SALUD URBANA EN AMÉRICA LATINA

# Evaluation of Vision Zero in Mexico City: road safety and air pollution

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# ROAD SAFETY IN MEXICO CITY

- On average 15 deaths due to collisions per week in 2015
- Mexico City adopts Vision Zero in 2015
- New road traffic regulations - December 15, 2015

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1) lower speed limits, introduction of speed radars and higher fines for speeding vehicles

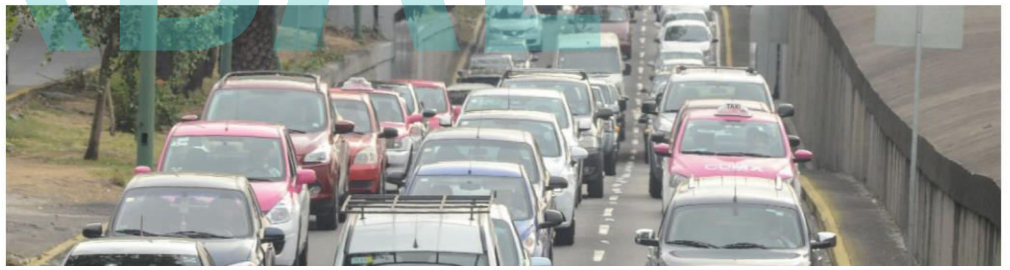
2) traffic enforcement devices to detect nine motoring offences.

# Controversies following 2015 regulations

- Air pollution
- Fines = economic burden for families

## Límites de velocidad en CDMX y el aumento de la contaminación: artículo de Luis Mochán

"La velocidad óptima para autos se sitúa típicamente entre los 55 km/h y los 80 km/h, mucho mayor que la velocidad permitida en la mayor parte de las vías de la Ciudad de México...".



EL UNIVERSAL | TRANSICIÓN 2018 | FOTOS | VIDEO | GRÁFICOS

## Fotomultas desaparecerán en primer año de mi gestión, dice Sheinbaum

La jefa de Gobierno electa afirmó que se reformará el Reglamento de Tránsito bajo un esquema que promueva la cultura vial; a finales de agosto se dará a conocer su programa de movilidad

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## Acabaremos con las fotomultas y sus abusos: Claudia Sheinbaum

La jefa de Gobierno electa confirmó que trabajan en un nuevo esquema basado en la educación vial para sustituir las excesivas sanciones económicas. En septiembre presentaría su plan de movilidad.

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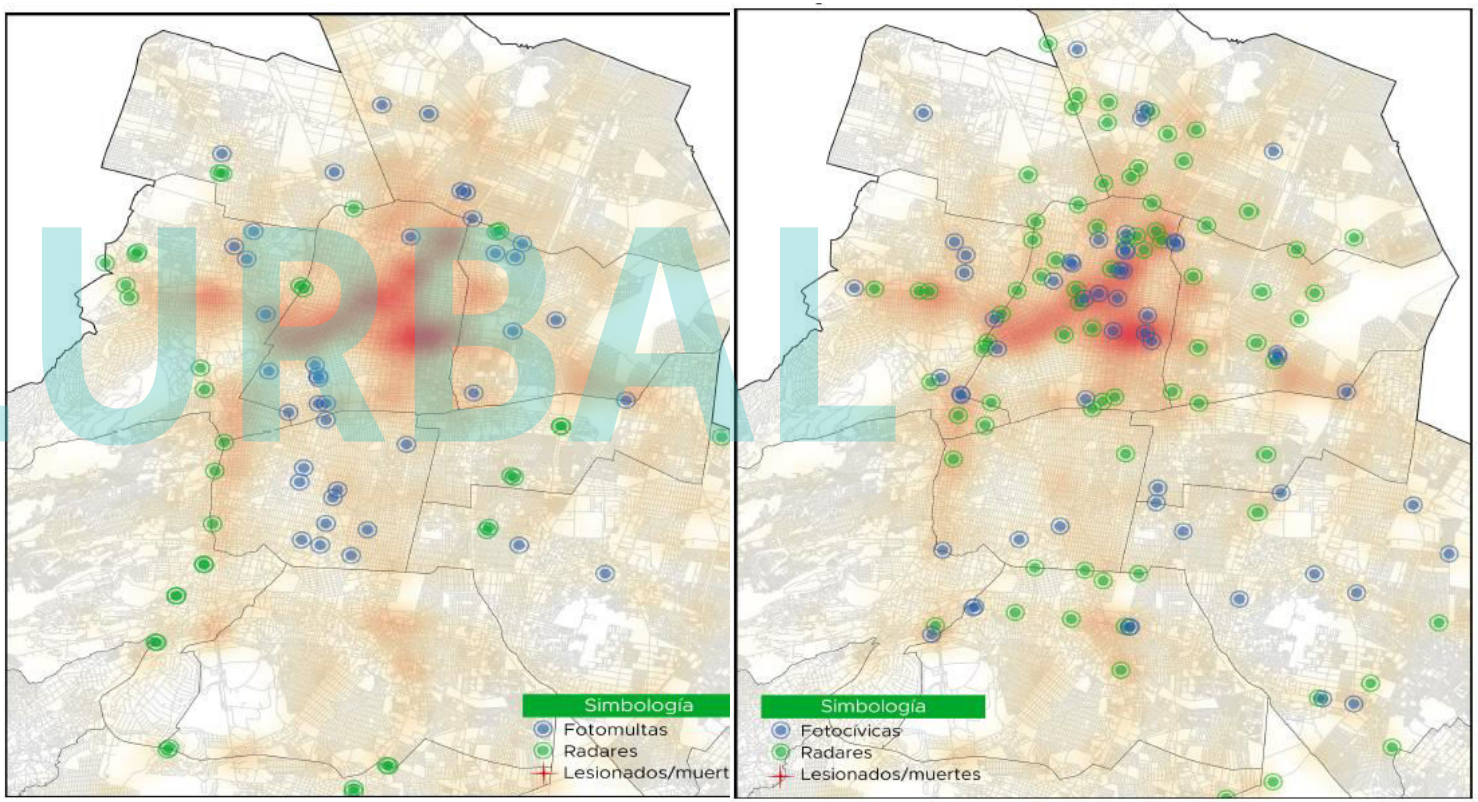
# 2019 changes to the road traffic regulations

- Economic fines scrapped
- New devices, relocation of old devices, 129 new preventive devices for speed control in school environments
- Speed limits continue the same

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# OBJECTIVE AND HYPOTHESIS

- Objective 1: To estimate the effect of the road traffic regulations implemented in 2015 and 2019 in Mexico City on collisions, collisions resulting in injury and mortality from road traffic collisions.
  - Hypothesis: Total collisions, collisions resulting in injury and mortality will decline in Mexico City after December 2015 and will increase after April 2019

Objective 2: To estimate the effect of the road traffic regulations implemented in 2015 in Mexico City on air pollution, PM2.5 and NO2.

- Hypothesis: Air pollution will increase in Mexico City after December 2015

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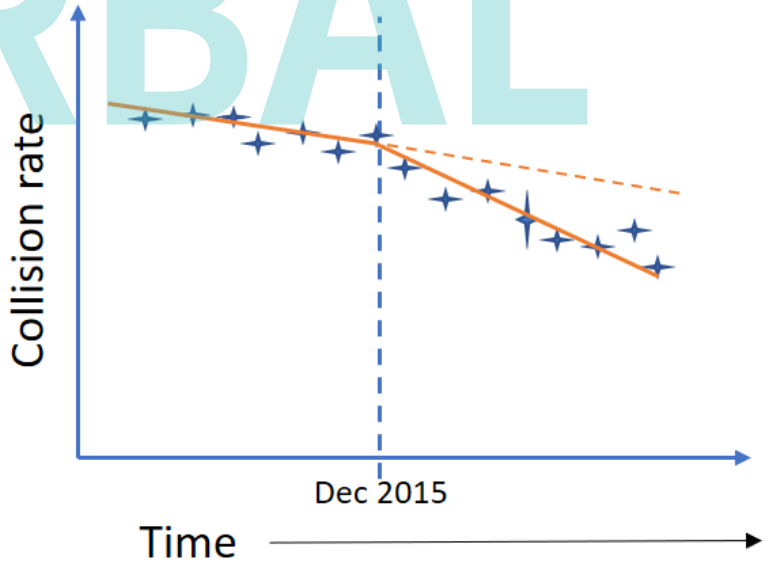
# METHODS

## Data sources

- **Collisions:** insurance reported collisions (AXA), number of registered vehicles (INEGI), number of insured vehicles (AMIS). Jan 2015-Dec 2019
- **Mortality:** vital registry data, total population (CONAPO). Jan 2013- Dec 2019
- **Air pollution:** Atmospheric Monitoring System. Jan 2014 – Dec 2018

## Statistical analysis

- Compared trends before and after the intervention with the ITS analysis and CITS analysis




$$Y_t = \beta_0 + \beta_1 T + \beta_2 X_t + \beta_3 T X_t$$

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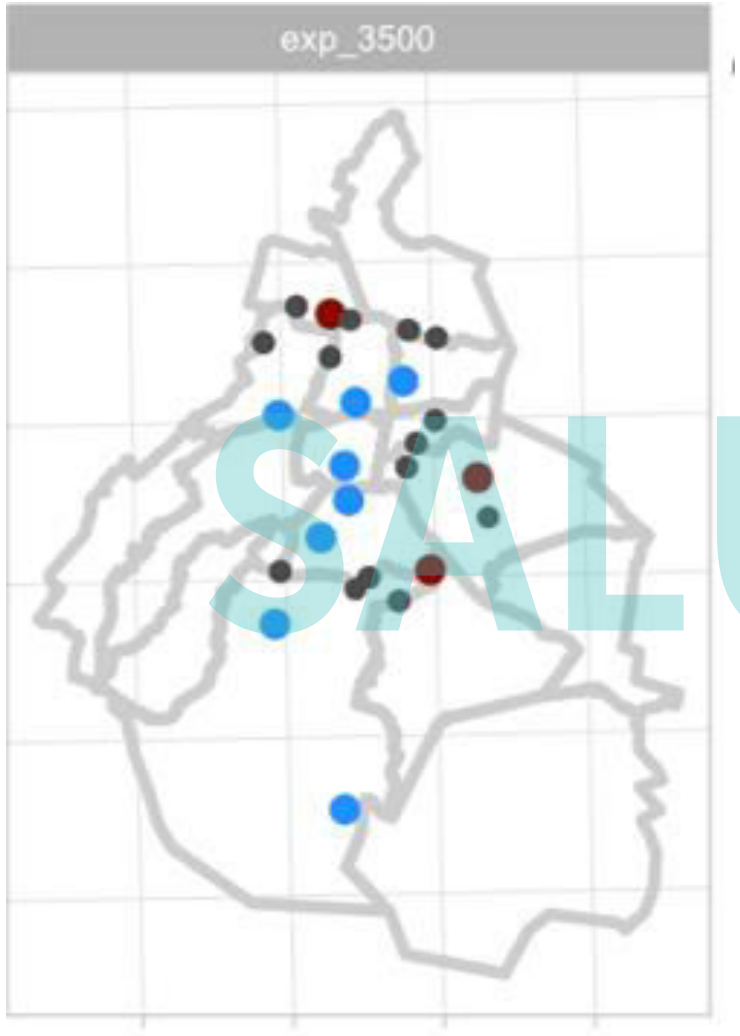


# Air pollution analysis: Controlled Interrupted Time Series Analysis

- Unexposed monitoring station
- Exposed monitoring station
- Speed radar

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# RESULTS

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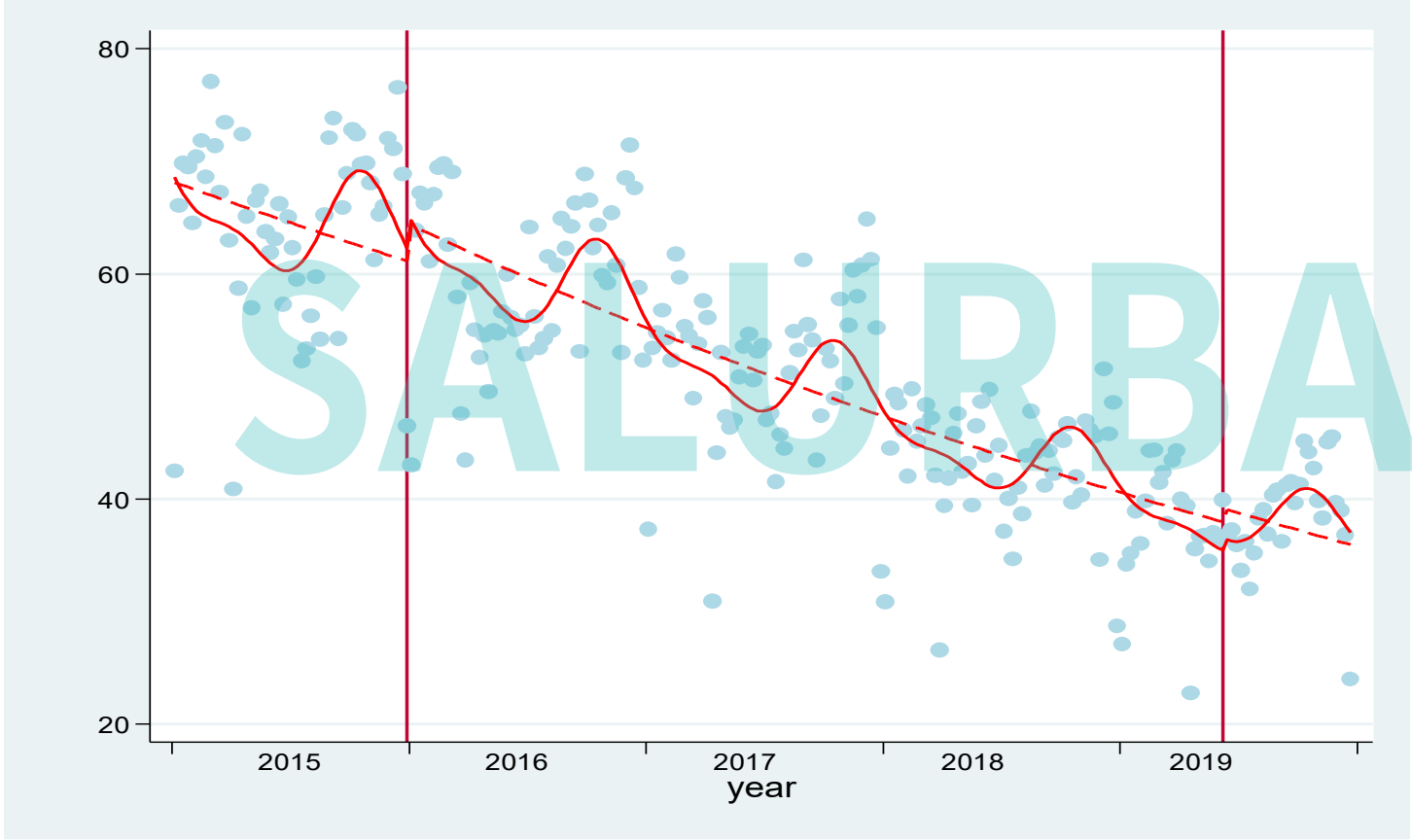
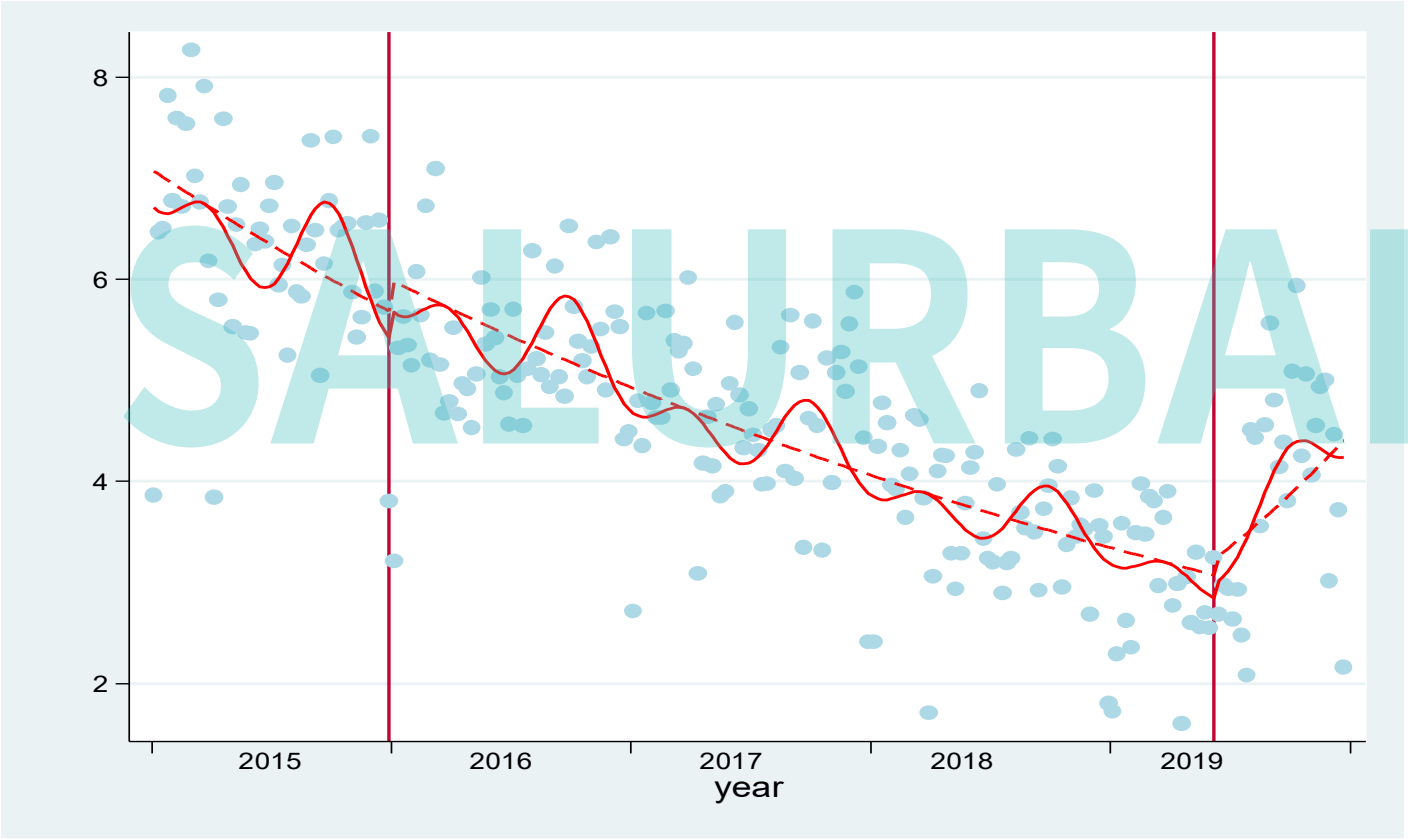
# TOTAL COLLISIONS RATE PER 100,000 VEHICLES



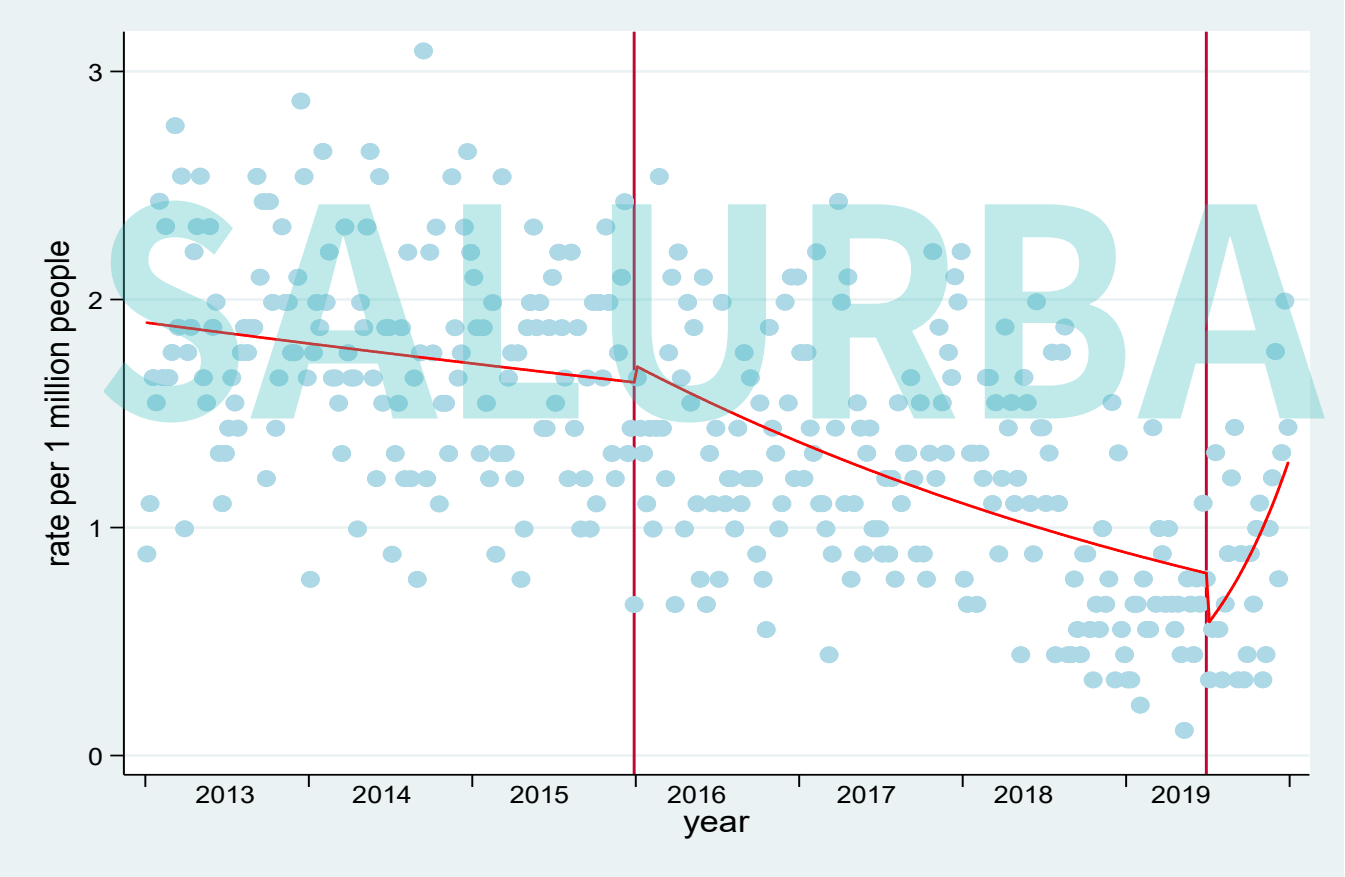

Adjusted for seasonality

# COLLISION RESULTING IN INJURY RATE PER 100,000 VEHICLES, MEXICO CITY

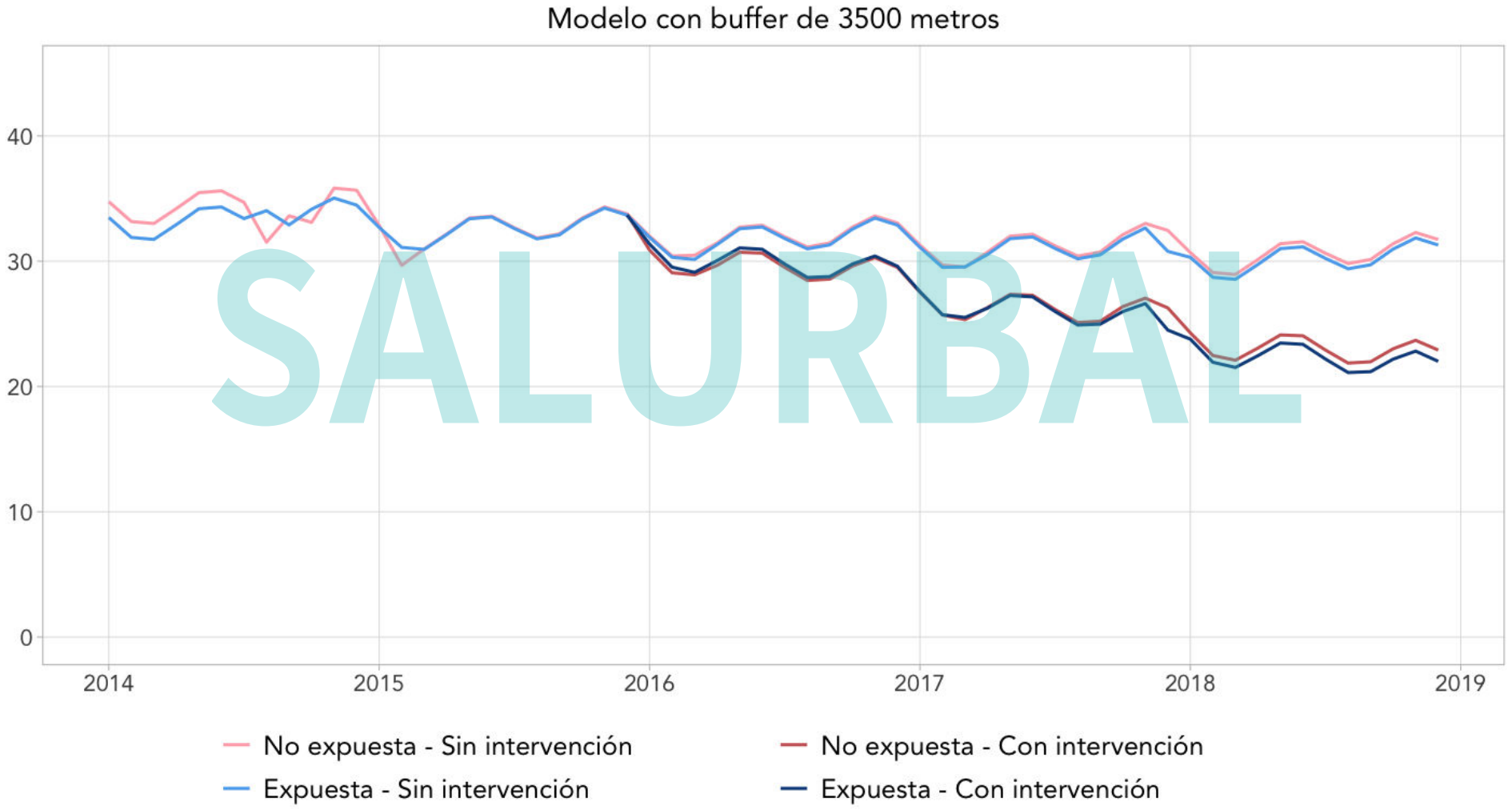



Adjusted for seasonality

# MORTALITY RATE FROM ROAD TRAFFIC COLLISIONS PER 1M, MEXICO CITY



# AIR POLLUTION - NO2

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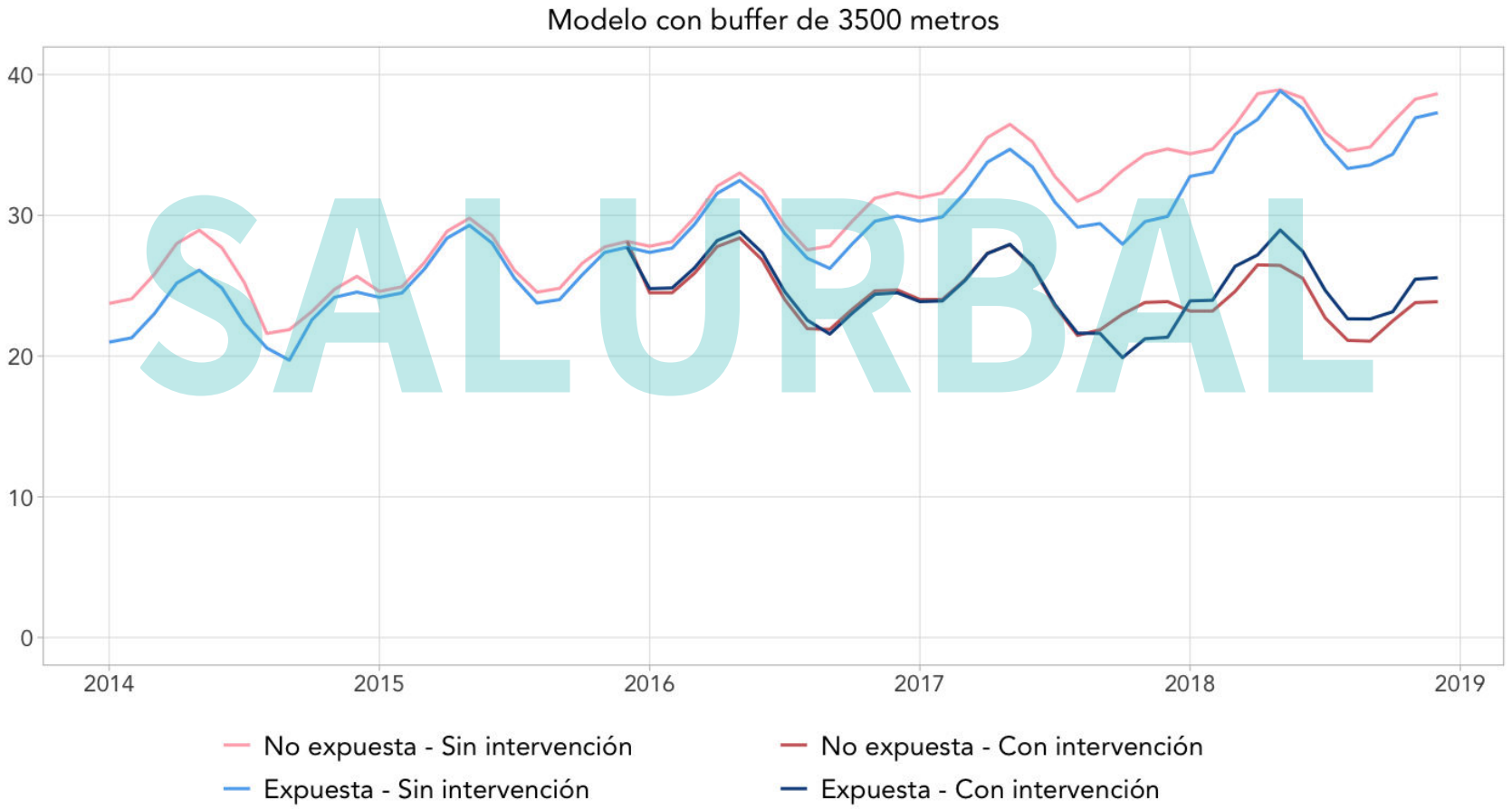
* Adjusted for seasonality, registered vehicles, temperature and wind velocity

# AIR POLLUTION- PM2.5

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* Adjusted for seasonality, registered vehicles, temperature and wind velocity

# CONCLUSIONS

- The 2015 vision zero regulations involving lower speed limits, higher fines and automatic traffic enforcement devices were associated with a decline in mortality and a decline in air pollution
- The 2019 changes to the regulations which involved replacing economic fines with a penalty point system were associated with an increase in the rate of collisions resulting in injury and mortality
- Legislation combined with strong traffic enforcement produces the best road safety outcomes

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# SENSITIVITY ANALYSES

- Changing the intervention start date from December 2015 to June 2016. This was be done to consider a transition period of 6 months.
- Keeping only private vehicles for analysis (excluding taxis, motorcycles and public transport).
- Creating intervention and control groups considering different collision rates, not only presence or absence of automated traffic enforcement devices.
- Redistributing “garbage codes” of external causes on mortality from road traffic collisions.
- Using police reported collisions instead of insurance reported collisions
- CITS for collisions

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