

Exploratory Modeling to Inform Planning for COVID-19 Recovery

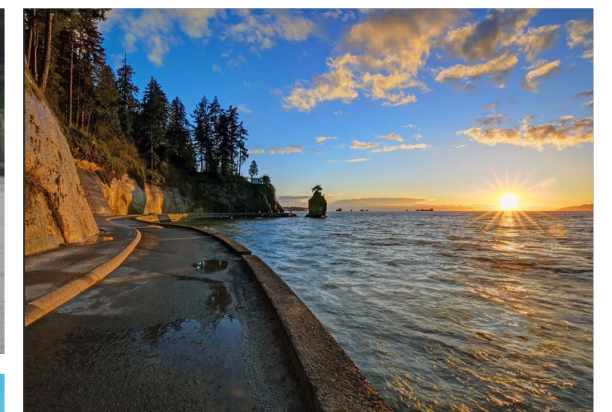
TMIP Webinar – December 7, 2021



Together all the way



Metro Vancouver



Population - 2.5m (2017)
Employment – 1.3m (2017)

Over 90% of our population and jobs are within walking distance to transit



Together all the way



TransLink



Coast Mountain Bus Company

220+ bus routes with a fleet of 1,500 vehicles



SeaBus

3 passenger-only ferries linking Downtown Vancouver & North Vancouver



Cycling

1,000 km of regional bike paths, locker facilities



HandyDART

Custom transit service for people with disabilities (310 fleet vehicles)



SkyTrain

Expo, Millennium & Canada Lines (68 km)



West Coast Express

5 daily trains running from Mission to Vancouver & back (67 km)



Major Road Network

Operation & maintenance of 2,300 lane kms of major roads



Bridges

Pattullo, Knight Street, Golden Ears & Westham Island Bridges

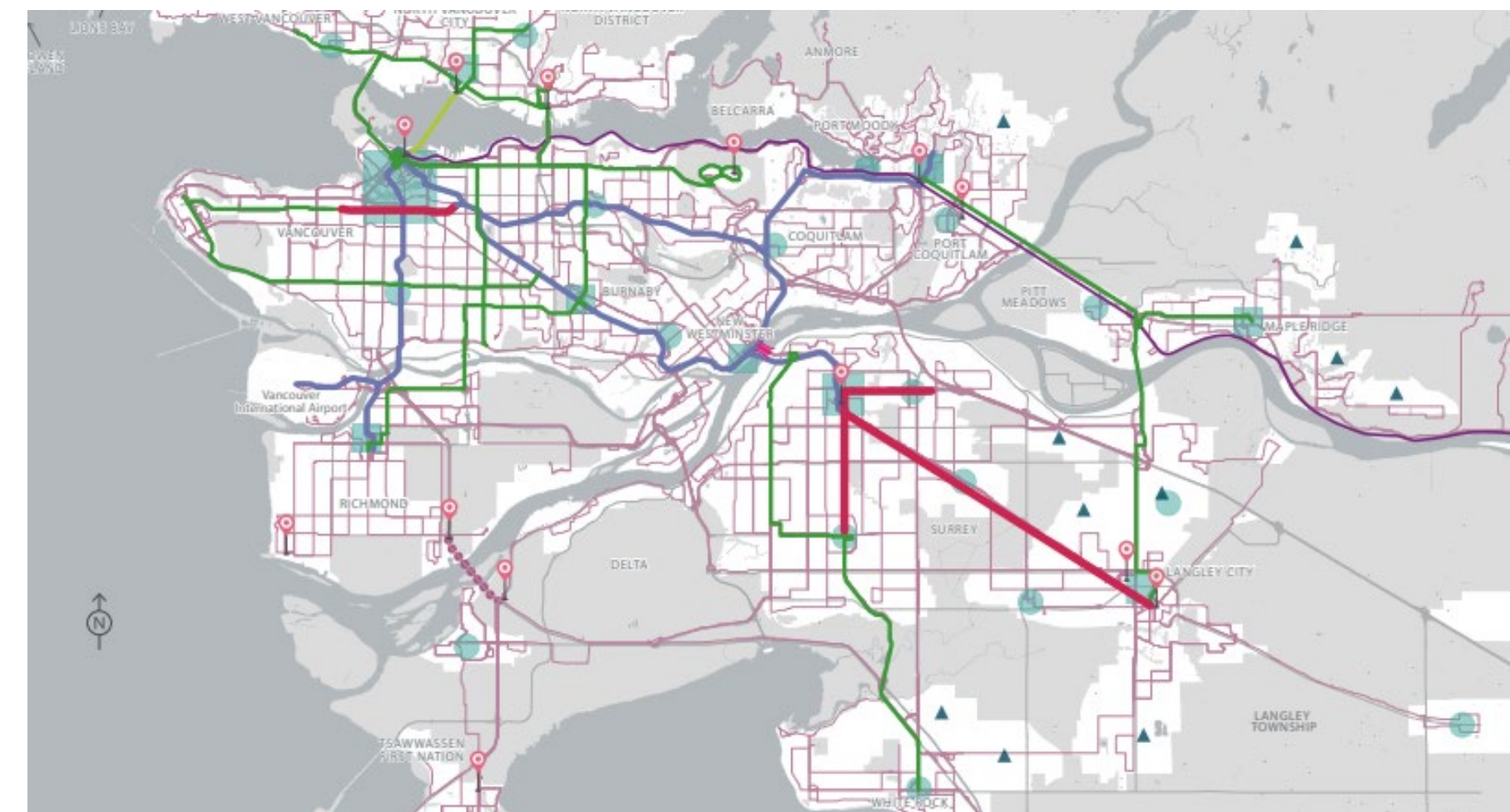


Transit Police

Dedicated transit police service (160+ sworn uniformed officers)

TransLink: Roles and Responsibilities

- Plans, funds and delivers the public transit system for Metro Vancouver
- Provides cost-sharing funding to municipalities for the Major Road Network
- Provides cost-sharing funding to municipalities for regional cycling and pedestrian infrastructure and programs
- Provides coordination role for regional transportation planning



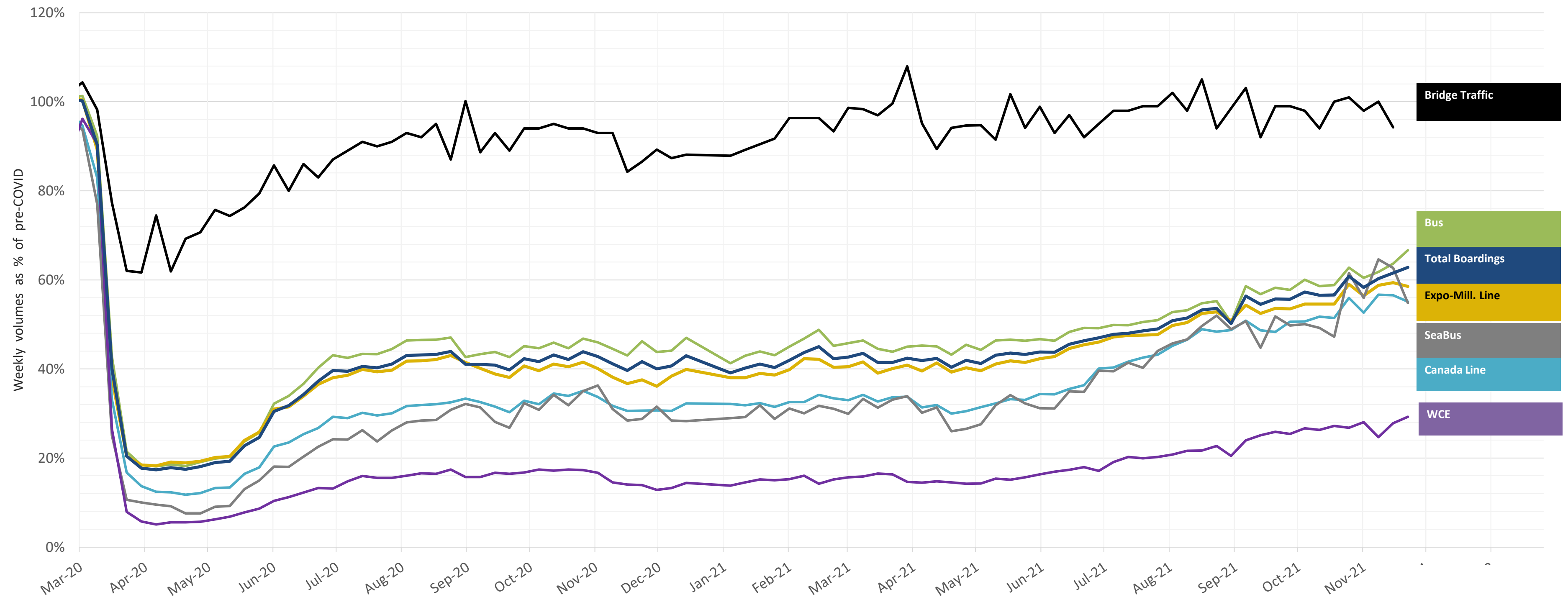
Together all the way



WHY IS EXPLORATORY MODELING NEEDED?

- COVID-19 substantially decreased transit ridership and profoundly disrupted overall regional transportation behaviours
- Close to two years 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

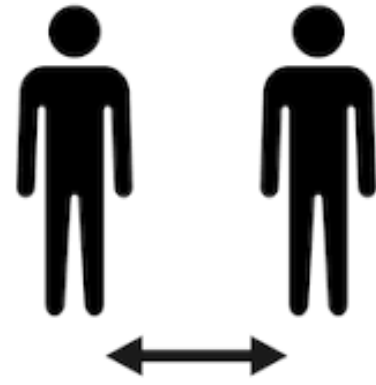
TRANSPORTATION DEMAND BY MODE



SIGNIFICANT UNCERTAINTIES



Employment?



Willingness to
share rides?



Strength of economy and
discretionary spending?



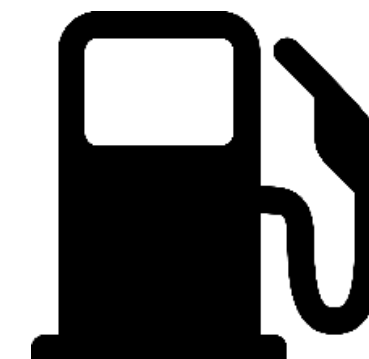
Auto ownership?



Work from home?

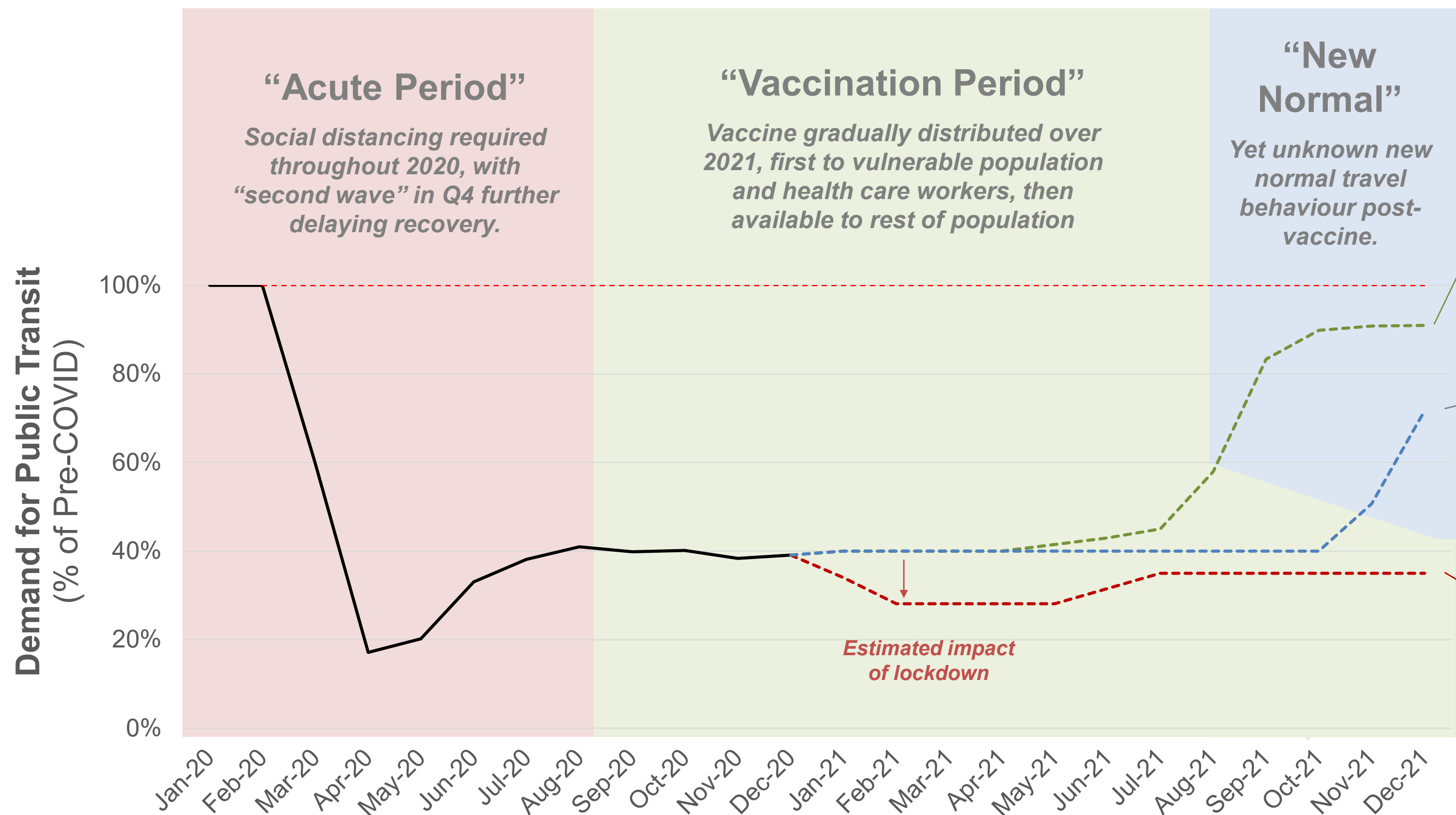


Distance learning?



Fuel prices?

RIDERSHIP SCENARIOS



Scenario 1: “High Demand”

The vaccine is successful, providing lasting protection and is deployed on schedule– the “new normal” (P95) includes a relatively quick return to full employment with only limited additional working/studying from home compared to before the pandemic.

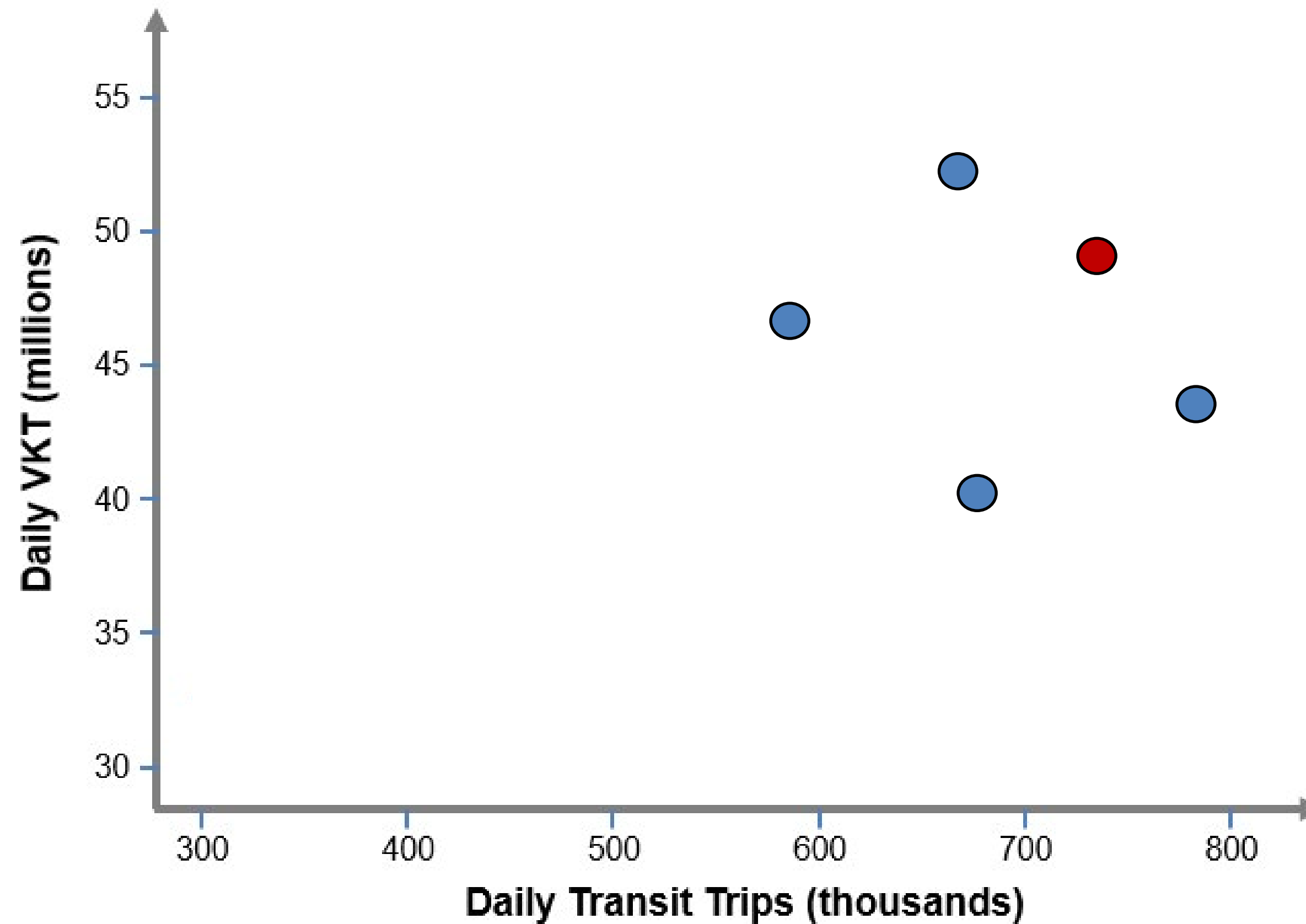
Scenario 2: “Medium Case”

Vaccines are successful, providing lasting protection, but are deployed with some delays – however it takes longer than expected to reach community immunity and socio-economic conditions in the “new normal” (P50) are less favourable than in Scenario 1.

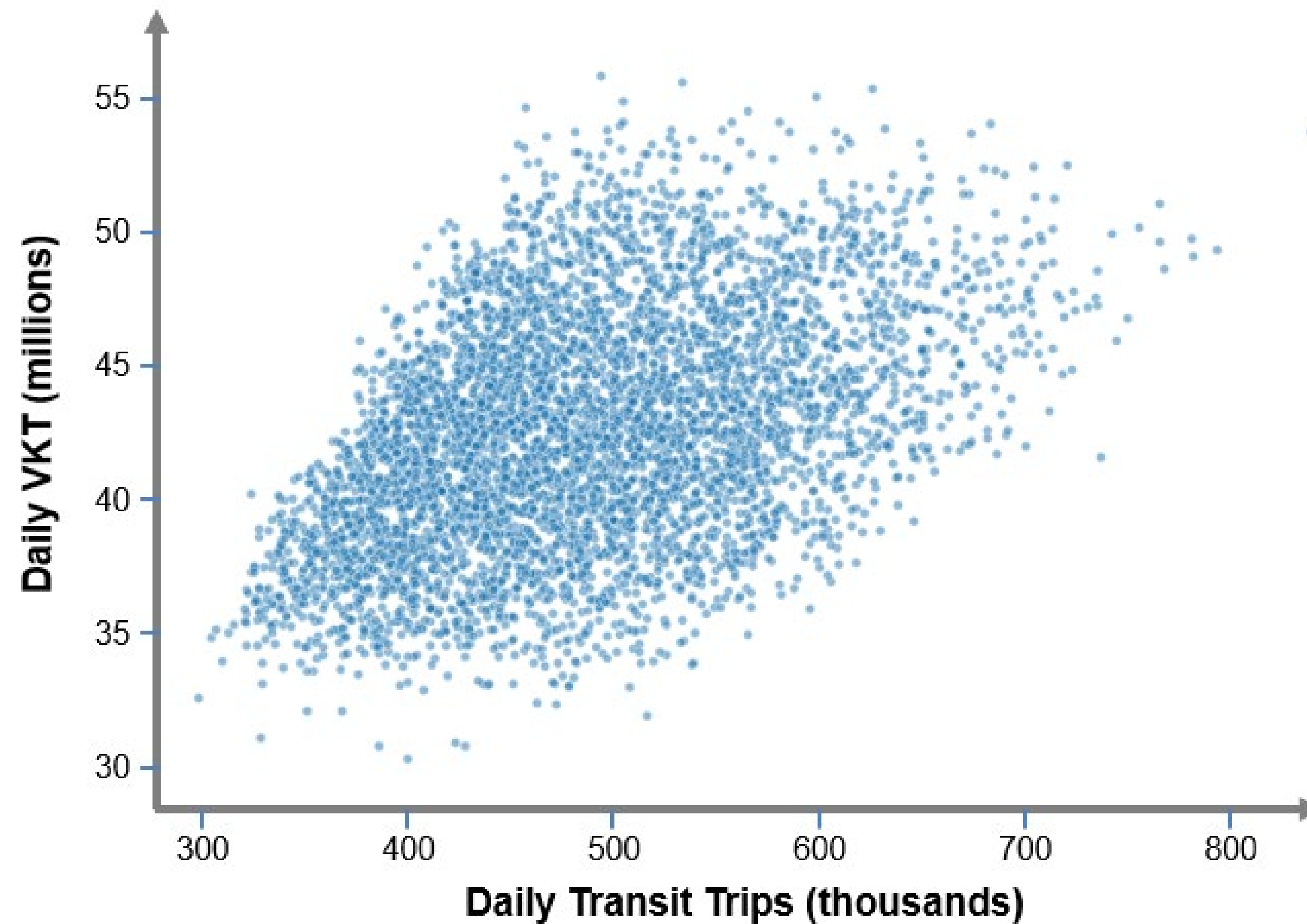
Scenario 3: “Low Demand”

Vaccines do not meet expectations in terms of efficacy and speed of delivery, providing only limited and temporary protection, leading to multiple recurrent outbreaks and deep socioeconomic consequences. The “New Normal” is not reached for several years and features a significant drop in demand.

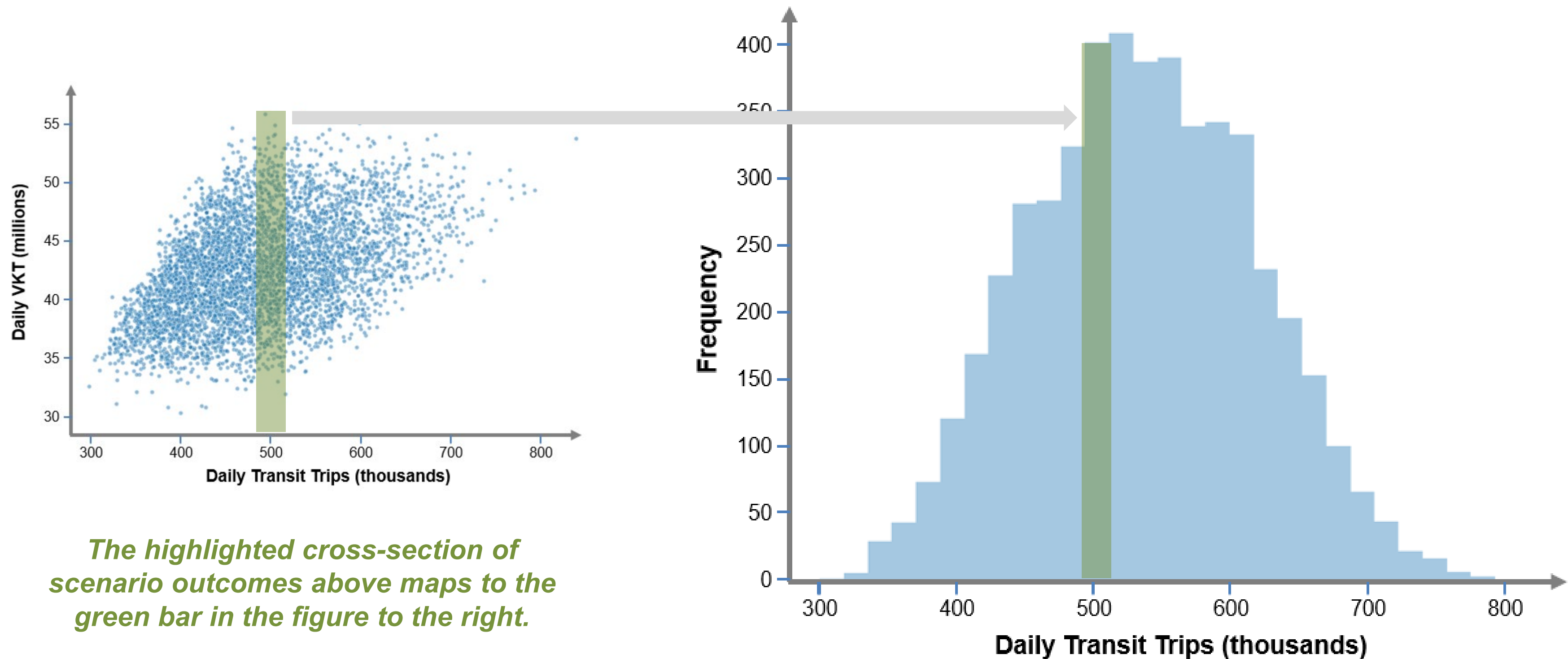
TRADITIONAL FORECASTING



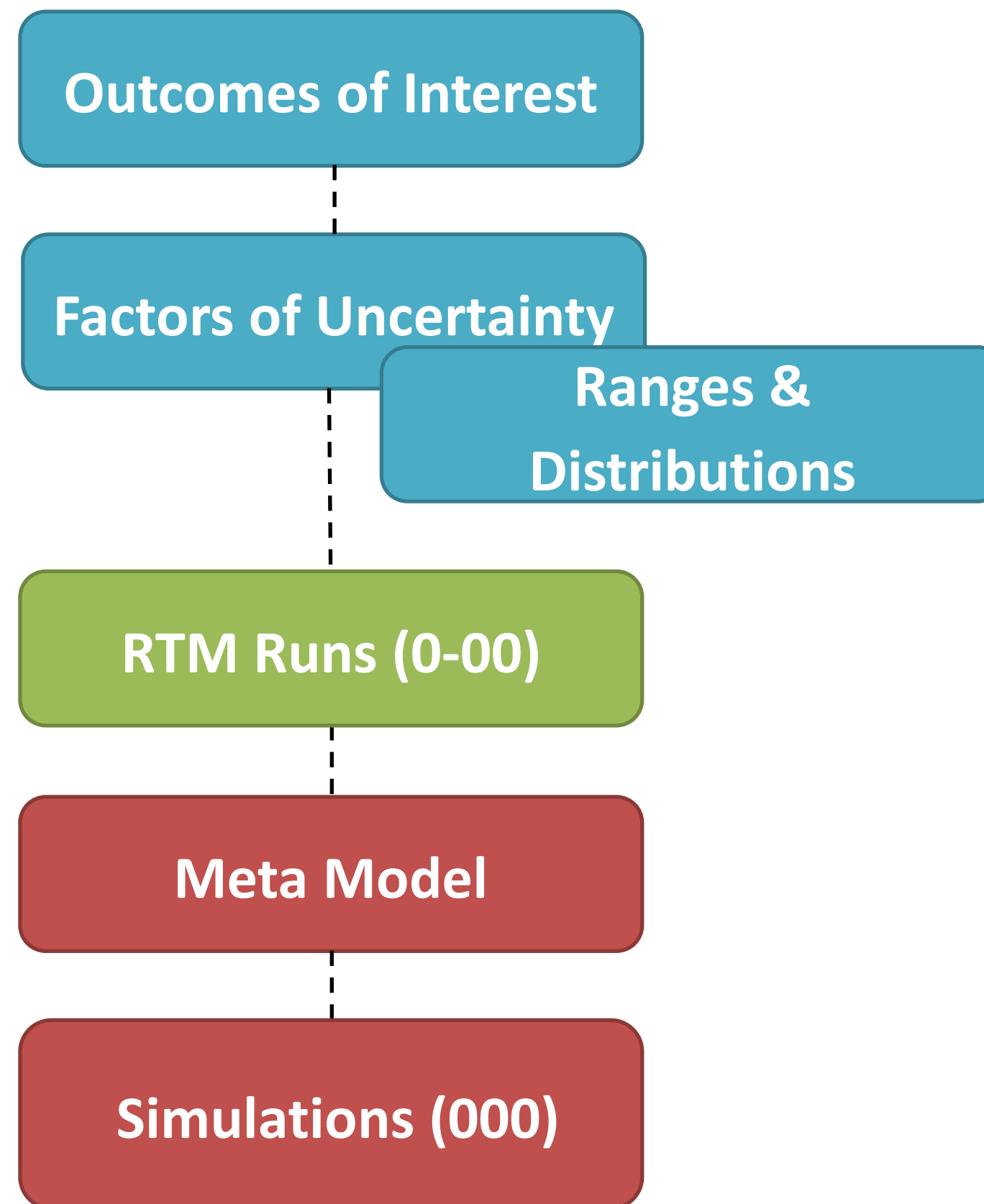
MULTIPLE SCENARIOS IN EXPLORATORY MODELING



PROBABILITY DISTRIBUTIONS OF OUTCOMES



WHAT THE PROCESS LOOKS LIKE

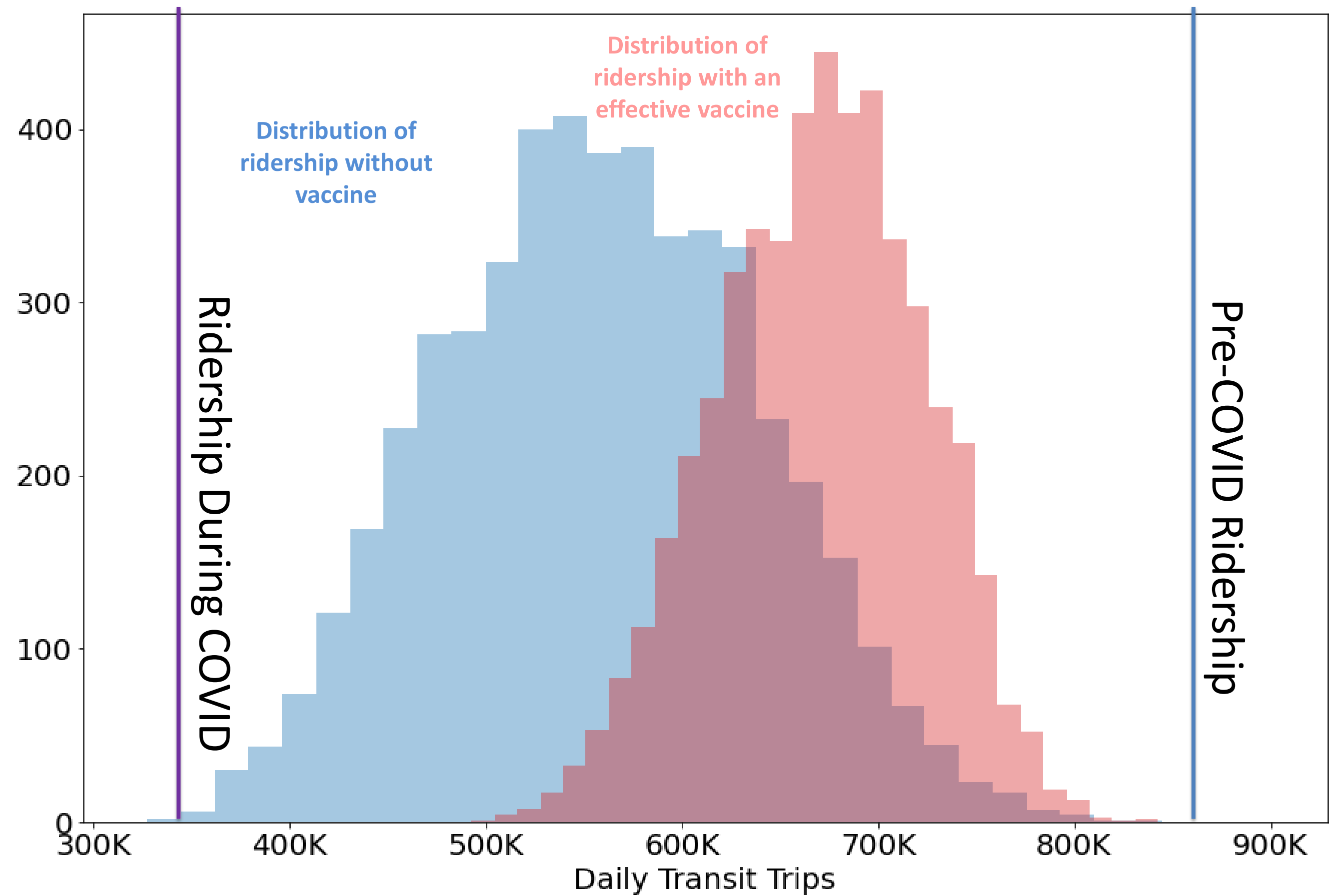


EXPLORATORY MODELLING ASSUMPTIONS

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



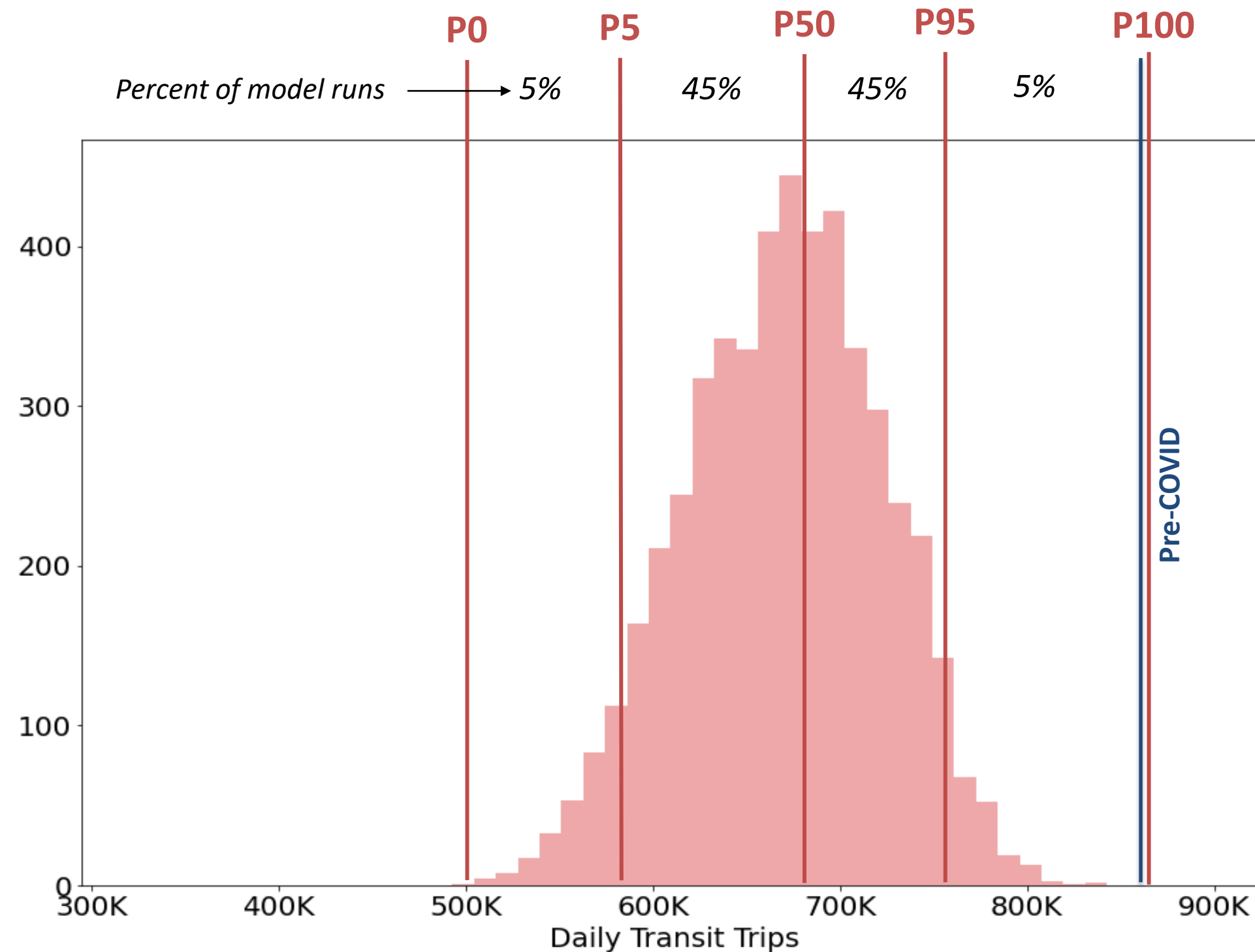
RELATIVE IMPORTANCE OF FACTORS – NO VACCINE

	Discretionary Trips	Employment	Gas Prices	Propensity for Vehicle Ownership	Propensity to Ride Share	Vehicle Capacity	Telecommuting/ Remote Learning
Daily Transit Trips	0.09	0.09	0.09	0.08	0.45	0.04	0.16
PM Speed	0.07	0.13	0.04	0.22	0.07	0.03	0.43
Sustainable Mode Share	0.08	0.08	0.10	0.21	0.41	0.04	0.07
Daily VKT	0.09	0.14	0.06	0.22	0.06	0.03	0.40
Daily Fare Revenue	0.07	0.09	0.09	0.08	0.42	0.05	0.20

RELATIVE IMPORTANCE OF FACTORS – WITH VACCINE

	Discretionary Trips	Employment	Gas Prices	Propensity for Vehicle Ownership	Propensity to Ride Share	Telecommuting/ Remote Learning
Daily Transit Trips	0.12	0.15	0.11	0.10	0.34	0.17
PM Speed	0.07	0.22	0.06	0.23	0.06	0.36
Sustainable Mode Share	0.09	0.09	0.09	0.38	0.21	0.13
Daily VKT	0.07	0.25	0.08	0.22	0.08	0.30
Daily Fare Revenue	0.11	0.17	0.10	0.11	0.31	0.21

“NEW NORMAL” SCENARIOS



Distribution Percentile	2022 Ridership (% Pre-COVID)	Role in Recovery Scenarios
P0	60%	
P5	70%	Low scenario
P50	82%	Medium scenario
P95	91%	High scenario
P100	103%	

KEY DECISIONS INFORMED BY THIS METHODOLOGY

- 2021 budgeting based on ridership and revenue projections
- Recovery expectations and updating of service level plans
- Funding discussions with senior governments