

## ABSTRACT

Teen driving safety is a national concern for teens, parents, and drivers alike. According to the Centers for Disease Control roughly 2,000 teens were killed and 200,000 injured in motor vehicle accidents in 2014. The University of Michigan's Transportation Research Institute (UMTRI) is conducting a series of studies to explore what impedes and improves teen driving. Adolescents spend a vast amount of their time with friends, often doing activities that require transportation and travel by car. As a result, the most prominent factor considered in this project is the effect passengers have on drivers.

## BACKGROUND

- The risk of 16 or 17 year old drivers being killed in a crash increases with each additional teenage passenger in the vehicle according to a 2012 report from The AAA Foundation for Traffic Safety.
- Our study focuses solely on teen males as they are the most at-risk population behind the wheel. About 2 out of every 3 teenagers killed in crashes in 2012 were males and in 2014, the motor vehicle death rate for male drivers and passengers ages 16 to 19 was more than two times that of their female counterparts.
- While men are likely to take more risks than women in general, male risk-taking tends to increase in stressful situations — such as navigating a vehicle while simultaneously engaging in conversation with passengers.
- Due to the complex nature of driving and road traffic; it is not safe, affordable, or ethical to study teen drivers on the road. This is why UMTRI developed a driving simulator to study teen driving behavior in a safe and controlled environment.

## OBJECTIVES

- Our project's foremost objective was to understand teen driving behavior, in hopes of subsequently understanding the causes and effects of teen distracted driving.
- The project focuses on examining the influence of male teen passengers on a teen drivers' risk taking behaviors.
- Through this study we seek to contribute to the body of knowledge and scientific literature regarding teen driving safety.



# THE EFFECT OF TEEN PASSENGERS ON TEEN DRIVERS



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## METHODS

The experimental study was executed by observing teen drivers in a driving simulator, both alone and with two of their friends. The simulator includes a fully outfitted car in a climate controlled studio surrounded by large screens. To maximize realism the screen tilts when you come to a virtual stop, and the mirrors all depict images that correspond to the virtual environment.

Additionally, the recruited passengers were two real friends of the driver, to further build a realistic scenario. Each subject drove in both rural and urban settings and was presented with a variety of speed limits, intersections, stop lights, pedestrians and potentially hazardous vehicles.

To analyze the findings we examined how drivers behave in higher risk situations, by tracking each driver's eye movement, road path, and interactions with passengers. We observed driver behaviors between driving alone versus when they drive with their friends, and compared variables including speed, eye movements, red-light running, speeding and talking to passengers.

### Data Collected:

- Driver's eye movements
- Driver's gaze location towards hazards
- Driver's heart rate
- Speedometer readings
- Miscellaneous vehicle parameters

## EXPECTED RESULTS

While analyses are ongoing and the study has not yet yielded concrete results, our hypothesis is that the presence of passengers will negatively affect a driver's focus, safety and road performance. This will be demonstrated by the data collected, as we expect to see risky behaviors such as higher speeds, increased red light-running, and more distraction behaviors when the driver has passengers verses when he is alone. We expect to find useful information from this study to highlight areas in need of improvement within driver's education programs and ultimately contribute to lowering teen mortality rates.