vs. European] 0.68 (0.60, 0.77)
Staying home	Per increase in adherent days/wk 0.81 (0.70, 0.93)

Model also included child age, mother's age, household income, number of people in household, child health behaviours (limiting visitors in the home, avoiding contact, keeping distance, washing hands), and maternal infection

**Table 5.** Factors associated with testing in mothers (n=697)

Factor	Adjusted HR
Num. people in household	Per person increase 1.43 (1.06, 1.94)
Limiting visitors	Per increase in adherent days/wk 1.24 (0.78, 1.95)
Weekly PHU cases	Per 1000 increase in cases 1.16 (1.07, 1.26)
Child vaccination status	Vaccinated [vs. Unvaccinated] 0.68 (0.48, 0.96)
Maternal ethnicity	East Asian [vs. European] 0.43 (0.25, 0.73)

Model also included child age, mother's age, child sex, maternal education, maternal ethnicity (Other, Southeast Asian) household income, health behaviours (staying home, avoiding contact, keeping distance, washing hands), child infection

## References

1. Flasche, Stefan, and W. John Edmunds. "The role of schools and school-aged children in SARS-CoV-2 transmission." *The Lancet infectious diseases* 21.3 (2021): 298-299.
2. Goldstein, Edward, Marc Lipsitch, and Muge Cevik. "On the Effect of Age on the Transmission of SARS-CoV-2 in Households, Schools, and the Community." *The Journal of infectious diseases* 223.3 (2021): 362-369.