COVID-19 Impacts on the auto insurance industry through the lens of accident data

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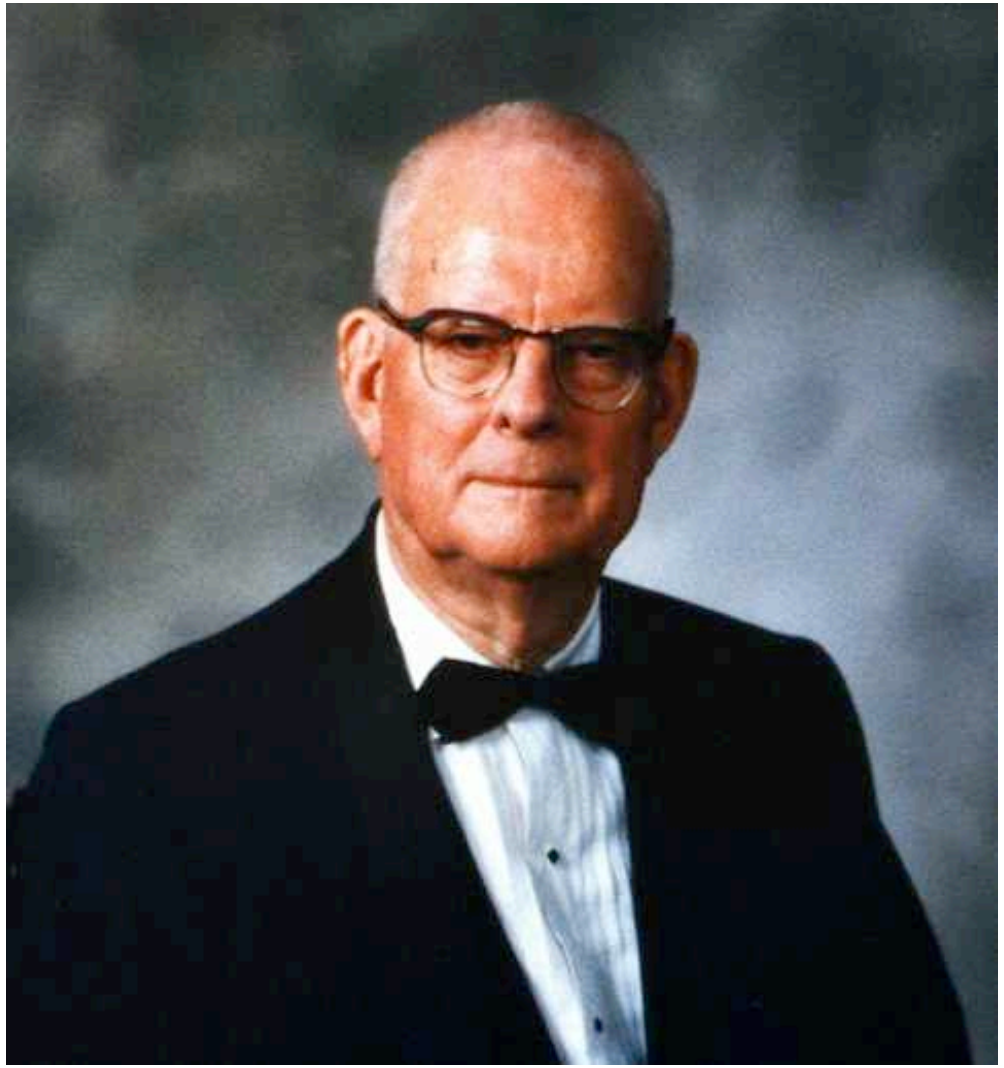
Topics

- **Accident data as a new data source**
  - Data collection and curation
  - Key benefits and limitations
  - General pricing applications
  - Application of an actuarial principle to improve data usefulness

- **Covid-19 Impacts on the auto insurance industry**
  - Accident count over time
  - Rate of change of accident count across regions
  - Accident severity
  - Additional insights

A fundamental idea
People vs. Process



W. Edwards Deming

Accident data from police reports provide timely and more complete understanding of the auto risk, particularly location risk

OH-1 (Rev.06/09)

TRAFFIC CRASH REPORT

OHIO DEPARTMENT OF PUBLIC SAFETY

Local Report # *	12-233
Crash Severity	3 (1 Fatal 3 PDO 2 Injury 4 Unknown)
Private Property	
Hit/Skip	1 (1 Not Hit/Skip 2 Solved 3 Unsolved)
Photos Taken	OH-2 X, OH-3 X
N.C.I.C. # *	02510
Reporting Agency *	WESTERVILLE PD
# Units	01
Unit Error	01 (98 = Animal 99 = Unknown)
Date of Crash *	
Type of Crash	1834
Day of Week	WED
City *	X
Village *	
TWP *	
Name (City, Village or Township) *	WESTERVILLE
County # *	25
Latitude	
Longitude	

Crash Occurred On

Prefix	Crash Location	Type Loc

Type Location Point Used: 1 Named Street 3 Numbered Route 2 Numbered Street

Local Information: DISTRICT 3

At / Reference

Dist Reference	DR	Prefix	Reference	Ref Point
200 Ft.	S			02

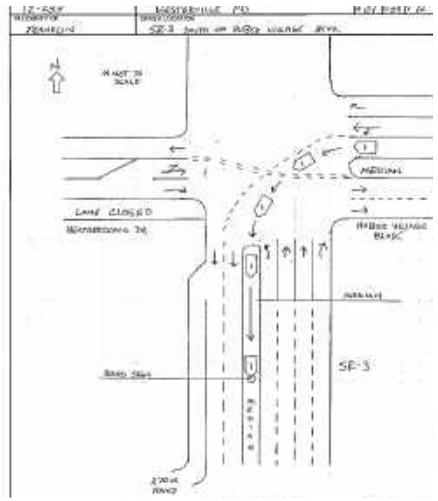
Reference Point Used: 01 State Line; 02 Intersection 2 Streets; 03 County Line; 04 House Number; 05 Township Boundary; 06 Mile Post; 07 Corporation Limit; 08 Place Name W/O Reference; 09 Driveway; 10 Street Or Route W/O Reference

A	01	02

Name (Case, First, Middle)

Address (Street, City, State, ZIP Code)

Date of Birth | Age | Sex | Home Phone # | Work Phone #



Crash Occurred On

Prefix	Crash Location	Type Loc
	SR-3	3

Type Location Point Used: 1 Named Street 3 Numbered Route 2 Numbered Street

Local Information: DISTRICT 3

At / Reference

Dist Reference	DR	Prefix	Reference	Ref Point
200 Ft.	S		HUBER VILLAGE BLVD.	02

Reference Point Used: 01 State Line; 02 Intersection 2 Streets; 03 County Line; 04 House Number; 05 Township Boundary; 06 Mile Post; 07 Corporation Limit; 08 Place Name W/O Reference; 09 Driveway; 10 Street Or Route W/O Reference

To make use of accident data across states and over time, data have to be properly curated and enriched

Data Acquisition	Data Curation	Data Enrichment	Analytics	Technology
• Acquire data directly from various state & government agencies • Know the right contacts within the right agencies, and the proper processes • On-going data update	• Manage on-going data ingestion with quality control processes for file formats & types • Cleanse & standardize address attributes • Process automation	• Multi-layers geo-coding processes • Scalable and cost effective proprietary capabilities	• Proven analytic methods taking into consideration of detailed space across granular time periods • Multiple products (analytical outputs) from baseline offering to advanced solutions	• Highly scalable geo-scoring engine enabling delivery performance to clients • Inter-state operability for commercial fleet applications • Secured and scalable rested APIs

TNEDICCA®

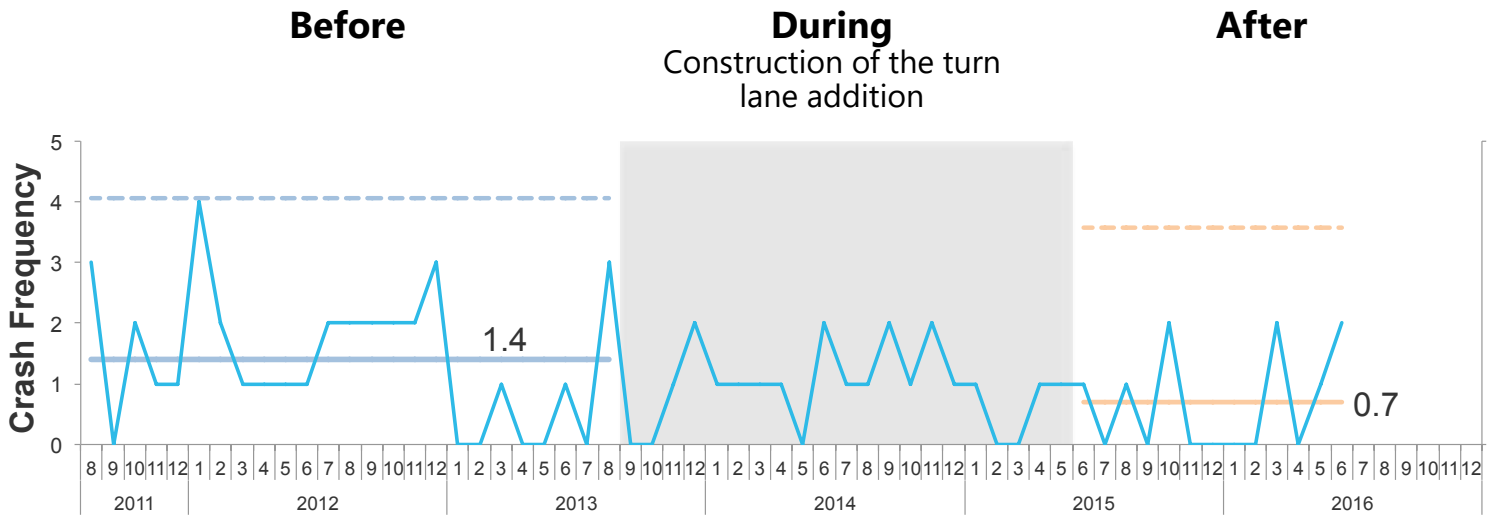
Benefits and Data Limitations

- **Benefits**
  - Larger sample size than using carrier's own loss data
  - Timely insights
  - Additional useful data attributes for auto insurance applications

- **Data Limitations**
  - Not all accidents are reported
  - Not all reported accidents are reported in a timely manner

Crash location is important and useful

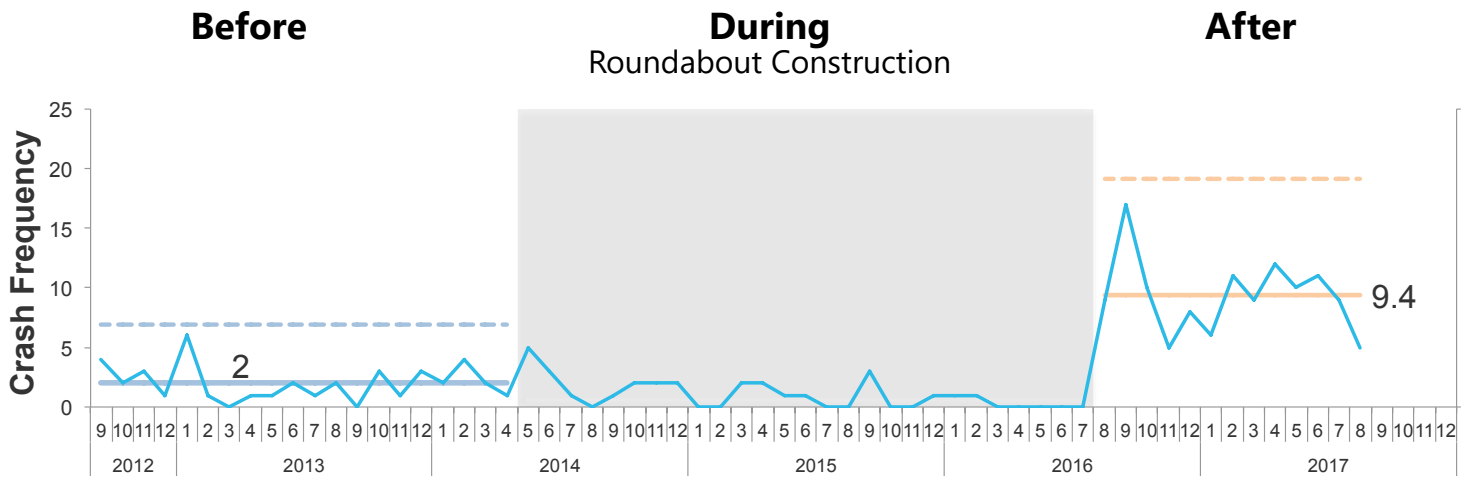
Adding a turn lane



Source: TNEDICCA®

Crash location is important and useful

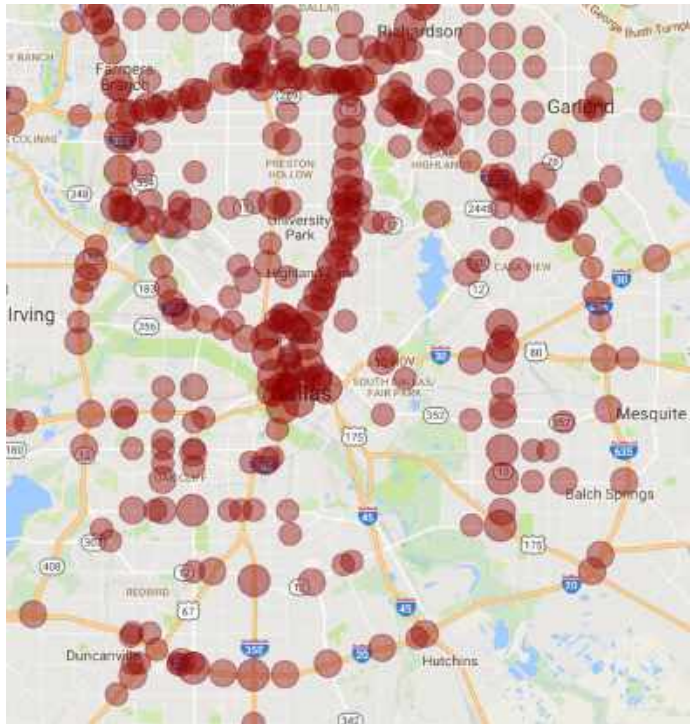
New Roundabout

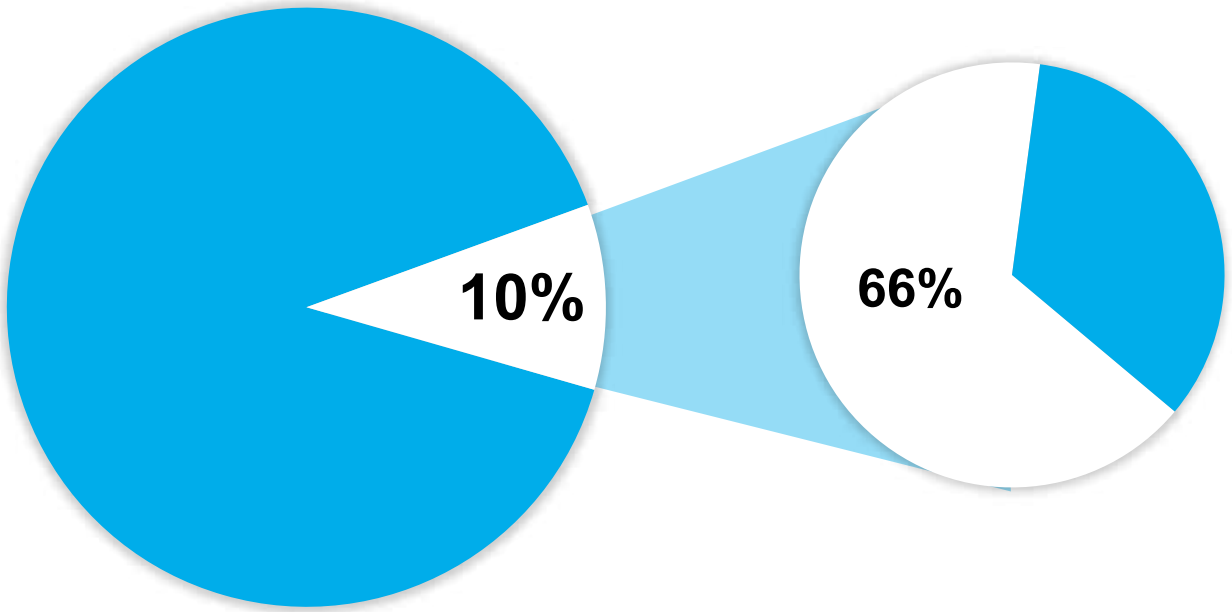


Source: TNEDICCA®

Fundamental insight:
Crash location matters a lot...

10% of the locations account for more than two-thirds of the accidents.





Proportion of Locations

Contribution of Total Crashes

Source: Analysis from *TNEDICCA®*

The underlying crash location data form the building blocks for the following three empirically-verifiable pricing applications

Location-Based Risk Score

For territory rating improvement

Route-Based Risk Score

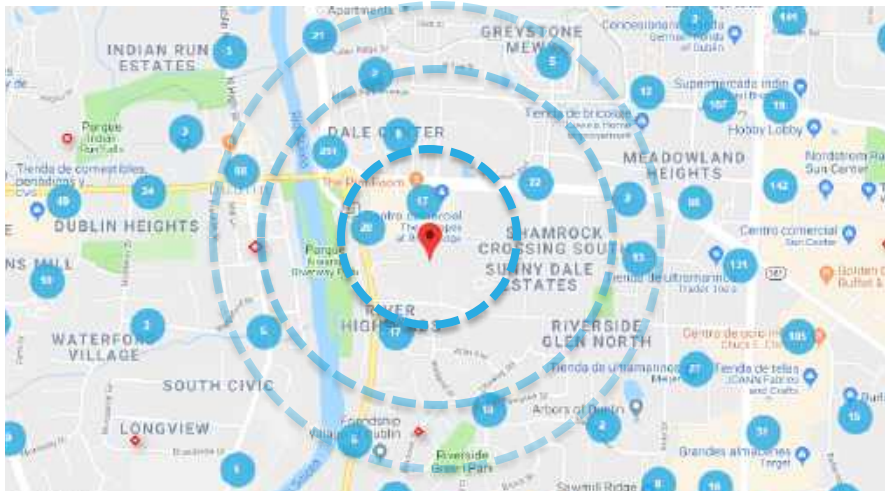
An innovative non-telematics solution

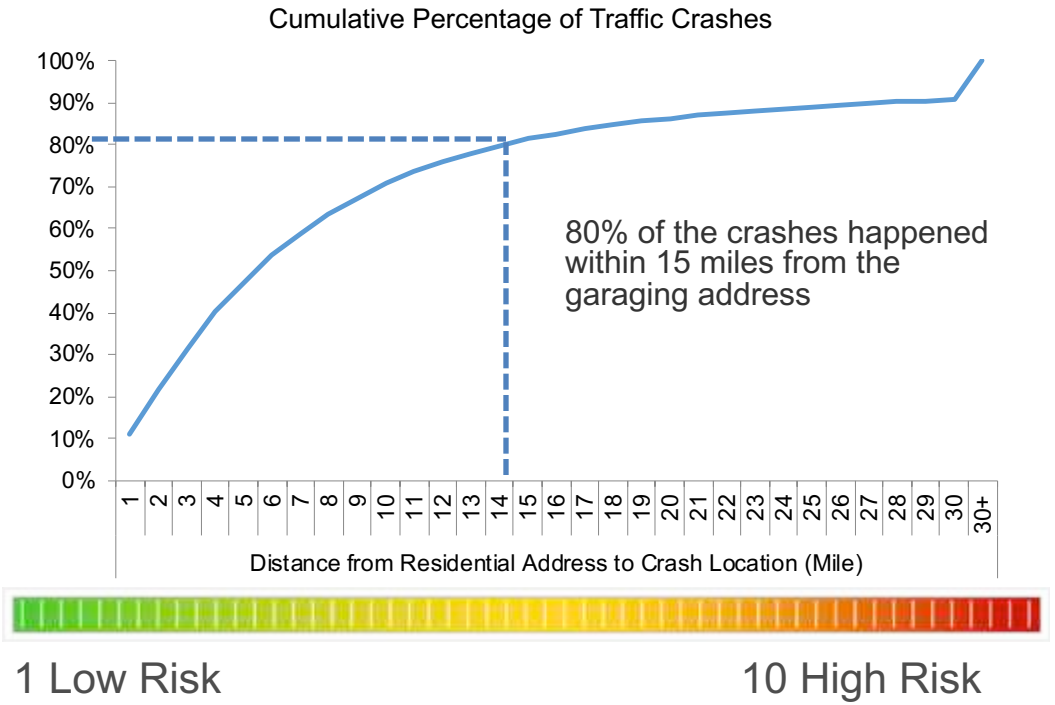
Usage-Based Risk Score

“Where You Drive” telematics enrichment

Location-Based Risk Score

More refined territory definitions and factors





Source: Analysis from *TNEDICCA*® based on ~2.5 million crashes in a state

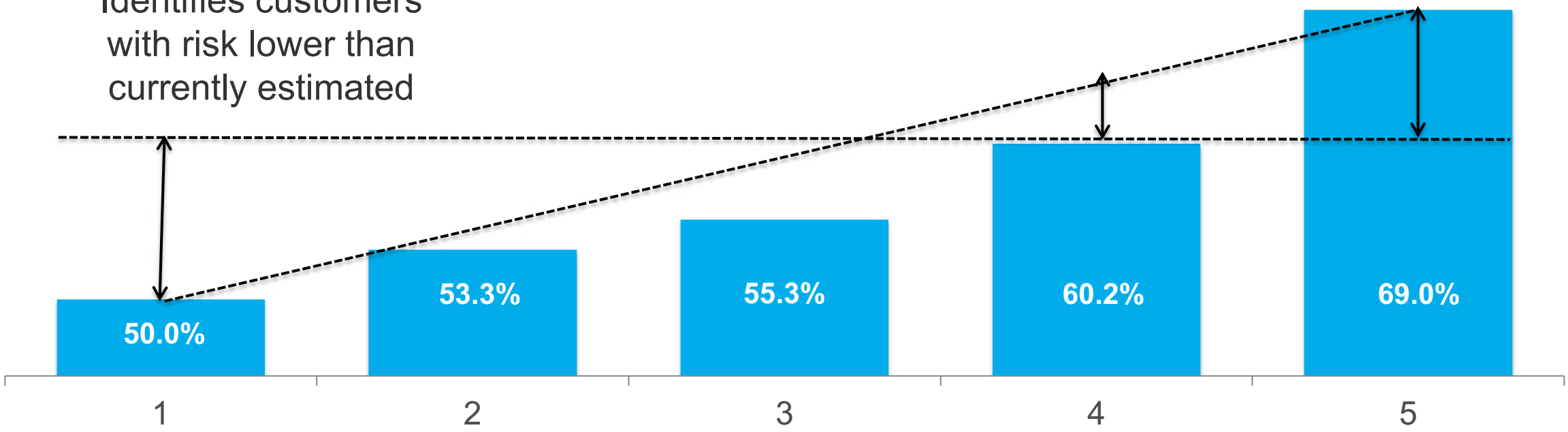
Crash location can help improve understanding of auto risk

Average loss ratio lift is 38%

Opportunity Gap:
Identifies customers with risk higher than currently estimated

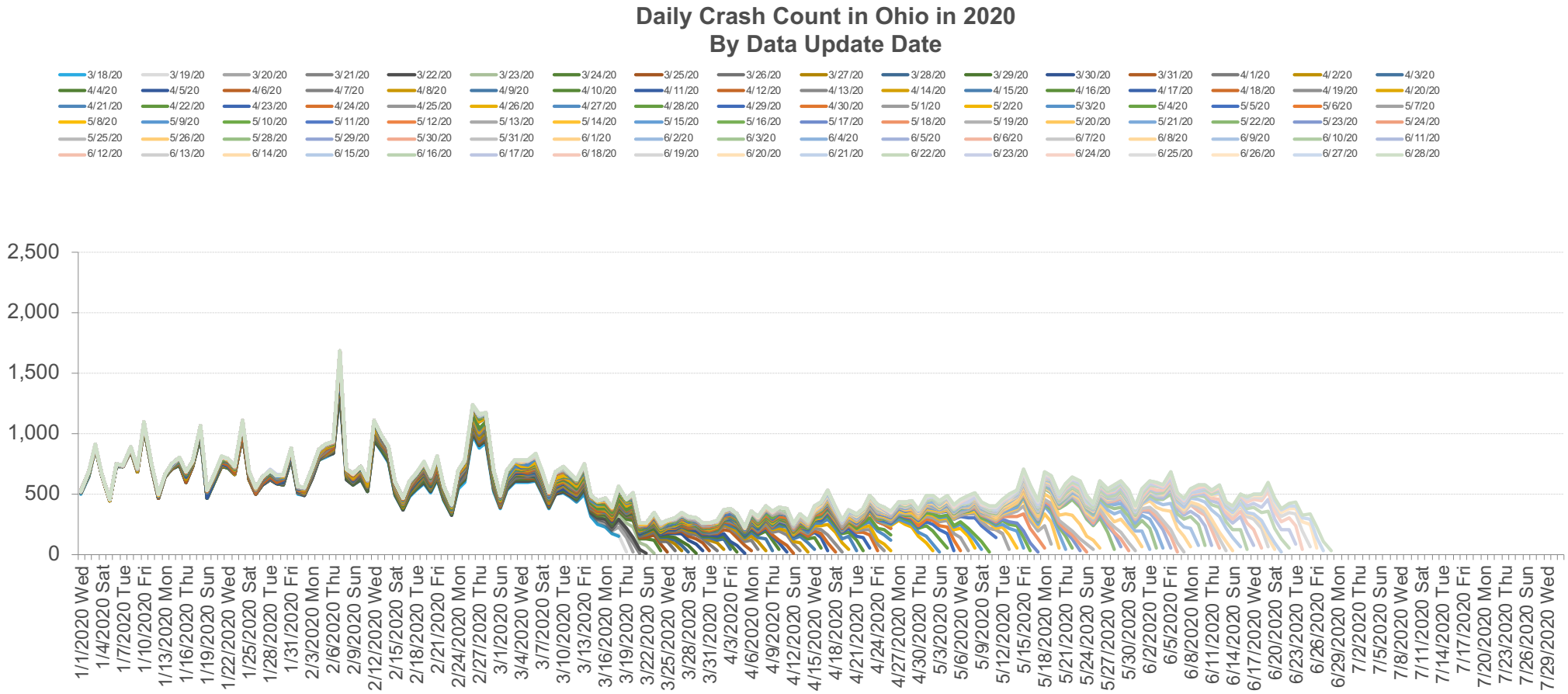
Incremental Lift = (69%/50%)-1 = 38%

Opportunity Gap:
Identifies customers with risk lower than currently estimated



Loss Ratio by TNEDICCA's Risk Quintile

By applying a similar method to loss development triangle, crash data can be used in a more timely fashion



Source: TNEDICCA

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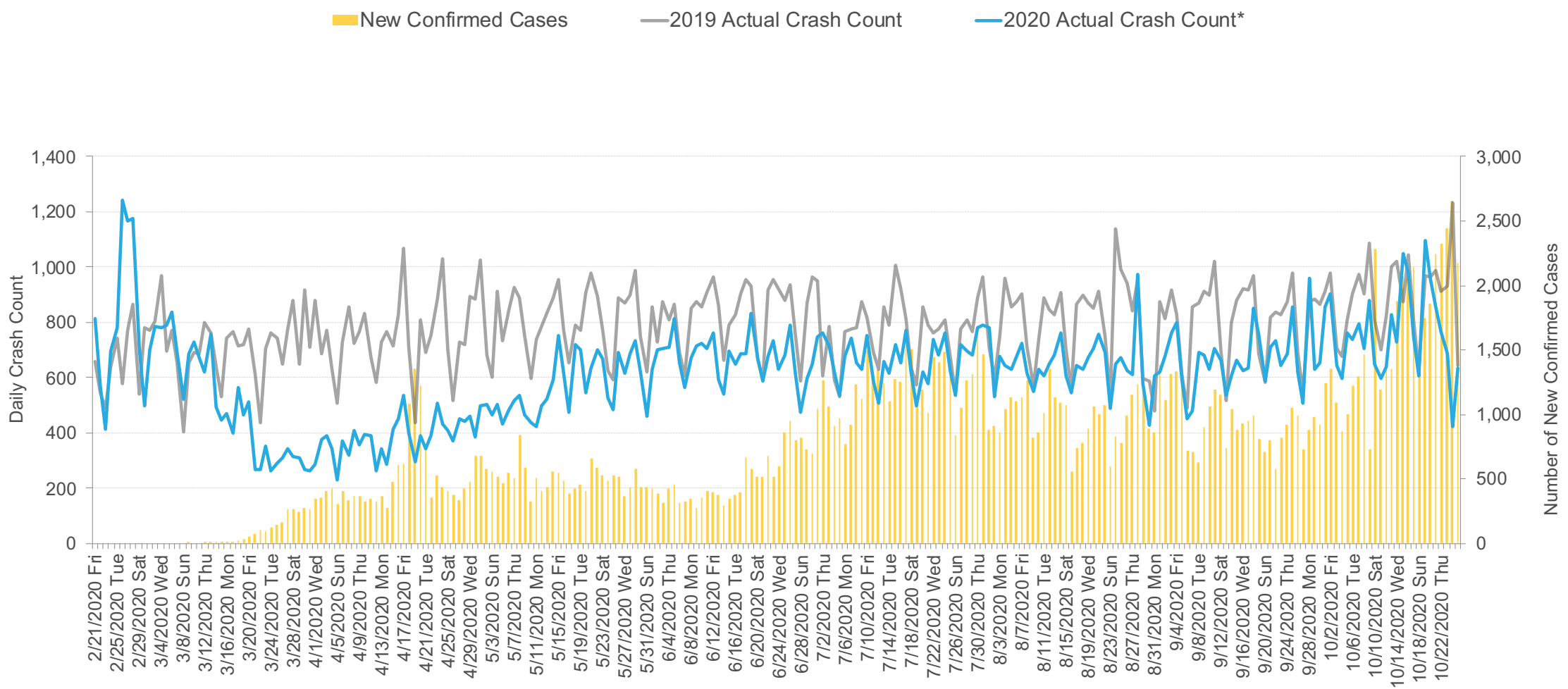
Daily Crash Frequency in Ohio

COVID-19 has had a significant impact on crash frequency



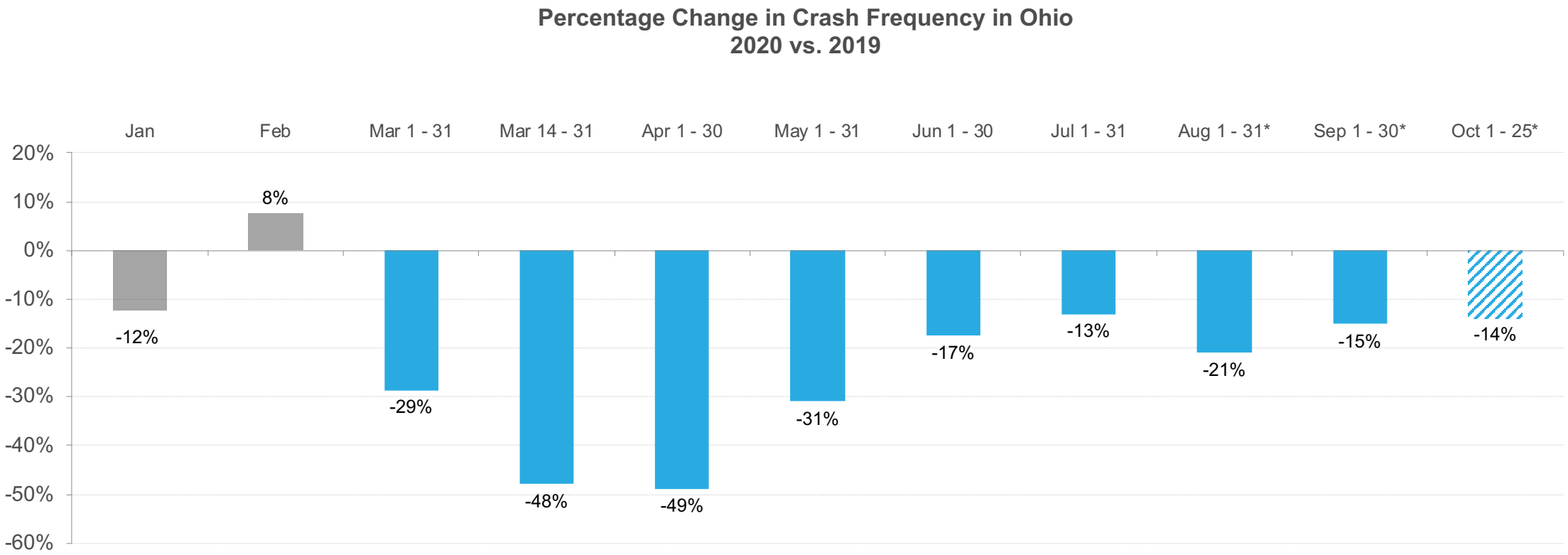
Note: Data updated as of 10/25/2020

* Actual crash counts from 08/05/20 were adjusted for data report lag

Source: Crash frequency from TNEDICCA and Coronavirus confirmed cases from Ohio Department of Health

Daily Crash Frequency in Ohio 2019 vs. 2020

October MTD is down 14%



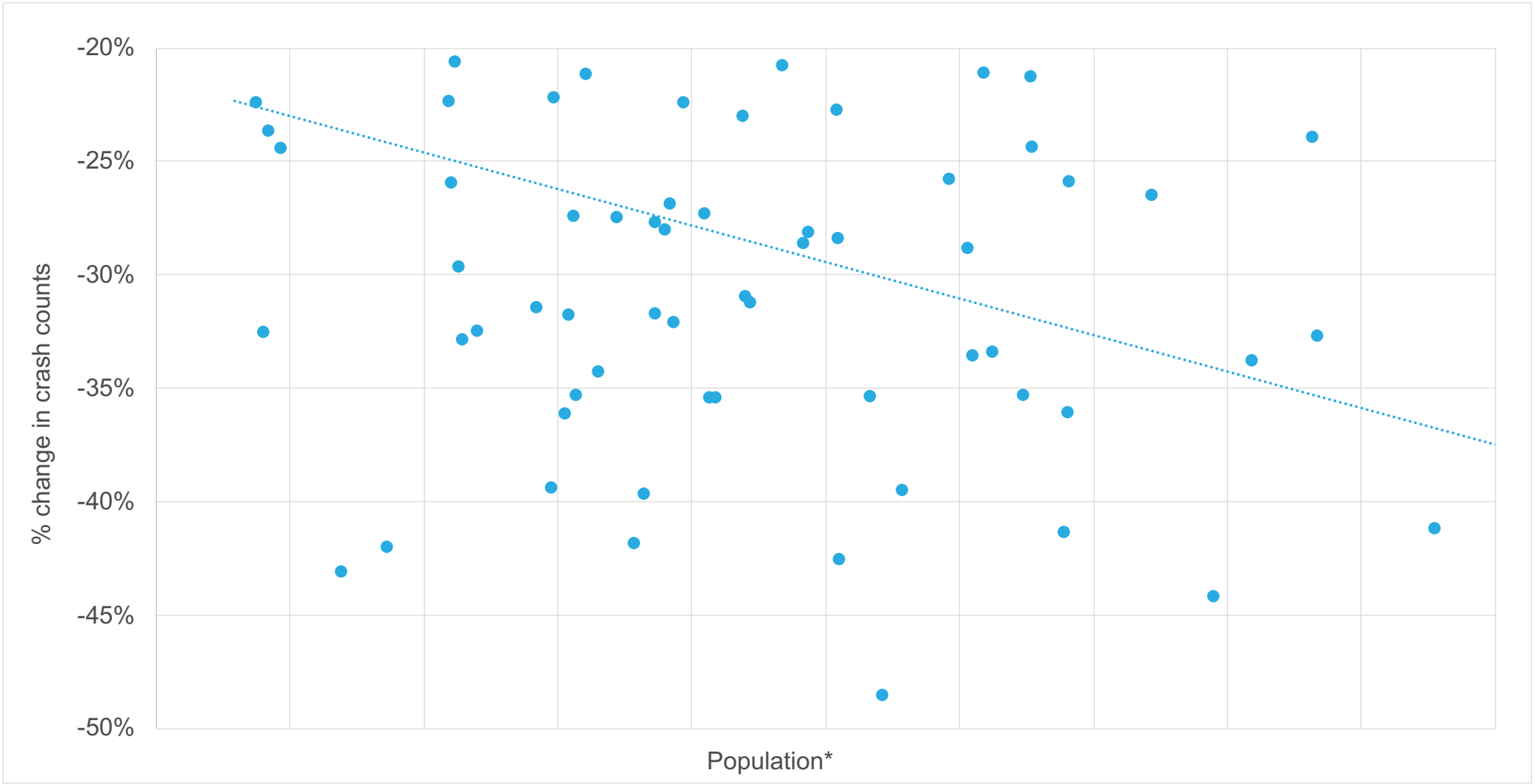
* Actual crash counts were adjusted for data report lag

Source: TNEDICCA

Note: Data updated as of 10/25/2020

Percentage Change by County in Ohio 2020 vs. 2019**

More populated counties experienced greater decline



* Country population numbers are in logarithmic scale.

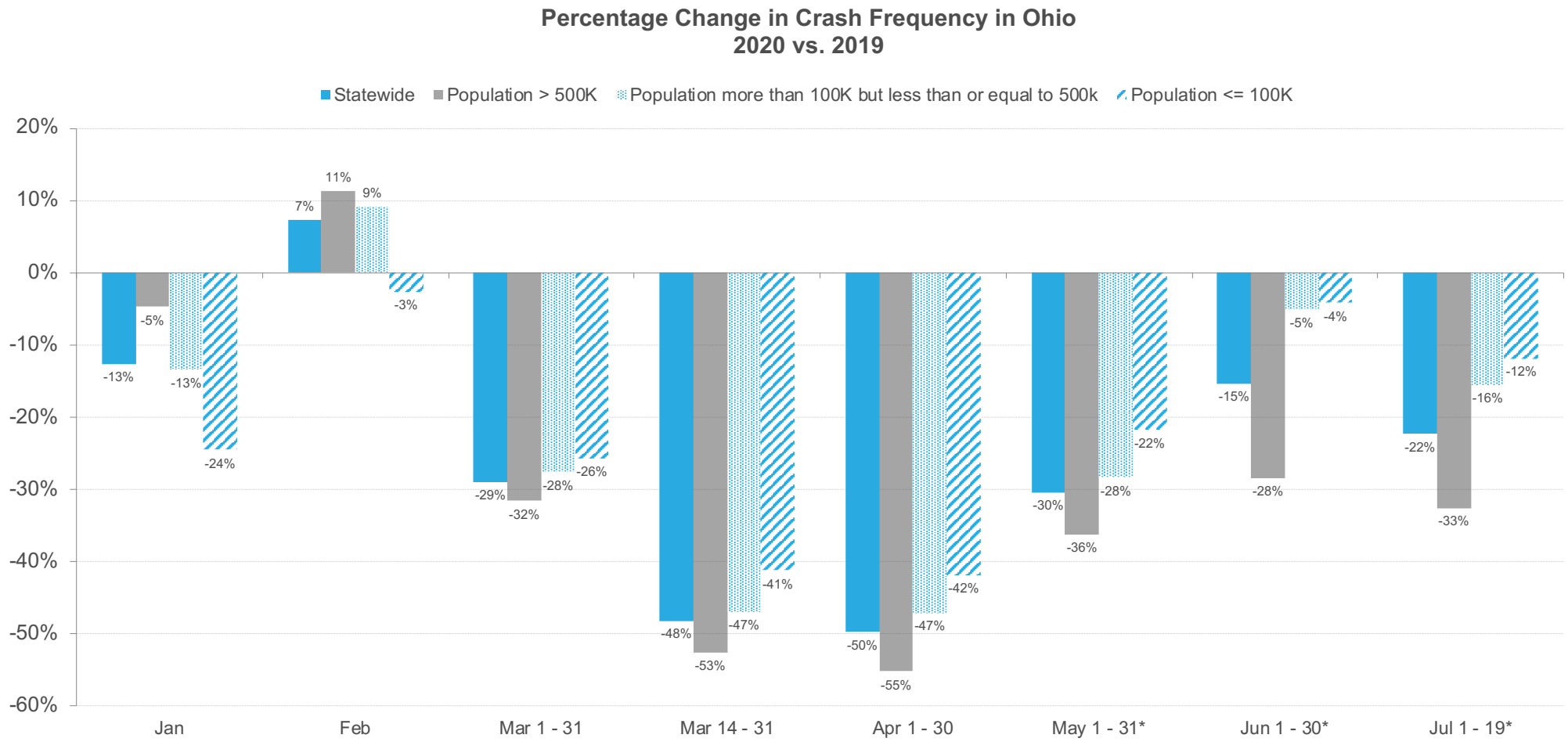
** For 2020, the data is from Wednesday 4/01 to Tuesday 6/30. For 2019, the data is from Monday 4/01 to Sunday 6/30.

Source: TNEDICCA

Note: Data updated as of 07/19/2020

Percentage Change by County in Ohio 2020 vs. 2019

More populated counties experienced greater decline



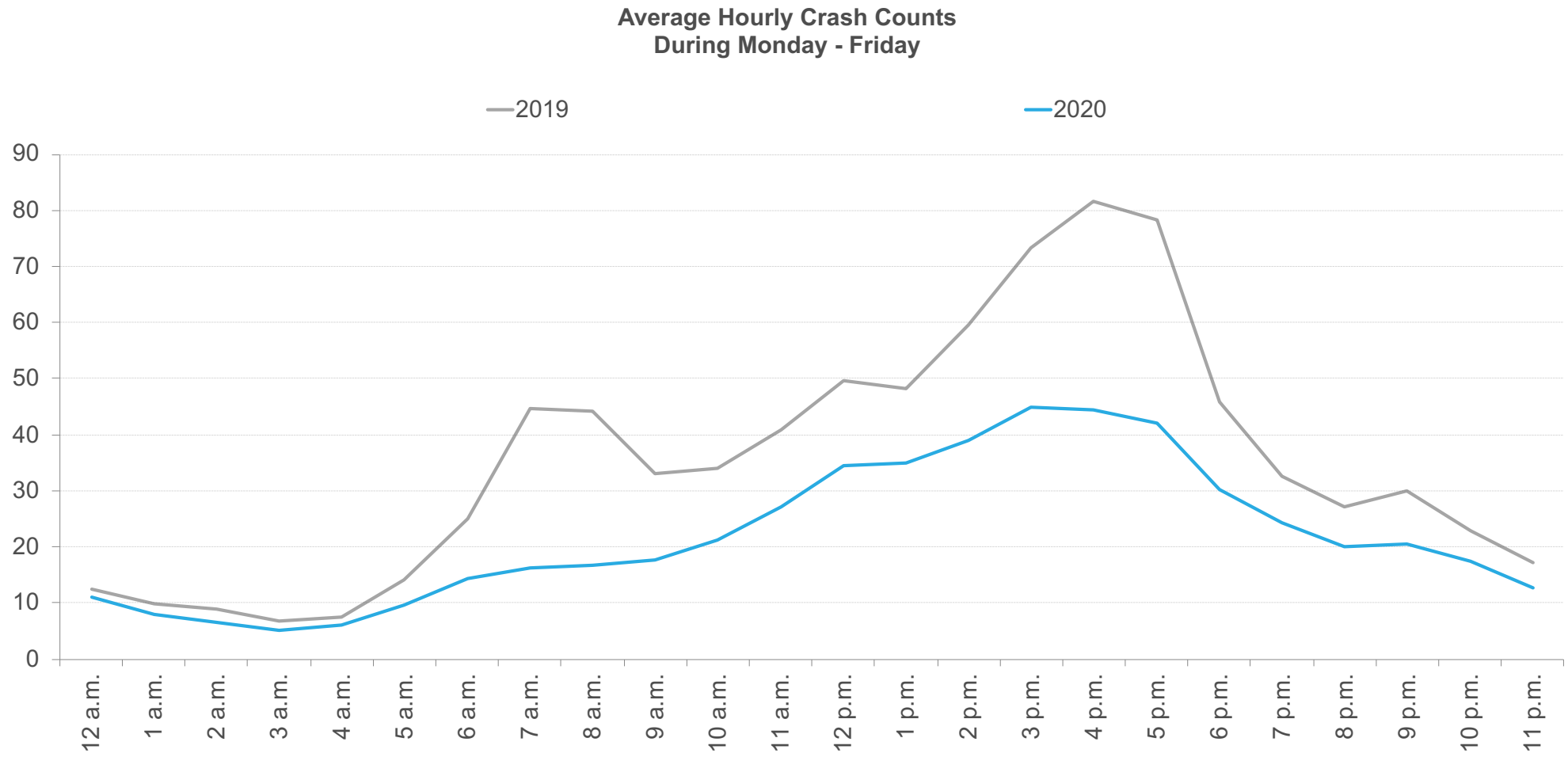
* Actual crash counts were adjusted for data report lag

Source: TNEDICCA

Note: Data updated as of 07/19/2020

Hourly Crash Frequency During Week Days in Ohio 2020 vs. 2019*

Drive time patterns have changed

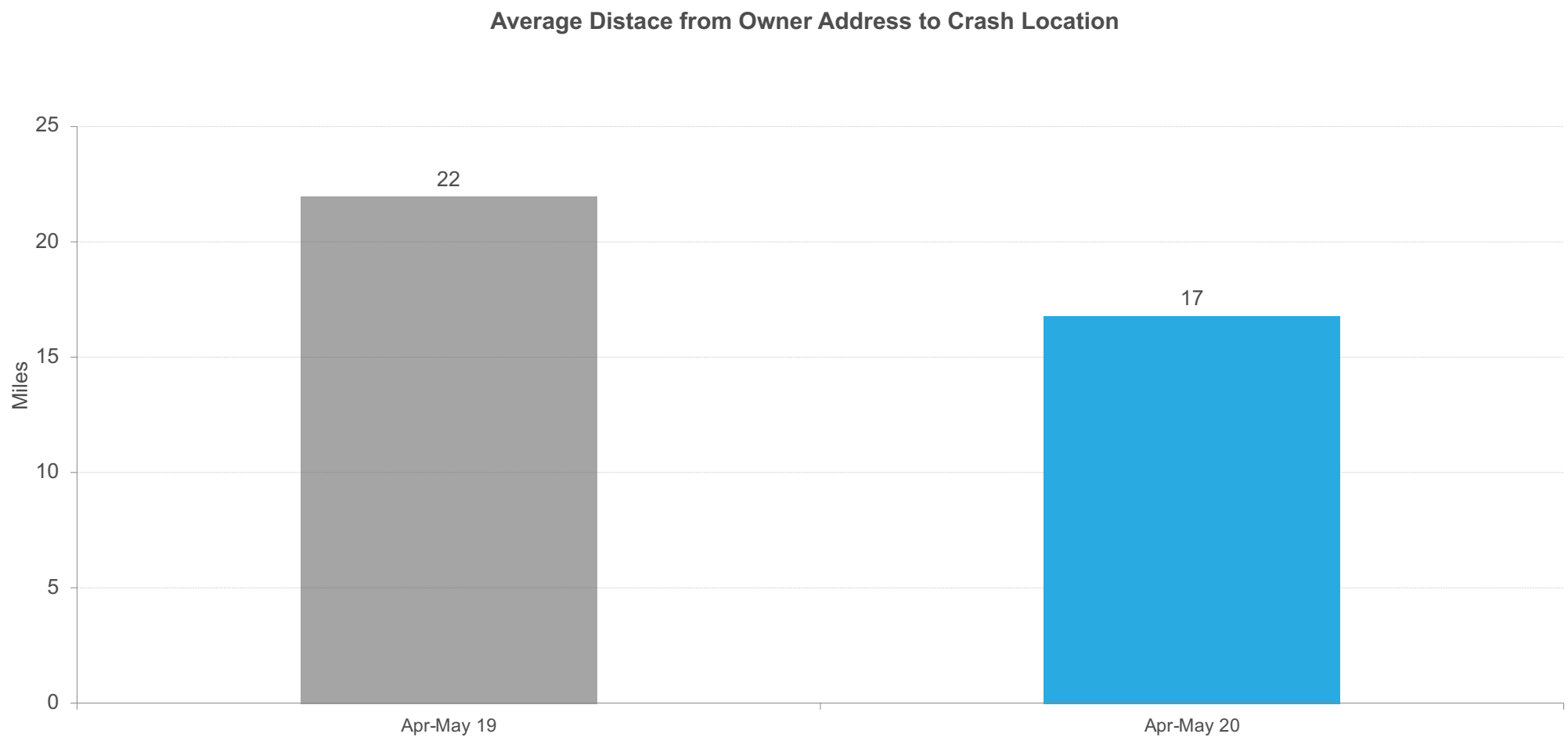


* For 2020, the data is from Wednesday 4/01 to Tuesday 6/30. For 2019, the data is from Monday 4/01 to Sunday 6/30.

Source: TNEDICCA Note: Data updated as of 07/19/2020

Distance of Crash Location to Home in Ohio 2020 vs. 2019

Average distance decreased by 23%

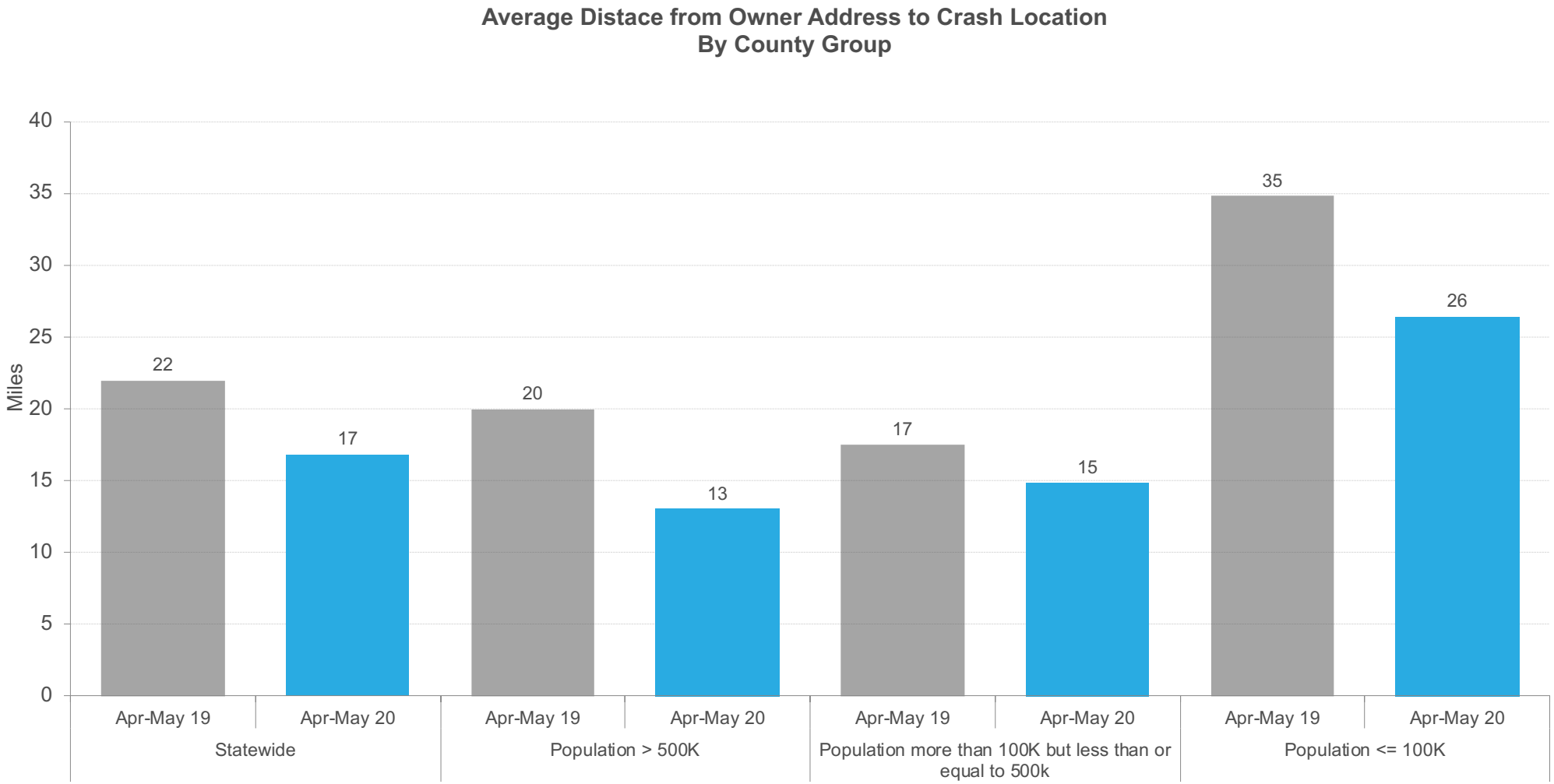


Source: TNEDICCA

Note: Data updated as of 07/19/2020

Distance of Crash Location to Home in Ohio 2020 vs. 2019

The average reduction in distance was higher among more populated counties

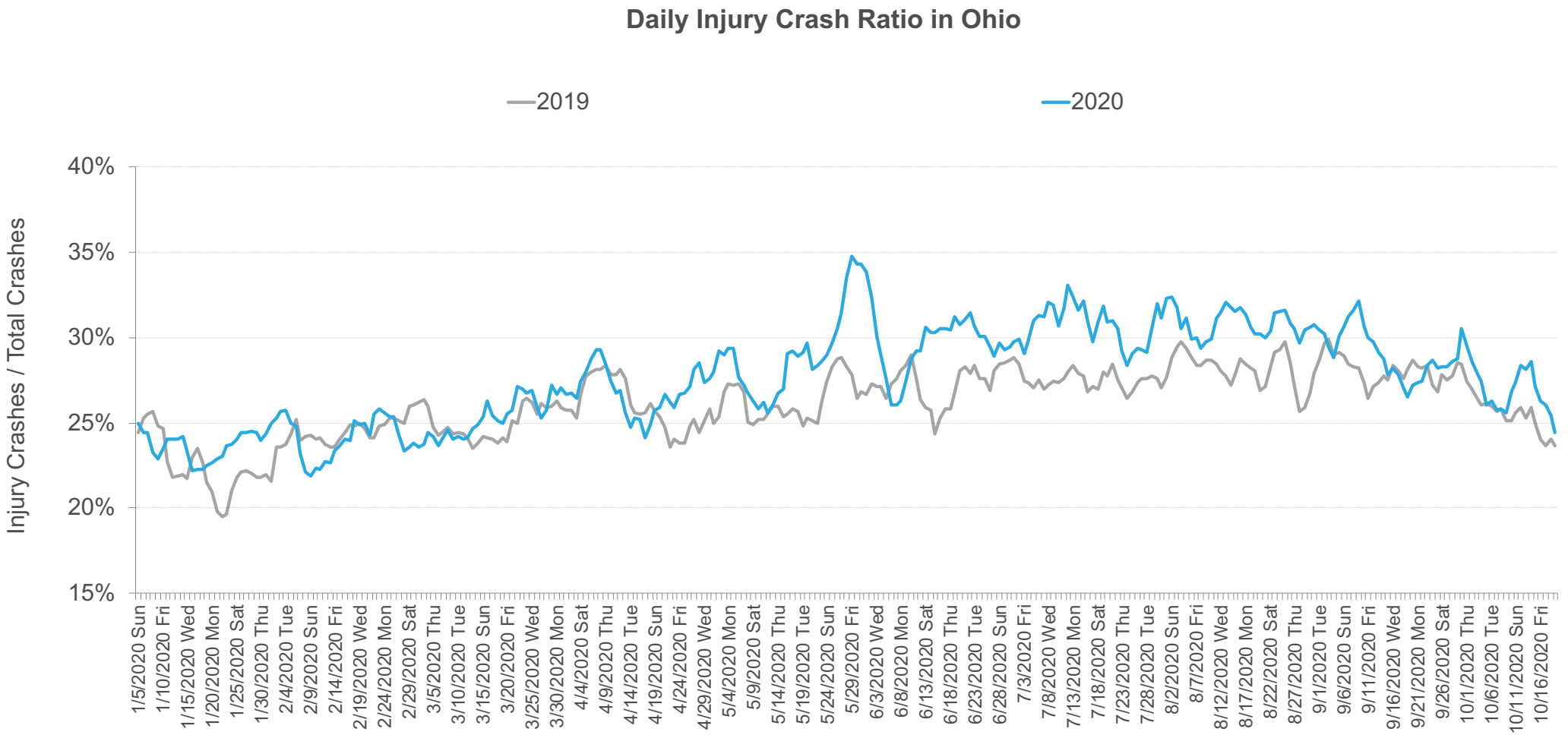


Source: TNEDICCA

Note: Data updated as of 07/19/2020

Daily Injury Crash Ratio in Ohio 2020 vs. 2019

Injury crashes have declined at a slower rate



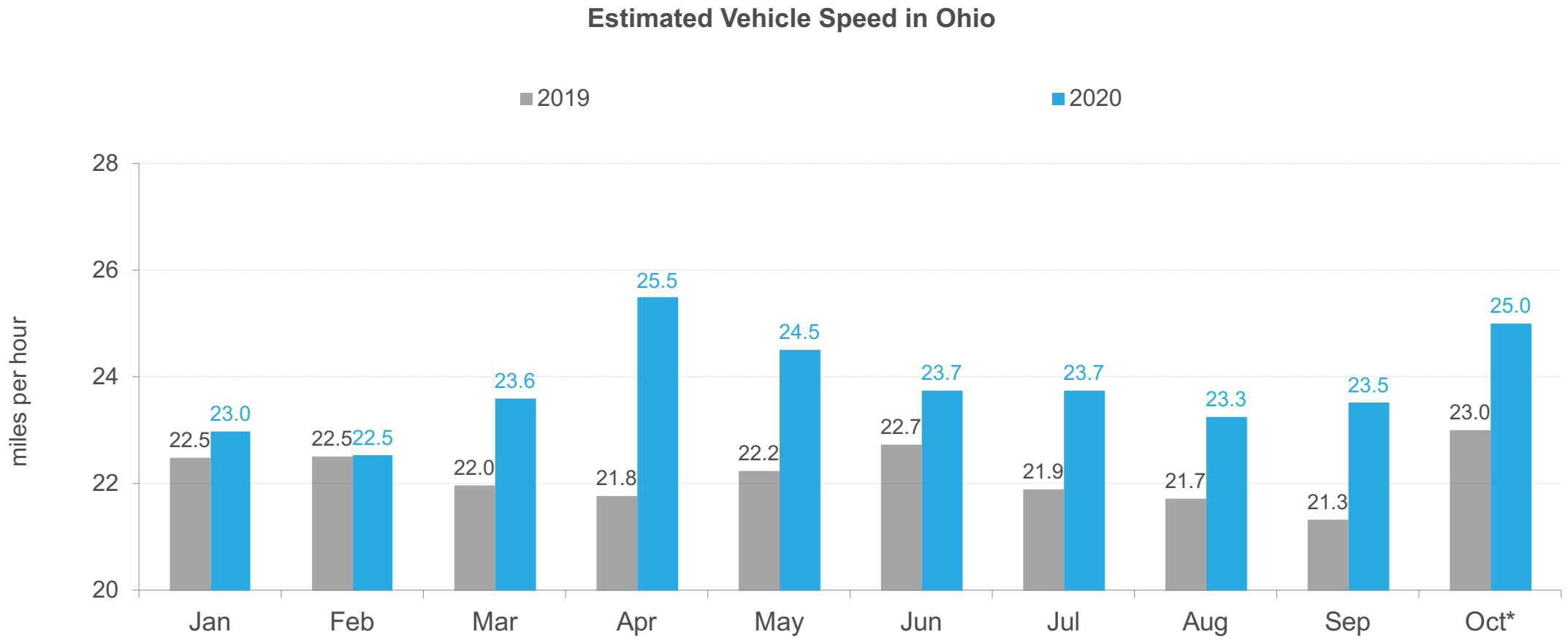
* Daily injury ratio is based on 5-day moving average

Source: TNEDICCA

Note: Data updated as of 10/25/2020

Estimated Vehicle Speed 2020 vs. 2019

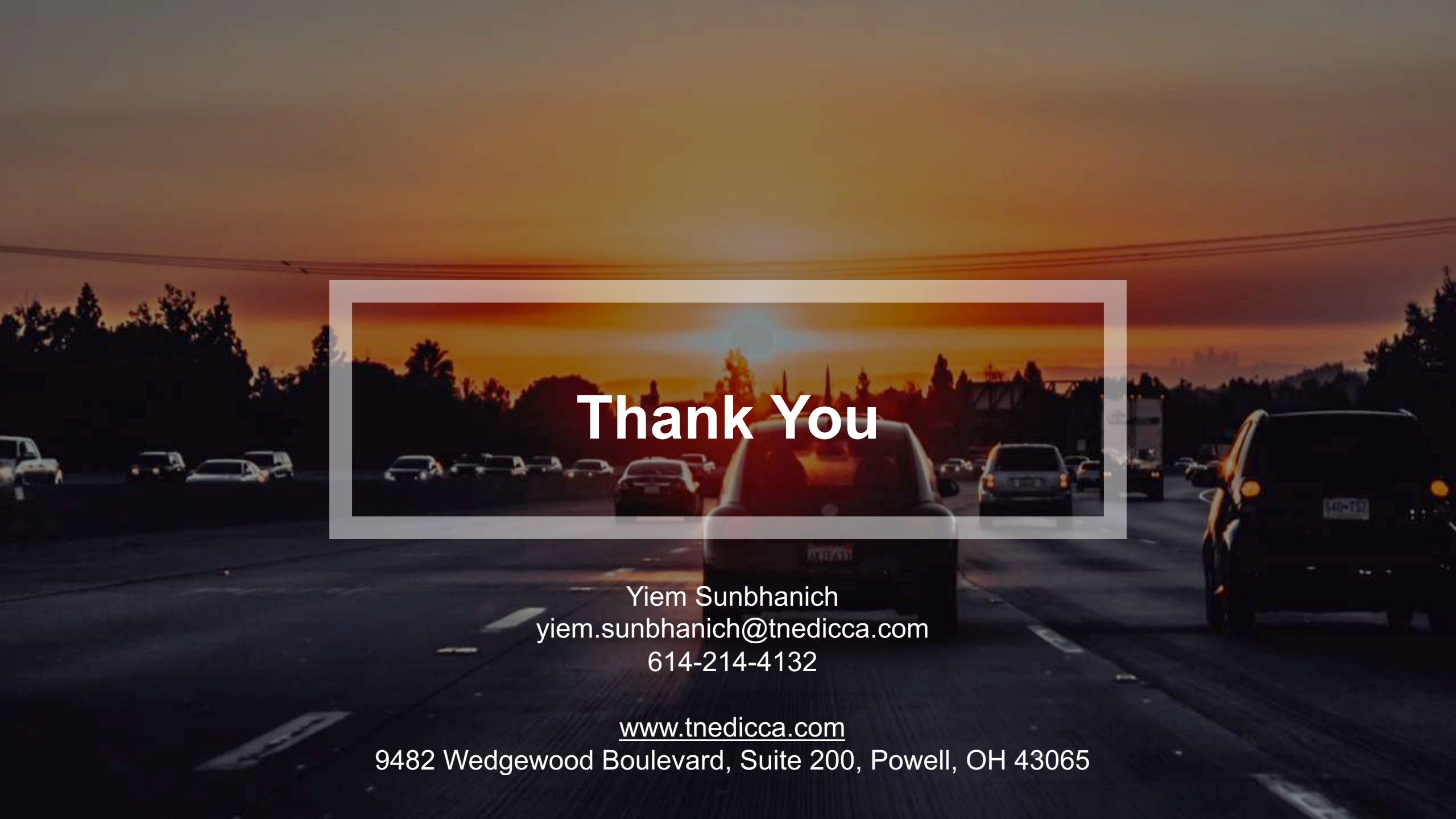
Vehicle speed at crash has increased since March 2020



* For October 2020, data is up to 10/25/2020

Source: TNEDICCA

Note: Data updated as of 10/25/2020



Thank You

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