



Eunice Kennedy Shriver National Institute
of Child Health and Human Development

First Year of Driving: The Effect of Passenger on Teens' Crash/Near-Crash Risk

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Teen Drivers - Vulnerable Road Users

Teen drivers are over represented in crashes statistics

- In 2015, 5% of the licensed U.S. drivers were teen drivers
 - 12% of all police-reported crashes
 - 9% of total fatal crashes
- 1,886 teen drivers (15-20yrs.) were killed and 195,000 injured in 2015

(NHTSA, 2017)

Driving Independently

- Driving SOLO with some restrictions
- Elevated crash risk after obtaining provisional licensure
 - Highest for the youngest
- Increase in risky driving behaviors
 - Distracted driving
 - Speeding

(Curry et al., 2017; Gershon et al., 2018)

Contributing Factors to Teens' Over Involvement in Crashes



Research Goals & Contributions

Identify predictors for teens crash/near-crash (CNC) rates during the first year of independent driving

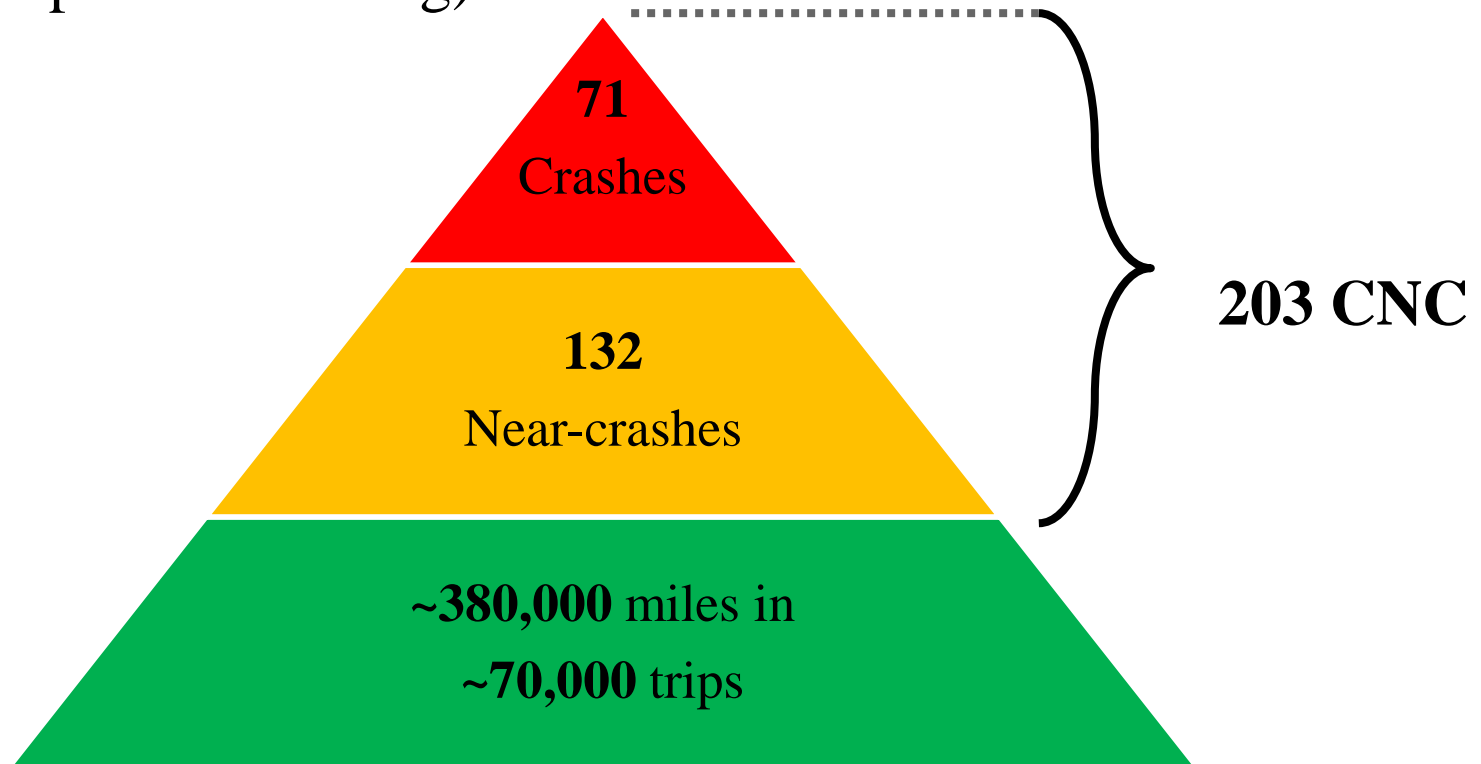
- Demographics measures (e.g. gender, vehicle access)
- Environmental measures (e.g. time of day, road condition)
- Psychosocial measures (e.g. sensation seeking, parental trust)

Study Contributions:

- Naturalistic data set
- Using CNC as an outcome measure of risky driving
- Prolonged data collection

The Supervised Practice Driving Study

- 82 newly-licensed teens (16.44 yrs., $SD=.32$) 53% females
- Data collection period 2010-2014 (up to 12 months independent driving)



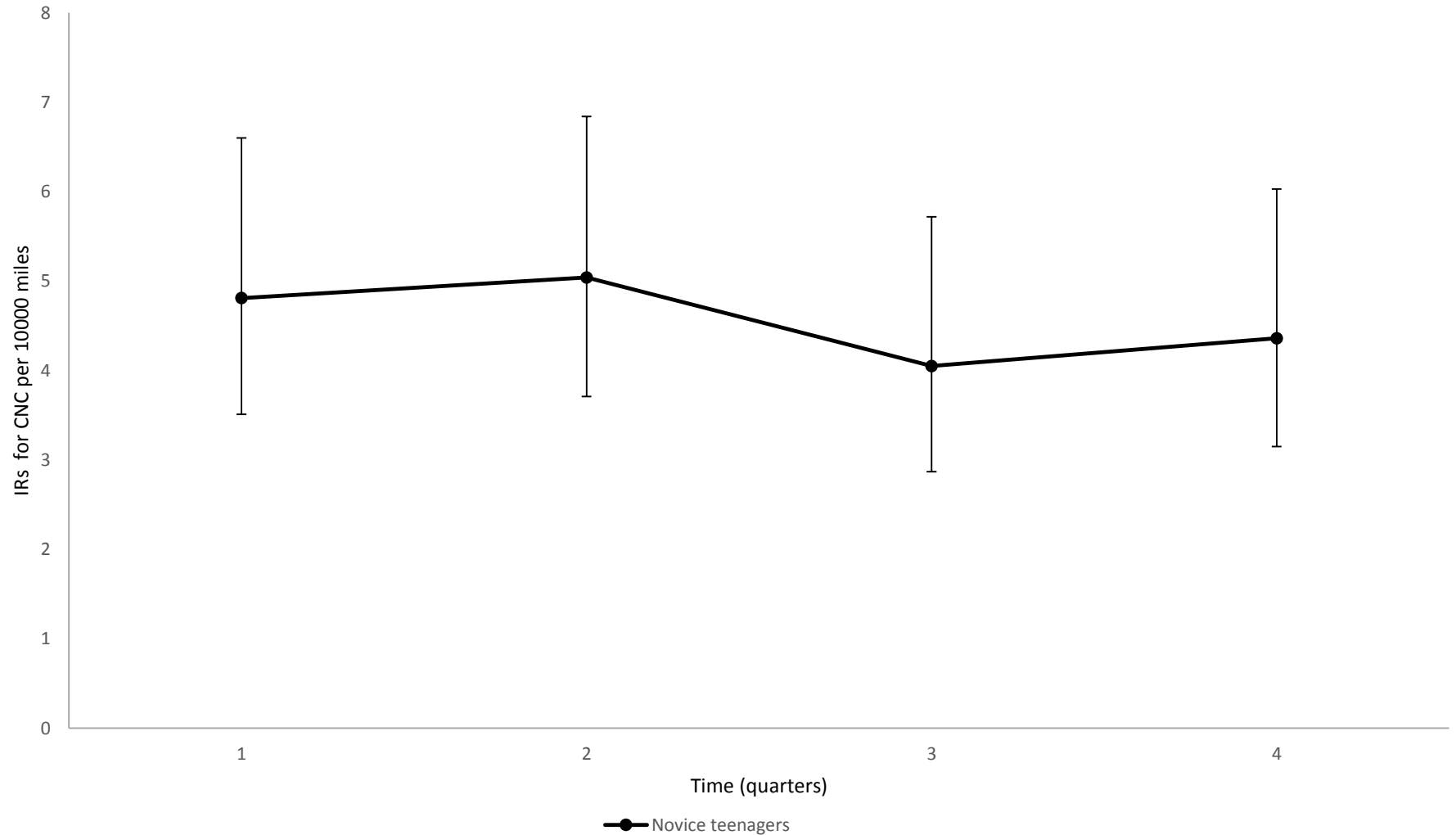
Method

In-vehicle Data Acquisition

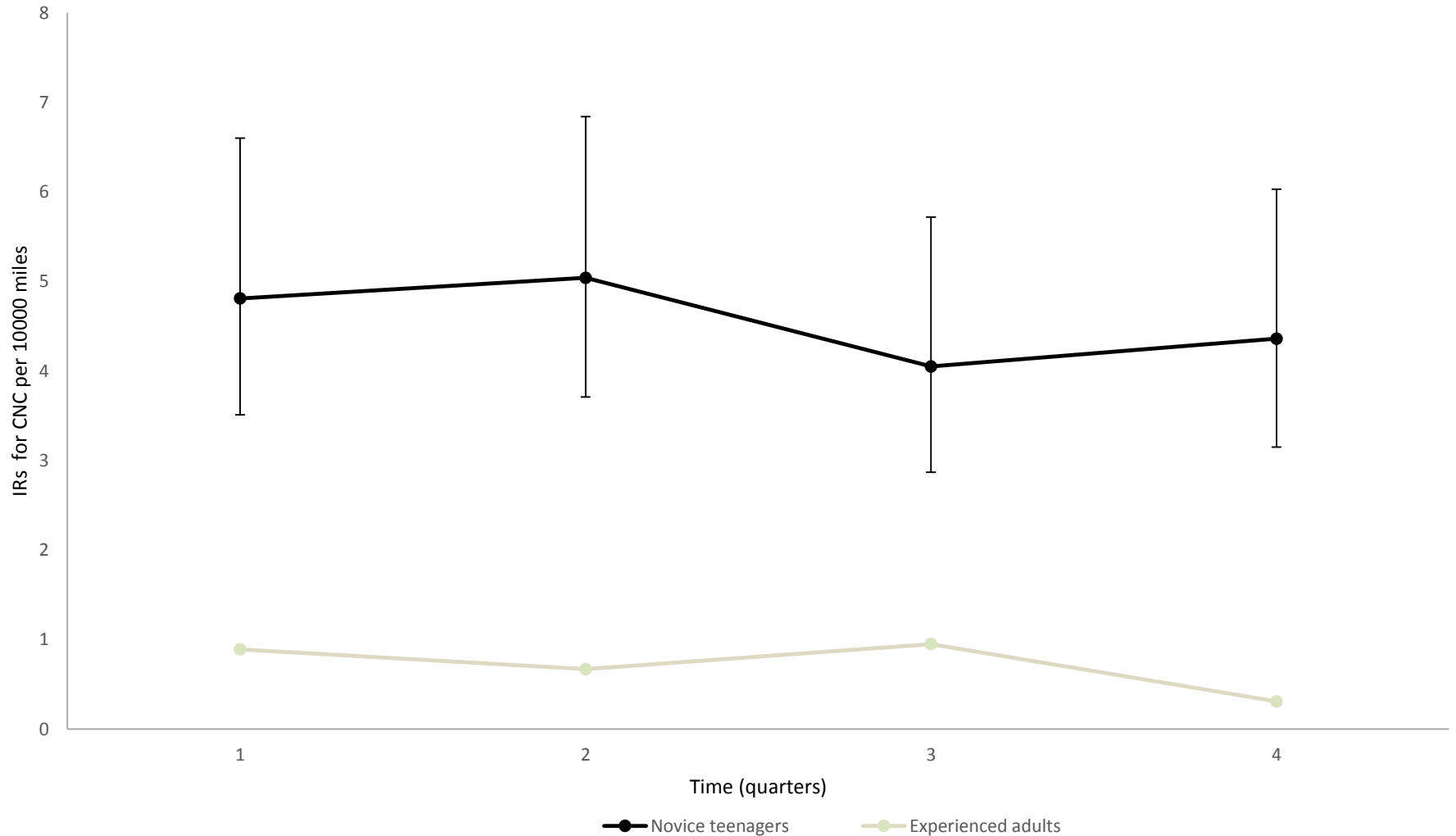
System (DAS) included:

- Multi-axis accelerometer
- Global Positioning System (GPS)
- Video cameras monitoring driver's face, hand and body positioning, driver's forward, rear views, and the car dashboard

Results: Crash/Near-Crash Rates



Results: Crash/Near-Crash Rates



Results

Factor	IRR	95% CI
Gender		
Male Vs. Female	1.5	0.98-2.31
Vehicle ownership		
Owned vs. Shared	1.18	0.75-1.85
Passengers		
Yes vs. None	0.6	0.44-0.81
Adult vs. None	0.28	0.15-0.54
Teen vs. None	0.64	0.50-0.83
Time of day		
Night Vs. Day	1.23	0.90-1.67
Weather condition		
Wet vs. Dry	0.78	0.49-1.25
Self reported risky driving		
High vs. Low	0.55	0.06-4.97
Risk perception		
High Vs. Low	0.51	0.07-3.89
Sensation seeking		
High Vs. Low	1.81	0.28-11.84
Friends substance use		
High Vs. Low	2.01	0.36-11.35
Friends risky driving		
High Vs. Low	1.76	0.31-10.20
Parents trust		
High Vs. Low	0.97	0.07-1.95
Parents knowledge		
High Vs. Low	1.77	0.17-18.81
Parents limits		
High Vs. Low	0.81	0.13-5.21

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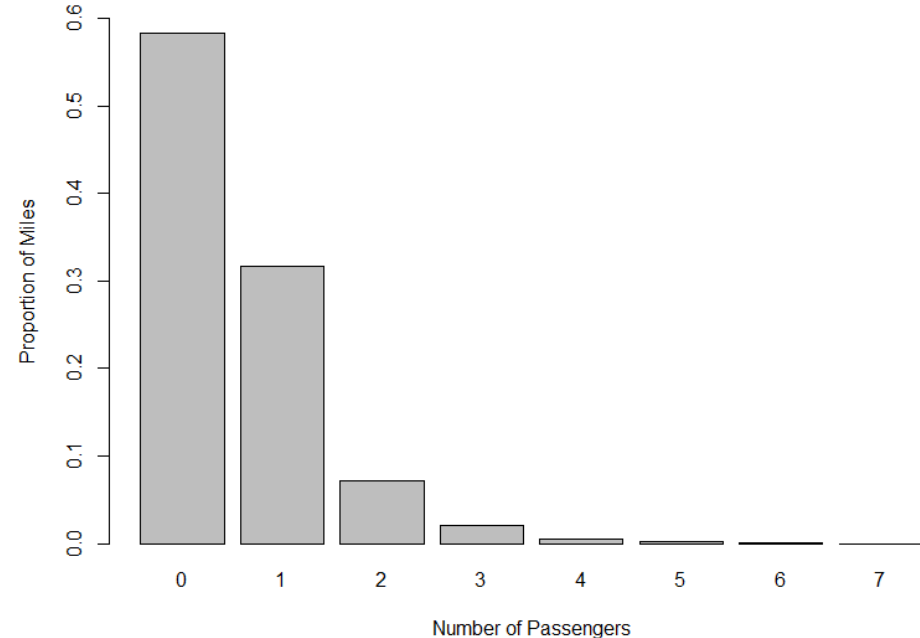
- Miles driven by passenger type

Passenger Type	Alone	Teen	Adult	child
Total miles (%)	60	30	8	2

*Data for 88% of trips

Results

- Number of passengers



- Teen driver and passenger gender

		Passenger's gender	
		Female	Male
Driver's gender	Female (miles %)	64	36
	Male (miles %)	44	56

Discussion and Conclusions

- Passenger presence was associated with decreased crash/near-crash rates among novice teen drivers.
 - Adult passenger was associated with dramatic decrease in CNC rates.
 - Teen passenger was also associated with some decrease in CNC rates
- The effect of teen passenger is somewhat inconsistent across studies.
 - Passenger gender, number of passengers, and other passenger characteristics should be examined

Limitations and Challenges

- Naturalistic driving studies provide extremely rich data
 - Passenger data were coded at the beginning and end of a trip
- Passenger related attributes can change during the trip
 - Presence, type, number, and gender
 - Front seat vs. back seat passengers
- The approach we are considering is to work on the CNC dataset and randomly sampled baselines.

Thank You!

Collaborators

- Bruce Simons-Morton,
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