# EMERGING SOURCES OF DATA AND METHODS FOR SAFETY ANALYSIS OF PEDESTRIAN AND BICYCLE FACILITIES

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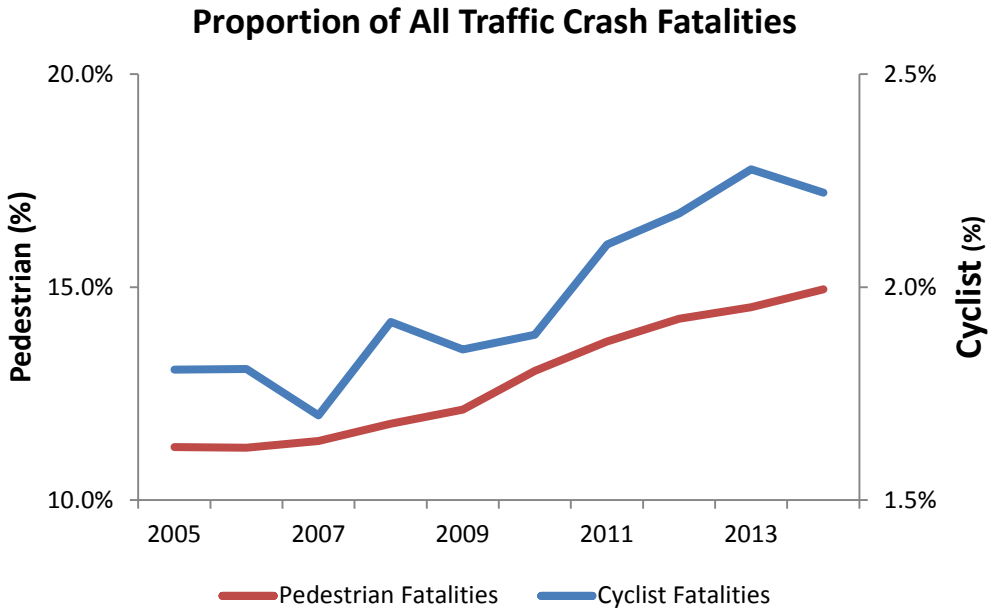
# Why is Pedestrian and Bicycle Safety Important?

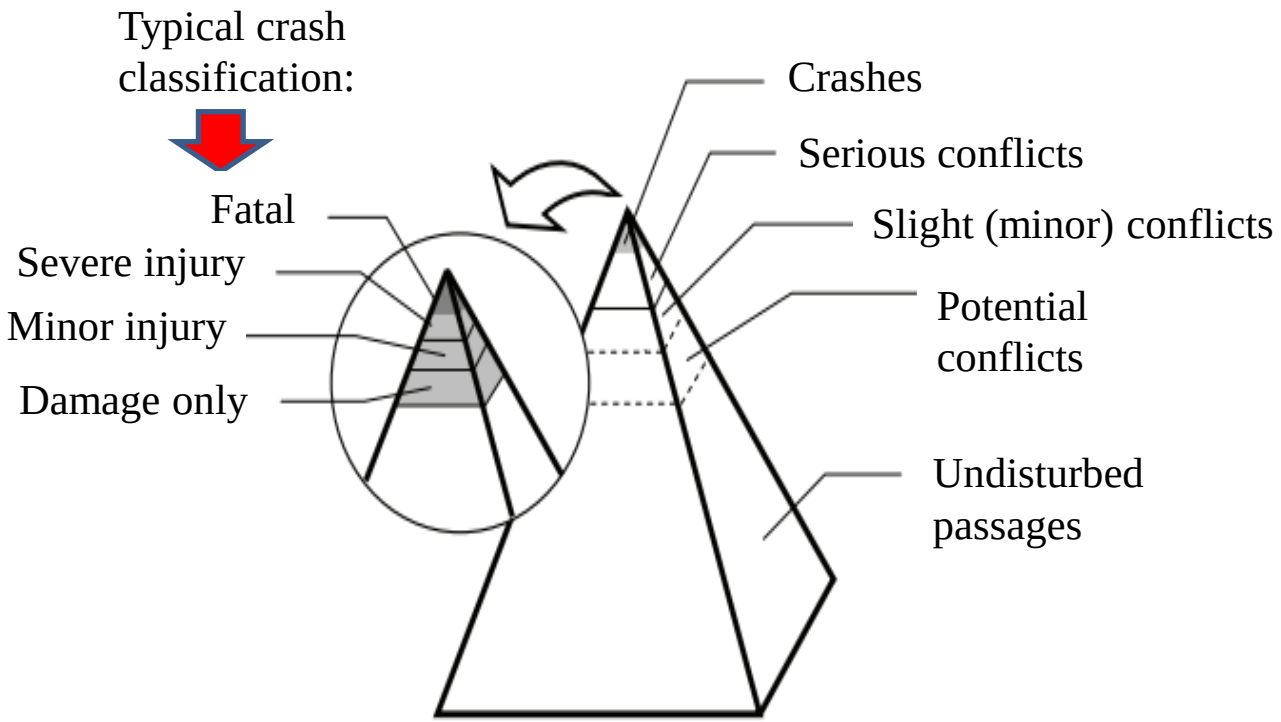
- Total Crash Fatalities (involving motor vehicles) → **33,561** (2014, USA)
  - Decrease of 25% from 2005
- Pedestrian Crash Fatalities → **4,884** and (2014, USA)
  - Unchanged from 2005
- Cyclist Crash Fatalities → **726** (2014, USA)
  - Decrease of 8% from 2005




Source: NHTSA's National Center for Statistics and Analysis, 2014 data

# Methods for Road Safety Analysis

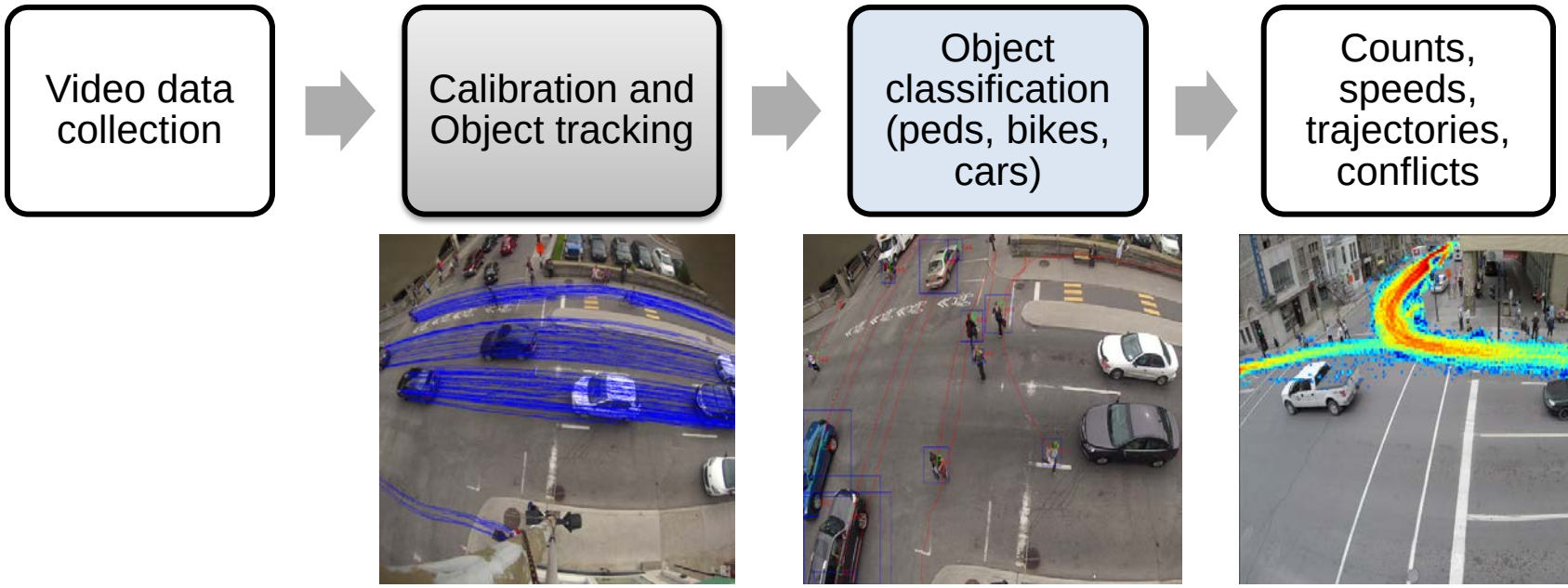
## Traditional crash-based vs. Surrogate approach




Hyden's classic pyramid-model (1985)

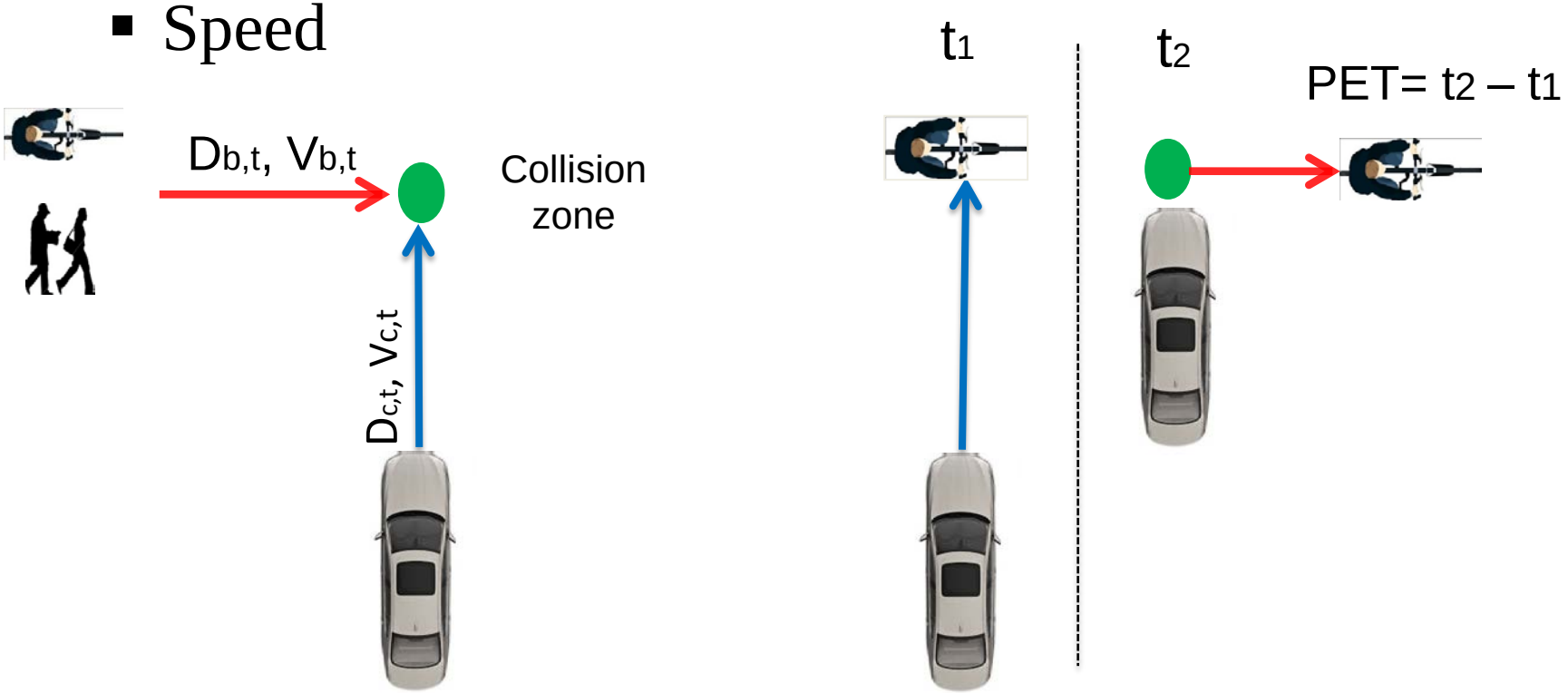
# Surrogate (Indirect) Safety Analysis

- Advantages: proactive, short in duration
- Applications: (1) before/after an intervention,
  (2) crash data unavailable or incomplete
- Four step process:

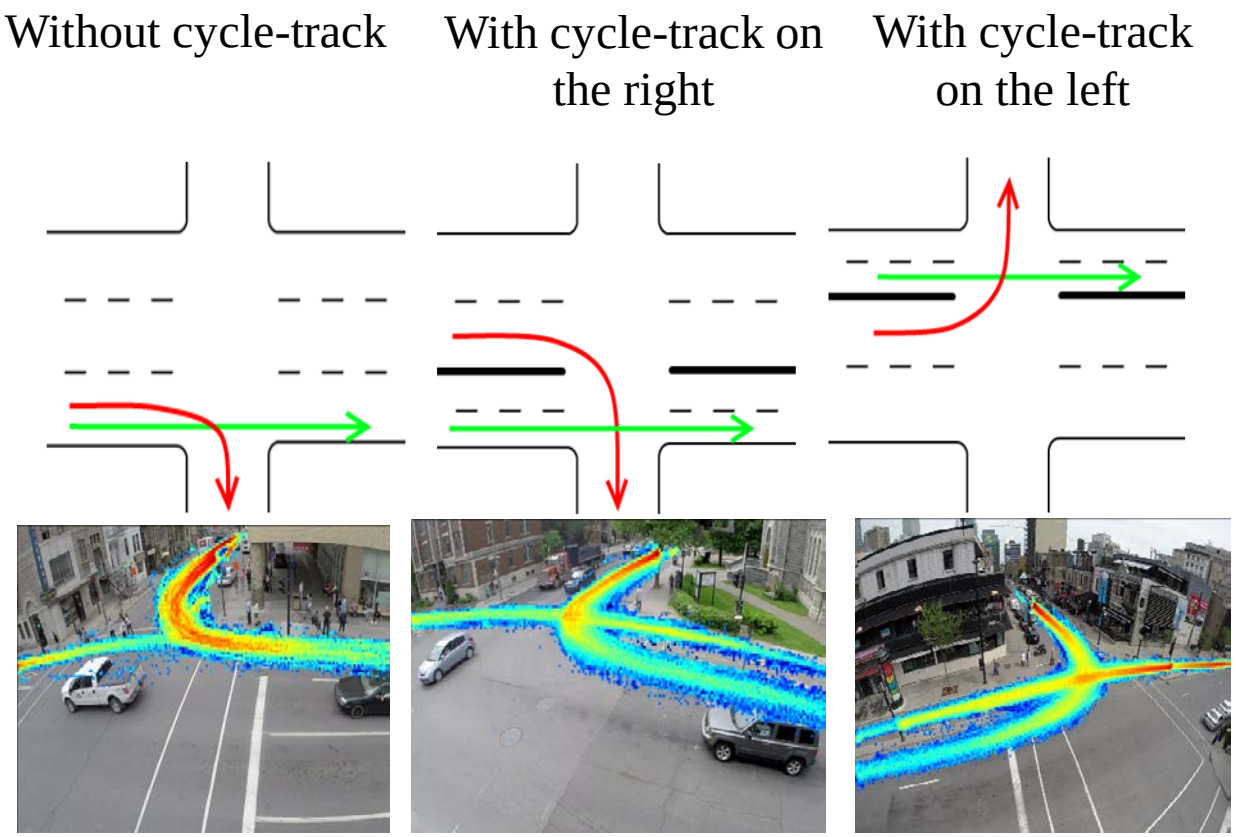


# Typical Surrogate Measures

- Post-encroachment time (PET)
- Time-to-collision (TTC)
- Speed



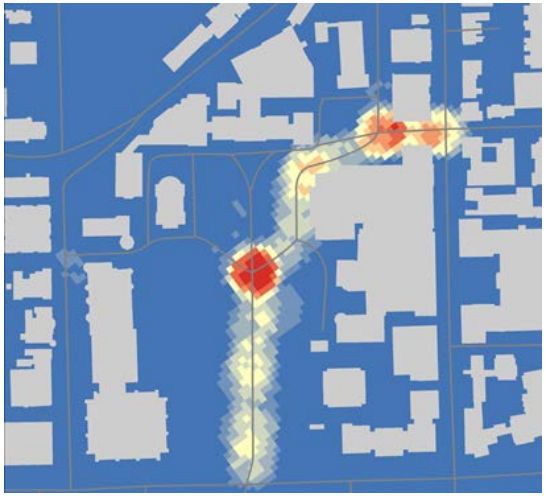
# Case Study 1 – Safety of Different Cycling Facilities

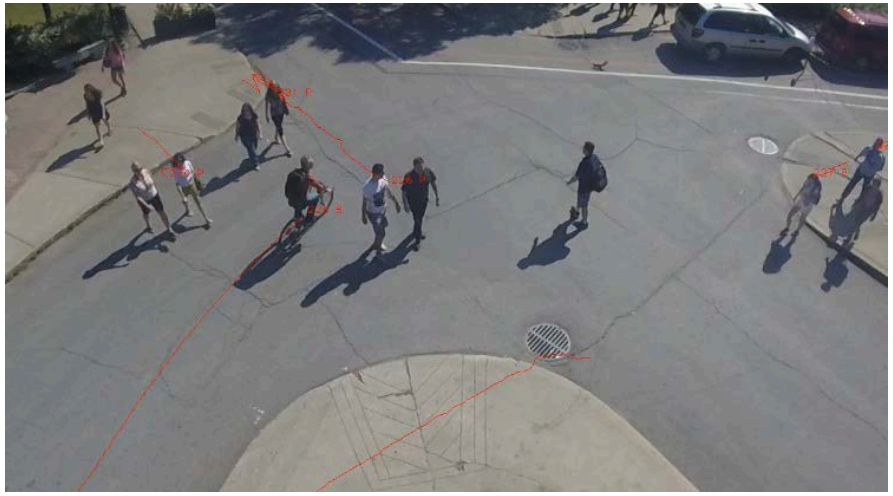


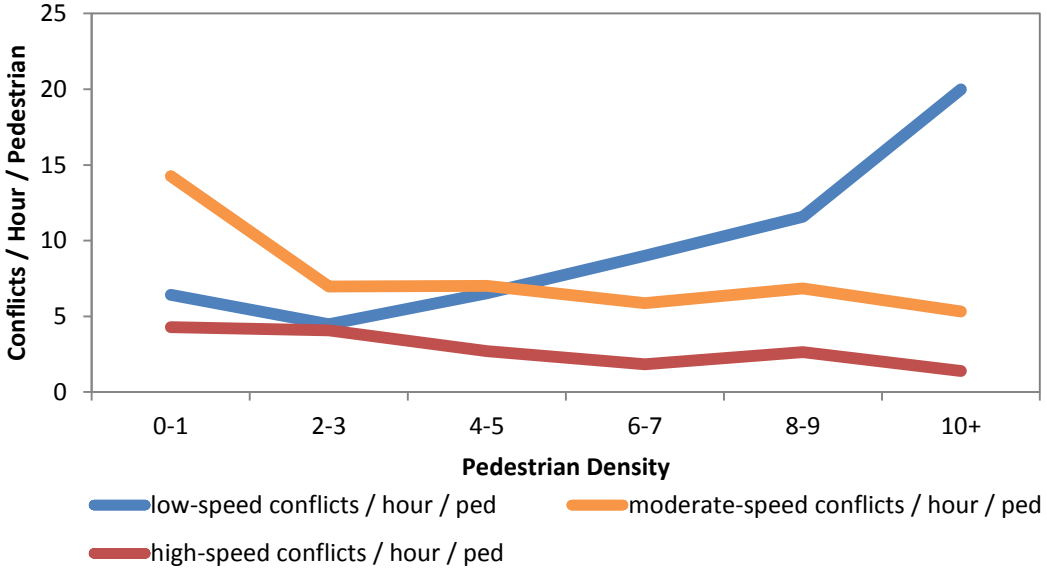

- Eight intersections of each type (100 hours)
- Intersections with **cycle tracks are safer** than without cycle tracks
- **Correlation between injury rates and conflict rates (**based on ranks ) is 0.65

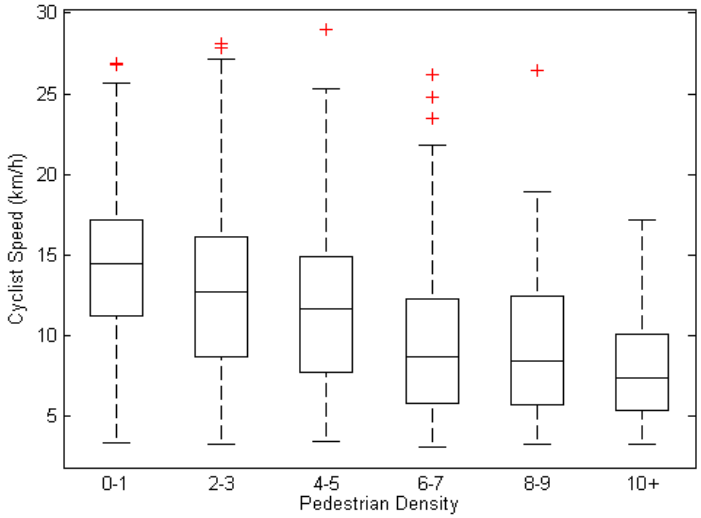
Zangenehpour, S., Strauss, J., Miranda-Moreno, L. F., & Saunier, N. (2016). Are signalized intersections with cycle tracks safer? A case–control study based on automated surrogate safety analysis using video data. *Accident Analysis & Prevention*, *86*, 161-172.

# Case Study 2: Bicycle-Pedestrian Conflict Analysis








Beitel, D., Stipancic, J., Manaugh, K., Miranda-Moreno, L.M. (2017) Exploring cyclist-pedestrian interactions in shared space using automated video conflict analysis. Transportation Research Board Annual Meeting