Effect of a large-scale, public bicycle sharing program on urban health: A natural experiment in Mexico City

Lessons learned

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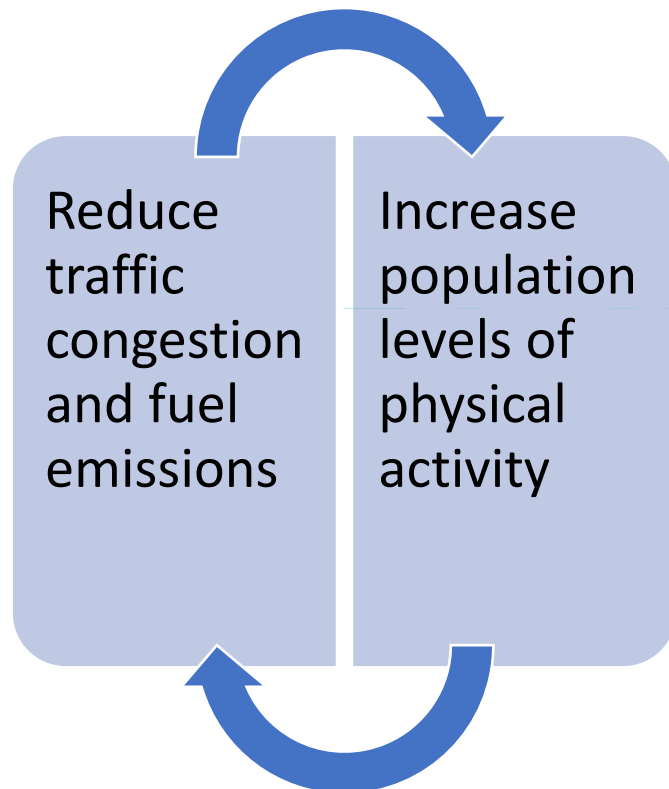Alejandra Jauregui, PhD

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wellcome   SALURBAL   LAC-URBAN HEALTH
Salud Urbana en América Latina   Urban Health Network for Latin America and the Caribbean

Background

- Safe active mobility

Reduce traffic congestion and fuel emissions

Increase population levels of physical activity

- Bicycle sharing schemes have become increasingly popular globally as a means to promote these benefits in urban areas.

What is Ecobici?

Large-scale bicycle sharing program in Mexico City

Implemented in 2010 with important and regular expansions since then

Cycling is not a common transportation mode in Mexico City

Aim

To assess the association of Ecobici expansions on increases in bicycle-commuting, transport-related physical activity, and overall physical activity in Mexico City

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Lesson 1.

Get feedback

Ecobici station
500-m buffer around Ecobici stations
Av. Revolucion
500-m around proposed Ecobici stations
Census tract poverty status
Medium poverty
Low poverty
Very low poverty

Figure 2. a) Map showing the part of Mexico City with Ecobici, b) Zoomed-in map showing existing and proposed Ecobici stations, c) Zoomed-in map showing proposed Ecobici stations and census tract poverty status

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Component 1

Area-level quasi-experimental study

- To measure longitudinal trends in **bicycle ridership** across three areas of the city (original EcoBici service area, EcoBici expansion area, and control area), before and after the implementation of Ecobici expansions.

Component 2

Individual cross-sectional study

- To investigate **which transportation modes are substituted** when transitioning to Ecobici
- To test differences in overall and **transport-related physical activity** between Ecobici users, other cases of bicycle riders and non-bicycle users.
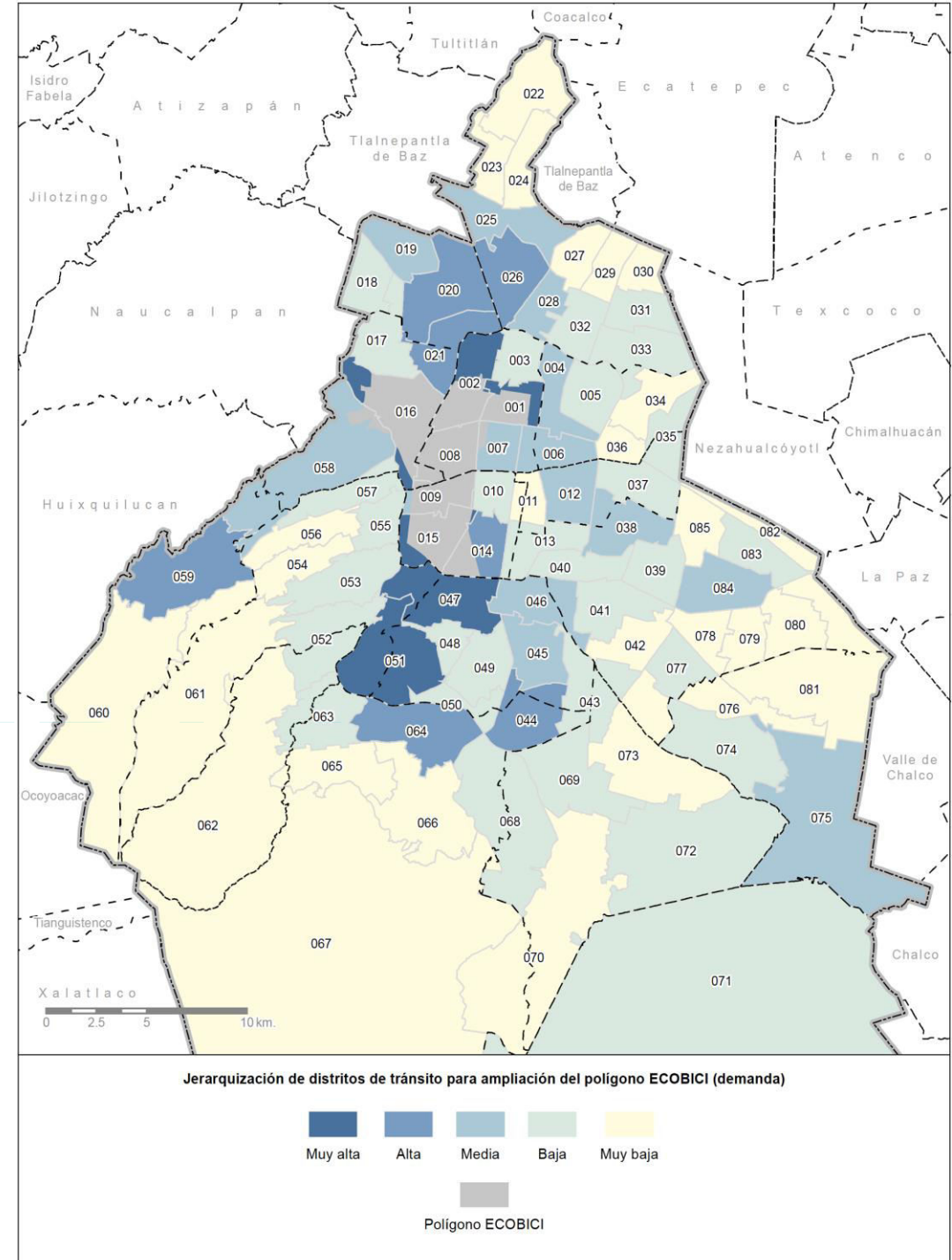
Component 3

Secondary data analysis

- To explore longitudinal variations in the demographics of Ecobici users, travel information and the contribution of Ecobici to meeting the PA recommendations among users.
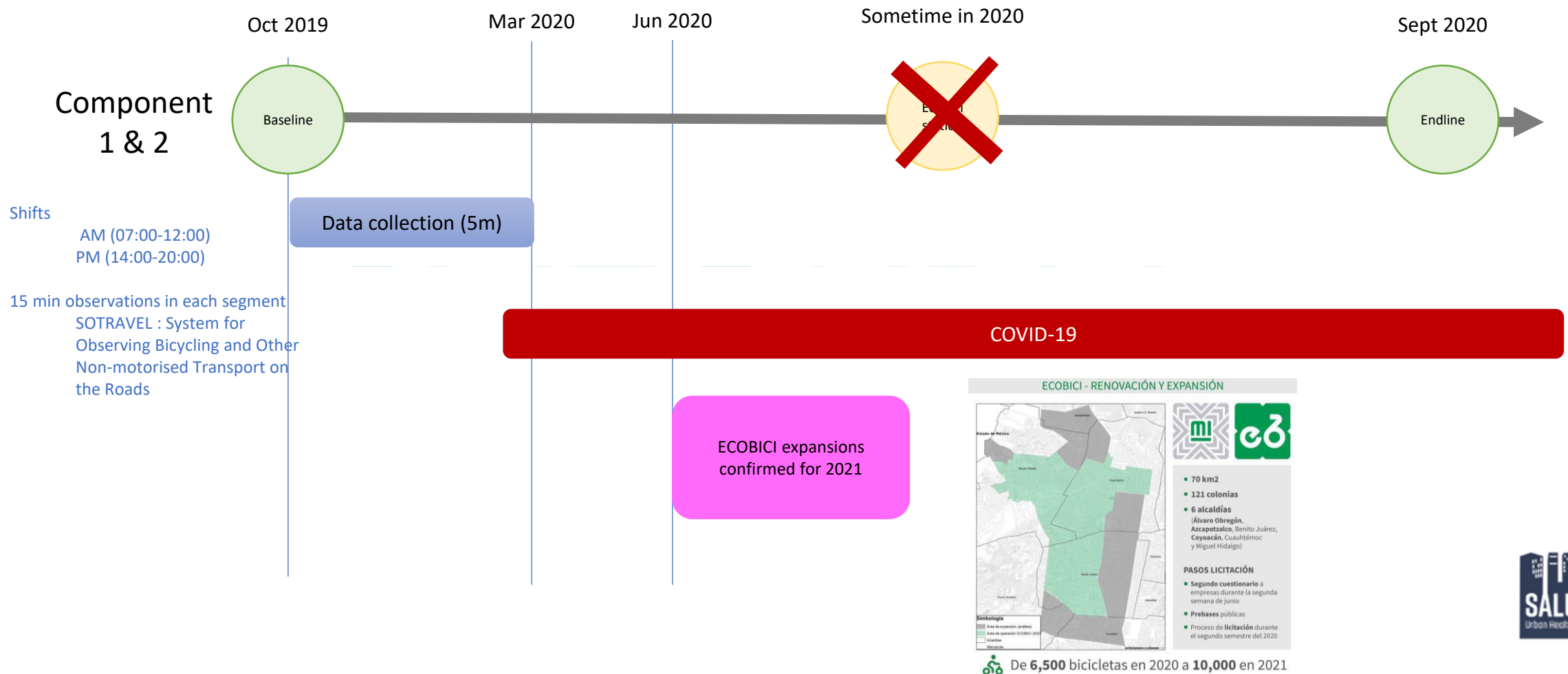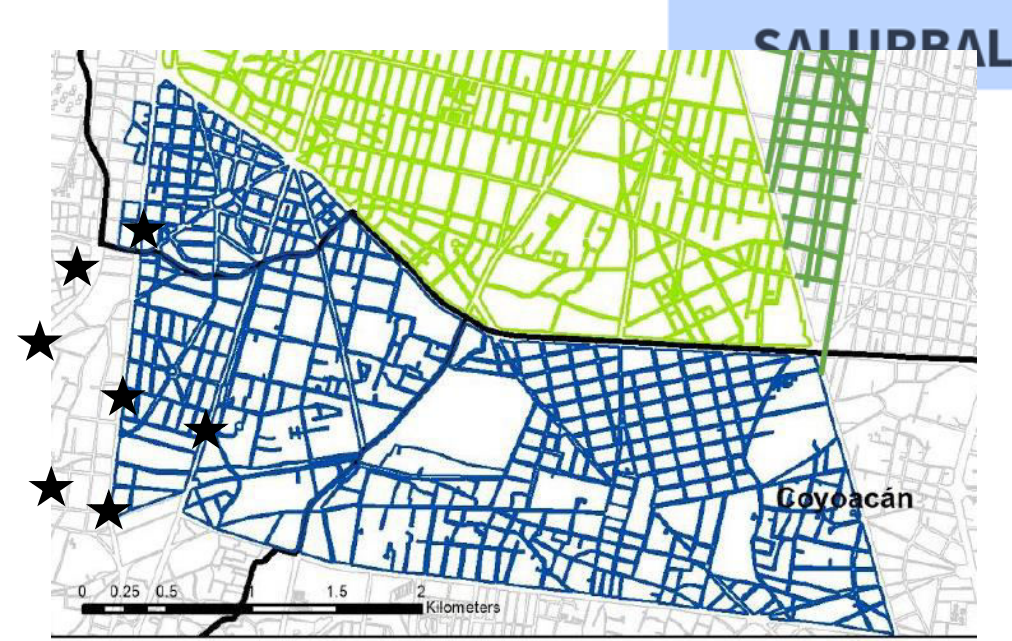
I. Area-level quasiexperimental study
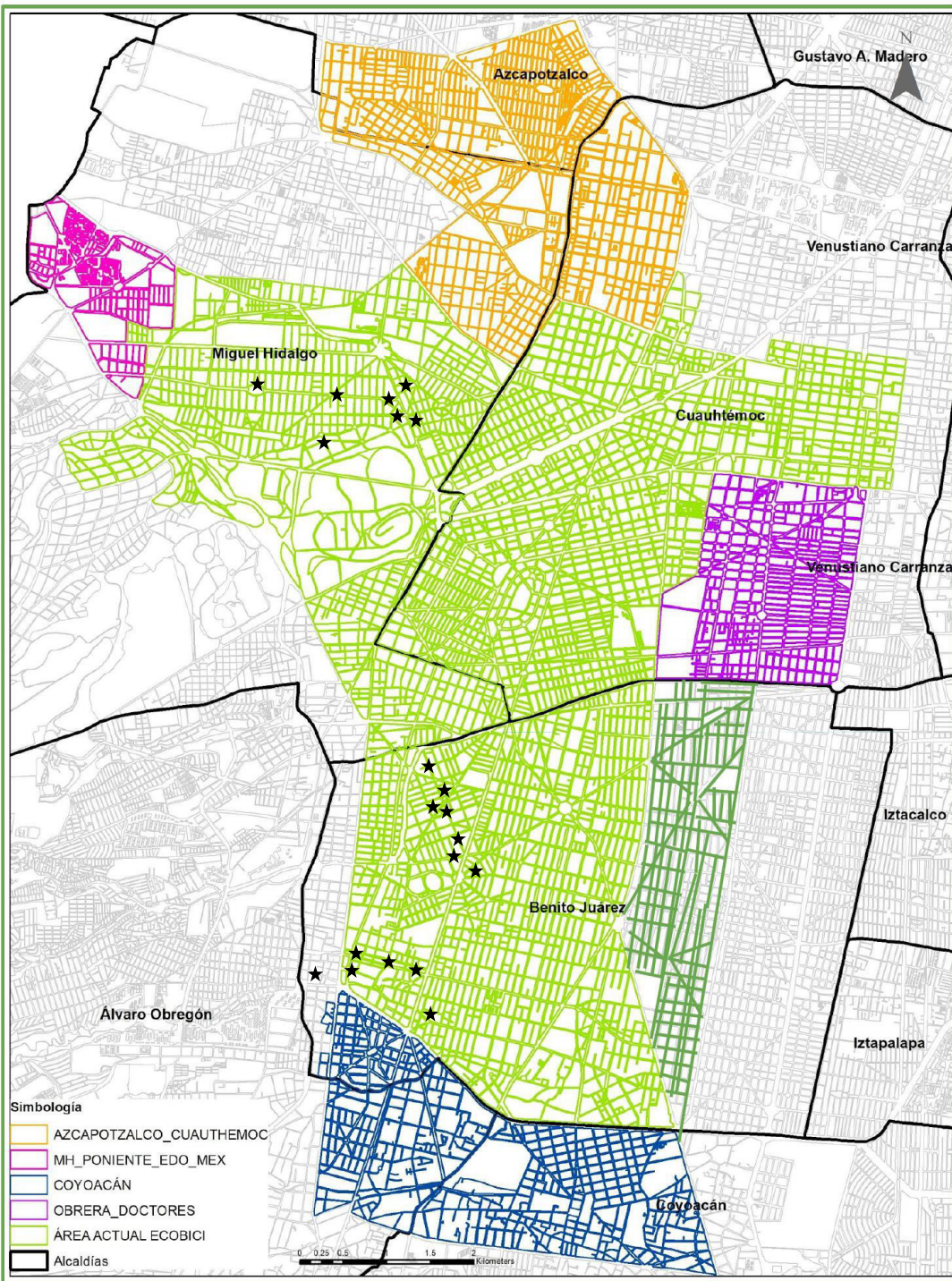
To measure longitudinal trends in **bicycle ridership** across three areas of the city

1. Ecobici area

2. Priority areas for Ecobici expansion

3. Comparison areas (i.e. where Ecobici expansions are not being considered).
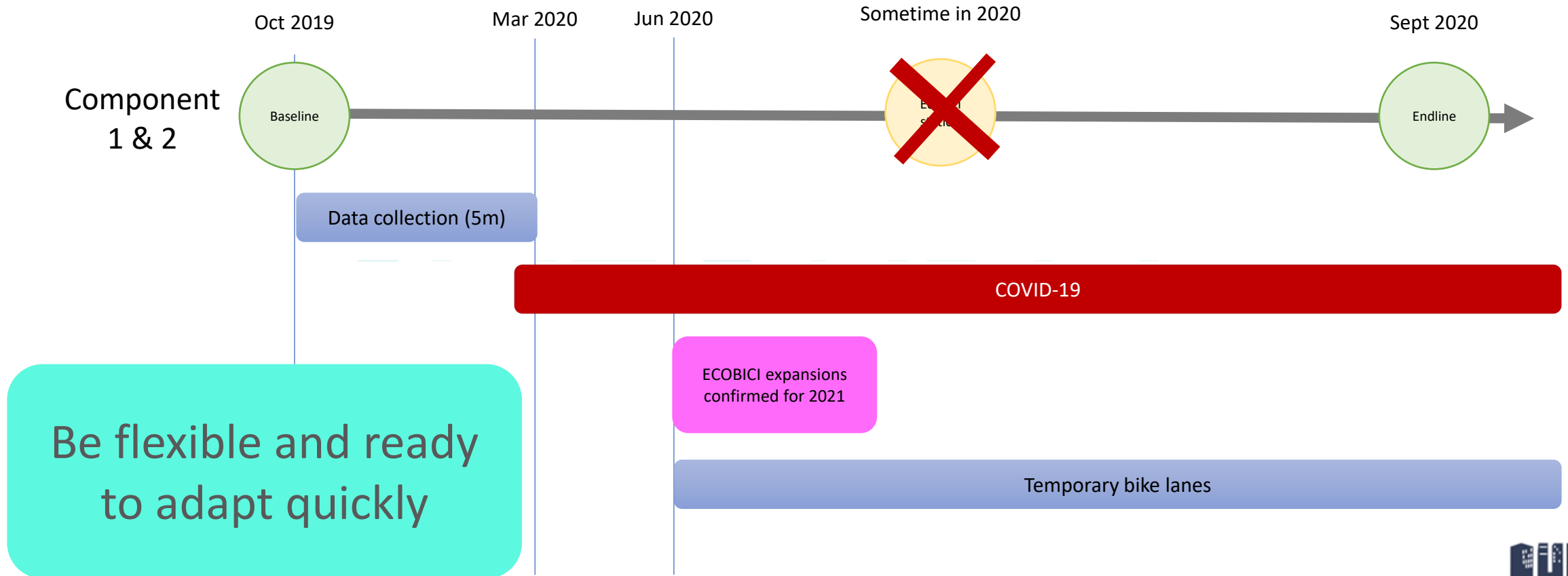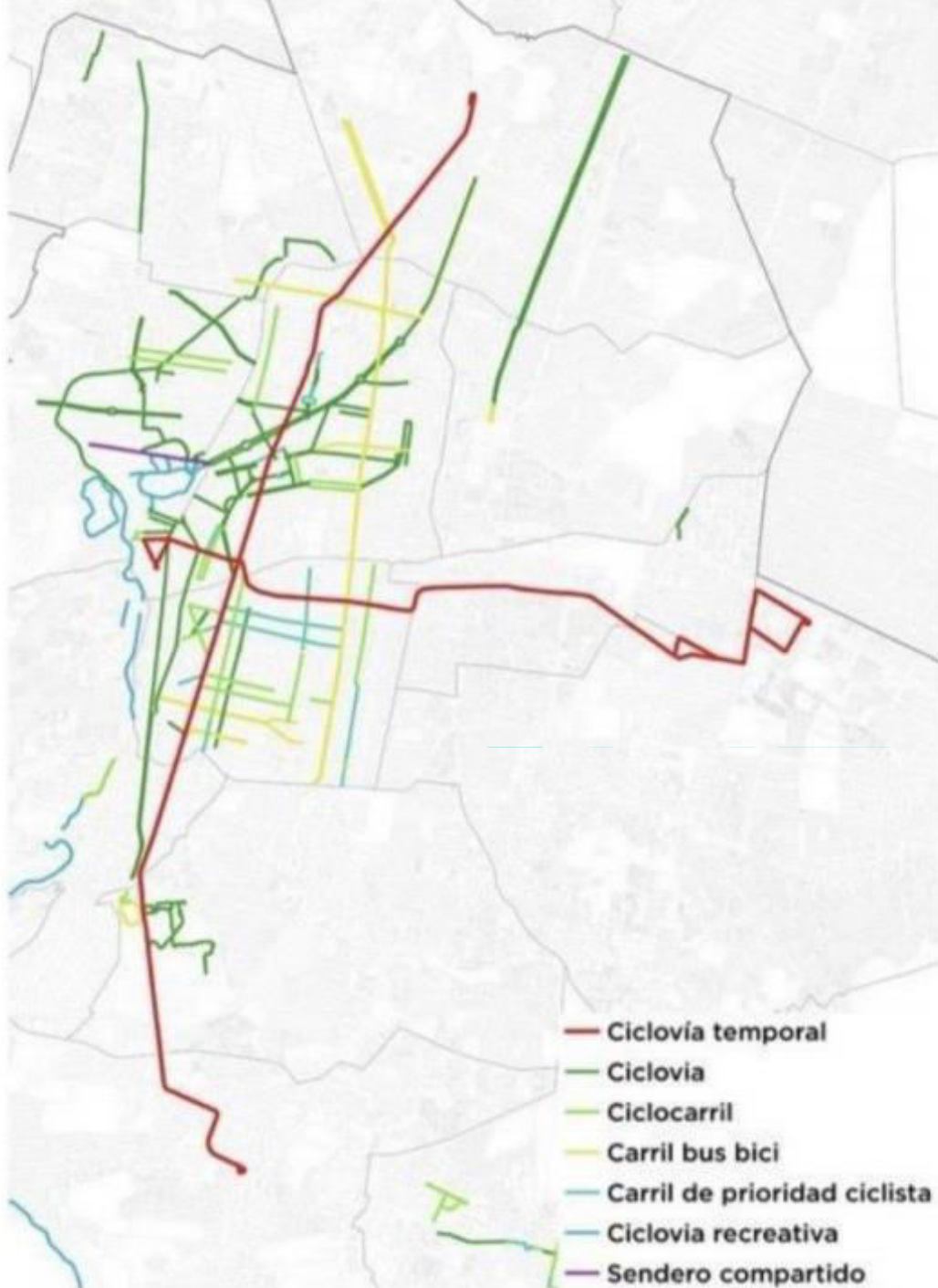

Jerarquización de distritos de tránsito para ampliación del polígono ECOBICI (demanda)

Muy alta   Alta   Media   Baja   Muy baja

Polígono ECOBICI

Lesson 2. Natural experiments are unpredictable

Component 1 & 2

Oct 2019 — Baseline
Mar 2020
Jun 2020
Sometime in 2020 — Ecobici service (crossed out)
Sept 2020 — Endline

Shifts

AM (07:00-12:00)
PM (14:00-20:00)

15 min observations in each segment
SOTRAVEL : System for Observing Bicycling and Other Non-motorised Transport on the Roads

Data collection (5m)

COVID-19

ECOBICI expansions confirmed for 2021

ECOBICI - RENOVACIÓN Y EXPANSIÓN

- 70 km2
- 121 colonias
- 6 alcaldías
(Álvaro Obregón, Azcapotzalco, Benito Juárez, Coyoacán, Cuauhtémoc y Miguel Hidalgo)

PASOS LICITACIÓN

- **Segundo cuestionario** a empresas durante la segunda semana de junio
- **Prebases** públicas
- Proceso de **licitación** durante el segundo semestre del 2020

De **6,500** bicicletas en 2020 a **10,000** en 2021

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Simbología

- AZCAPOTZALCO_CUAUTHEMOC
- MH_PONIENTE_EDO_MEX
- COYOACÁN
- OBRERA_DOCTORES
- ÁREA ACTUAL ECOBICI
- Alcaldías

Azcapotzalco

Gustavo A. Madero

N

Venustiano Carranza

Miguel Hidalgo

Cuauhtémoc

Venustiano Carranza

Iztacalco

Álvaro Obregón

Benito Juárez

Iztapalapa

Coyoacán

0 0.25 0.5   1.5   2
                              Kilometers

Coyoacán

0 0.25 0.5   1.5   2
                              Kilometers

Azcapotzalco

Lesson 3. Seize the opportunities

Component 1 & 2

Oct 2019 — Baseline

Mar 2020

Jun 2020

Sometime in 2020 — ~~Endline study~~

Sept 2020 — Endline

Data collection (5m)

COVID-19

ECOBICI expansions confirmed for 2021

Temporary bike lanes

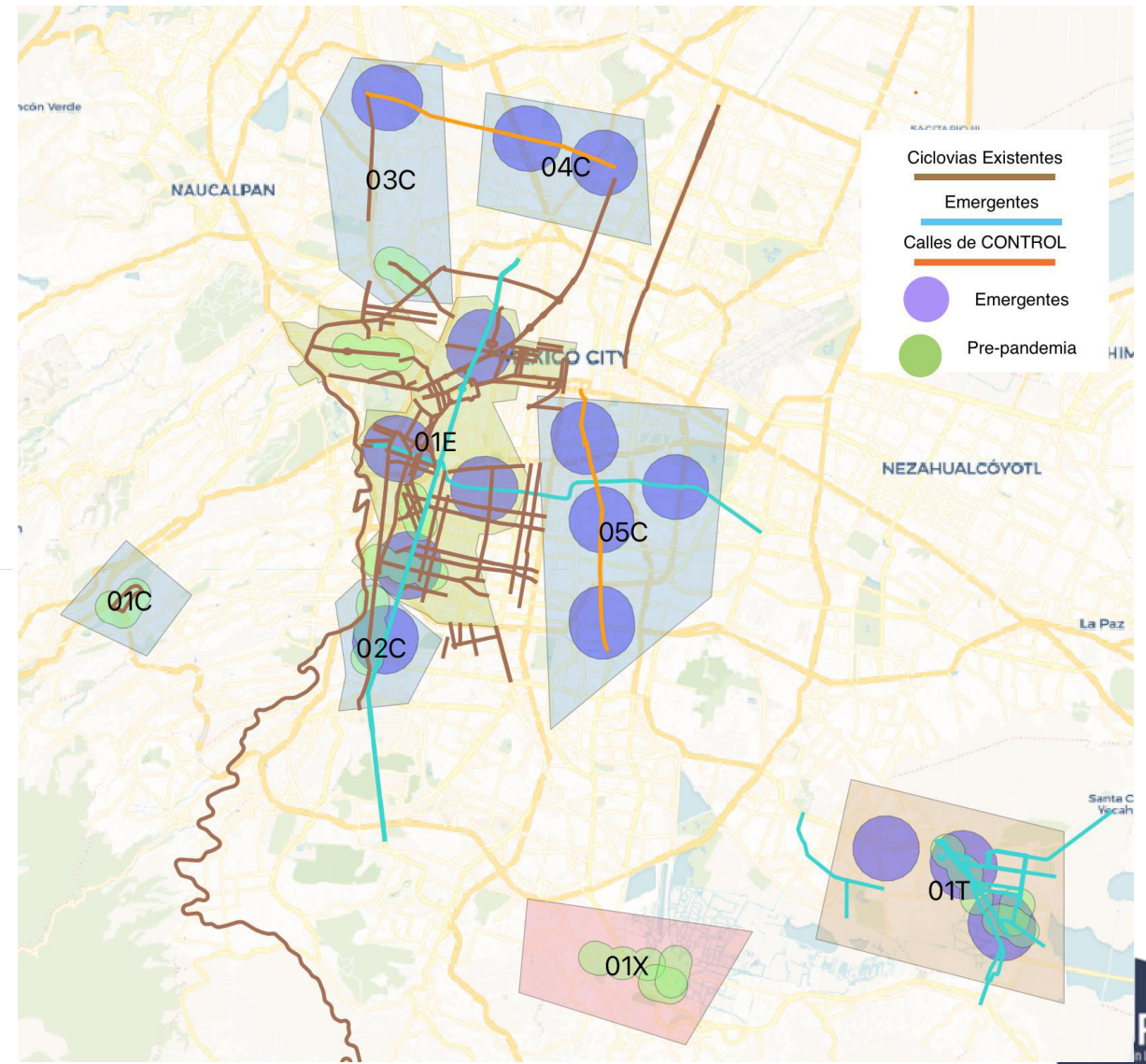Be flexible and ready to adapt quickly

1. **Temporary bike lanes**
   1. High-capacity roads
   2. Neighborhood roads

2. **Regular bikelanes**
   1. High-capacity roads
   2. Neighborhood roads

3. **No bikelanes**
   1. High-capacity roads
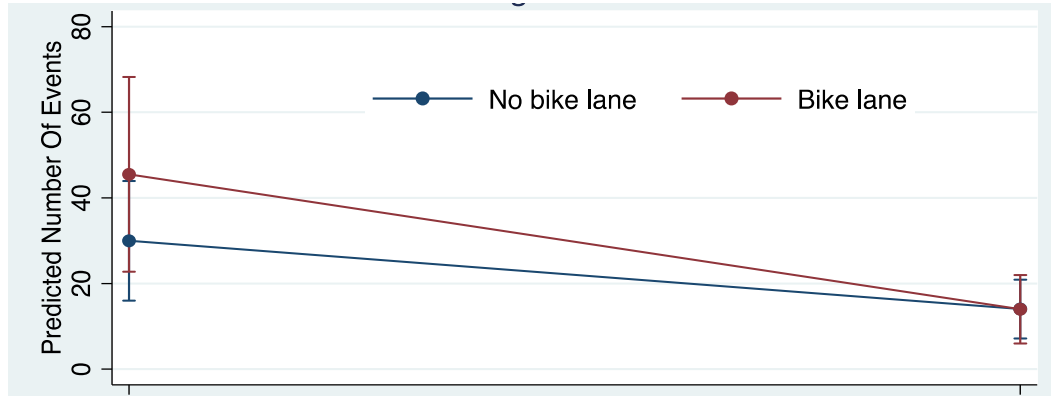   2. Neighborhood roads

Legend:
- Ciclovía temporal
- Ciclovia
- Ciclocarril
- Carril bus bici
- Carril de prioridad ciclista
- Ciclovia recreativa
- Sendero compartido

Lesson 4. Scientific rigor must prevail

N=3669
Data collection: August 25,
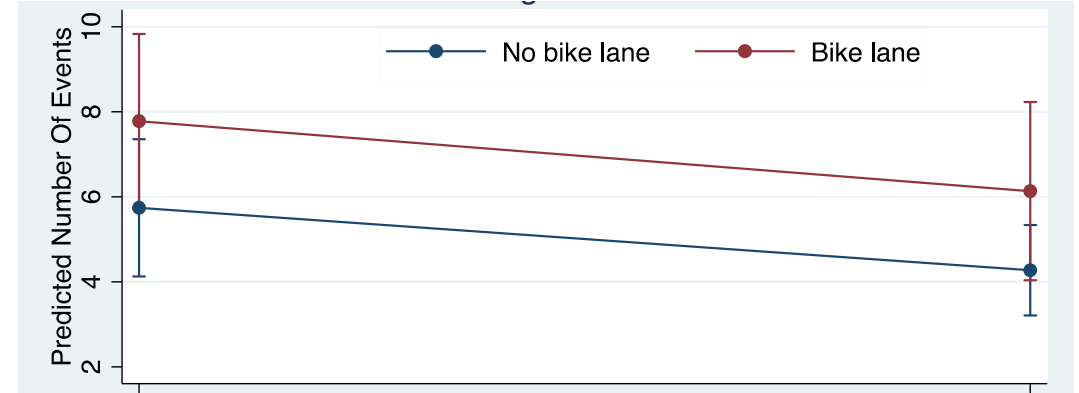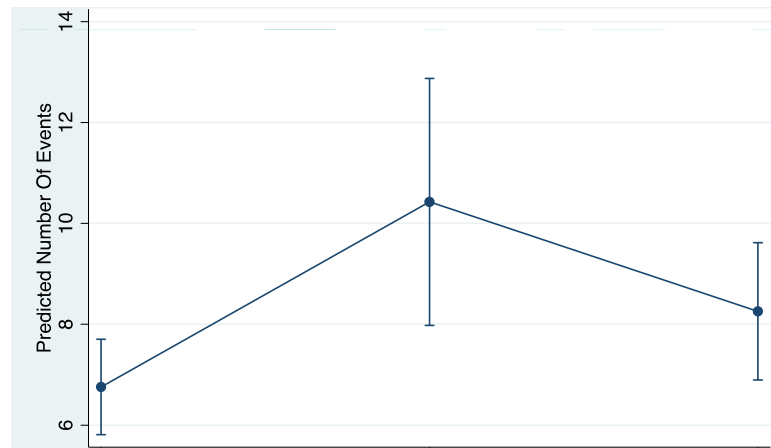2020 – November 20, 2020

Preliminary Results

Pedestrians

All types of bycicles

Estimates adjusted for day of the week, month, car accidents, park density, public transit density, time of data collection, temperature and weighted using propensity score matching

Final remarks

- The modifications to the project will allow us to evaluate two natural experiments
  - Temporary bike lanes
  - Ecobici expansions

- Preliminary results suggest that temporary bike lanes prevented further declines in bicycling during COVID-19 by providing an alternative transportation mode in this period

Thanks

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