University of Canterbury
DATA 601

SPEED CHANGES & ROAD SAFETY

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BACKGROUND

1.19M lives lost 20–50M non-fatal injuries globally annually in crashes.

Labour reduced speed limits.

National is reversing limits.

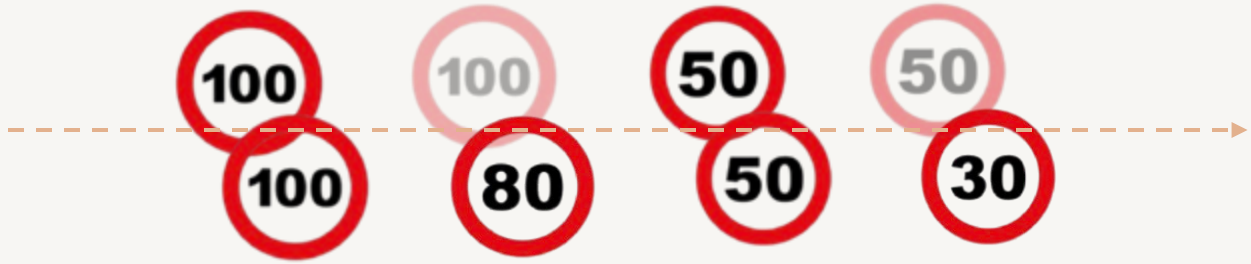
GOALS

Evaluating speed reduction impact on fatalities and serious injuries.

OVERVIEW

STUDY DESIGN

SPEED LIMIT GROUPS



SPEED LIMITS

30 km/h 50 km/h

80 km/h 100 km/h

APPROACH

“No change” vs “Reduced”

“Before & After”

ANALYSIS

Spatial

Temporal

DATA SOURCE

NZ Transport Agency

Waka Kotahi

DATA

NZ TRANSPORT AGENCY
WAKA KOTAHI

Crashes Analysis System

53,912 records of 97 variables

crashes from 2019–2023

National Speed Limit Register

52,033 records of 29 variables

speed limit zones up to 2024

LIMITATION

CHALLENGE

Complex, multi-factorial causes of crashes

LIMITED DATA

Small dataset for ”after” period

MISMATCHES

Crash speeds vs rule-based limits

PROCESS

Extract

- Load CAS dataset
- Load NSLR dataset

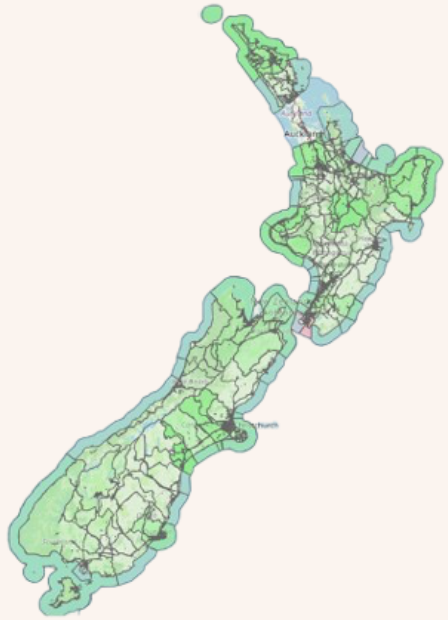
Transform

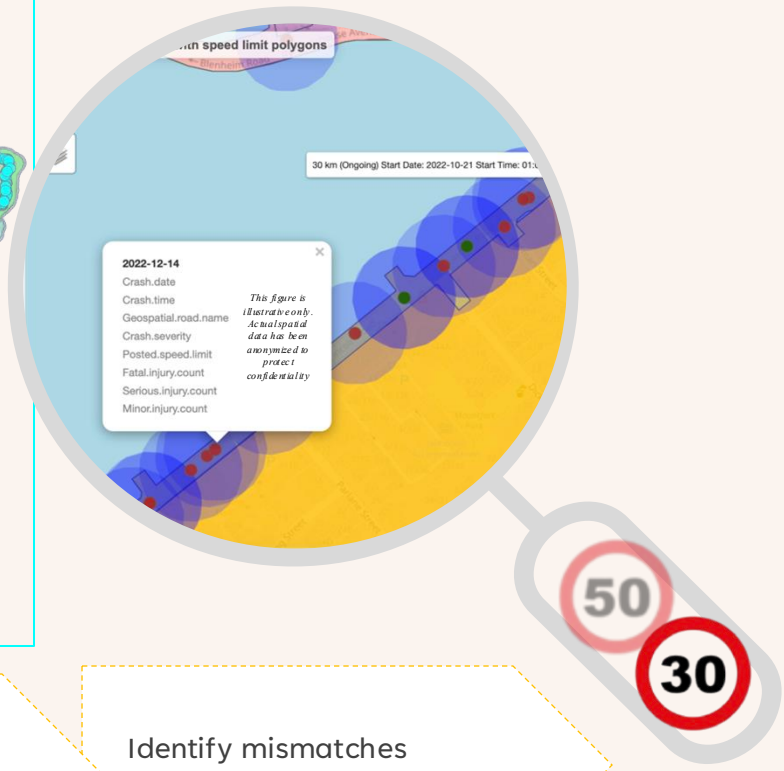
- Check for missing values and duplicates
- Normalise speed limit zones and crash speeds
- Filter speed zones by effective dates
- Spatially merge speed limit zones with crash locations
- Identify mismatches and clean data

Load

- Calculate mean dates
- Determine ratios

VISUALIZATION





Prepare data (1)

Visualise speed limit shapes

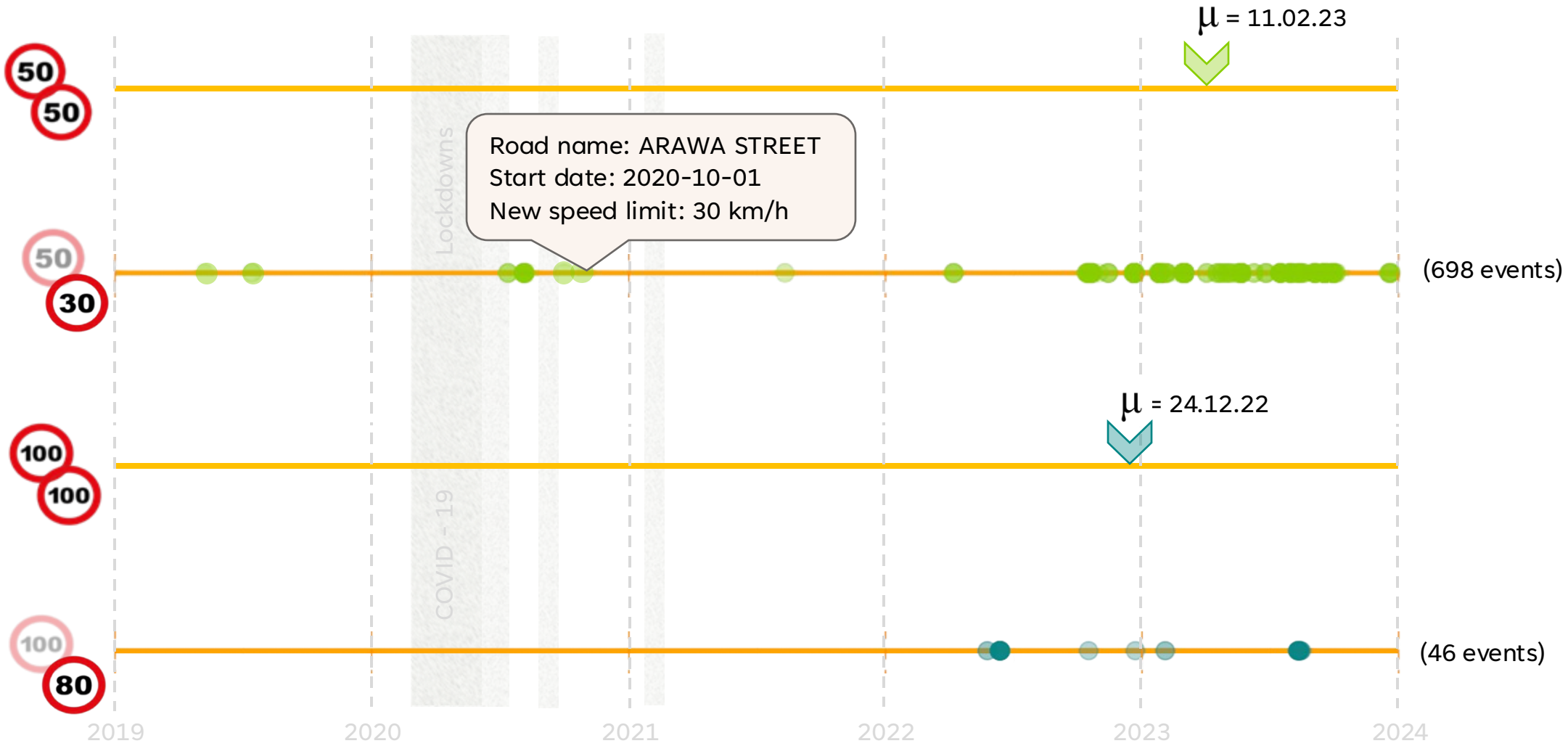
Prepare data (2)

Visualise crash points

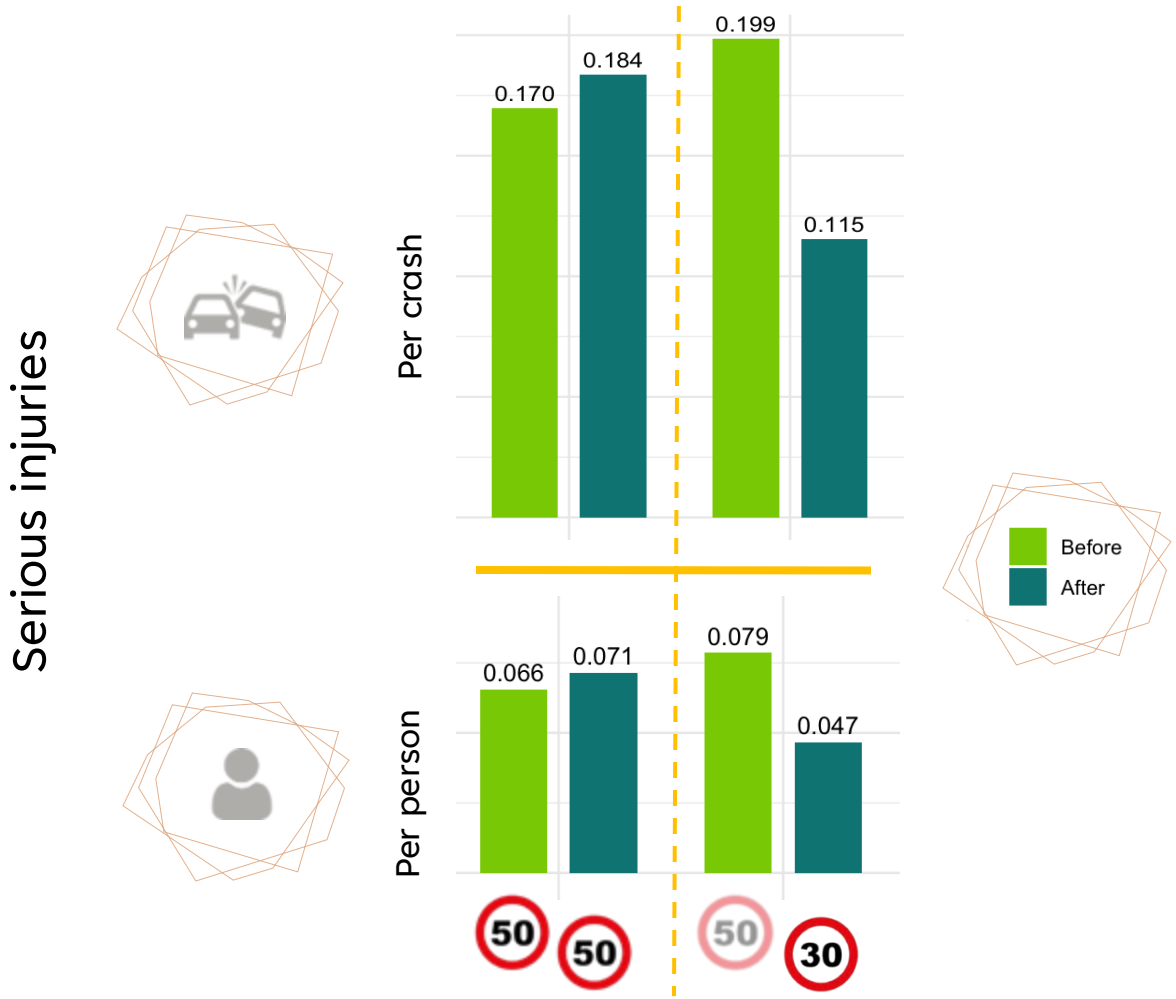
Merge crash points with speed limit shapes

Identify mismatches

Clean data


μ = 11.02.23
50
50
Road name: ARAWA STREET
Start date: 2020-10-01
New speed limit: 30 km/h
Lockdowns
50
30
(698 events)
μ = 24.12.22
100
100
COVID - 19
100
80
(46 events)
2019
2020
2021
2022
2023
2024

RATIOS



RESULTS

Areas for reduction

- Speed limits were reduced in areas where injuries and fatalities were a **concern**.

Before vs After

- Significant **reduction** in proportions after speed limit changes.

Balance

- Most speed limits were reduced in 2023, leading to an **unbalanced** before-and-after comparison.

Methods

- Methods are in place, but 2024 data would provide stronger **validation**

CONCLUSION

Speed reductions improved safety.

FURTHER WORK

Incorporate 2024 data for a more comprehensive analysis.

Examine other factors in crashes.

THANK YOU

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