

Table S1. Variables Representation in the Models

Variables	Meaning
x_1	proportion of apartment in a building that has five or more storeys in the total occupied private dwellings for different areas
x_2	proportion of other attached dwelling in the total occupied private dwellings
x_3	proportion of apartment in a building that has fewer than five storeys
x_4	average household size
x_5	prevalence of low income based on the Low-income measure (\%, after tax)
x_6	prevalence of low income in 0-17 years age group(\%, after tax)
x_7	prevalence of low income in 18-64 years age group(\%, after tax)
x_8	prevalence of low income in over 65 years age group(\%, after tax)
x_9	proportion of self-employed workers in all class workers
x_{10}	population density
x_{11}	proportion of health occupations in all occupations
x_{12}	65 years and over distribution (%) of the population by broad age groups

Table S2. Restriction Methods and Corresponding Levels.

Restriction Methods	Restriction Levels
Indoor Gathering	level 0: No upper limit on the number of people allowed level 1: The upper limit was less than 50 level 2: The upper limit was less than 10 level 3: The upper limit was less than 5
Outdoor Gathering	level 0: No upper limit on the number of people allowed level 1: The upper limit was less than 100 level 2: The upper limit was less than 25 level 3: The upper limit was less than 10 level 4: The upper limit was less than 5
Non-essential Services	level 0: No restrictions were imposed level 1: Sit-down dining (with varying upper limit and some limitations, like wearing facial mask) at cafes, restaurants was allowed level 2: Access to some non-essential and leisure services allowed, such as outdoor and non-contact activities level 3: Restaurants/bars/cafes (except takeout/delivery) closed, retail services restricted and personal services closed level 4: Non-essential businesses closed

Table S3. Indoor Gathering Intervention Timeline Under Level in Ontario

Date	Levels
2020-03-28	level 3
2020-06-12	level 2
2020-07-17	level 1 (24 public health units that entered stage 3)
2020-07-24	level 1 (7 public health units that entered stage 3)
2020-07-31	level 1 (Toronto, Peel public health units)
2020-09-18	level 2 (Toronto, Peel and Ottawa public health units)
2020-09-19	level 2
2020-11-07	level 3 (Peel public health unit)
2020-11-14	level 3 (Toronto public health unit)
2020-11-16	level 3 (Hamilton, Halton, York public health units)
2020-11-23	level 3 (Durham, Waterloo public health units)
2020-11-23	level 2 (5 regions entered orange level and 6 regions entered yellow level)
2020-11-28	level 3 (Windsor Essex County health unit)
2020-11-28	level 2 (Haldimand Norfolk, and 3 regions entered yellow level)
2020-12-07	level 2 (Middlesex London, Thunder Bay health units and 3 regions entered yellow level)
2020-12-14	level 3 (Windsor-Essex, York Region health units and 3 regions entered red level)
2020-12-14	level 2 (Eastern, Leeds, Grenville and Lanark District health units)
2020-12-21	level 3 (Hamilton, Brant County, Niagara Region health units)
2020-12-21	level 2 (Kingston, Frontenac and Lennox and Addington health unit, Timiskaming and Sudbury Districts health units)
2020-12-26	level 3
2021-02-10	level 2 (Kingston, Frontenac and Lennox and Addington health unit, Renfrew County and District health unit, Hastings and Prince Edward Counties health unit)
2021-02-16	level 2 (Leeds, Grenville and Lanark District health unit, Timiskaming health unit, 9 regions entered orange level, 4 regions entered yellow level)
2021-02-22	level 3 (Lambton health unit)
2021-03-01	level 2 (Grey Bruce health unit, 2 regions entered yellow level, 3 regions entered orange level)
2021-03-08	level 3 (Peterborough, Sudbury health units)
2021-03-08	level 2 (Renfrew County health unit)
2021-03-19	level 3 (Ottawa health unit)
2021-03-22	level 2 (North Bay Parry Sound District, Wellington Dufferin Guelph health units)
2021-03-22	level 3 (Brant, Chatham-Kent, Leeds, Grenville and Lanark District health units)
2021-03-26	level 3 (Timiskaming health unit)
2021-03-30	level 3 (Middlesex London health unit)
2021-04-03	level 3

Table S4. Outdoor Gathering Intervention Timeline Under Level in Ontario

Date	Levels
2020-03-28	level 4
2020-06-12	level 3
2020-07-17	level 1 (24 public health units that entered stage 3)
2020-07-24	level 1 (7 public health units that entered stage 3)
2020-07-31	level 1 (Toronto, Peel public health units)
2020-09-18	level 2 (Toronto, Peel and Ottawa public health units)
2020-09-19	level 2
2020-11-23	level 3 (Toronto, Peel health units)
2020-12-14	level 3 (Windsor Essex, York Region health units)
2021-01-13	level 4
2021-02-10	level 2 (Kingston, Frontenac and Lennox and Addington health unit, Renfrew County and District health unit, Hastings and Prince Edward Counties health unit)
2021-02-16	level 2 (Leeds, Grenville and Lanark District health unit, Timiskaming health unit, 9 regions entered orange level, 4 regions entered yellow level, 11 regions entered red level)
2021-02-16	level 3 (Niagara Region health unit)
2021-02-22	level 2 (York Region health unit)
2021-03-01	level 3 (Simcoe Muskoka District, Thunder Bay District health units)
2021-03-01	level 2 (Niagara Region health unit)
2021-03-08	level 3 (Toronto, Peel health units)
2021-03-08	level 2 (North Bay Parry Sound District, Sudbury and District health units)
2021-03-12	level 3 (Sudbury and District health unit)
2021-04-03	level 4
2021-05-20	level 3

Table S5. Non-essential Services Intervention Timeline Under Level in Ontario

Date	Levels
2020-03-25	level 4
2020-05-19	level 3
2020-06-12	level 2 (24 public health unit regions entering stage 3)
2020-06-19	level 2 (7 public health unit regions entering stage 3)
2020-06-24	level 2 (Toronto, Peel public health units)
2020-07-17	level 1 (24 public health units that have entered stage 3)
2020-07-24	level 1 (7 public health units that have entered stage 3)
2020-07-31	level 1 (Toronto, Peel public health units)
2020-10-10	level 2 (Ottawa, Toronto, Peel public health units)
2020-10-19	level 2 (York region public health unit)
2020-11-23	level 3 (Peel, Toronto public health units)
2020-12-14	level 3 (Windsor Essex County, York Region public health units)
2020-12-21	level 3 (Hamilton health unit)
2020-12-26	level 3
2021-02-10	level 1 (3 regions that entered green-prevent level)
2021-02-16	level 1 (Leeds, Grenville and Lanark District health unit, Timiskaming health unit)
2021-02-16	level 1 (11 regions entered red-control level, 9 regions entered orange level, 4 regions entered yellow level)
2021-02-22	level 1 (York Region, Lambton health units)
2021-03-01	level 1 (Niagara Region public health unit)
2021-03-08	level 1 (North Bay Parry Sound District health unit)
2021-03-19	level 1 (Ottawa public health unit)
2021-04-03	level 2