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**Transportation Planning Applications** 

# Modeling COVID-19's impact on regional travel using TMIP-EMAT

# WHY IS EXPLORATORY MODELING NEEDED?

- COVID-19 decreased transit ridership by 60% and profoundly disrupted overall regional transportation behaviours
- One year into the pandemic, significant demand uncertainty persists, making it challenging to forecast revenue and plan service levels
- Exploratory modeling helps manage this uncertainty by simulating future scenarios to understand the probability and distribution of outcomes



# SIGNIFICANT UNCERTAINTIES



#### TRADITIONAL FORECASTING PROVIDES A SMALL NUMBER OF **FORECASTS**







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# EXPLORATORY MODELING ALLOW MULTIPLE SCENARIOS





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#### SIMULATIONS HELPED ASSESS THE PROBABILITY AND DISTRIBUTIONS OF POTENTIAL SCENARIO OUCOMES





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# EXPLORATORY MODELLING ASSUMPTIONS

Factors of Uncertainty	Without Vaccine			With Vaccine		
	Ranges			Ranges		
	Max	Min	Peak	Max	Min	Peak
Employment	PC	80% PC	0.95	PC	80% PC	0.95
Propensity for Auto Ownership	115% PC	85% PC	1	115% PC	85% PC	1
Propensity to Share Rides	PC	60% PC	0.9	PC	85% PC	1
Telecommuting/Remote Learning	55% PC trips	PC trips	0.9	75% PC trips	PC trips	0.95
Discretionary Trips	115% PC	70% PC	0.9	115% PC	85% PC	1
Fuel Prices	1.80\$/L	0.90\$/L	1.35\$/L	1.80\$/L	0.90\$/L	1.35\$/L
Transit Service (hours)	PC	PC		PC	PC	
Transit Capacity	PC	67% PC		PC	PC	

*Note: PC = "Pre-COVID"* 





### Modeled ridership distributions with and without vaccine





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# KEY DECISIONS INFORMED BY THIS METHODOLOGY

- 2021 budgeting based on ridership and revenue projections
- Recovery expectations and updating of service levels/vehicle procurement
- Funding discussions with senior governments

#### **Future Applications:**

- Network decisions and long-term project prioritization
- Capital investment decisions
- Evaluation of major regional policy alternatives



