

North Carolina eCrash Data Modernization Project

Nancy Lefler



www.hsrc.unc.edu

October 14, 2020

Agenda

- Background
- Project purpose
- Overview of approach
- Current status
- Future Phases
- Questions / Discussion
- Next Steps

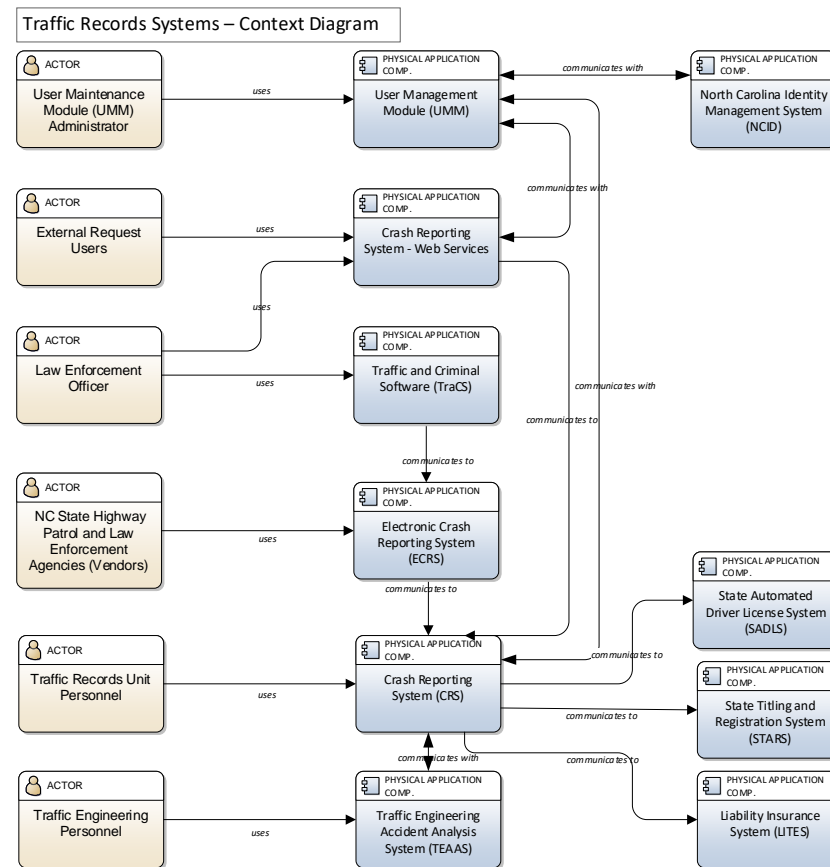
Background

- NCDMV manages the State's crash data
- Over 380,000 crashes reported annually
- Current crash management system is outdated
- The NC Legislature mandated the crash systems be replaced. State Law 2016-94 (HB 1030), Section 35.25.(a).

<http://www.ncga.state.nc.us/Sessions/2015/Bills/House/PDF/H1030v8.pdf>.

Purpose:

- Plan, develop and manage a modern statewide electronic crash data system for North Carolina.



Goals

- GUI with a secure connection to a relational database
- Multi-concurrent users, mixed connectivity
- Meet users needs
- Generate accurate data
- Easily accessible
- Incorporate data quality management process
- Address security and risk
- Update DMV-349 Form

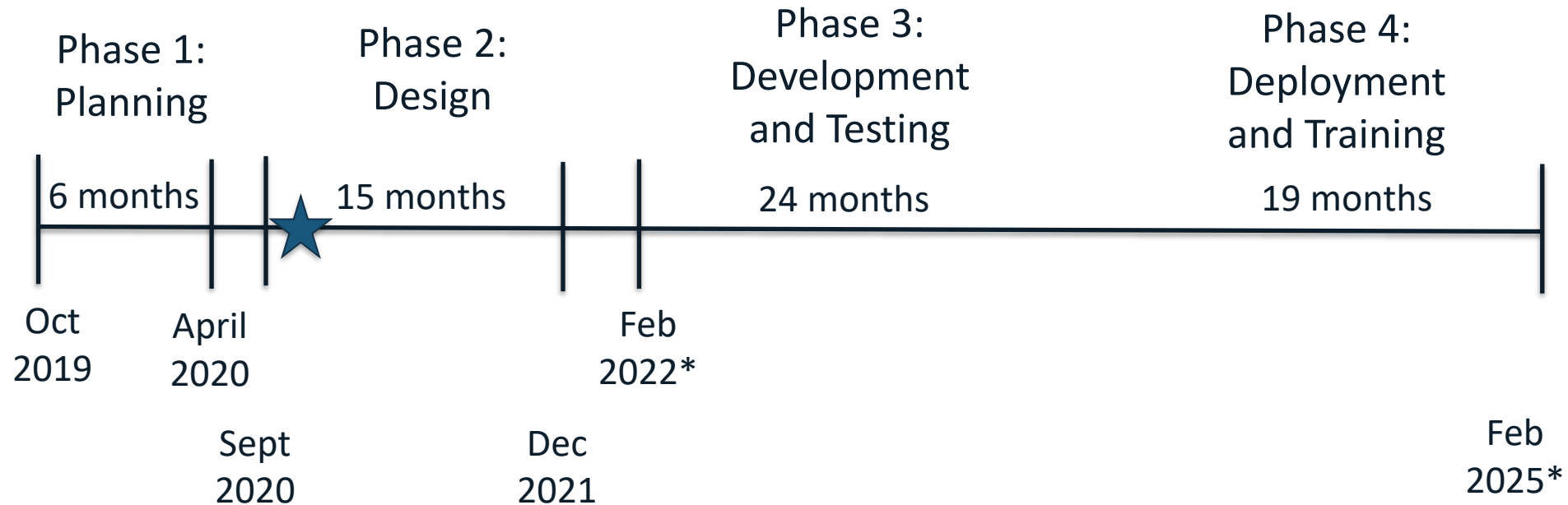
UNC Team



Approach

- Phase I: Planning (complete) – 6 months
- Phase II: Design (In progress) – 15 months
- Phase III: Development and Testing – 24 months
- Phase IV: Deployment – 19 months

Timeline



★ We are here

*Estimated Dates

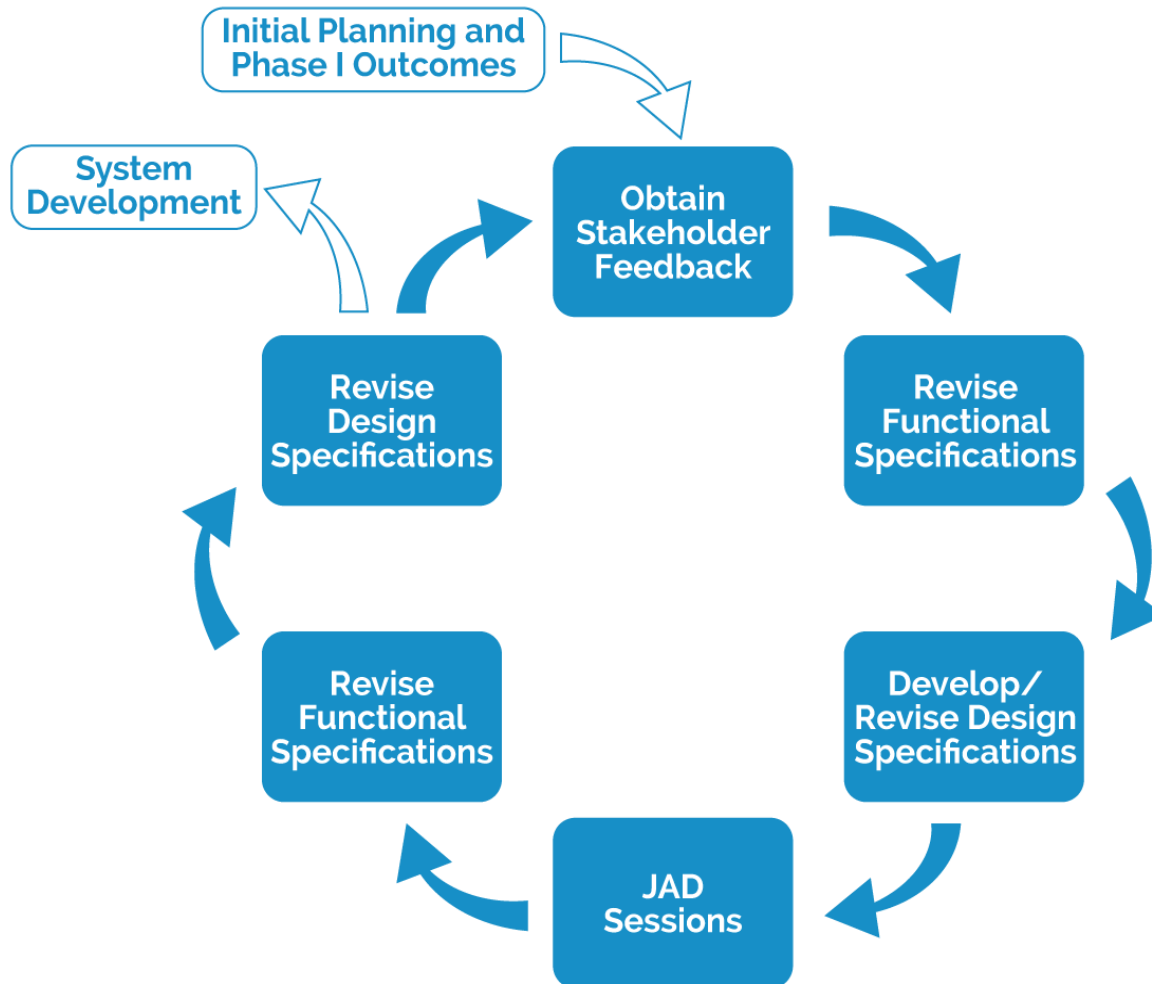
Phase I: Planning (completed)

- Kick-off Meeting: Nov 2019.
- Peer Exchange: Wisconsin, Louisiana, Connecticut, and Utah.
- Working Sessions with DOT and DIT-T.
- Statement of Work and Budgets for Phases II-IV.

Phase II: Design (currently underway)

- Project Management Plan.
- Project branding and website
- Iterative Design Process
- Revised DMV-349 Form
- Revised Functional Specifications
- Design Specifications
- Schedule of application development.
- Revised Statement of Work and Budgets for Phases III-IV.

System Design Iterative Process



Stakeholder Groups

- Crash Data Ingest
 - Law enforcement officers
- Traffic Records Processing
 - DMV, SHP, others
- Internal DOT Uses/Needs
 - DOT Safety Staff, TEAAS users, Crashweb users
- External Users Uses/Needs.
 - Universities, Consultants, Public Health, Non-profits, etc.

Revise NCDMV-349 Form

- Improved MMUCC compliance
- Updated elements/attributes

DMV-349 Instructional Manual

The DMV-349 Form

Revised Functional Specifications

- Key Decision Points:
 - What will be the physical location of the database(s)? NCDOT, NCDIT, UNC, Cloud, etc. or mix of various locations according to security needs?
 - Will the revised crash report form be released with go live of new database? (This is the highly recommended approach).
 - Will there be one database or two with a separate system of record and analytic database with additional QA/QC and PII removed?
 - Will the DOT convert old reports into the new system or keep old reports in the old system and only have new reports in the new system.
 - How will we transition from the previous system to the new system (piecemeal or all at once)?

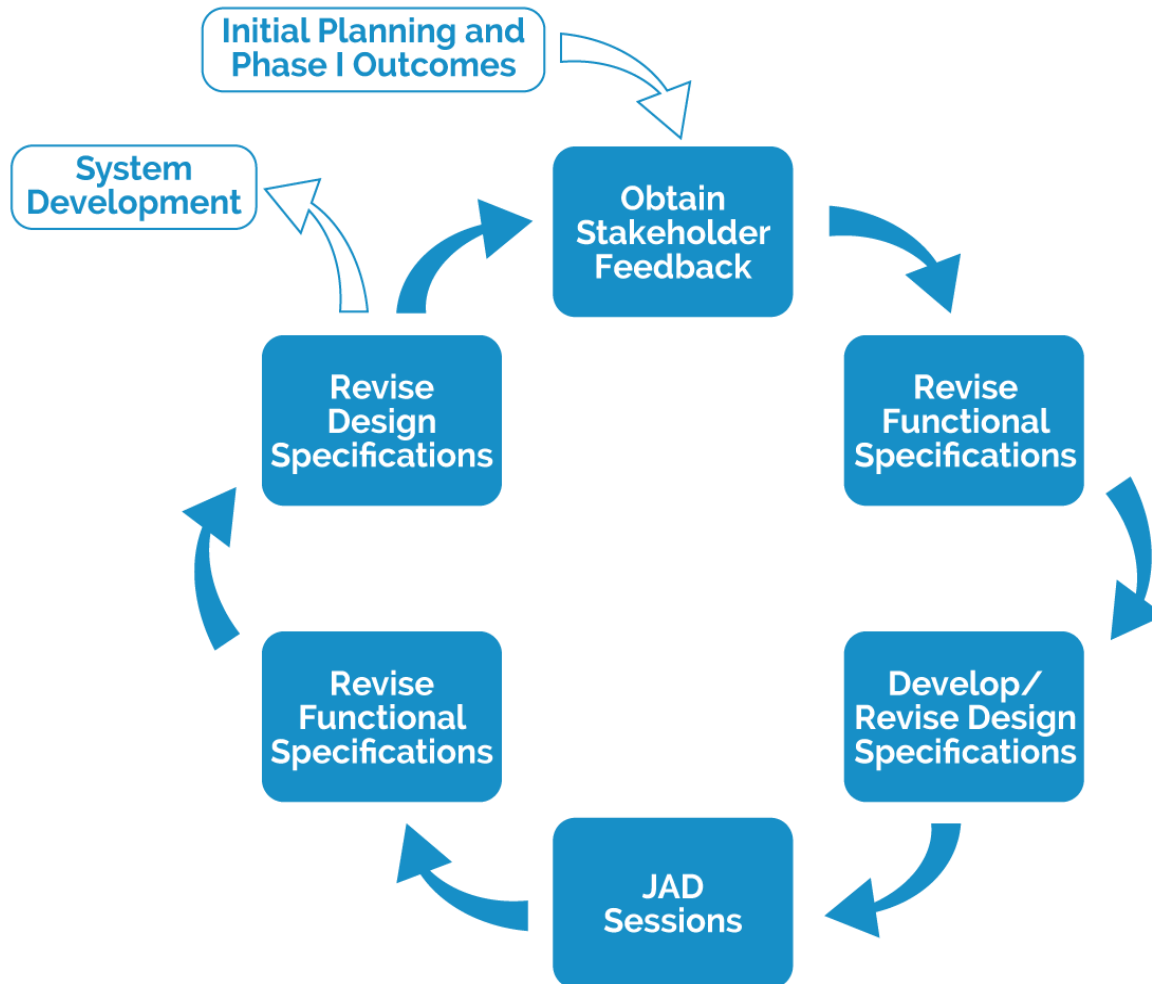
Design Specifications:

- Architecture diagram describing the component's interfaces, other components that interact with it, the protocols they use, etc.
- Description of the technology stack to be used.
- Stories describing end user activities incorporating the component's behavior and descriptions of how other components will integrate the component will also be produced.

JAD Sessions

- Vet updated functional specification and design specifications with DIT/DOT and other stakeholders
- Update functional specification and design specifications based on feedback

System Design Iterative Process



Phase II: Design (currently underway)

- Additional Deliverables:
 - Schedule of application development.
 - Revised Statement of Work and Budgets for Phases III-IV.

Phase III: Development and Testing

- Acquire and install development infrastructure
- Development of systems and subsystems and applications.
- Testing of systems, subsystems, and applications.
- Perform User Acceptance Testing.
- Revise Statement of Work and Budget for Phase IV.

Phase IV: Deployment and Training

- Provide training on the crash reporting and analysis system.
- Fully deploy system.
- Transition legacy pieces.

Additional Feedback / Questions



Thank you!

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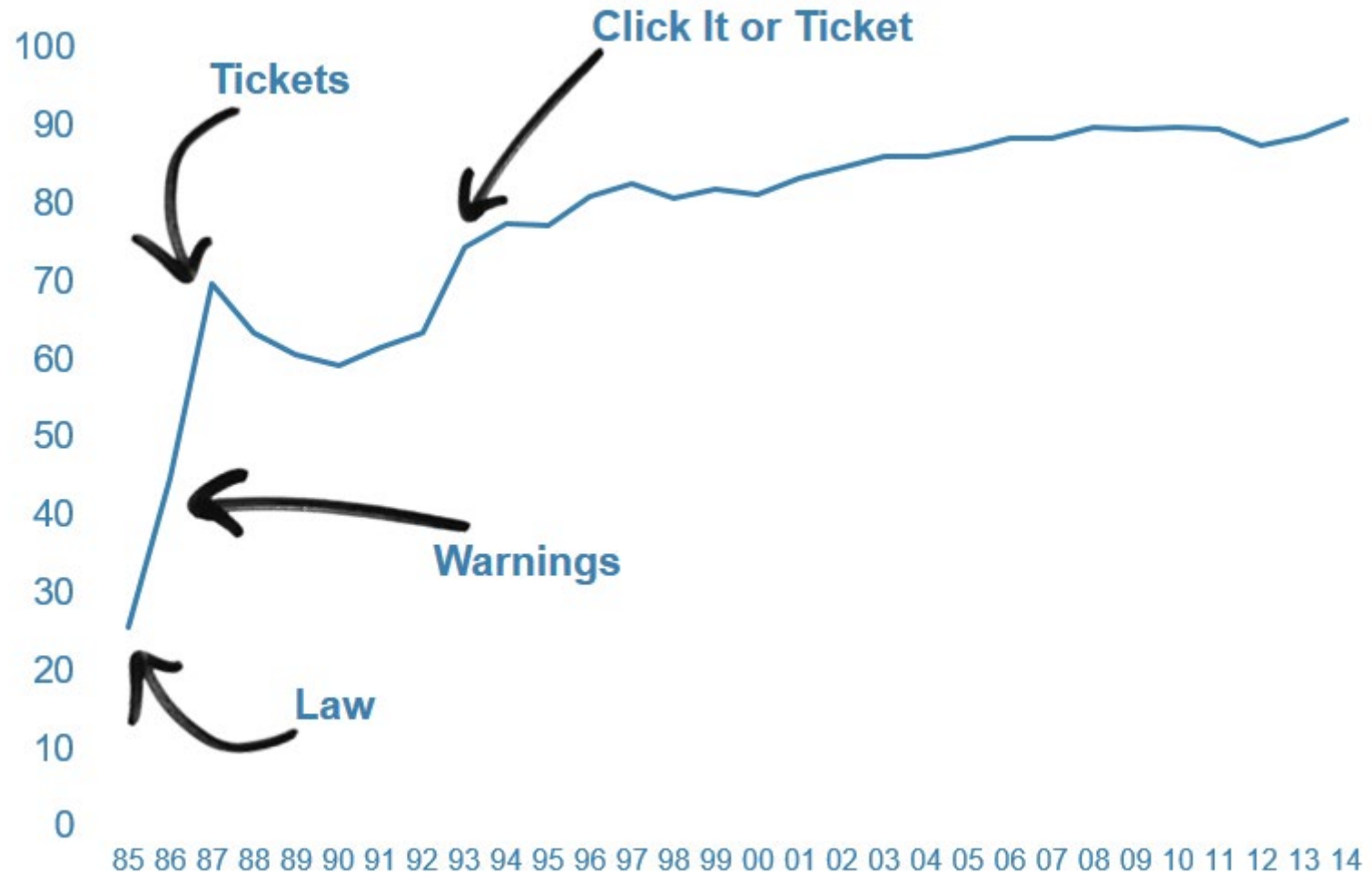
Most of Us Buckle Up in Person County

A social norms approach to increase seat belt
use in a rural North Carolina County

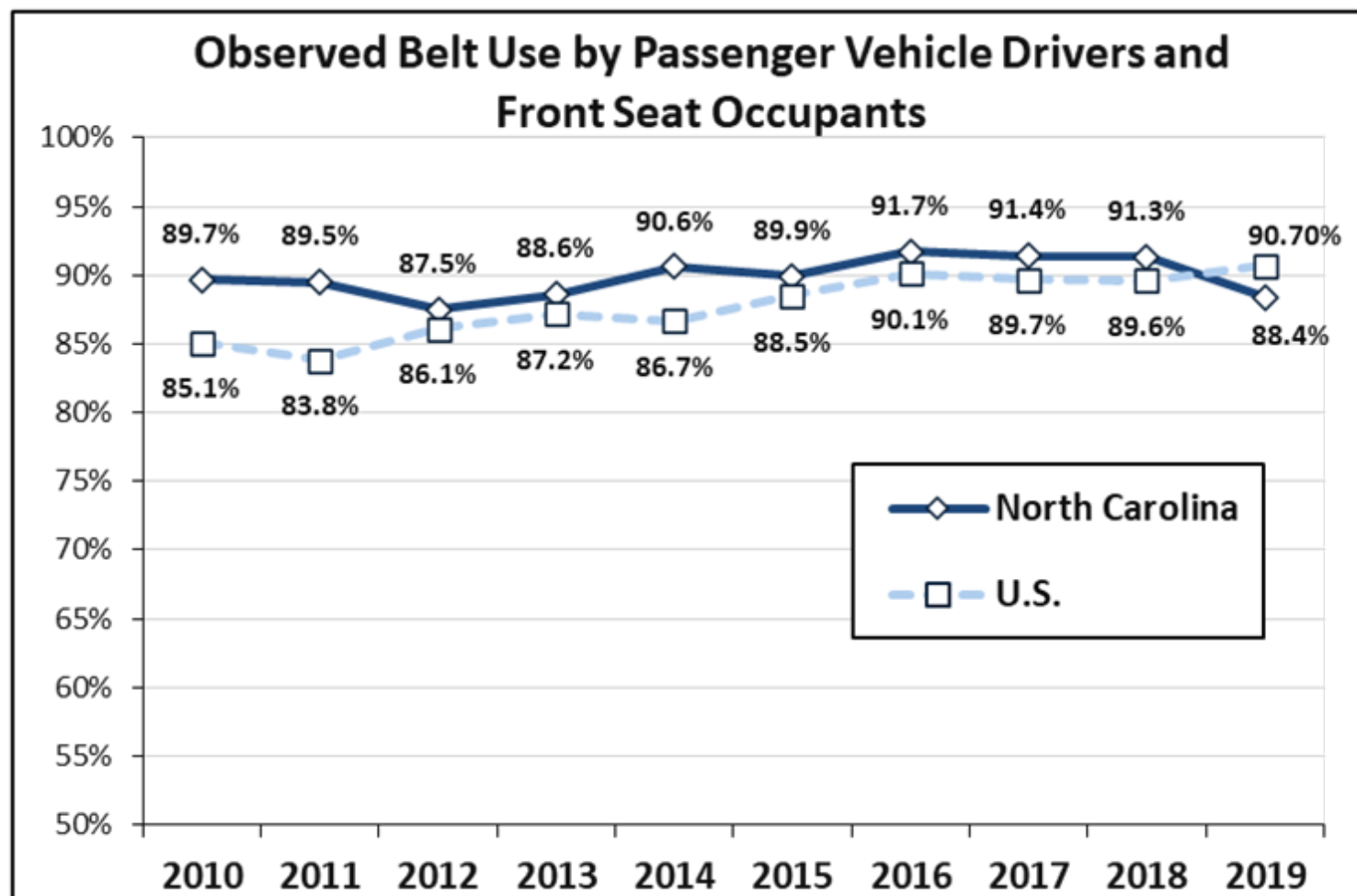


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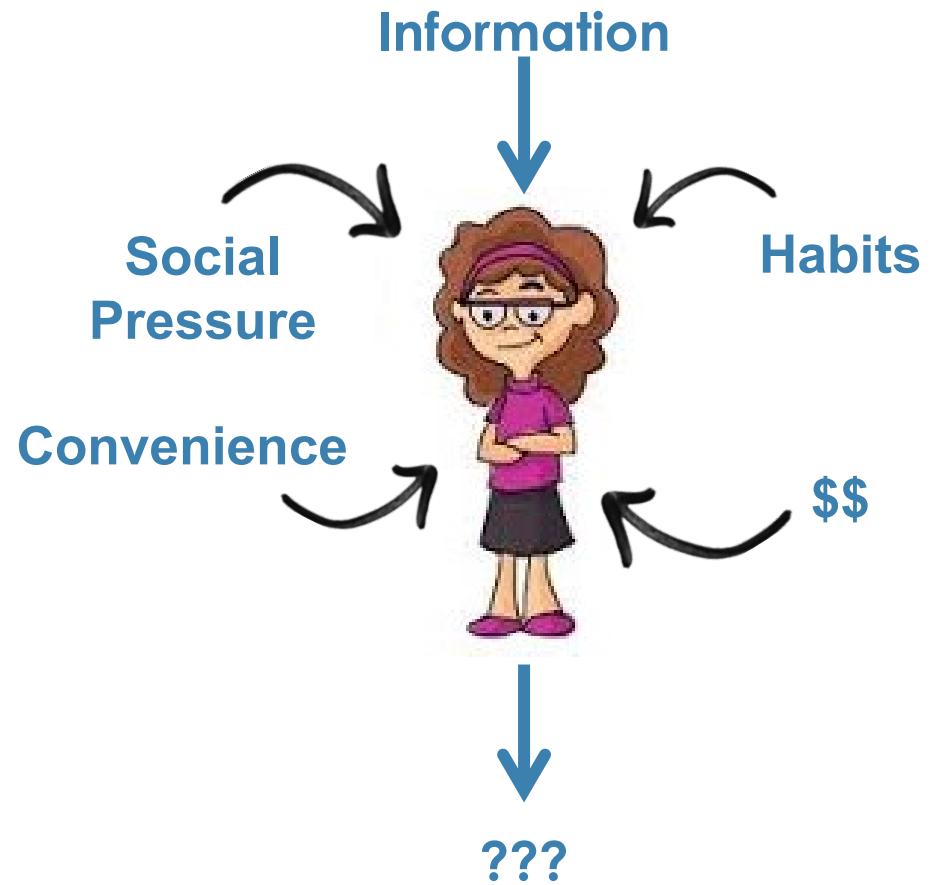
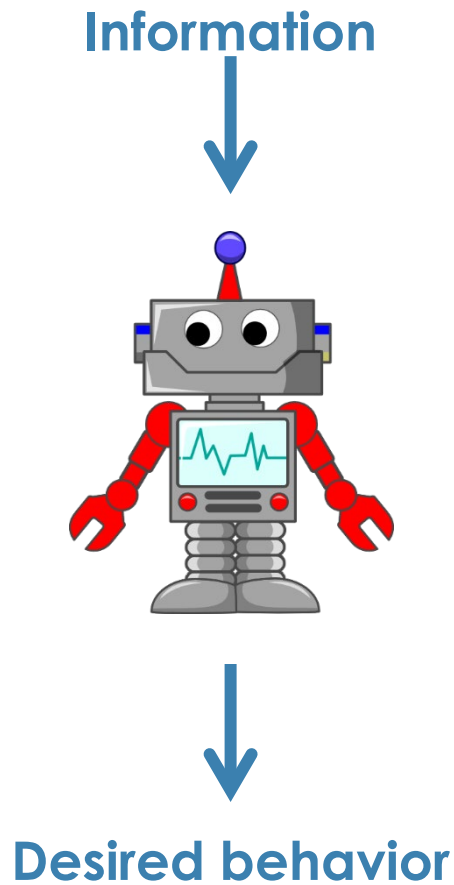
NC Seat Belt Use



NC Seat Belt Use



Changing Human Behavior is Difficult



What Are Social Norms?

“Unwritten rules of behavior that are considered acceptable in groups or social situations”

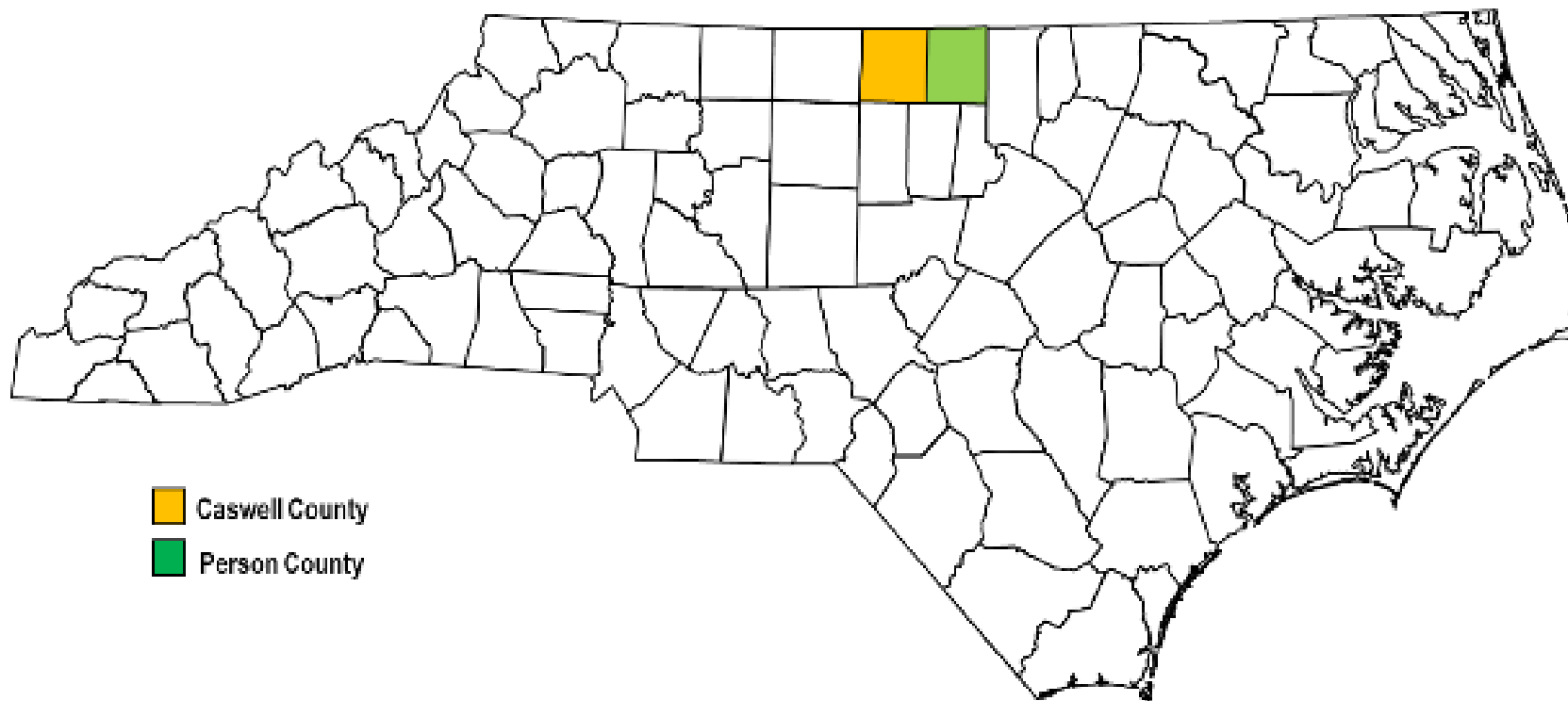


Using Social Norms

- People are influenced by their beliefs about the behavior of others
- Perceptions are often inaccurate
- Correcting these misperceptions can empower people to make safer decisions



Program Communities



-  Caswell County
-  Person County

Program Goals

- Identify community perceptions of seat belt use in Person County and correct any misperceptions that exist
- Increase observed seat belt use in Person County

Identify the “Norm”



Create the Program



Program Materials



Seat Belt Use Rate Signs



Social Media



Roxboro Police Department

October 9 · 🌐

Seat belt use increasing

Thank you Personians for increasing seat belt use 4% in just one week! You are just 1% away from the state average! But, let's be honest, everything is better in Person, which means we can do better than the state average.

We challenge drivers to raise the bar. Next time the sign updates, lets see it say 98%.

Help us and the [UNC Highway Safety Research Center](#) as we partner to save lives one click at a time.

#BuckleUpPerson



👍❤️👏 267

59 Comments 24 Shares



Person County Department of Social Services

October 31 at 8:45 AM · 🌐

DSS employees participated in a Public Service Announcement yesterday for the Buckle Up campaign.



Person High School

October 16 · 🌐

#BuckleUpPerson



Earned and Paid Media

Ready for Halloween?

McDonald's in Walmart at 1049 Durham Road sits empty following the end of its lease.

Person County seat belt use is high

WEATHER

Day	High	Low
Wednesday	95	68
Thursday	94	68
Friday	82	51

INDEX

Agencies	2A
Classifieds	4-5B
Obituaries	6A
Opinion	4A
Sports	1B

MOST OF US BUCKLE UP ALMOST 90% IN PERSON COUNTY

VETERAN'S DAY SPECIAL TRIBUTE

To honor the anniversary of the day originally celebrated as "Armistice Day," The Courier-Times will publish a special tribute on November 9th, to honor all the military men and women.

WAYS TO SUBMIT YOUR PHOTO:

Please include (if able): Full name, rank, branch of service, and dates of service. (FREE OF CHARGE)

- BY EMAIL: Email photo attachment and information listed above to leann@redrobert-courier.com

- IN PERSON: Drop your clearly labeled photos by The Courier-Times 111 N. Main St., Rutherford to Lea Russell or Johnny Whitfield.

SEND US YOUR PHOTOS!

PHOTO DEADLINE: FRIDAY, NOV. 1st BY 5PM

How to Mulch

- Insulates Soil from heat & cold
- Multiple Colors Available
- Delivery Service

THE COURIER-TIMES

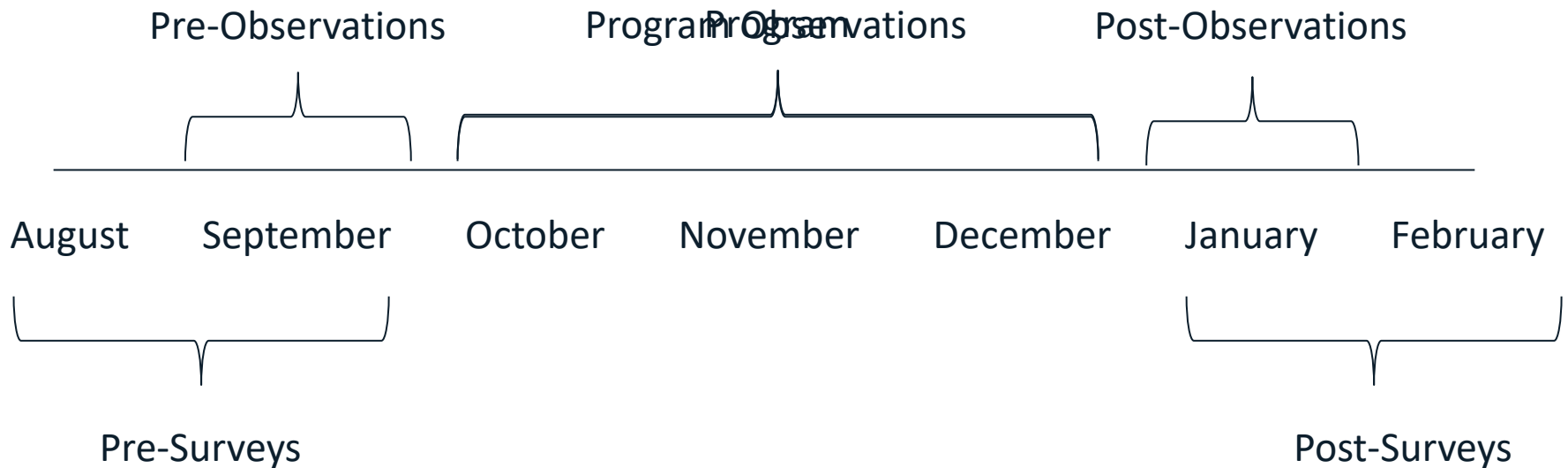


Billing Insert



Evaluation

- Seat Belt Observations (Pre, During, Post)
- Community Surveys (Pre, Post)



Results

Have you recently heard or seen anything about the following campaigns?

	Person County		Caswell County	
	Pre	Post	Pre	Post
Click It or Ticket	92%	96%	86%	97%
Most of Us Buckle Up in Person / Caswell County	28%	28%	22%	9%

Have you seen signs along the road showing current seat belt use?

Person County

84%

Caswell County

44%



What percent of people do you think wear a seat belt in Person/Caswell County?

Person County		Caswell County	
Pre	Post	Pre	Post
64%	79%	68%	70%

Progress Towards Goal 1



Goal 1: Identify community perceptions of seat belt use in Person County and correct any misperceptions that exist

- Perceived seat belt use in Person County rose substantially following the program
- Awareness of road signs was high
- Awareness of the “Most of Us Buckle Up” program was low

Seat Belt Observations

	Person County	Caswell County
Pre-Intervention	3,566	1,717
Intervention	8,097	3,149
Post-Intervention	1,777	1,397
Total	13,440	6,263

Overall Seat Belt Use

	Person County		Caswell County	
Pre- (September)	90.9%		92.0%	
Program (Oct – Dec)	89.9%		89.5%	
Post- (January)	89.5%		89.4%	

Seat Belt Use by Location

	Person County			Caswell County	
	In Town	Out of Town			
Pre- (September)	90.7%	91.3%		92.0%	
Program (Oct – Dec)	90.7%	88.9%		89.5%	
Post- (January)	91.9%	86.9%		89.4%	



Progress Towards Goal 2

Goal 2: Increase observed seat belt use in Person County

- Seat belt use showed a very strong seasonality effect.
- The social norms program partially blunted this seasonality effect.
- Observed seat belt use increased at in-town locations in Person County

Conclusions

- Social norms program can:
 - Correct misperceptions about seat belt use
 - Increase seat belt use (even when already high)
- Why the in-town effect?

Next Steps

- Increase program visibility
 - Billboards
 - Yard Signs
 - Direct Mail



Questions?

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Project funded by NC GHSP

Do Pedestrians like RRFBs or Median Islands?

Introducing a Pedestrian Satisfaction with Unsignalized Crossings Scale

Seth LaJeunesse

NCDOT Research and Innovation Summit
October 14, 2020



www.hsrc.unc.edu

Outline

- Research objective
- Methods
 - Intercept survey
 - Video observations
- Unsignalized crossings
- Statistical results
- Study conclusions and next steps

Partners



NCHRP NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

Research Objective

- Explore how pedestrians' satisfaction with crossing w/o signalization varied with their use of specific crossing treatments:
 - **Rectangular Rapid-Flash Beacon (RRFB)**
 - **median island**
 - **marked crosswalk**
 - **unmarked crosswalk**

Methods

- 3-min intercept survey administered via iPad immediately after participant crossed the street

How would you rate your crossing experience?

- ☐ 😄 Very satisfied
- ☐ 😊 Satisfied
- ☐ 😞 Dissatisfied
- ☐ 😡 Very dissatisfied

Surveys were coupled with video observations of crossings, focused on pedestrian behaviors and interactions with motorists

Portland team installing a pole-mounted Go Pro camera



Camera view of an RRFB crossing on MLK Jr Blvd in Chapel Hill

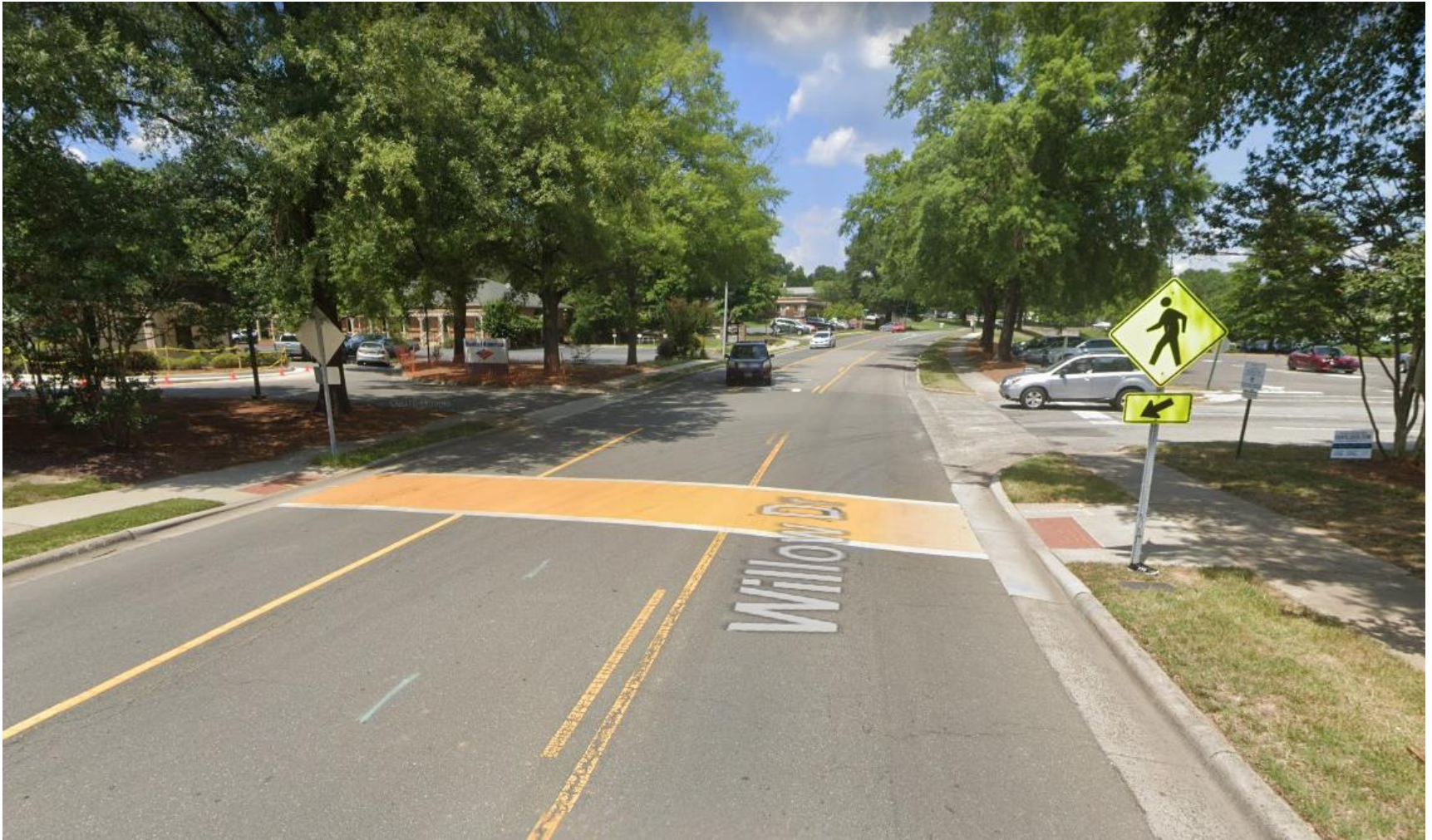


Rectangular Rapid-Flash Beacon (RRFB)



West Franklin Street, Chapel Hill, NC (RRFB with median island, facing east)

Marked crosswalk



Willow Drive, Chapel Hill, NC (marked crosswalk, facing north)

Median island w/ marked crosswalk



East Burnside Street Portland, OR (median island with marked crosswalk, facing east)

Unmarked crosswalk



Burnside Street Portland, OR (unmarked crosswalk, facing west)

Characteristics of crossings (N = 40)

	RRFB	Marked crosswalk	Median island	Unmarked crosswalk	<i>p</i>
Number of intersections	10	11	10	9	
Surveys per site	140	87	88	43	
Posted speed					<0.01
20	0.0%	11.5%	27.3%	4.7%	
25	70.0%	49.4%	30.7%	0.0%	
30	15.0%	13.8%	30.7%	41.9%	
35	15.0%	25.3%	11.4%	32.6%	
45	0.0%	0.0%	0.0%	20.9%	
# of lanes					<0.01
2	55.0%	32.2%	70.5%	48.8%	
3	0.0%	0.0%	15.9%	18.6%	
4	32.1%	39.1%	13.6%	32.6%	
5	12.9%	28.7%	0.0%	0.0%	
AADT (M (SD))	16,402 (10,073)	24,614 (12,286)	13,942 (6,333)	20,046 (7,420)	<0.01

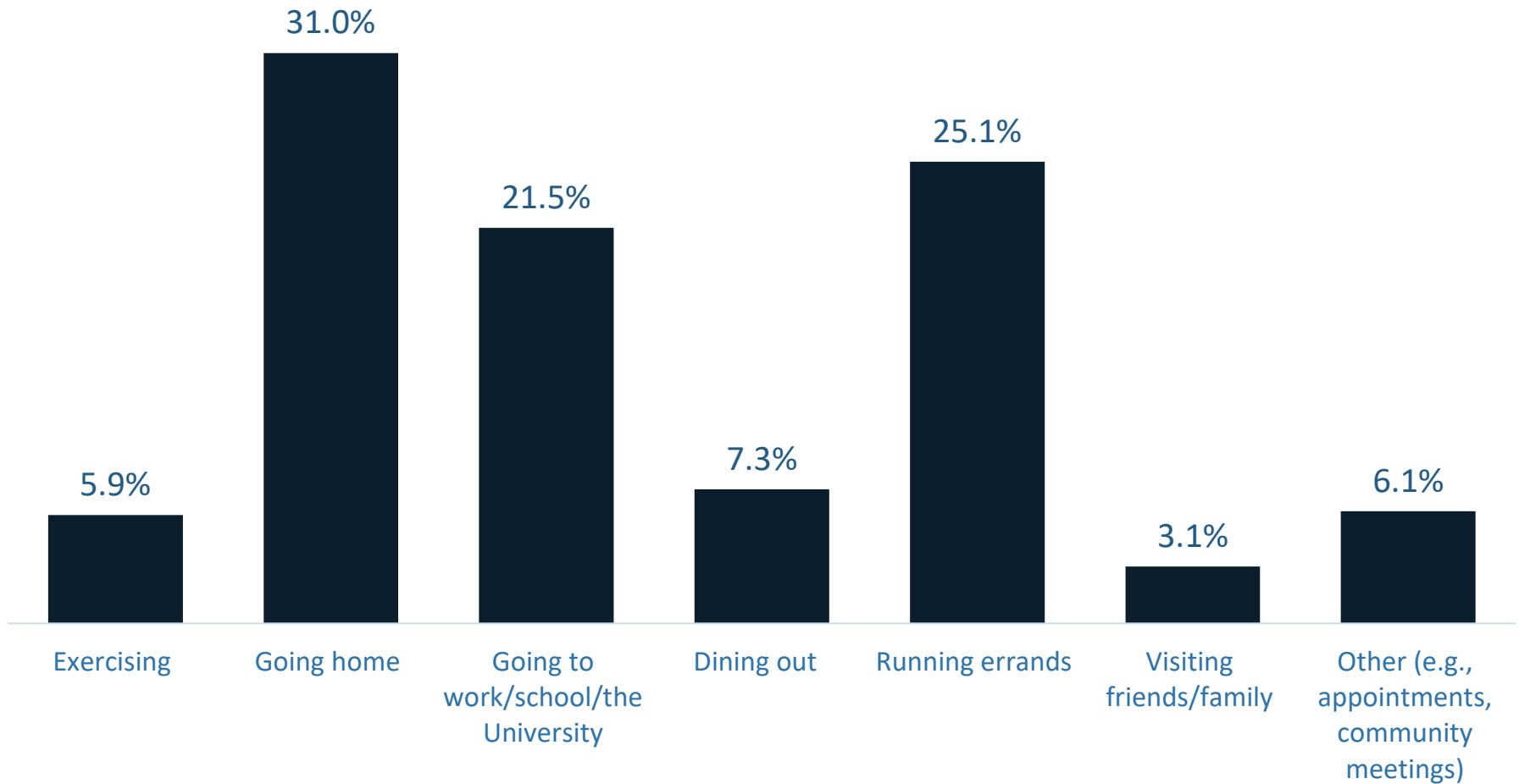
*marked and unmarked crosswalk sites tended to have higher speeds and volumes

Study findings

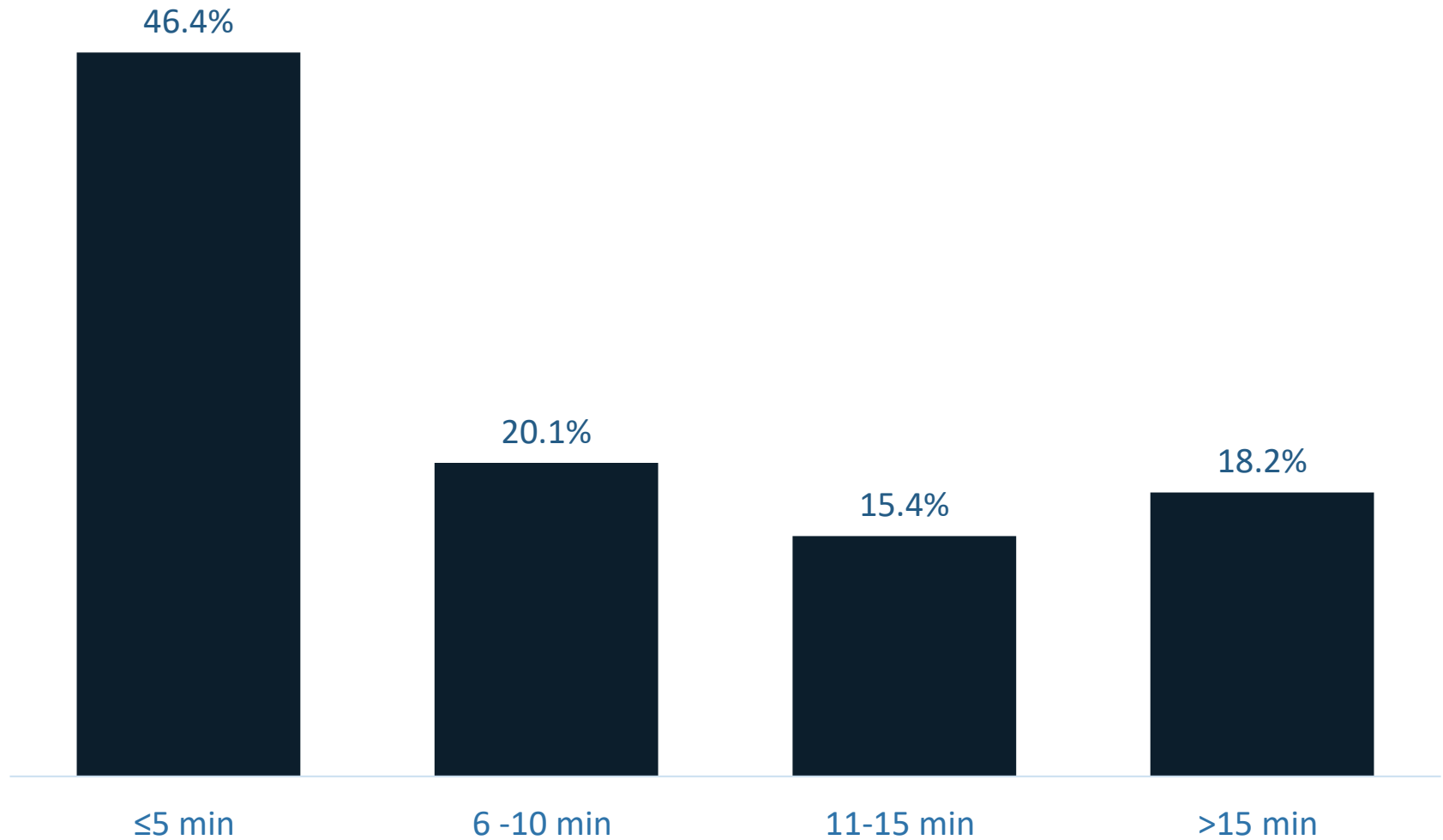
Participant demographics

- Study participants were:
 - slightly older
 - more likely to be male
 - less likely to be White and Asian than the Chapel Hill, NC and Portland, OR populations (*U.S. Census Bureau, 2018*)

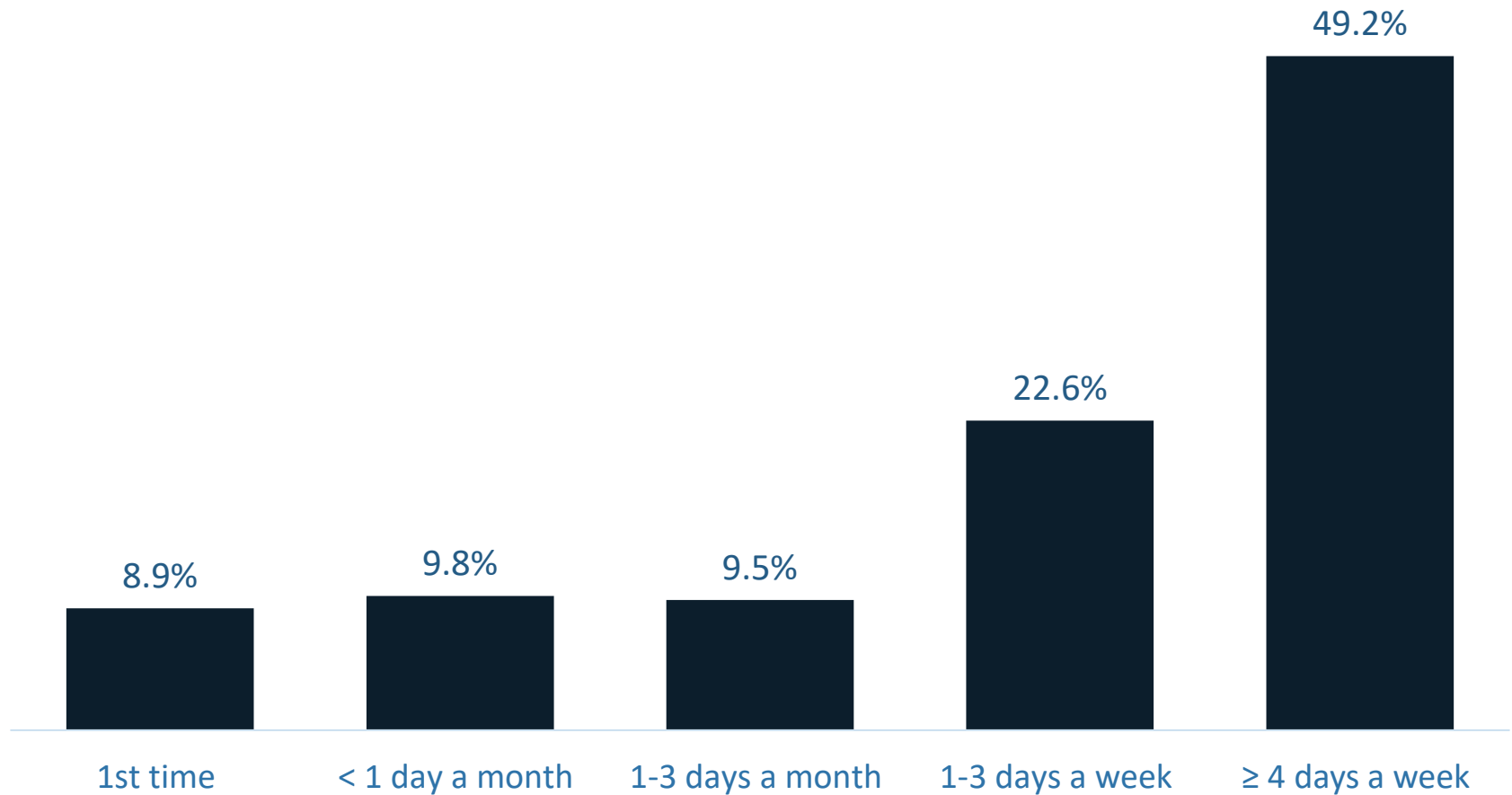
Trip Purpose (N = 358)



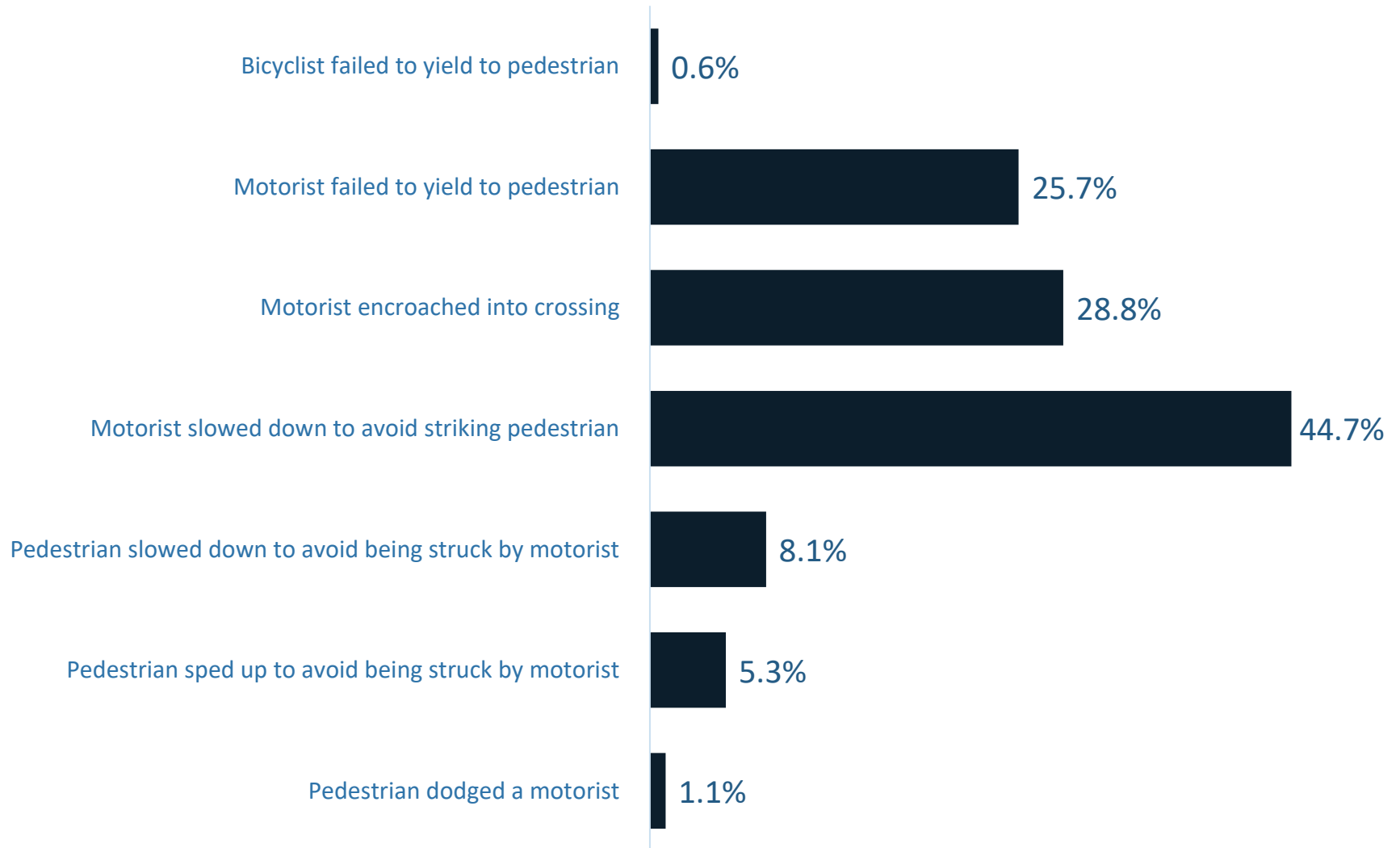
Trip Length



Frequency of Facility Use



Road User Interactions

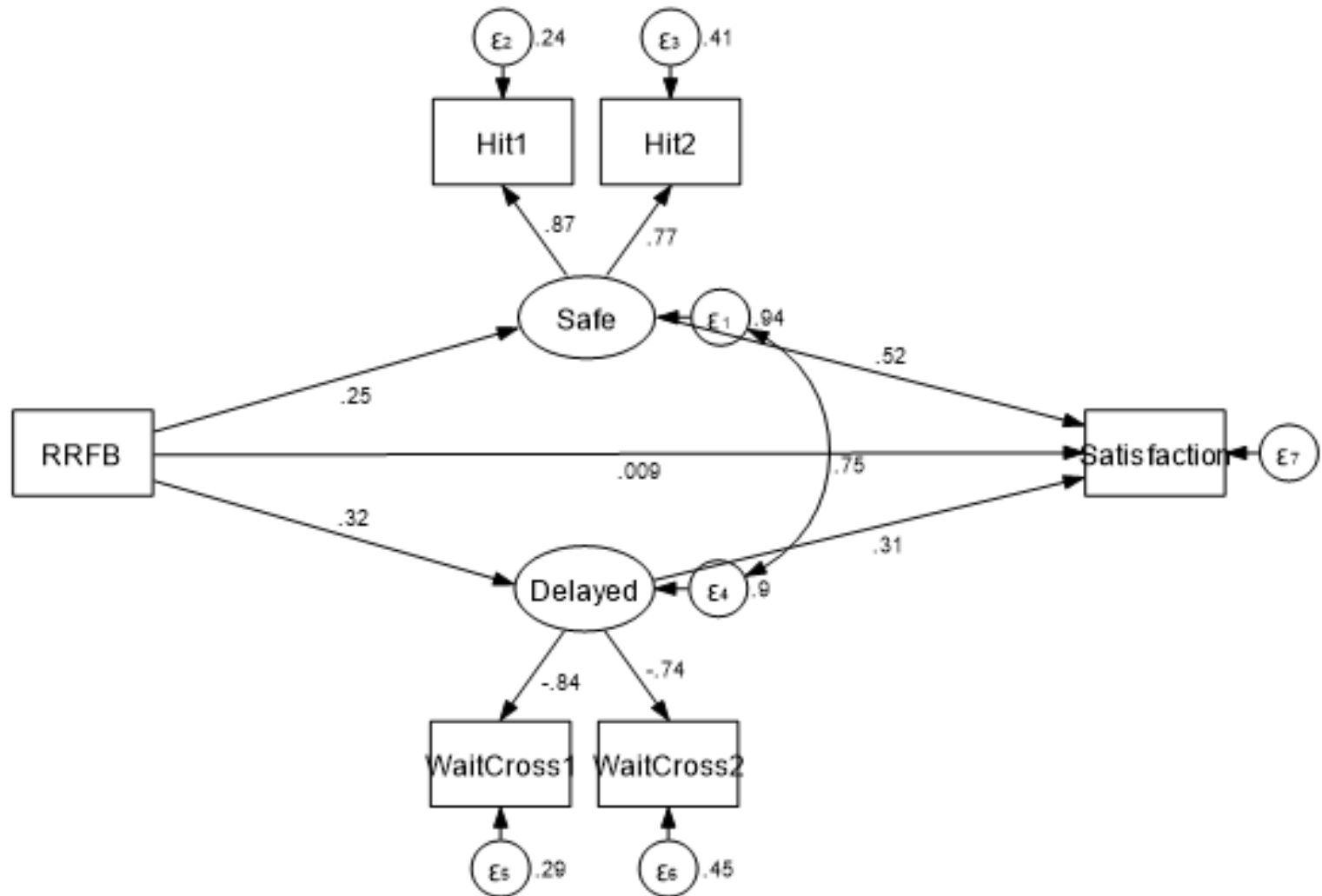


Least Squares Regression Results

- Unmarked crosswalks (-)
- At least weekly use of any crossing (-)
- 4-5 travel lanes (+)
- Perceptions of safety (+)
- Perceptions of delay (-)

Hypothesized that the crossing treatments had an ***indirect effect*** on crossing satisfaction

Structural Equation Modeling Results



Conclusion?

- Pedestrians' perceptions of crossing-related safety, delay, and satisfaction was closely associated with:
 - the unsignalized crossing treatment type
 - **RRFBs and median islands** offered pedestrians greater perceptions of safety and unhindered travel
 - **Marked and unmarked crosswalks** offered lower perceived safety and higher perceived delay

Why?

- Marked crosswalks, median islands, and RRFBs are designed to achieve different ends.
 - **Marked crosswalks:** delineate pedestrian crossing space and communicate to drivers where to expect pedestrians (*Sandt, et al, 2016*)
 - **Median islands:** augment marked crossings with a refuge from motor vehicle traffic
 - **RRFBs:** induce higher rates of drivers yielding (*Tay, Moshahedi, and Kattan, 2018; Porter, Neto, Balk, and Jenkins, 2016*), and the ability to indicate one's desire to cross the street

Why?

Crossing treatments themselves failed to directly affect crossing satisfaction.

This likely reflects pedestrians' crossing-related “expectancies”—i.e., people's appraisals of the perceived likelihood of gratifying their desires (*Kruglanski, Chernikova, and Schori-Eyal, 2014*).

That is, **at unmarked crossing**, pedestrians may *expect some degree of delay and lack of protection* from being struck by a driver. Thus, a successful crossing may evoke gratitude and relief with crossing the street unfettered.

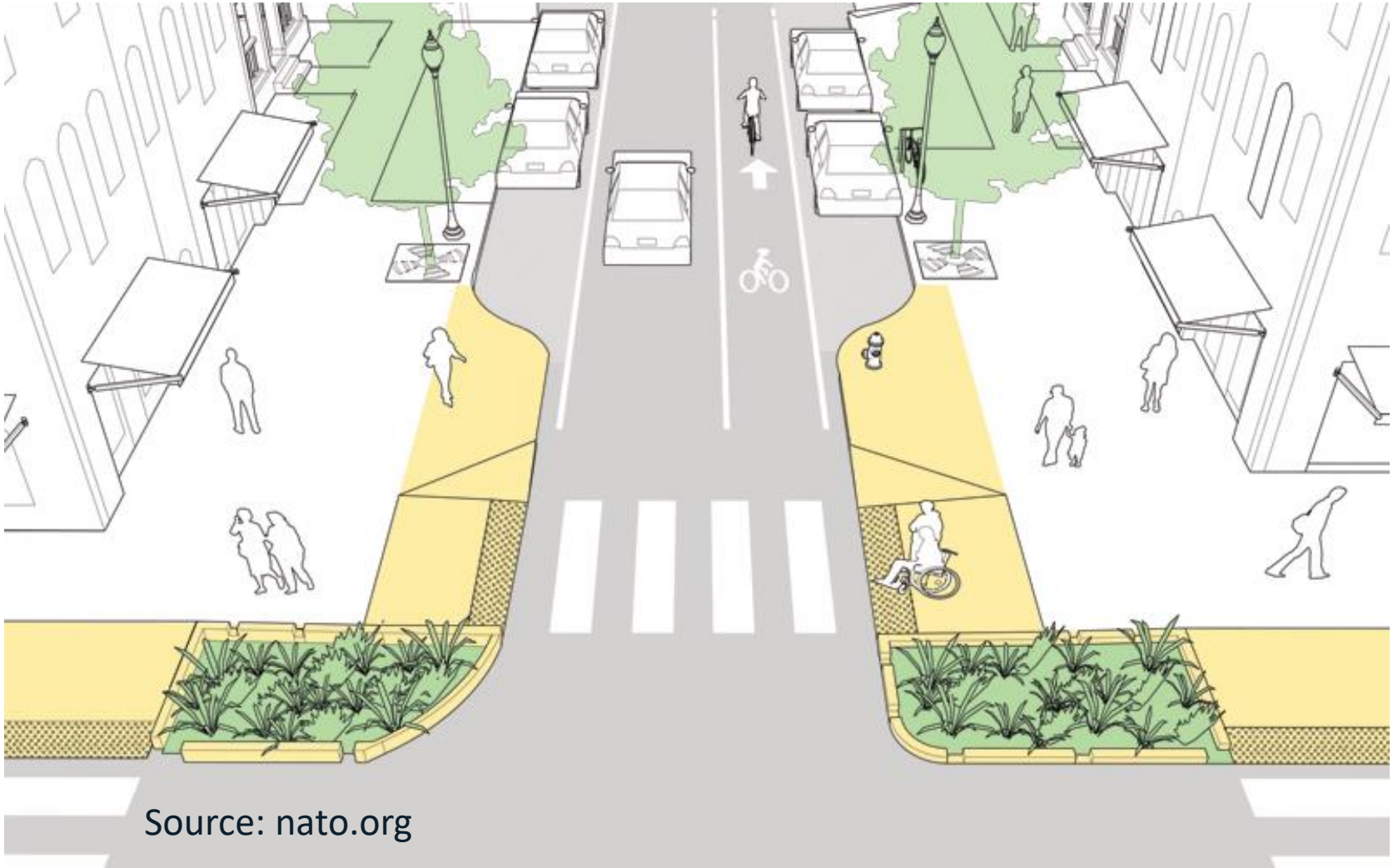
At RRFBs, pedestrians push the button and may expect drivers to stop for them. A successful crossing at an RRFB site may *meet pedestrians' expectation of a safe, unhindered crossing*.

Next steps: assess pedestrians' satisfaction
using additional crossing treatments

Pedestrian Hybrid Beacons



Curb Extensions



Thank You

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