

TARGetKids! COVID-19 Study: An analysis of COVID-19 public health measure adherence amongst parents & children

Kevin Dang

Supervisor: Dr. Charles Keown-Stoneman
Applied Health Research Centre (AHRC), St. Michael's Hospital

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- From March 2020, Ontario public health measures included school closures, stay-at-home orders, and restricting access to outdoor areas
 - ▶ Handwashing, mask-wearing, and social distancing were introduced soon after the initial closures
- Previously, a longitudinal cohort study¹ was conducted in young children and their parents through the TARGet Kids! COVID-19 Study in the Greater Toronto Area (April - July 2020)
 - ▶ The study concluded that adherence was high among parents and children but decreased over time
 - ▶ Next steps: Perform separate analyses of parents and children, extend the timeline to the present day, expand the region to Ontario

¹Y. Yoshida-Montezuma, C. D. G. Keown-Stoneman, S. Wanigaratne, et al., "The social determinants of health as predictors of adherence to public health preventive measures among parents and young children during the COVID-19 pandemic: a longitudinal cohort study."

- Parents filled out the COVID-19 data collection form on a weekly basis
 - ▶ Primary Outcome: Total adherence to COVID-19 public health measures in the past seven days = sum of 7.1-7.5 in Figure 1
 - ▶ Primary Exposure: Calendar date when the parents completed the weekly form

7. Out of the last 7 days, how many days have you and your child been practicing the following preventive measures?		
7.1 Staying home (did not go to work, school or other public places)	_____ days	_____ days
7.2 Limiting the number of visitors in your home	_____ days	_____ days
7.3 Avoiding contact with others	_____ days	_____ days
7.4 Keeping distance (2 m or more) from others	_____ days	_____ days
7.5 Practicing frequent hand washing	_____ days	_____ days

Figure 1: Weekly COVID-19 Data Collection Form

Research Questions

- Primary Research Question: How did the adherence to COVID-19 public health measures amongst parents & children in Ontario change over time?

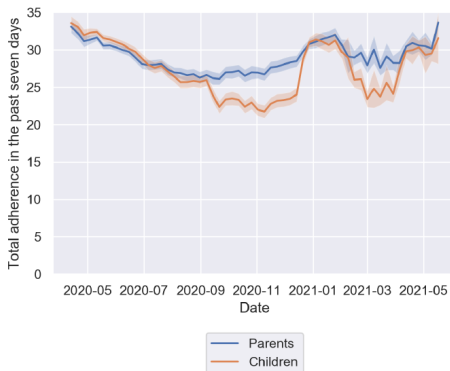
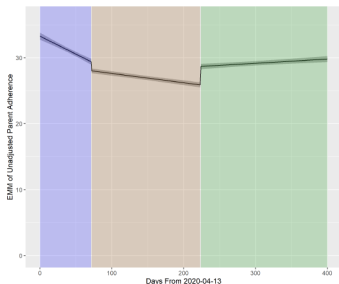


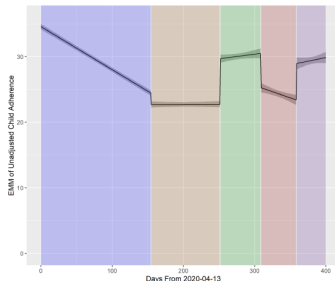
Figure 2: Total adherence to the five public health guidelines in the past seven days amongst parents & children over time

Research Questions

- Secondary Objective 1: Were provincial lockdowns associated with higher adherence to public health measures amongst parents?
- Secondary Objective 2: Were school closures associated with higher adherence to public health measures amongst children?



Secondary Objective 1



Secondary Objective 2

Figure 3: Estimated marginal means for the sum of the five public health guidelines in the past seven days in parents with linear splices during the lockdowns (left) and children with linear splices during school closures (right)

Research Questions

- Secondary Objective 3: To explore how sociodemographic factors modified these associations.
 - ▶ Main focus of practicum
- Secondary Objective 4: To explore how different COVID-19 public health measures changed over time amongst parents & children.

		COVID-19 public health measure adherence hypothesis
		Parents Children
Sociodemographic factor	Self-reported income	Decreased adherence for lower income
	Being in a hotspot FSA	Decreased adherence for living in a hotspot FSA
	Dwelling type	Decreased adherence for apartment-living
	Essential worker status	Increased adherence for having an essential worker in the household
	Maternal ethnicity	Decreased adherence for members of a visible minority
	Child age	Decreased adherence for having an older child in the household
	Child sex	Decreased adherence for having a male child

Secondary Objective 3



Secondary Objective 4

Figure 4: Hypotheses for sociodemographic factors (left), and adherence to the five public health guidelines in the past seven days in children over time (right)

- Multiple Imputation for missing data
 - ▶ Using the `mice` package in R
- Linear Mixed Effects Regression with Regularization
 - ▶ To test for changes in adherence to COVID-19 public health measures over time
 - ▶ Regularization: LASSO penalty to reduce number of interaction terms, using the `glmLasso` package in R
 - ▶ Bootstrapping: generate simulated datasets to test whether the same interaction terms will get selected each time
- Piecewise Linear Regression
 - ▶ To test for changes in adherence to COVID-19 public health measures during lockdowns & school closures

Proposed Methods

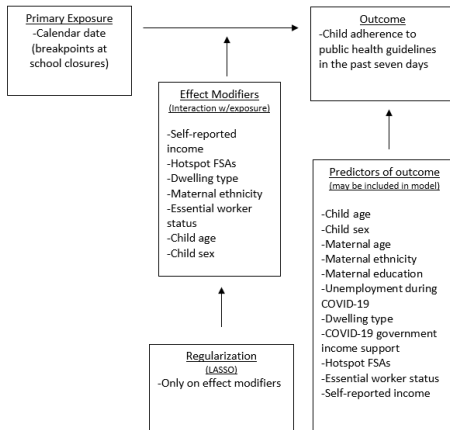


Figure 5: Diagram of LASSO-penalized Linear Mixed Model

- Least Absolute Shrinkage and Selection Operator

- ▶ The LASSO coefficients $\hat{\beta}_{\lambda}^L$ minimize the residual sum of squares + $\lambda \sum_{j=1}^p |\beta_j|$
- ▶ Cross-validation to select optimal tuning parameter λ
- ▶ Feature selection method

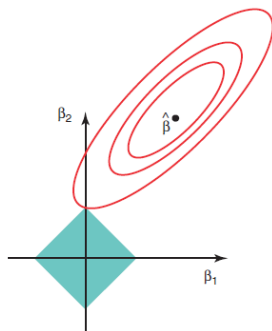


Figure 6: Contours of the error and constraint functions for the lasso.² When the ellipse intersects the lasso constraint region at an axis, one of the coefficients will equal zero.

²G. James, D. Witten, T. Hastie, R. Tibshirani. "An Introduction to Statistical Learning."

