



## Stop the Spread: COVID-19 Public Health Policy Decision Support

Client: Medical Operations Research Lab, University of Toronto

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### From Simulation Model to Public Health Policy

The Medical Operations Research Lab (morLAB) at the University of Toronto has been engaged by a provincial public health department to assist in making informed decisions about COVID-19 policies. Together, they integrated real public health data provided by the province into the morLAB Pandemic Outbreak Planner (morPOP). To bridge the gap between Public Health’s expertise and the complex simulation model output, the design team created a decision support system (DSS) consisting of a statistical analysis to determine the most effective policies and a user interface to display the results. The DSS enables Public Health to investigate the morPOP simulation outcomes self-sufficiently. Knowing the significant relationships between policy parameters and their impacts on model outcomes guides Public Health on the types of policies that have the most influence on controlling the spread of COVID-19.

### Building an Informative and Dynamic Decision Support System

The Pandemic Outbreak Policy Recommendation Assistant (POPRA) DSS gives Public Health access to key results for the statistical analysis. Using Design of Experiments, the team designed and ran 428 policy scenarios on the morPOP model. These scenarios compared seven parameters representing policies and their impact on three metrics: peak number of infections, total number of infections, and peak number of hospitalizations. Analysis of Variance was used to determine the parameters with a significant impact on the outcome metrics. At the 95% confidence level, the significant parameters include the following:

Unrestricted Policies	Household Bubble Size Fixed to Current Guideline
Household bubble size	Maximum number of daily community contacts
Maximum number of daily community contacts	Physical distancing and mask usage
Physical distancing and mask usage	Quarantine duration

The Excel user interface contains the analysis data, a summary of significant parameters, and a tool to independently analyze parameter combinations. The DSS can be updated with new simulation parameters and outputs, and the UI refreshes automatically when updated for ease of use.