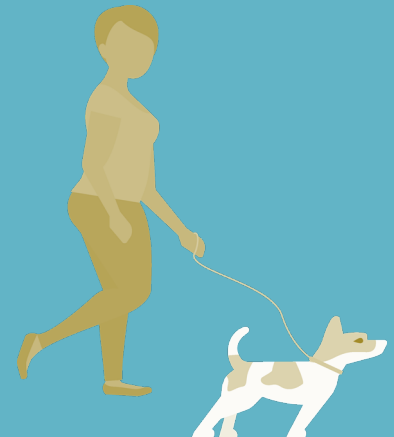


**INCORPORATING
SAFETY
IN BICYCLE &
PEDESTRIAN
PROJECTS**



**HCPO MAUI 2019
DIANE DOHM, AICP (OAHUMPO)**



ROADMAP

1. Basic Safety Data

2. Countermeasures

- a. FHWA Safe Transportation for Every Pedestrian (STEP)
- b. Other Resources: FHWA Proven Safety Countermeasures, FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, FHWA Bikeway Guide, NACTO Designing for All Ages and Abilities, HDOT Pedestrian Toolbox

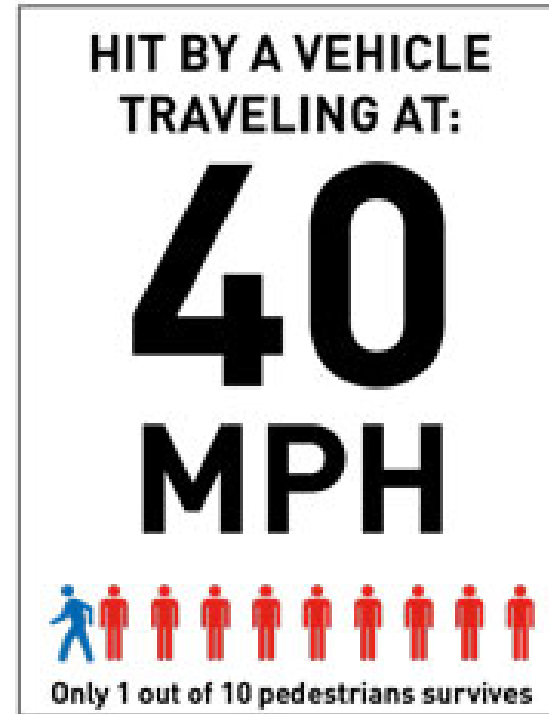
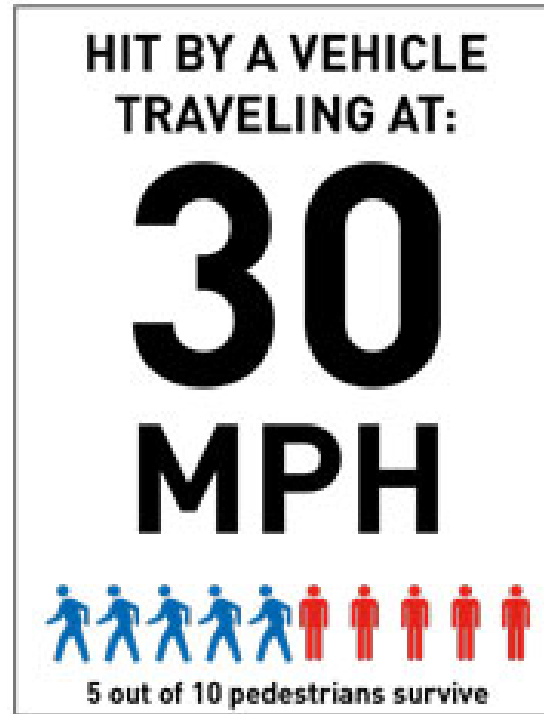
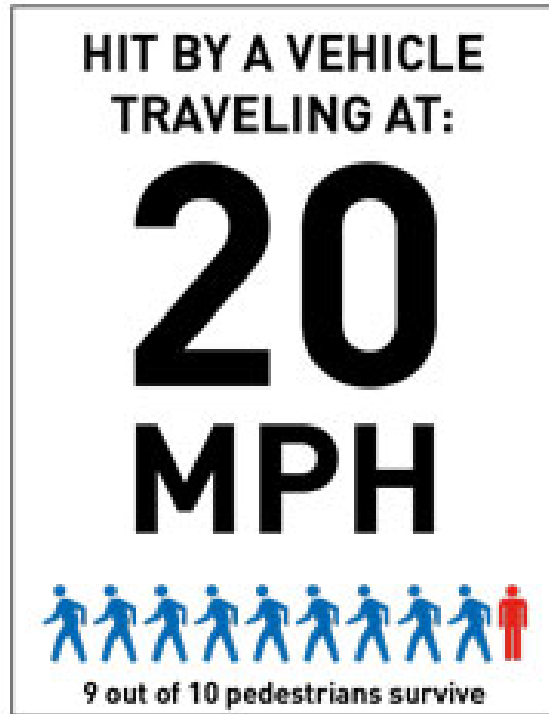
3. Consider Safety with Bike-Pedestrian Projects



SAFETY DATA

WALKING & BICYCLING

SLOW SPEEDS = SAVE LIVES



HIGHER SPEEDS = LESS ABILITY TO SEE

A driver's visual focus diminishes as speed increases.



15 mph



20 mph



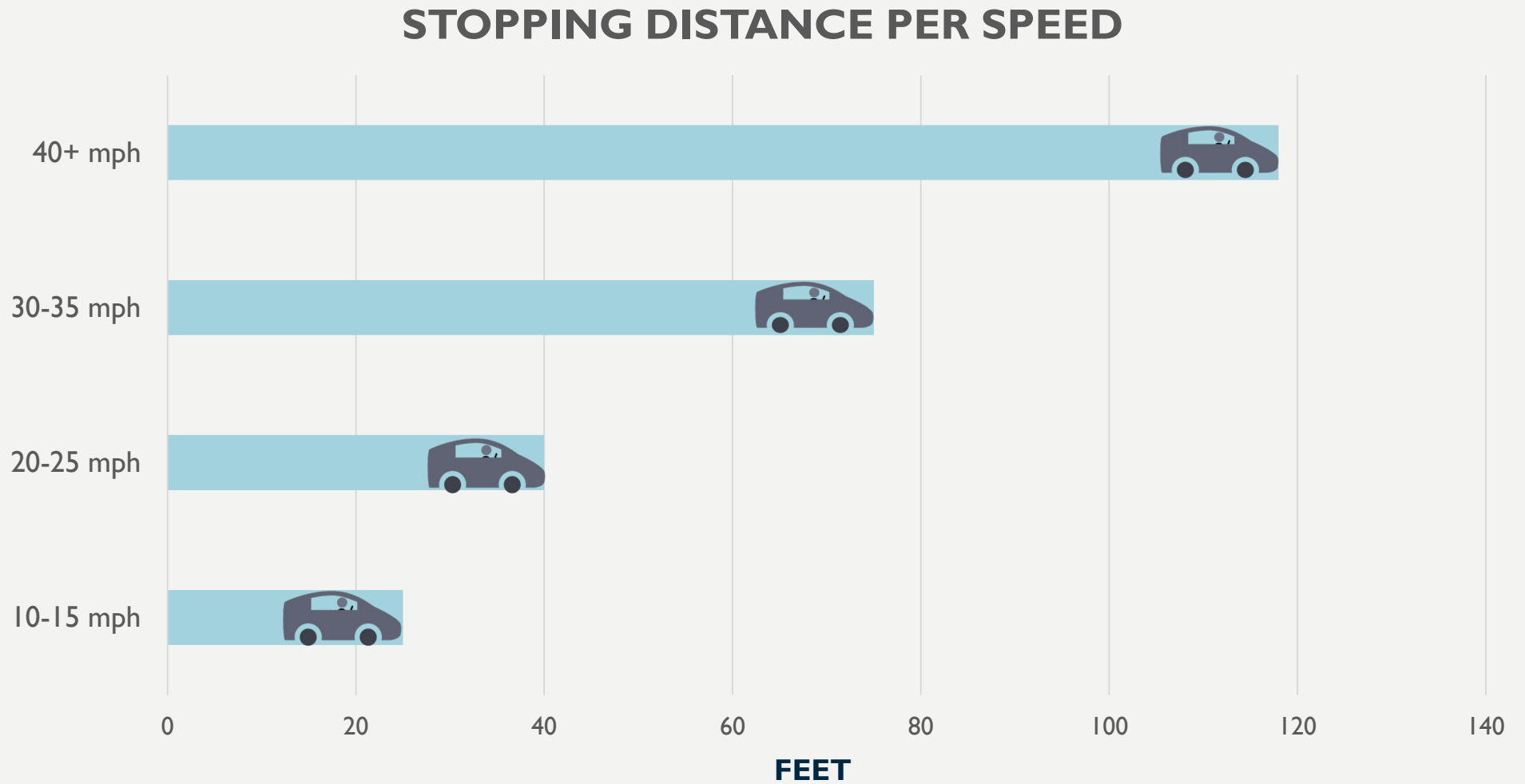
25 mph



30 mph

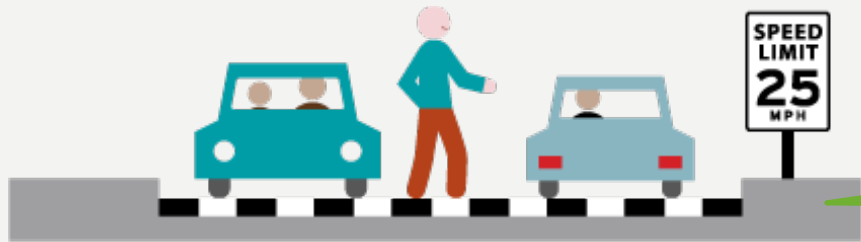
Source: National Association of City Transportation Officials (NACTO)

TIME IT TAKES TO STOP A CAR



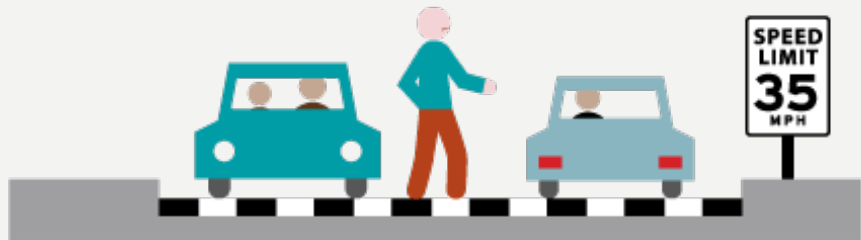
Source: *Traditional Neighborhood Development: Street Design Guidelines (1999)*, ITE Transportation Planning Council Committee (via NACTO)

NARROW + LOW SPEED = EASIER TO CROSS

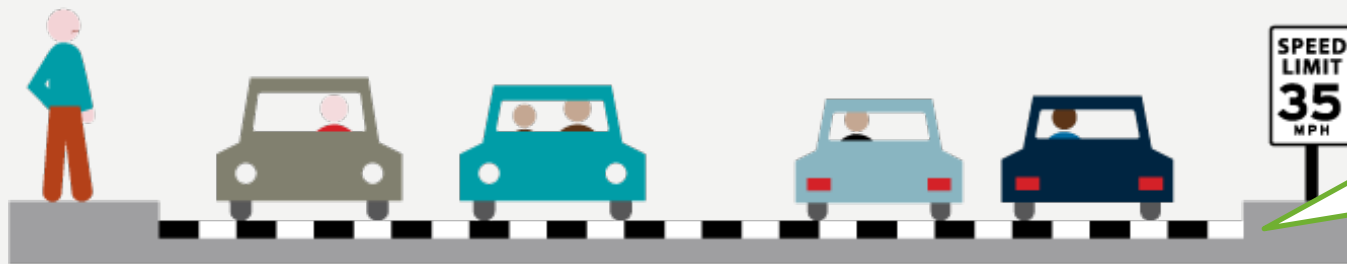


Two-lane road with 25–30 mph speed limit: drivers are 40–59% likely to yield to pedestrian

40-59%
yield
rate



Two-lane road with 35–40 mph speed limit: drivers are 15–39% likely to yield to pedestrian



Four-lane road with 35–40 mph speed limit: drivers are less than 15% likely to yield to pedestrian

<15%
yield
rate

FATALITIES IN HAWAI'I

On average, **109** people die *every year*
in traffic crashes in state of Hawai'i.

FATALITIES IN HAWAI'I

1,199

people died in traffic crashes in state of Hawai'i
(2008-2018)*

BIKE-PED FATALITIES IN HAWAI'I

312

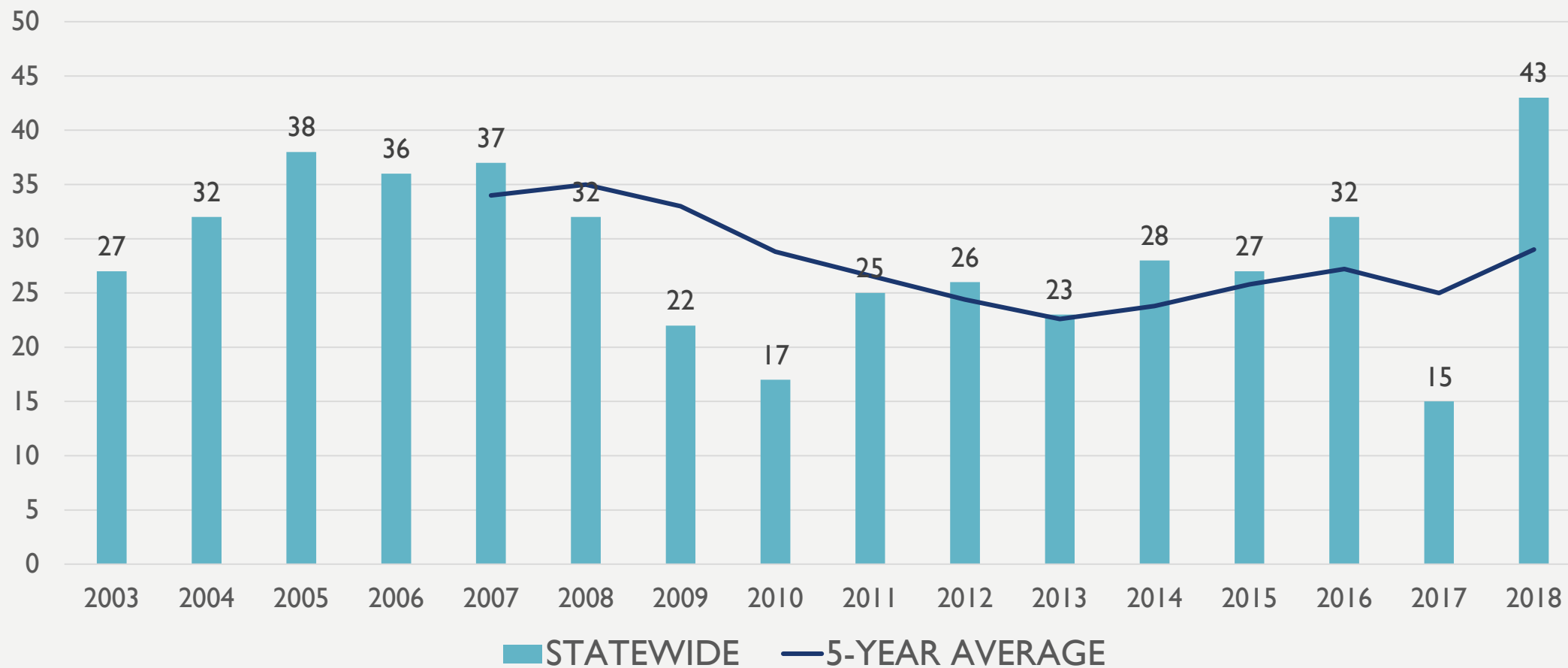
(26% of the total)
were people walking/biking
(2008-2018)*



*2018 data is preliminary

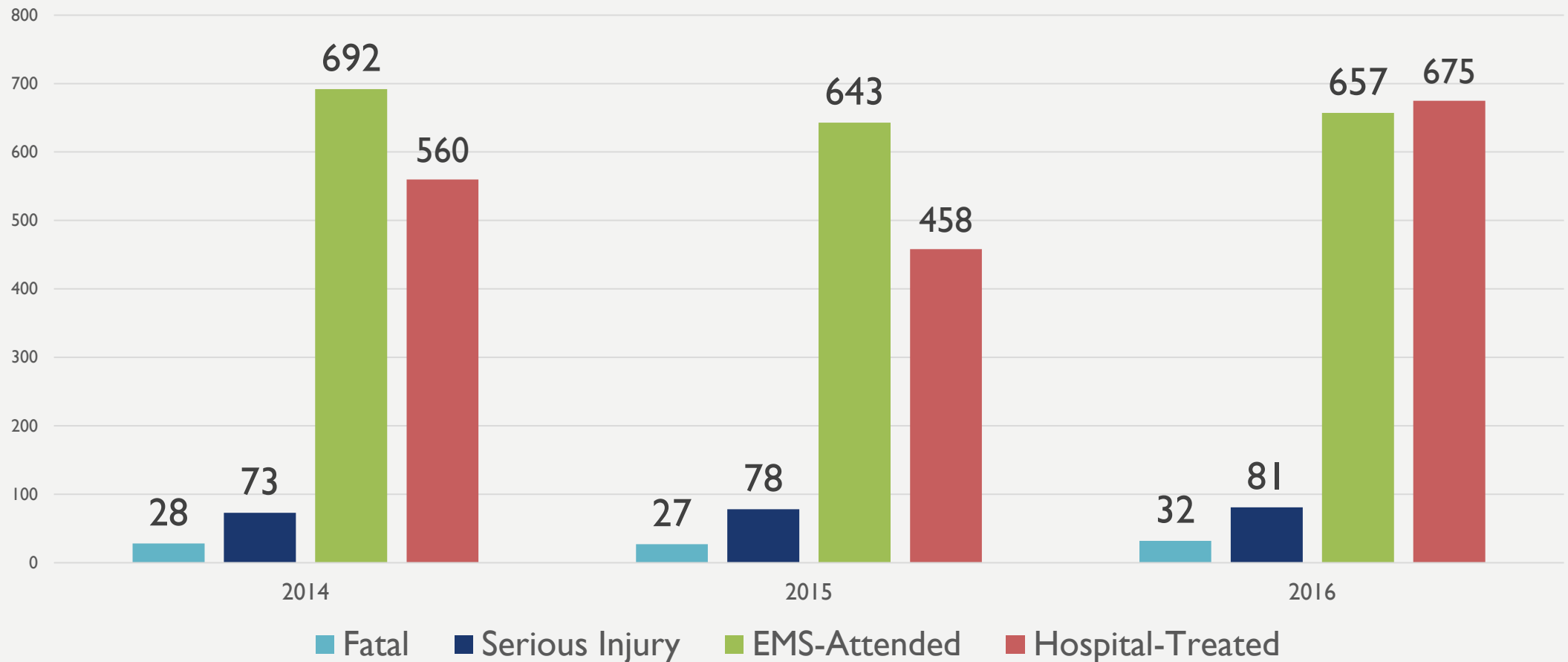
PEDESTRIAN FATALITIES

SOURCE: FARS 2003-2017, HDOT 2018 (2018 DATA NOT FINAL)



PEDESTRIAN STATEWIDE CRASHES

SOURCE: FARS (FATAL), HDOT (SERIOUS INJURY), & DOH (EMS/HOSPITAL), 2014-2016



ACTUAL COSTS OF PEDESTRIAN CRASHES (EMERGENCY DEPT + HOSPITAL COSTS)

DOH (2016-2017)

$$\begin{array}{r} \$13.2 \text{ M (ER)} \\ + \\ \$14.7 \text{ M (Hosp)} \end{array} = \$27.9 \text{ Million}$$

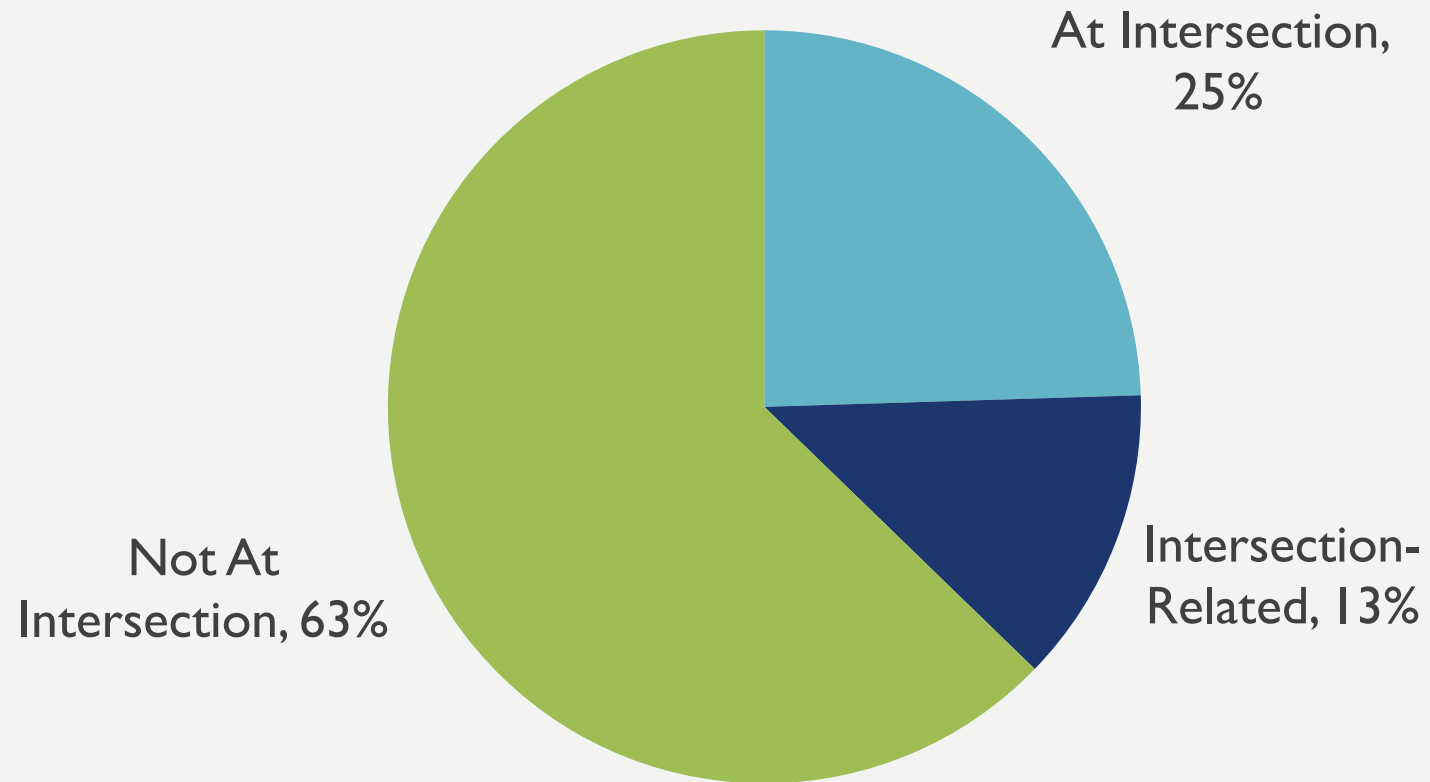
Only 2 years of data (2016-2017)

Emergency Department Discharge Data + Hospital Admissions Data



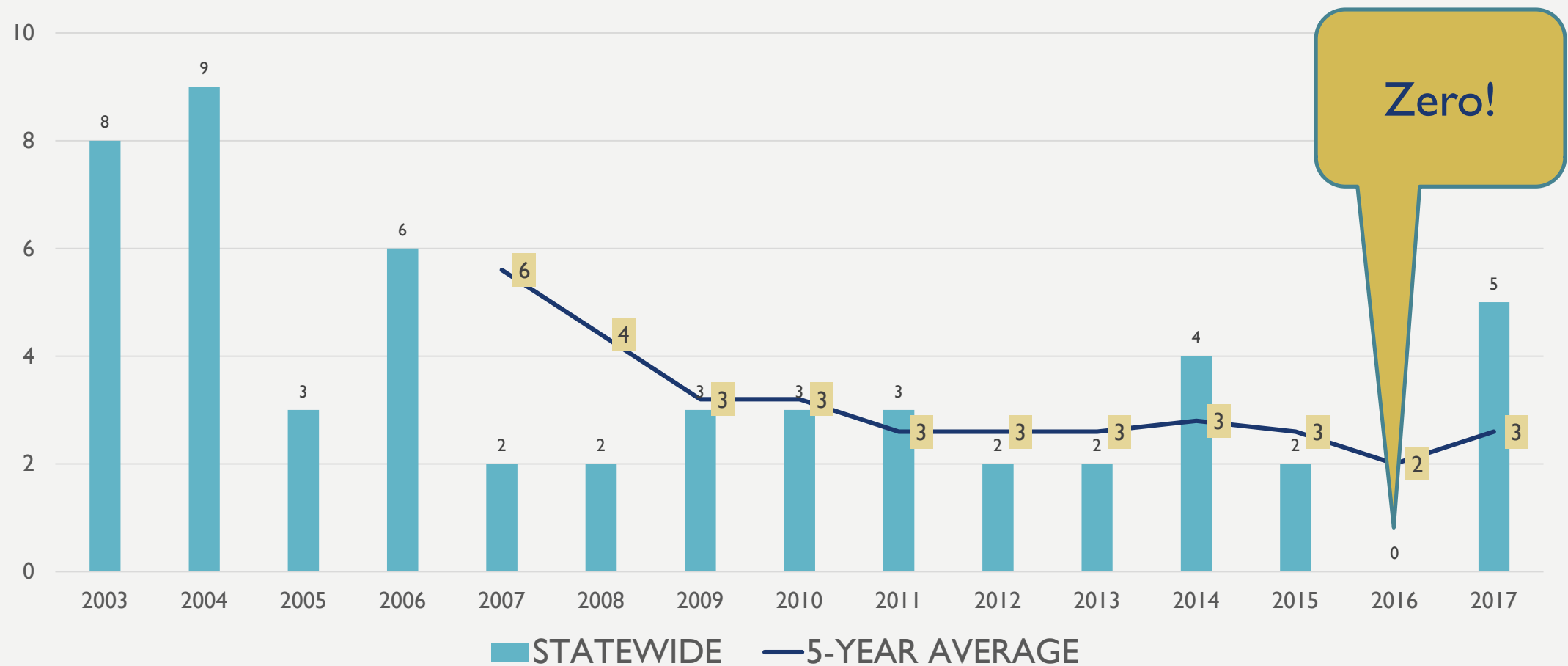
PEDESTRIAN FATALITIES, INTERSECTION

SOURCE: FARS 2014-2017



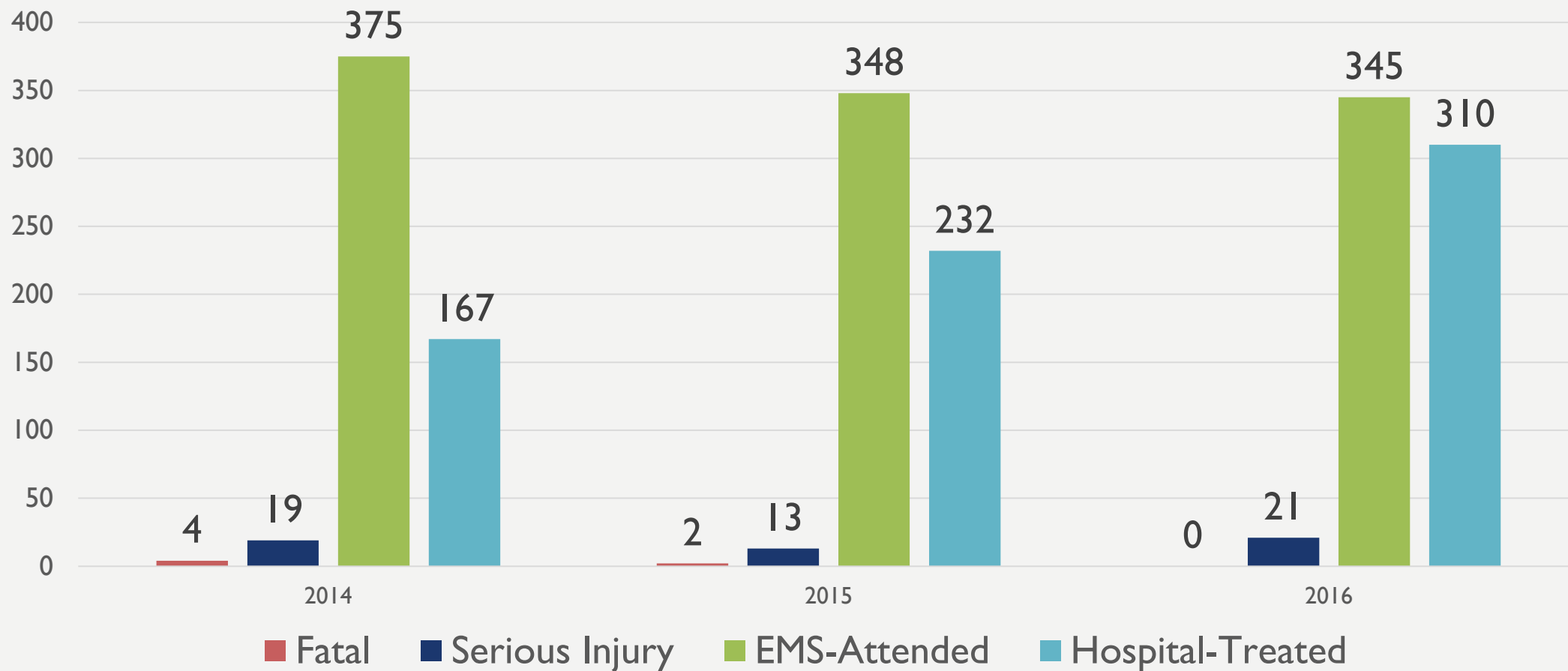
BICYCLIST FATALITIES

SOURCE: FARS 2003-2017



BICYCLIST STATEWIDE

SOURCE: FARS (FATAL), HDOT (SERIOUS INJURY), & DOH (EMS/HOSPITAL), 2014-2016



ACTUAL COST OF **BICYCLIST** CRASHES – EMERGENCY DEPT + HOSPITAL COSTS

DOH (2016-2017)

$$\begin{array}{r} \$6.0 \text{ M (ER)} \\ + \\ \$4.9 \text{ M (Hosp)} \end{array} = \boxed{\begin{array}{r} \$10.9 \\ \text{Million} \end{array}}$$

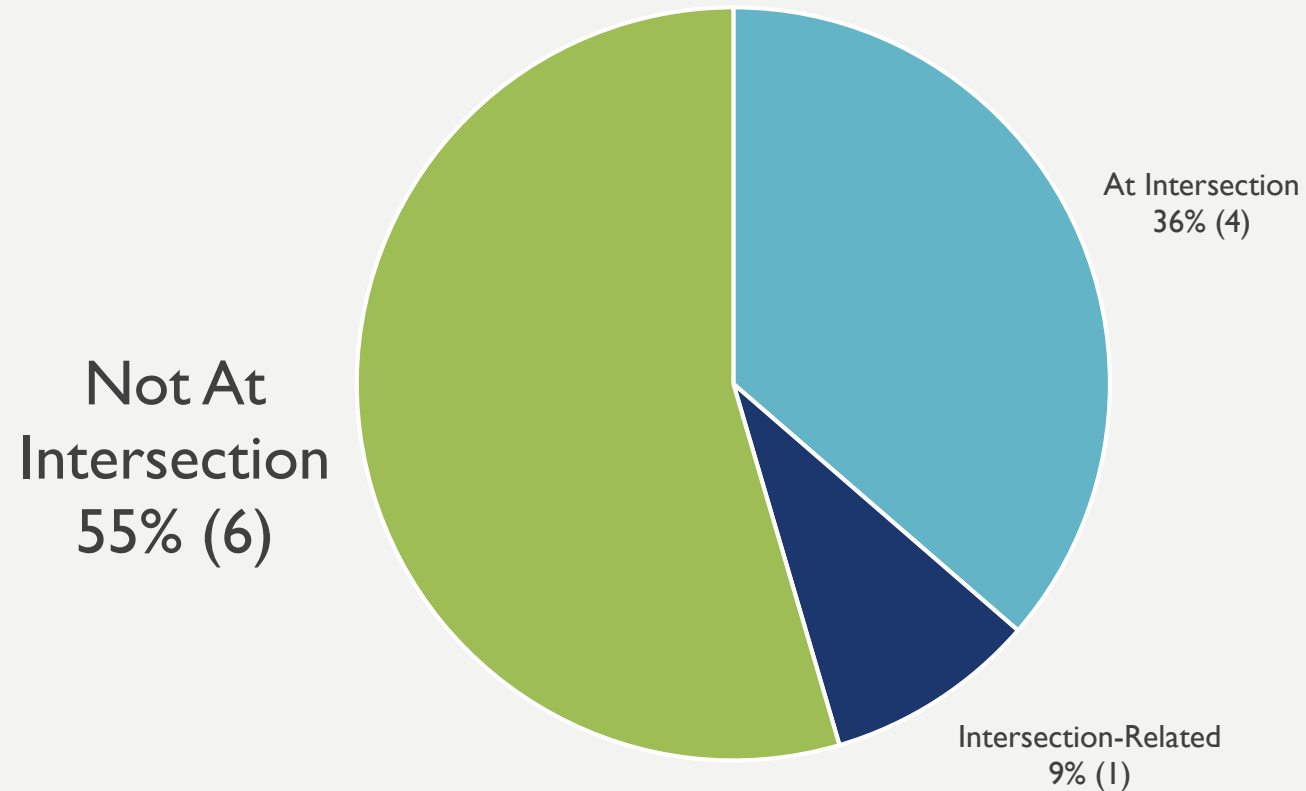
2 years of data (2016-2017)

Emergency Department Discharge Data + Hospital Admissions Data



INTERSECTION BICYCLIST FATAL CRASHES

SOURCE: FARS 2014-2017





COUNTERMEASURES **BEST PRACTICES**

WHAT ARE COUNTERMEASURES?

Countermeasures are interventions, or solutions, to a problem

Due to the complex nature of crashes, it is most effective to combine countermeasures (RRFB+high-visibility markings+in-roadway signs, and/or engineering + education + enforcement)

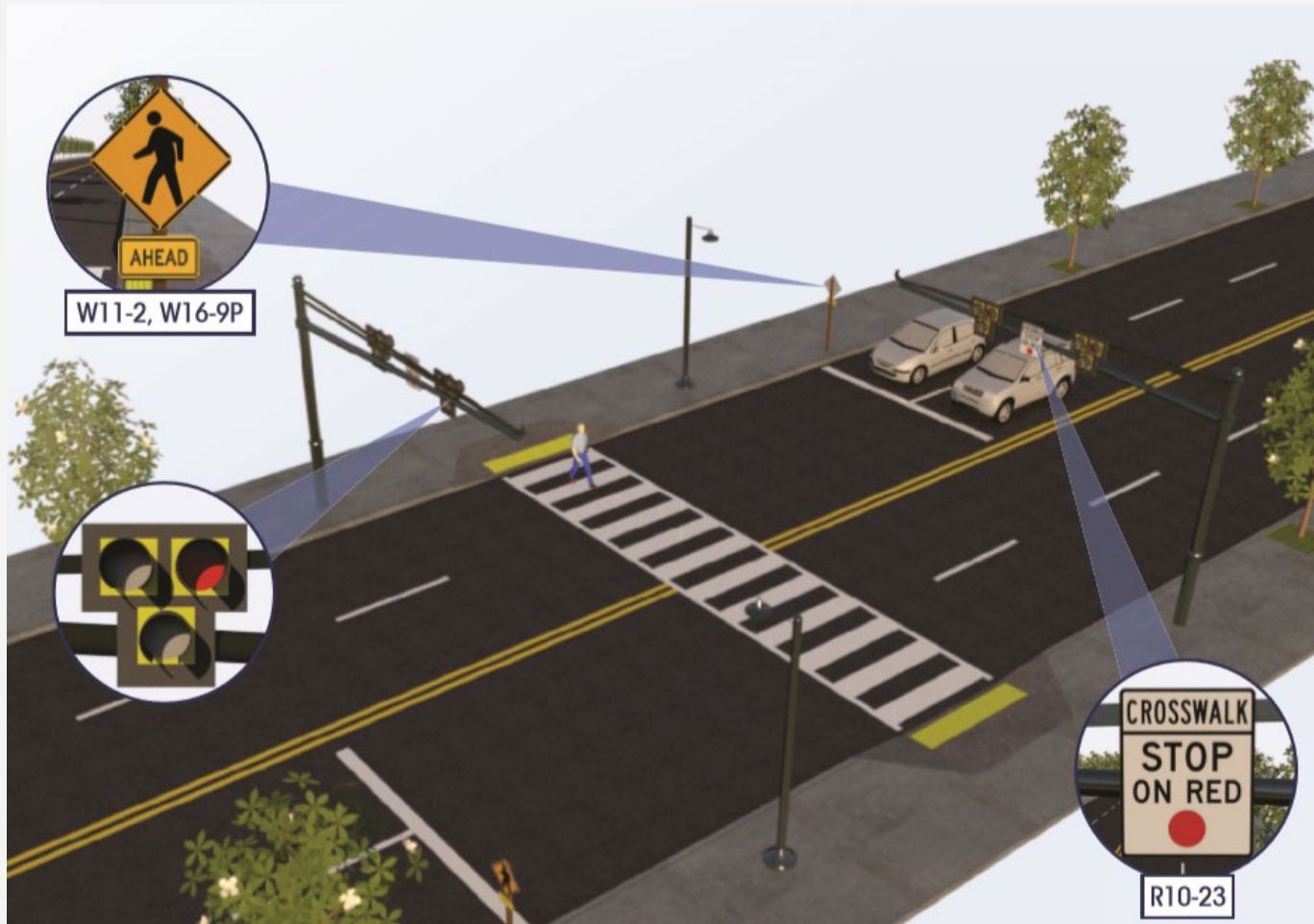
- Countermeasures include, but not limited to:
 - Engineering – pedestrian hybrid beacons, raised crosswalks, pedestrian refuge islands
 - Enforcement – perform targeted enforcement of driver non-compliance with pedestrian laws near schools
 - Education – create a Safe Routes to School curriculum to be taught in schools statewide
 - Policy – Complete Streets, Vision Zero, 3-Foot Law, Drivers Stop for Pedestrians in Crosswalk

SAFE TRANSPORTATION FOR EVERY PEDESTRIAN (STEP)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm

- Pedestrian Hybrid Beacons
- Rectangular Rapid Flashing Beacon (RRFB)
- Pedestrian Refuge Island
- Raised Crosswalks
- Crosswalk visibility enhancements
- Road Diet

PEDESTRIAN HYBRID BEACONS (STEP)

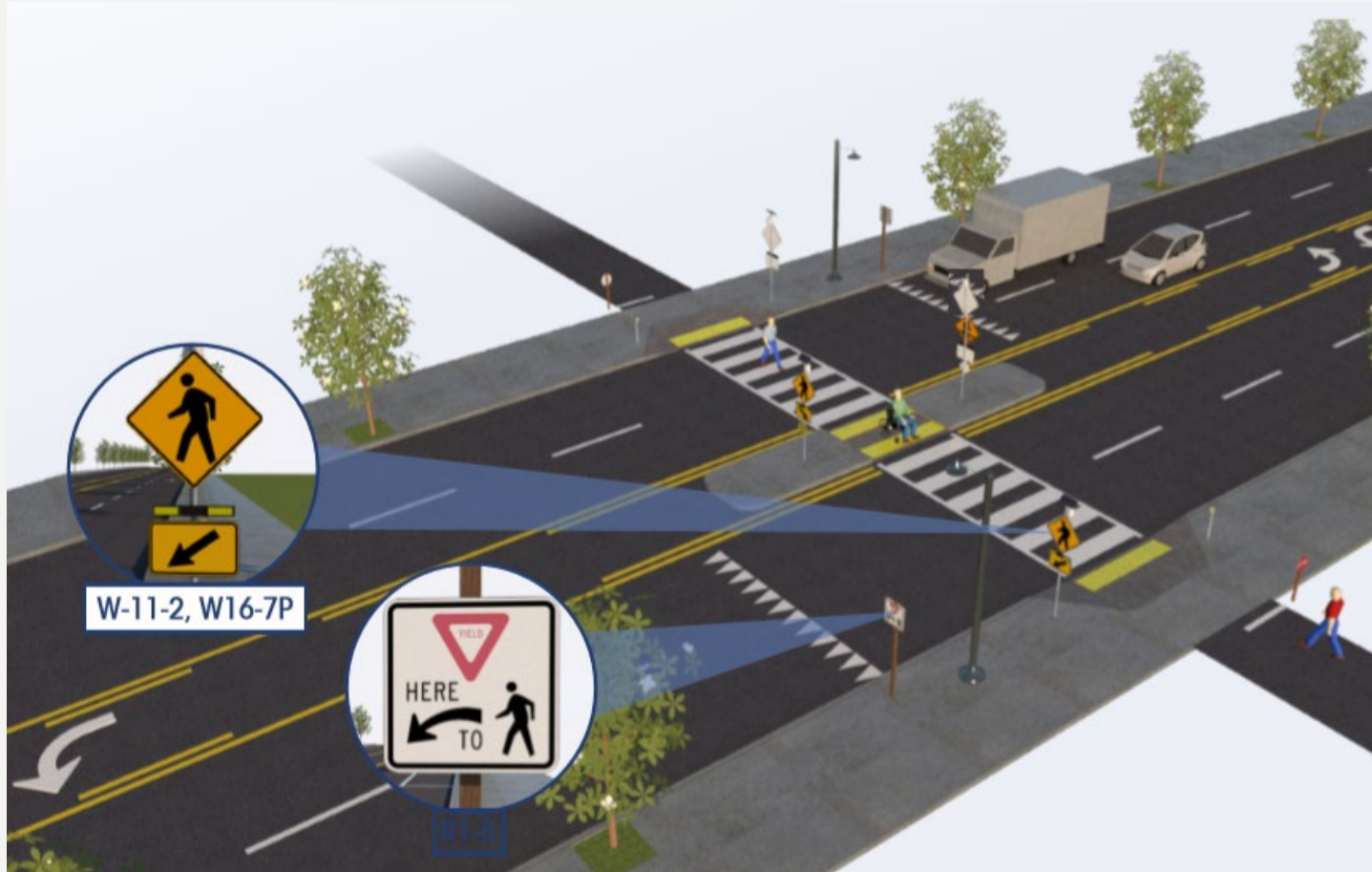


PHBs can
reduce
pedestrian
crashes by
55%



Average Cost: \$57,680

RRFB – RECTANGULAR RAPID FLASHING BEACONS (STEP)



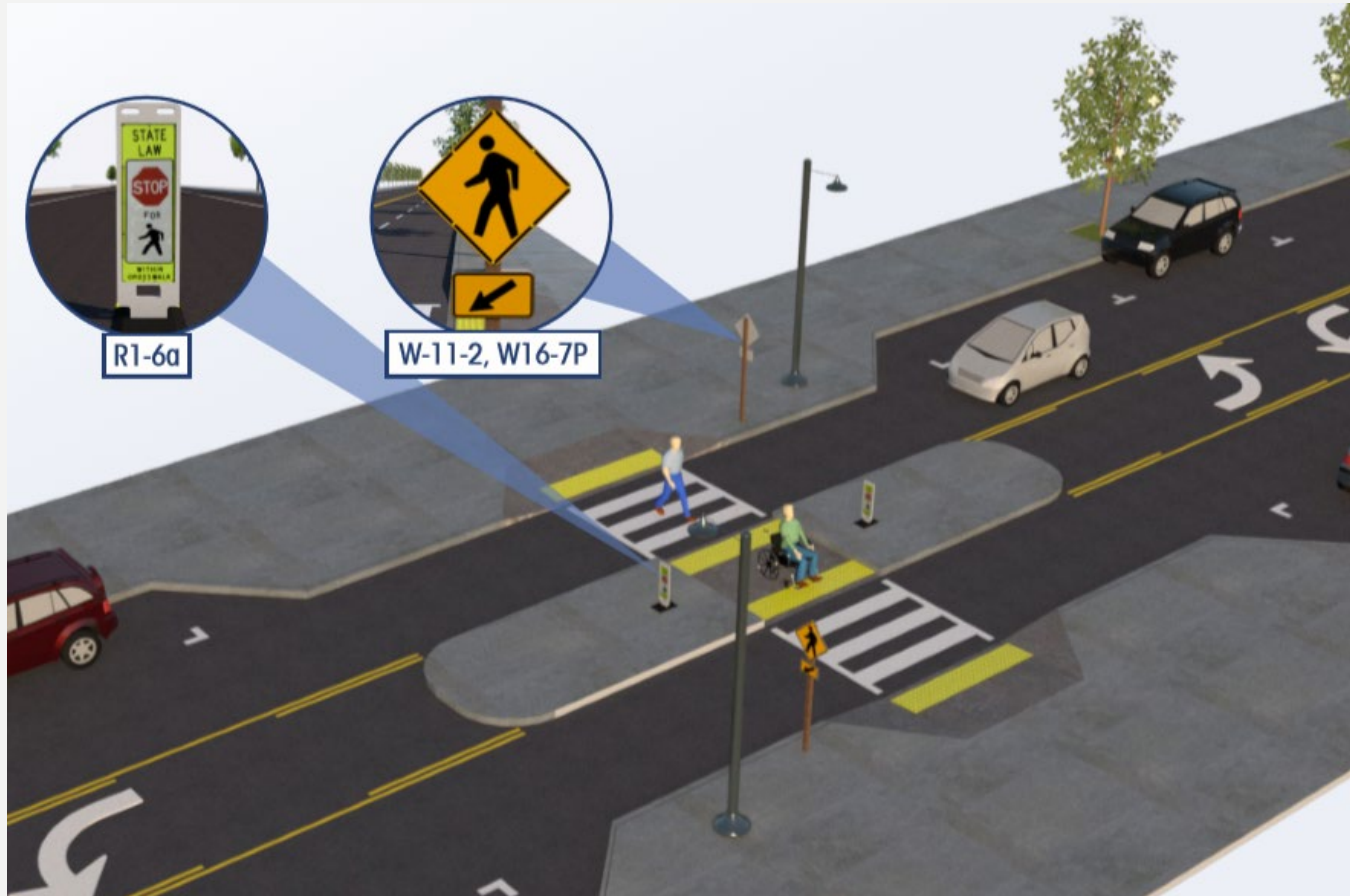
RRFBs can
reduce
pedestrian
crashes by

47%



Average Cost: \$22,250

PEDESTRIAN REFUGE ISLAND (STEP)



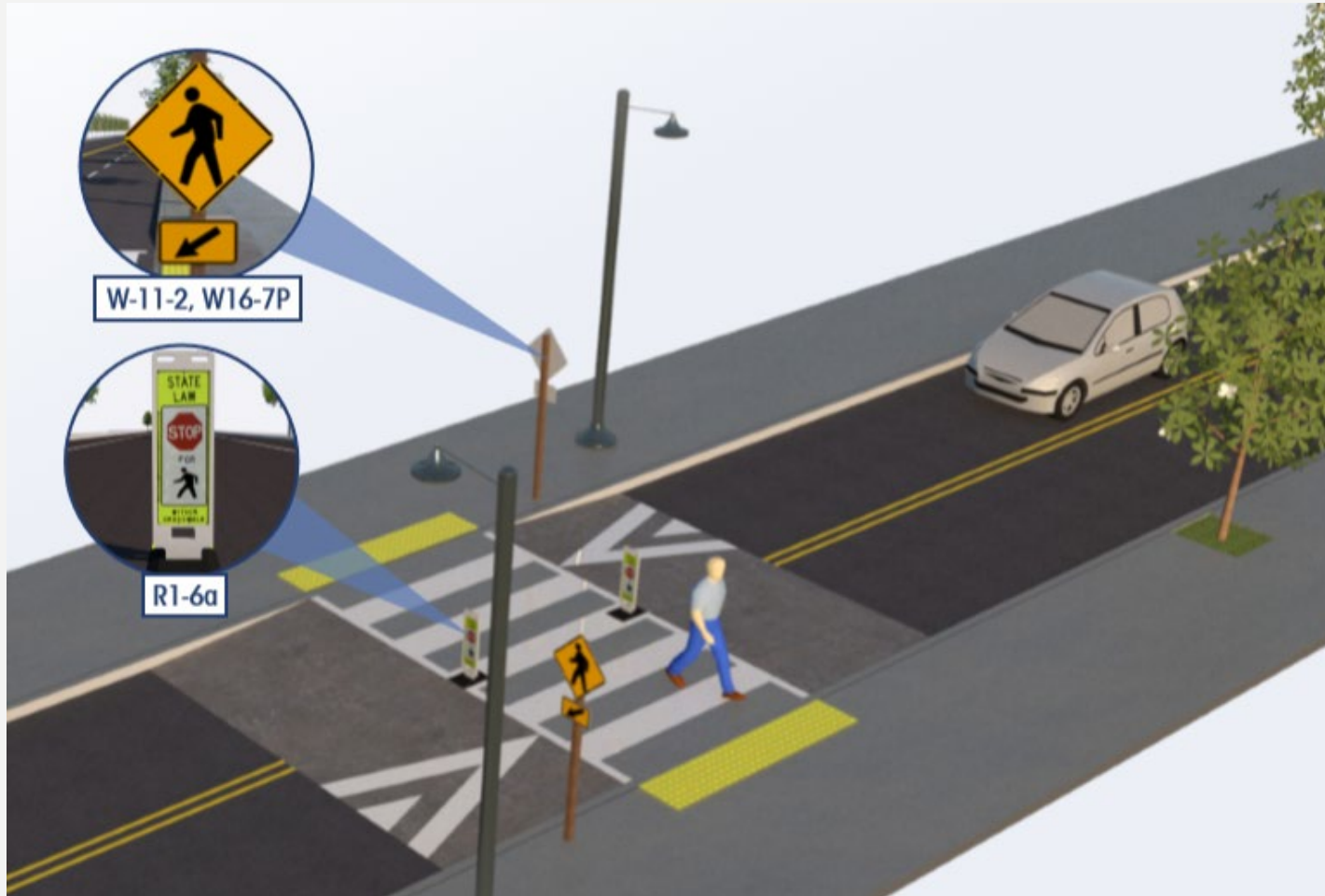
Pedestrian refuge islands
can reduce
pedestrian
crashes by

32%



Average Cost: \$13,520
(cost per sq. foot = \$10)

RAISED CROSSWALK (STEP)



.....

Raised crosswalks
can reduce
pedestrian
crashes by

45%

.....



Average Cost: \$8,170

CROSSWALK VISIBILITY ENHANCEMENTS (STEP)



Crosswalk visibility enhancements can reduce crashes by

23–48%



Average Costs:

- Crosswalk Markings: \$2,540
- Lighting: varies
- Curb Extension: \$13,000 (each)
- Advanced Stop/Yield: \$300 (each sign); \$320 (each line marking)
- In-Street Stop Sign (R1-6a): \$240 (each)

ROAD DIET (STEP)



Before



After



Road Diets can reduce
total crashes by

19-47%*

*19% in urban areas, 47% in suburban areas.

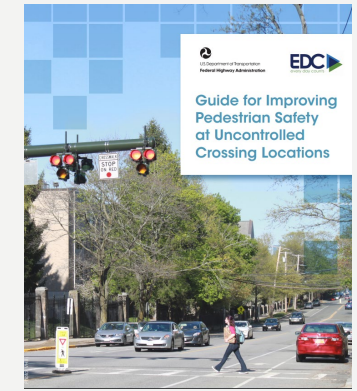
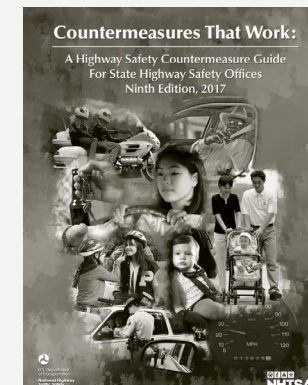
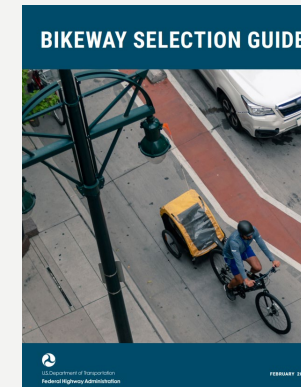
Average Cost: \$25,000 - \$100,00
per mile
(depends on geometric treatments – curb
extensions, refuge islands, etc.)

SAFETY + BIKE-PED PROJECTS

- When applying for TA, SRTS, (etc.) funds:
 - Think about safety with your bicycle and pedestrian designs
 - Implement proven safety countermeasures
 - STEP: RRFB, pedestrian hybrid beacon, raised crosswalks, road diets
 - PSC: leading pedestrian interval, walkways, pedestrian refuge islands
 - If you have conventional bike lanes in your design, it might be safer to design an off-street path or an in-street separated bikeway
- Think about implementing proven safety countermeasures to increase safety and maintain access and mobility for people walking and bicycling in your communities.

ADDITIONAL RESOURCES

- Proven Safety Countermeasures (FHWA)
<https://safety.fhwa.dot.gov/provencountermeasures/>
- Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (FHWA)
https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/guide_to_improve_uncontrolled_crossings.pdf
- Bikeway Selection Guide (FHWA)
https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf
- Designing for All Ages & Abilities (NACTO) https://nacto.org/wp-content/uploads/2017/12/NACTO_Designing-for-All-Ages-Abilities.pdf
- Countermeasures That Work (FHWA)
https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812478_countermeasures-that-work-a-highway-safety-countermeasures-guide-.pdf
- Hawaii Pedestrian Toolbox
<https://hidot.hawaii.gov/highways/files/2013/07/Pedest-Tbox-Hawaii-Pedestrian-Toolbox-Low-Res.pdf>



MAHALO
NUI
LOA!

THANK
YOU!

**DIANE DOHM, AICP
OAHUMPO**

