



Thornton Near Miss Analytics

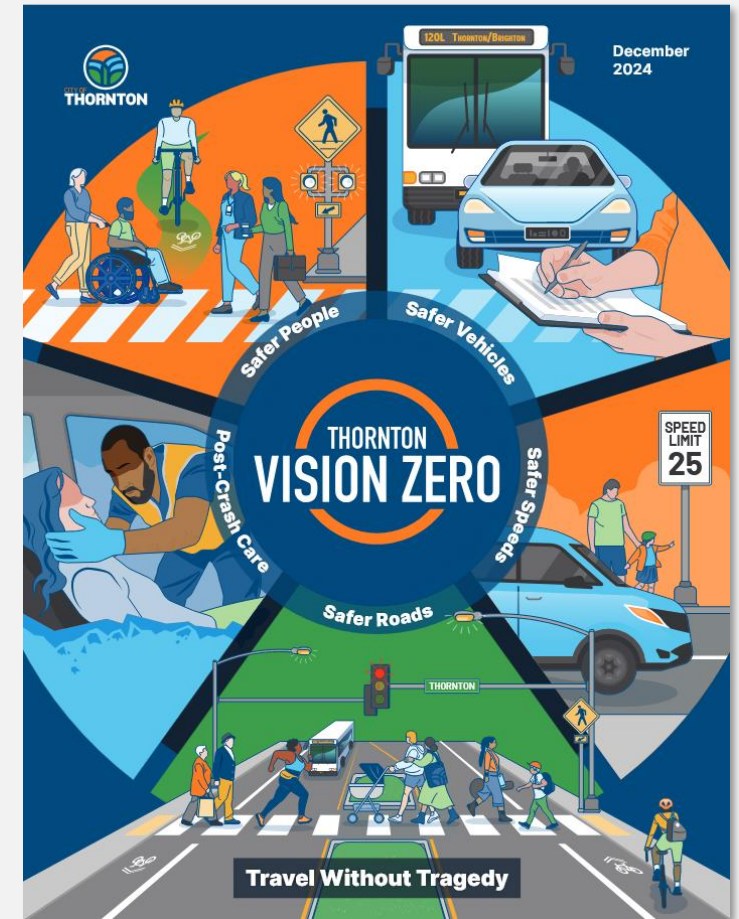
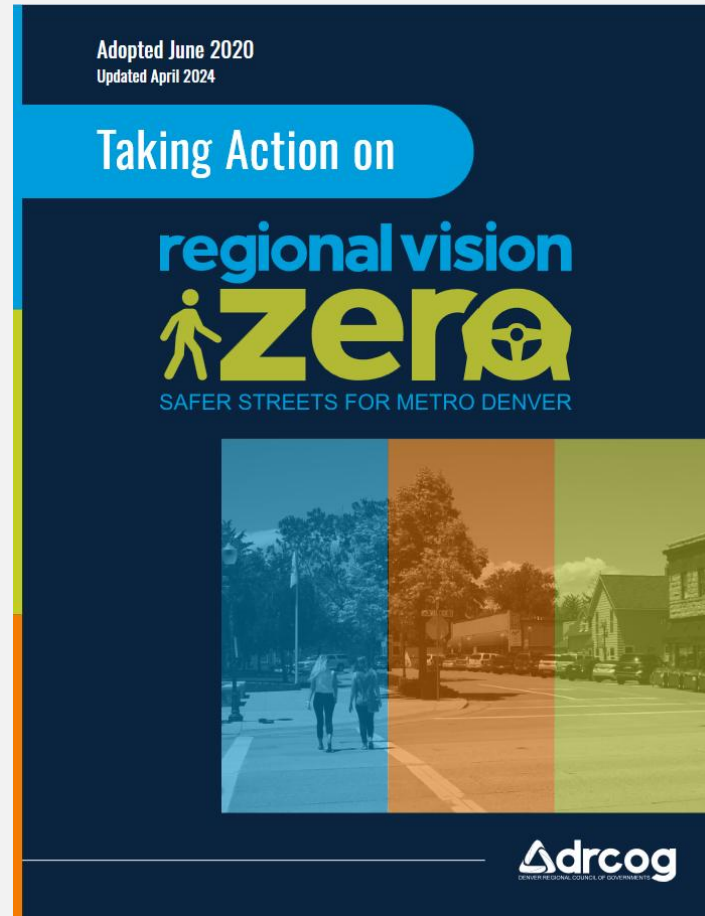
Transportation Advisory Committee – August 24, 2026

Project goals

- Understand common roadway conflicts at 10 intersections in the City of Thornton through **collecting two weeks of near miss conflicts** and analyzing combined with historic crash data
- Provide recommendations and **suggest possible improvements** to reduce vehicular, bicycle, and pedestrian crashes and near misses.
- Explore the **application of near miss analysis and learn lessons** which could be applied in other communities in the Denver region.

Vision Zero and Near Misses

- ✓ Innovative
- ✓ Actionable
- ✓ Scalable



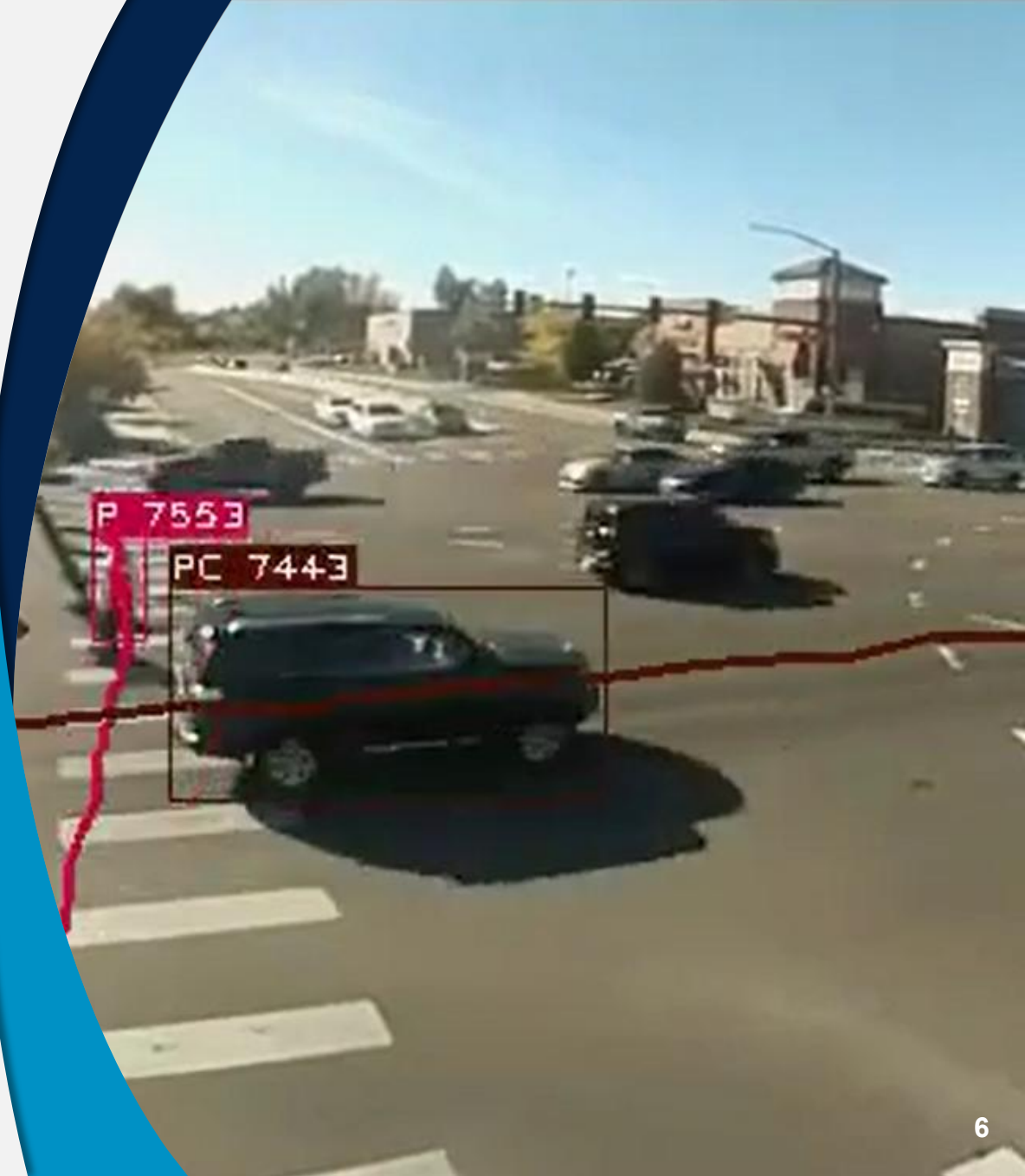
Ten study intersections in the City of Thornton

- All were signalized intersections.
- All were 4-6 lane arterial streets intersecting 2-4 lane arterial/collector roads.
- Primary Road Speed Limits: 35 to 45 miles per hour.
- Left-turn operations:
 - 50% Protected only.
 - 50% Protected-Permissive.



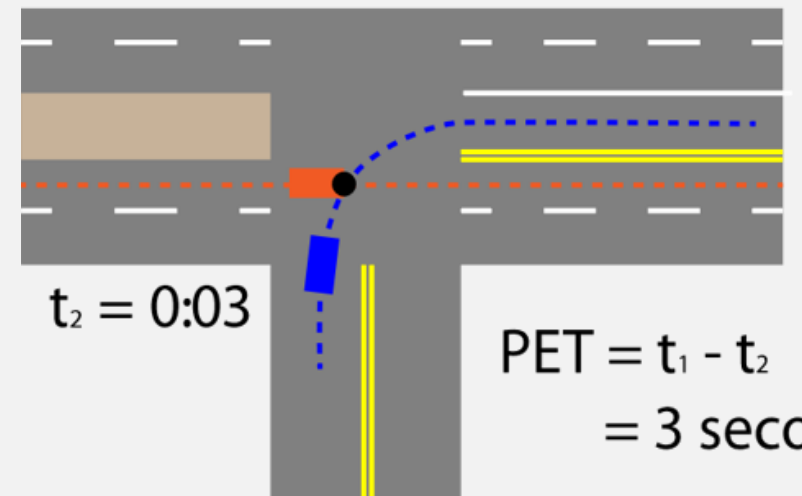
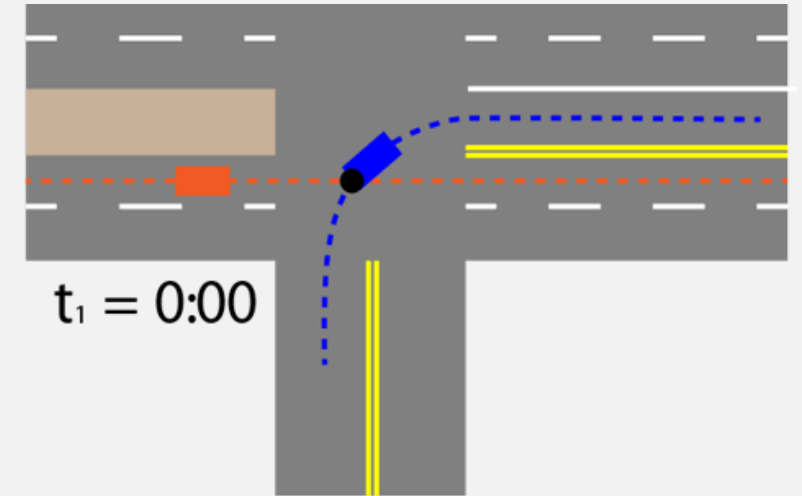
Near miss data collection

- 14 days of video from each location.
- Machine vision classification:
 - Vehicle type or mode.
 - Conflict type (vehicle-vehicle, vehicle-pedestrian, vehicle-bicyclist, and bicyclist-pedestrian).
 - Speed, direction, and maneuvers.
 - Red light running or crossing against the signal.



What is a Near Miss?

- Conflict with post encroachment time (PET) of ≤ 3 seconds.
- Order of movements matters:
 - Pedestrian or bike is first movement.
 - Left turning vehicle is first movement.
- High risk near miss:
 - $PET \leq 2$ seconds.
 - High speed:
 - ≥ 20 mph for ped/bike.
 - ≥ 30 mph for veh-veh.



$$PET = t_1 - t_2 \\ = 3 \text{ seconds}$$

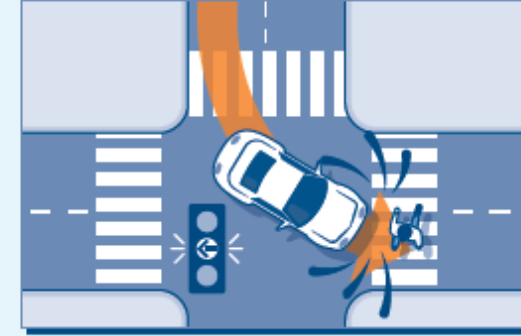
Top Thornton action plan crash profiles

- Nine common crash types comprise 70% of the city's fatal and severe injury crashes.
- Crash profiles defined in the Thornton Vision Zero Action Plan.

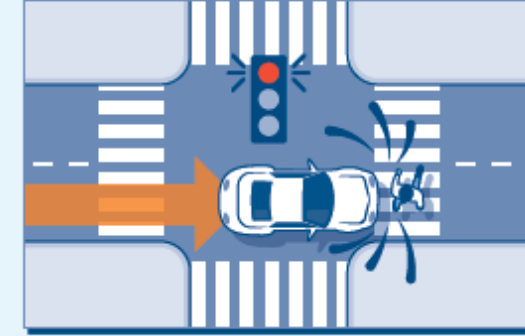
Run-Off-The-Road Crashes



Left Turn Crash at Signalized Intersections



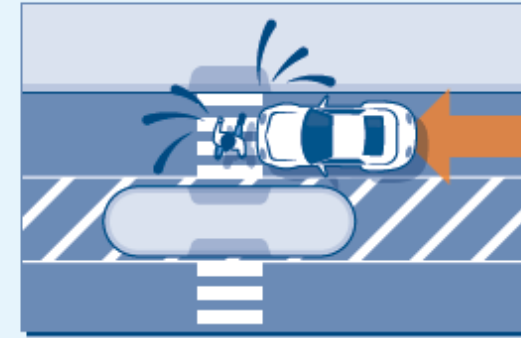
Red-Light Running Crashes



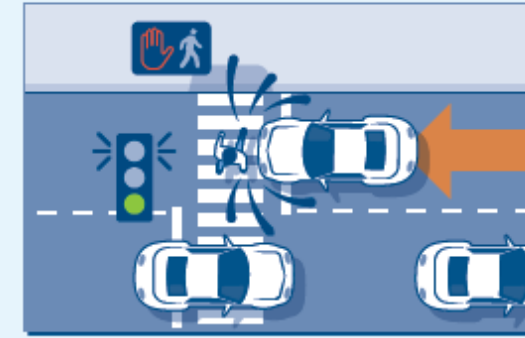
Broadside or Left Turn Crash at Unsignalized Intersections or Driveways



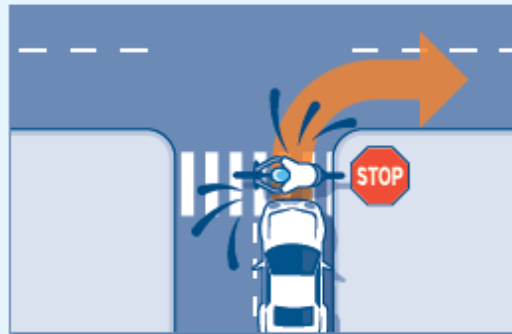
Pedestrian or Bicyclist Crossing Major Street at Unsignalized Locations



Pedestrian or Bicyclist Crossing Against the Signal



Side-Street Crosswalk Crash



Right Turn on Red Pedestrian or Bicyclist Crash



Right Turn Pedestrian Crash at Signalized Intersections



Top study area crash profiles

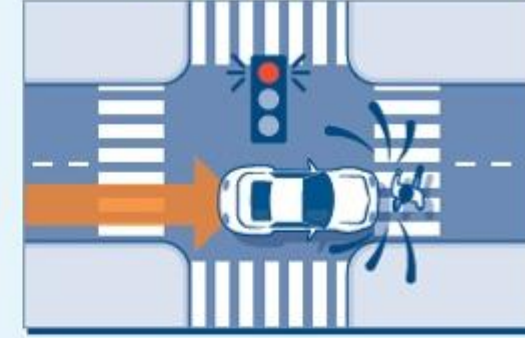
Best candidates for near-miss analysis:

- Left turn (at a signal).
- Red-light running.
- Pedestrian/bicyclist crossing against signal.
- Right turn on red (ped/bike).
- Right turn at signal (ped/bike).

Left Turn Crash at Signalized Intersections



Red-Light Running Crashes



Pedestrian or Bicyclist Crossing Against the Signal



Right Turn on Red Pedestrian or Bicyclist Crash



Right Turn Pedestrian Crash at Signalized Intersections



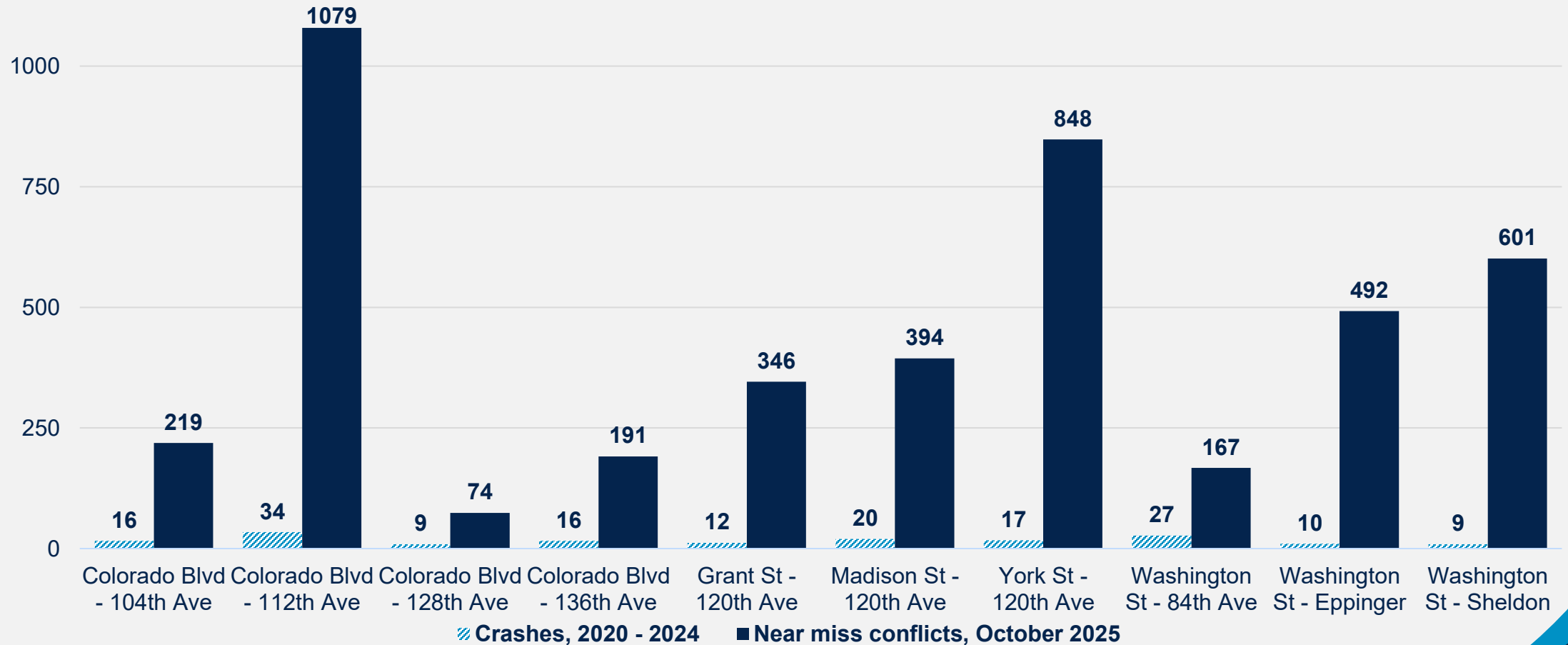


Brief results and lessons learned

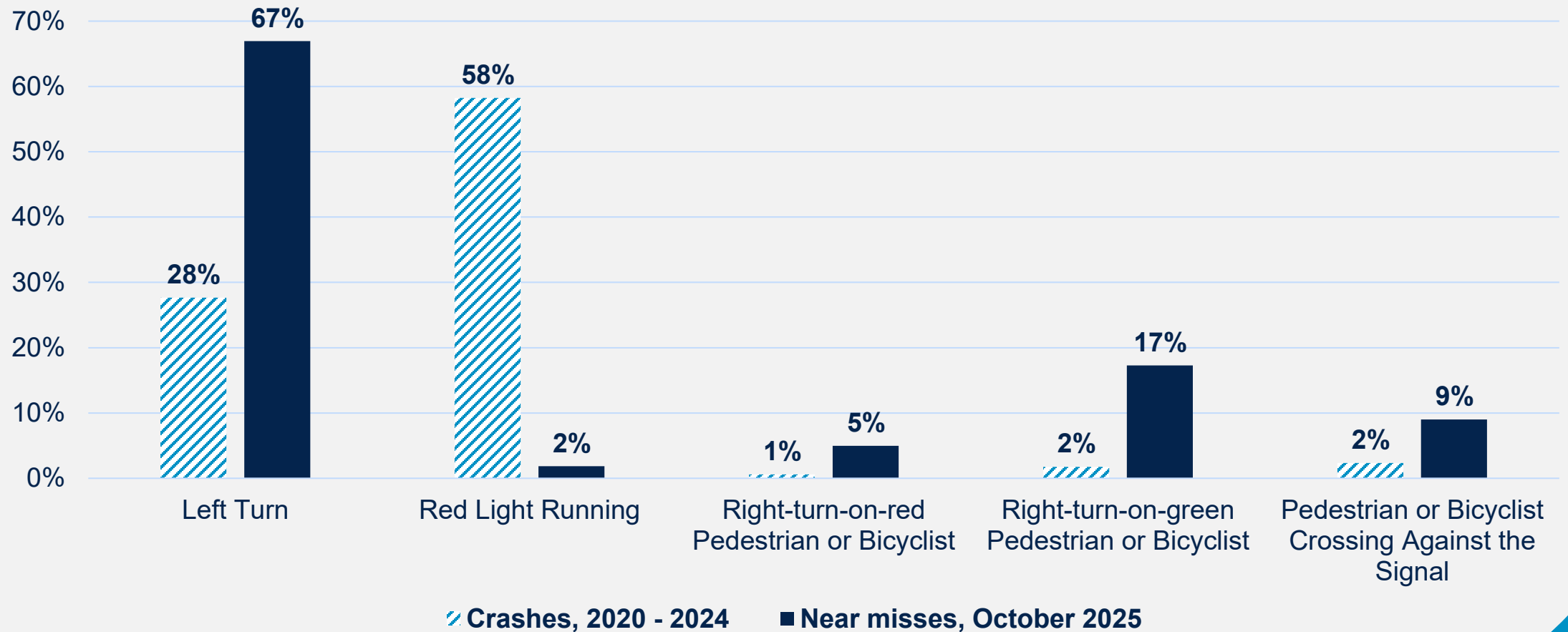
Fatal and serious injury crashes at study locations (2020 – 2024)

Crash Profile	Fatal and serious injury crashes
Red Light Running	7
Left Turn at Signalized Intersection	4
Pedestrian or Bicyclist Crossing Against the Signal	2
Rear End	2
Urban Lane Departure	1
Other Crash Profile	1
Right Turn on Red into Bike/Ped	0
Right Turn into Bike/Ped	0

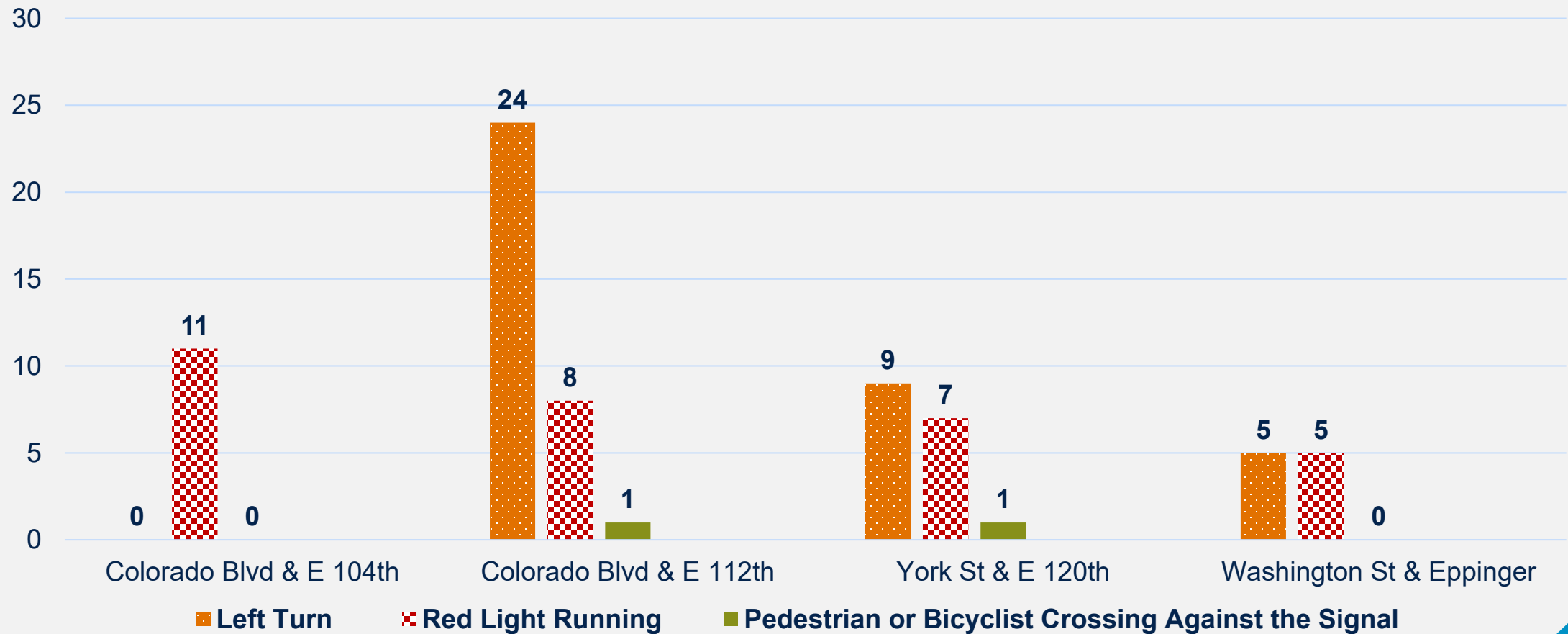
Crashes, 2020-2024 vs. Near misses, October 2025



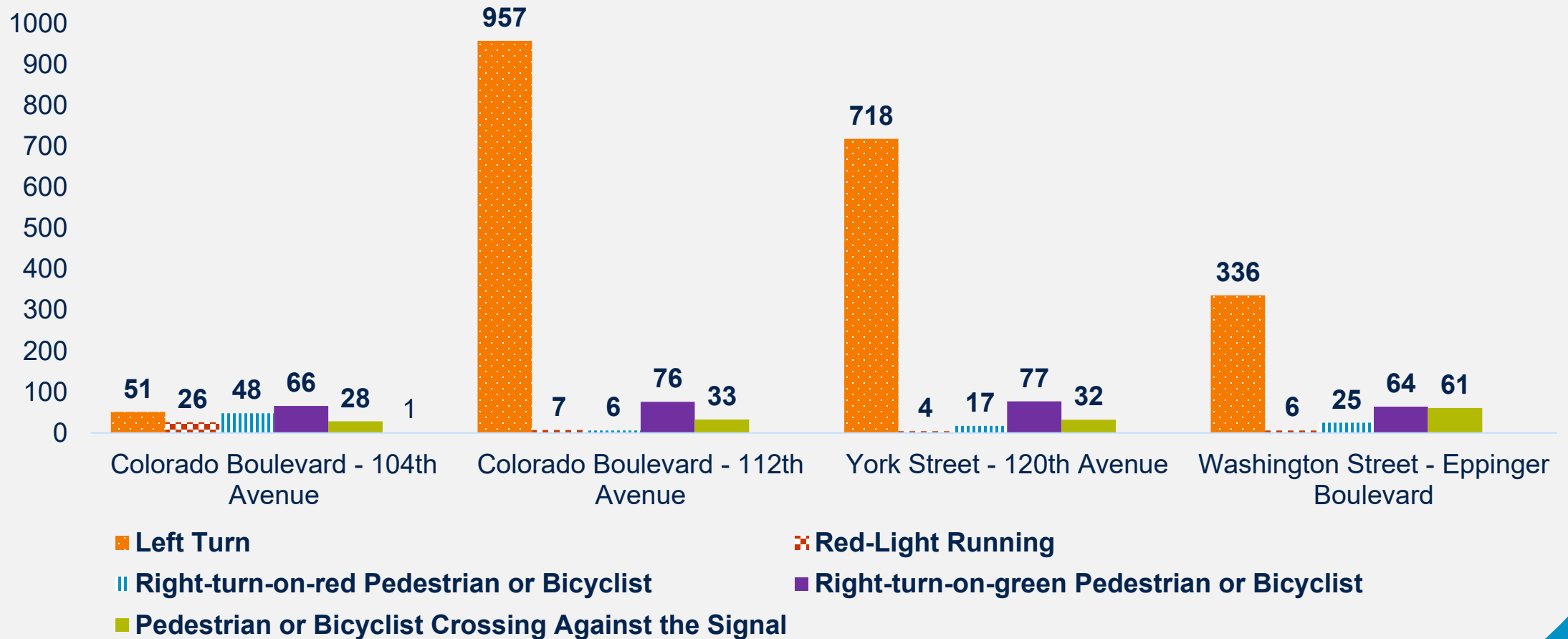
Crash profiles compared to near misses at all sites



Crash profiles at sample locations



Near misses at four sample locations



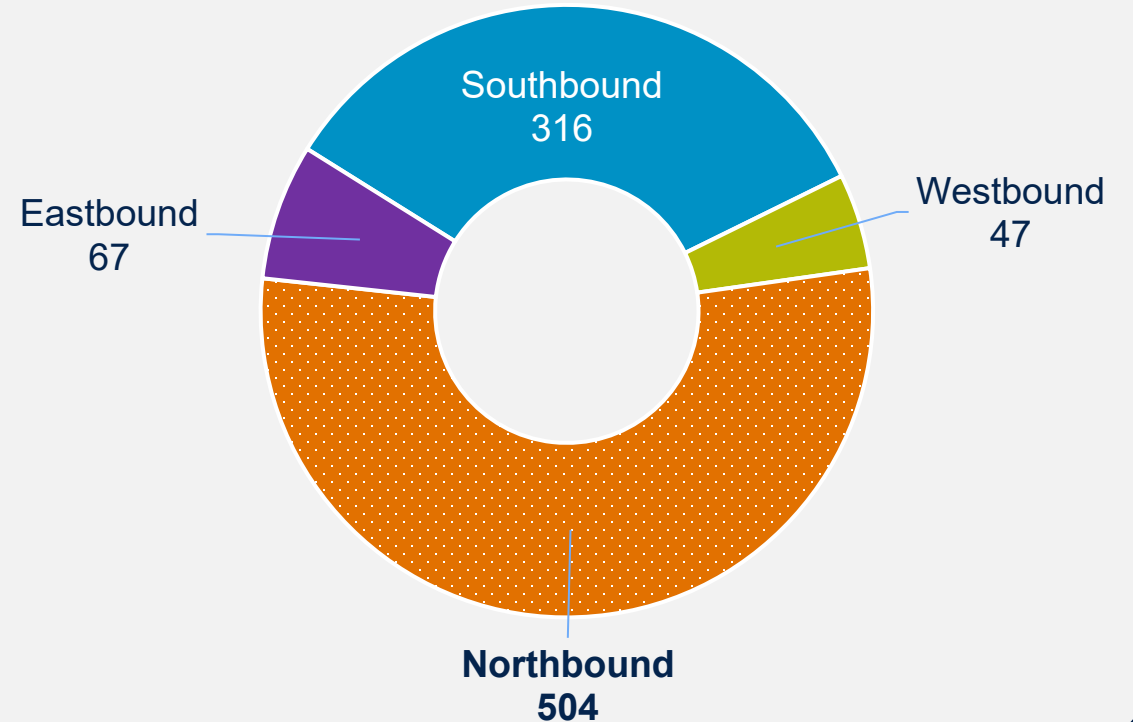
Near miss videos are a powerful story-telling tool



A tool for studying the detailed mechanics of conflicts.



Left turn conflicts, Colorado Boulevard and 112th Avenue





Key risk factors at major suburban intersections



Permitted/Permitted-Protected Left Turn Signal Phasing



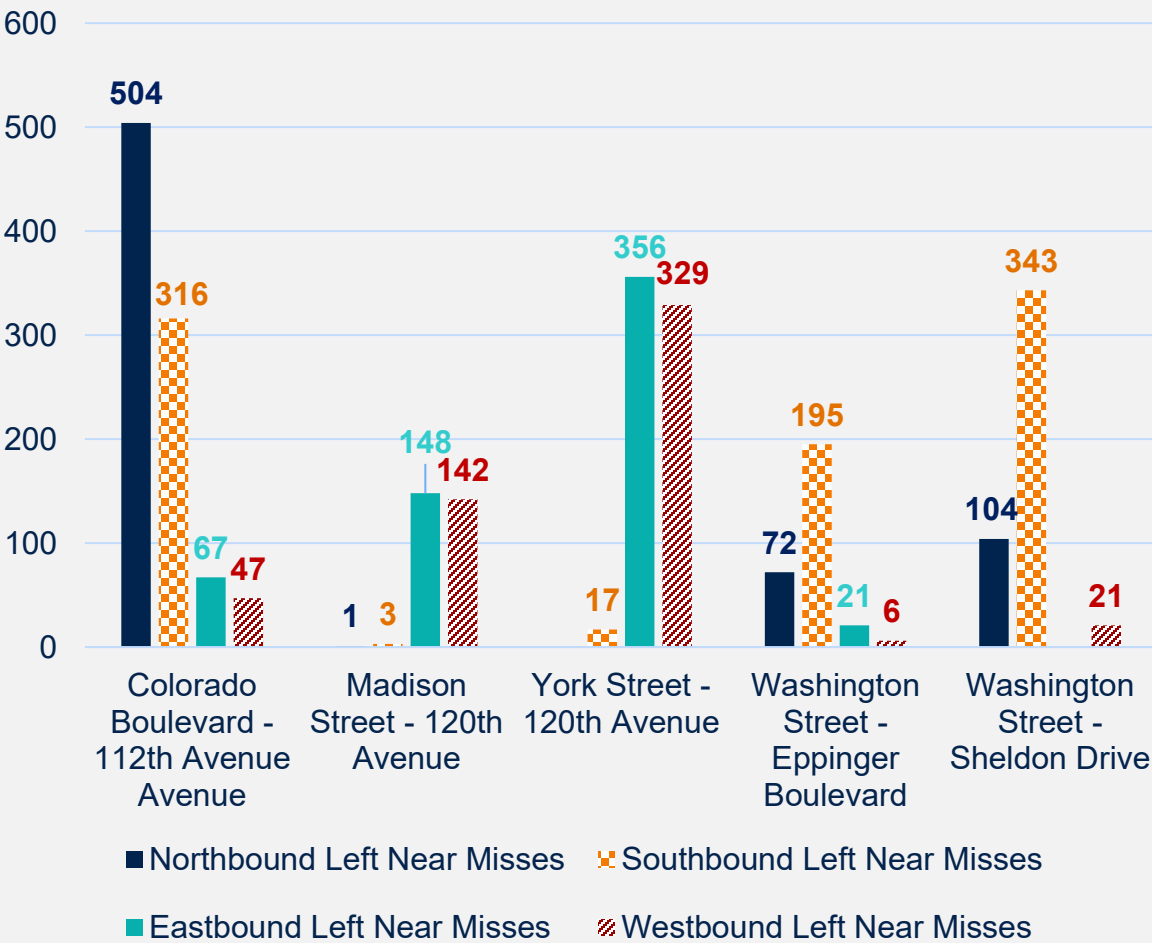
Conflicting Traffic Volume



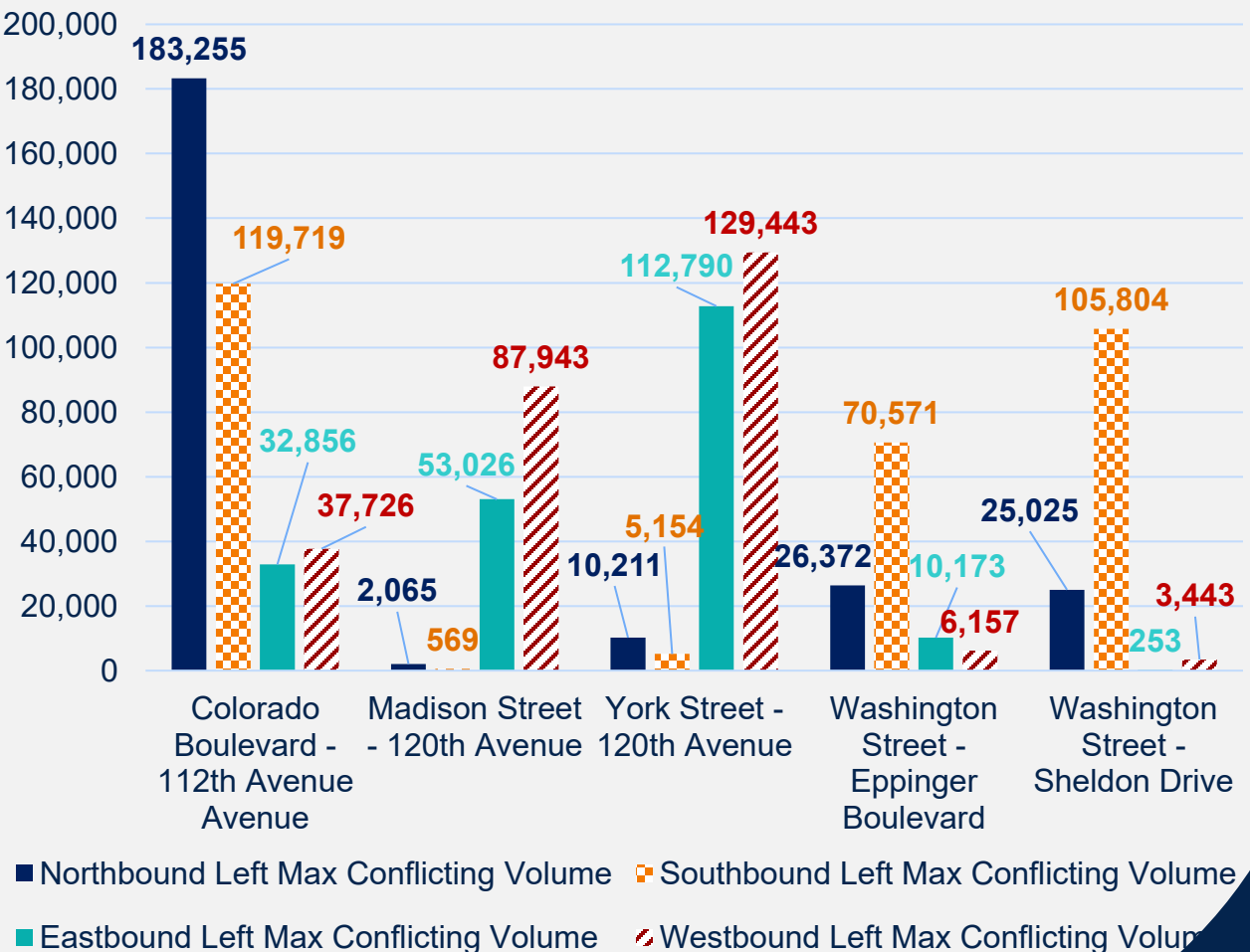
Pedestrian/Bicycle Volume

Left turn conflicts correlate with traffic volume

Left-Turn Vehicle Near Misses



Left-Turn Max Conflicting Vehicle Volume



Potential DRCOG applications

- Inform **recommended countermeasures for Suburban/Compact area type** in next full update of *Taking Action on Regional Vision Zero*.
- Consider **conflicting vehicle volumes and turning movement counts in future studies** in Suburban areas when data is available as proxy for near miss conflicts.
- **Reinforces broader patterns** seen in crash data across the region involving left turns and likely more protected lefts.
- Reinforces need for **systemic application of proven safety countermeasures** and examination of roadway system for opportunities to improve non-motorist crossings.

Lessons learned

- Define clear research questions.
- Shorter data collection period can suffice, such as two to seven days instead of two weeks.
- Use near miss analysis to supplement hard-to-observe issues.
- Consider deployment in a variety of street contexts.
- Use near-miss data to inform countermeasure prioritization.
- Not a panacea for all traffic safety issues, for example this tool was not useful for predicting the likelihood of red light running crashes.

Thank you

Erik Braaten, RSP1
Denver Regional Council of Governments
ebraaten@drcog.org

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