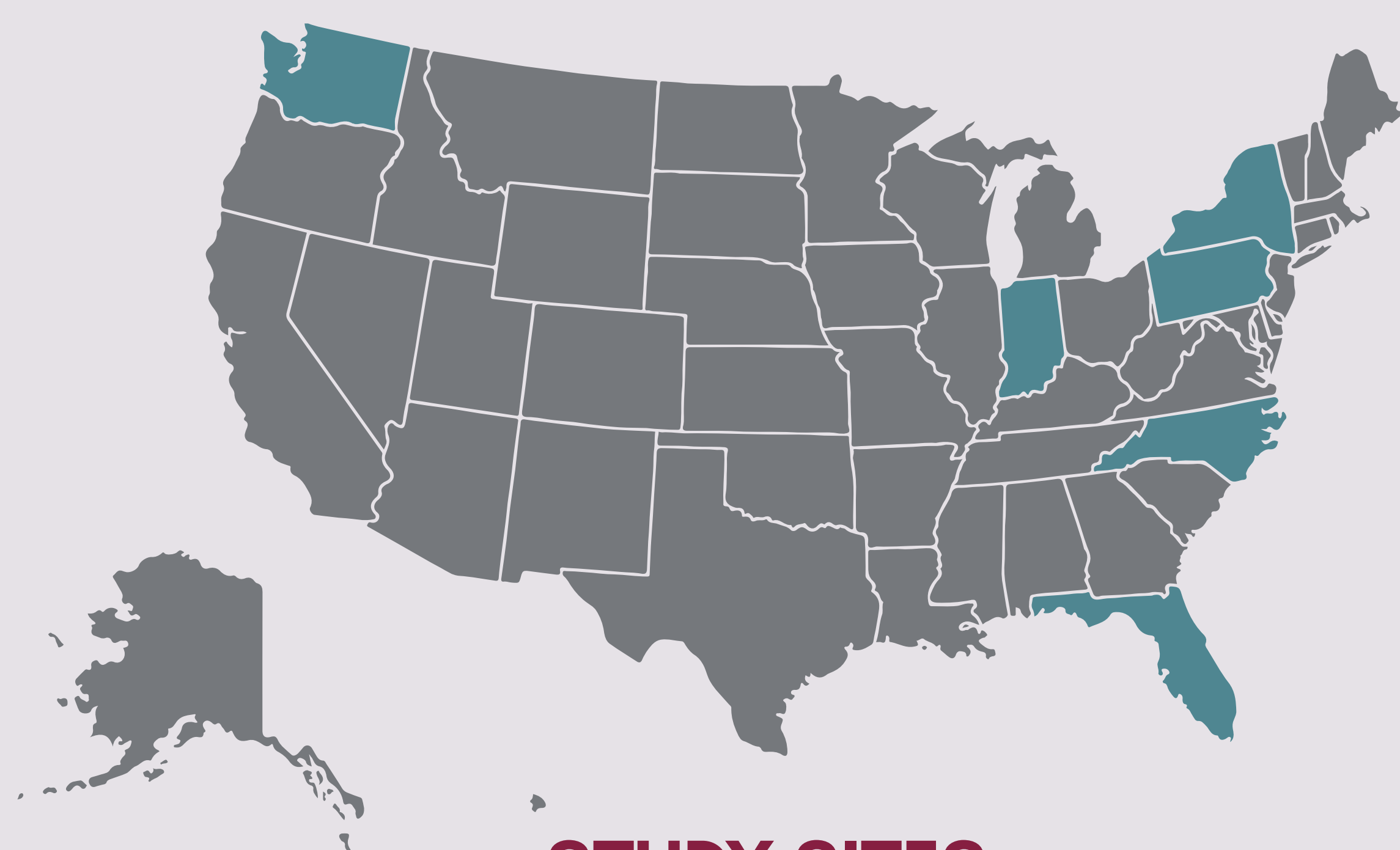


# Characterization of Conventional Cruise Control Engagement Using Naturalistic Driving Data

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## BACKGROUND

- Limited previous research has been conducted examining factors contributing to conventional cruise control use.
- Many studies have been conducted examining adaptive cruise control (ACC) and different factors associated with its use in numerous different settings.
- In order to develop a more comprehensive understanding of how assistive technologies such as cruise control alter the driving task, we must first understand when and how they are used.
- Research Questions:
  - Are there driver-centric characteristics that may increase cruise control use?
  - Are there certain temporal and geometric conditions associated with the use of cruise control?
  - How does cruise control activation affect driving speed relative to the posted speed limit?



**STUDY SITES**

## METHODS

- Analyzed data from the SHRP 2 NDS.
- Participant vehicles requirements:
  - Conventional cruise control
  - Parameter Identification Number
    - 764 Participants
    - 118,056 Trips
- Statistical analyses were conducted to answer each research question:
  - Negative binomial regression
  - Mixed effects logistic regression
  - Linear effects model

### 3 Age Groups:

- Young Adult (16 – 29; N = 27),
- Adult Drivers (30 – 64; N = 485)
- Senior Drivers (65 – 99; N = 236)

### Functional Class (FC):

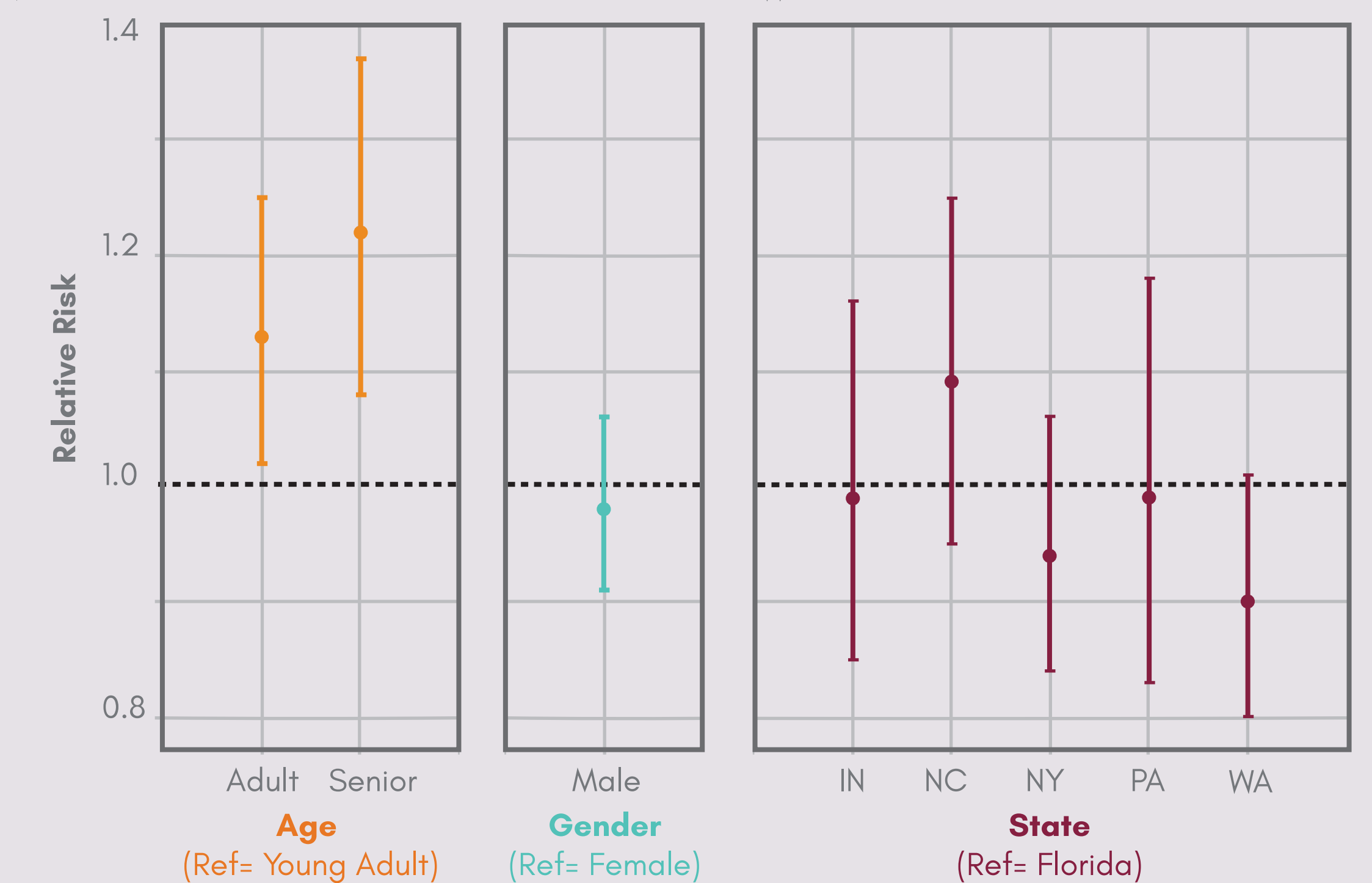
- FC 1: Controlled access roadway. Allows for high volume, maximum speed, traffic movement through major metropolitan areas.
- FC 2: Used to channel traffic to FC 1 roadways.
- FC 3: Roads which interconnect FC 2 roadways.
- FC 4: Provide a high volume of traffic movement at moderate speeds between neighborhoods.
- FC 5: Roads whose volume and traffic movement are below any other FC (e.g. walkways, truck/bus only roads, access roads).

### Time of Day:

- Morning: 6 AM – 8:59 AM
- Mid-Morning: 9 AM – 1:59 PM
- Afternoon: 2 PM – 5:59 PM
- Evening: 6 PM – 9:59 PM
- Night: 10 PM – 5:59 AM

## RESULTS

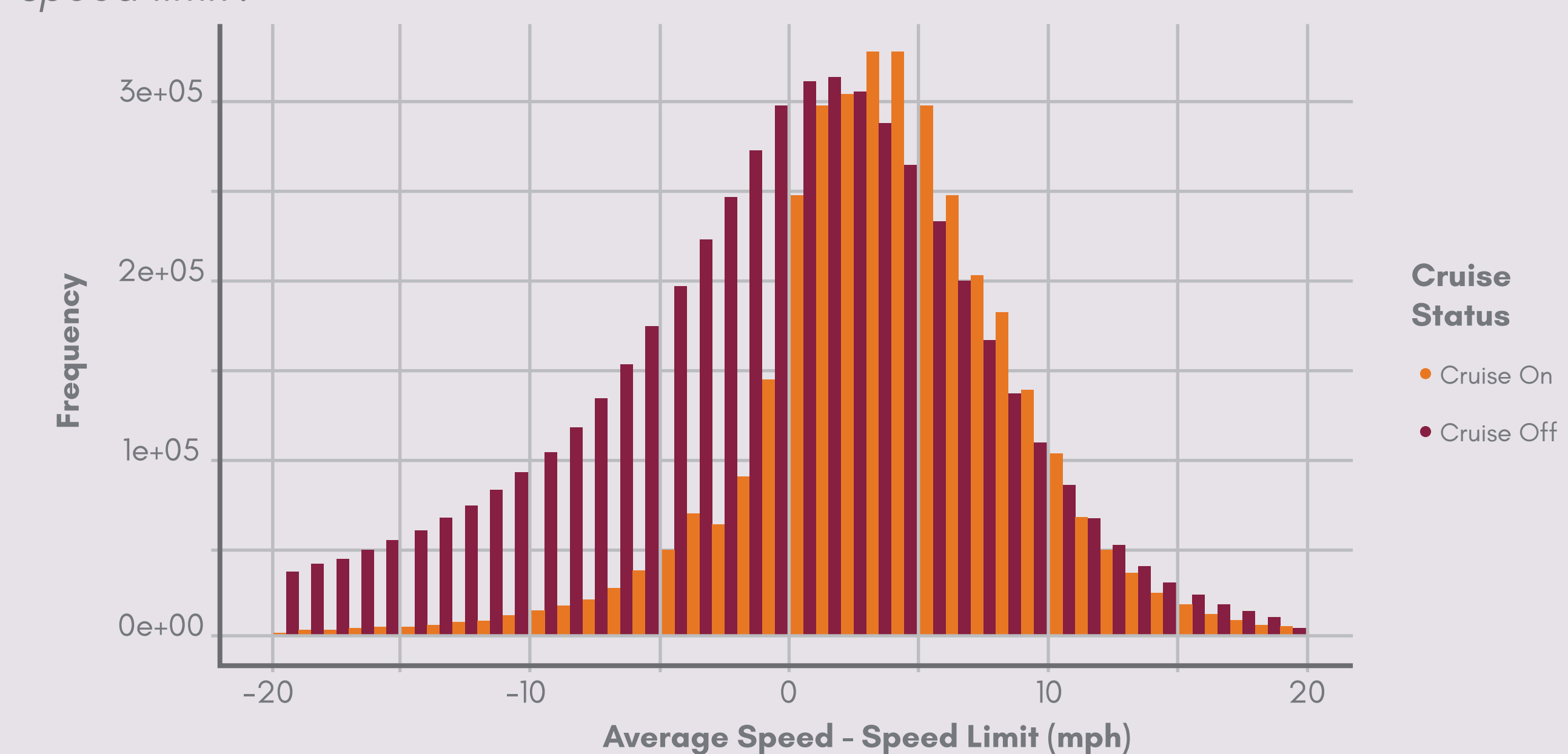
Driver-centric characteristics associated with cruise control use



Temporal and geometric conditions associated with cruise control use

	Estimate	SE	Z	Pr(> z )	OR	OR 95% CI	
						Lower	Upper
(Intercept)	-2.10	-0.13	-16.44	<0.001	0.12	0.09	0.16
Trip Duration	0.00	0.00	-0.93	0.35	1.00	1	1
Morning (reference group)					1.00	1	1
Mid-Morning (10 AM - 1:59 PM)	-0.03	-0.07	-0.40	0.69	0.97	0.83	1.12
Afternoon (2 PM - 5:59)	-0.26	-0.07	-3.77	<0.001	0.77	0.67	0.88
Evening (6 PM - 9:59 PM)	-0.03	-0.08	-0.32	0.75	0.97	0.83	1.14
Night (10 PM - 5:59 AM)	-0.28	-0.11	-2.50	0.01	1.32	1.06	1.65
FC 5 (reference group)					1.00	1	1
FC 4	0.47	0.11	4.18	<0.001	1.60	1.28	2
FC 3	1.02	0.12	8.72	<0.001	2.76	2.2	3.47
FC 2	1.89	0.12	16.30	<0.001	6.63	5.28	8.33
FC 1	2.38	0.12	20.26	<0.001	10.77	8.56	13.56

How does cruise control activation affect driving speed relative to the posted speed limit?



## CONCLUSIONS

- Adult and senior drivers were more likely to use cruise control than young adult drivers (13% and 22% respectively).
- Drivers are more likely to use cruise control when driving late at night, i.e., when the trip start time is between 10 PM and 5:59 AM (OR: 1.32, [CI: 1.06, 1.65]).
- Drivers are more likely to exceed the posted speed limit when cruise control is active.