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Teen driver travel patterns based on National Household Travel Survey and in-vehicle monitoring devices

TRB Young Driver Subcommittee
Mid-year Meeting • July 15, 2010

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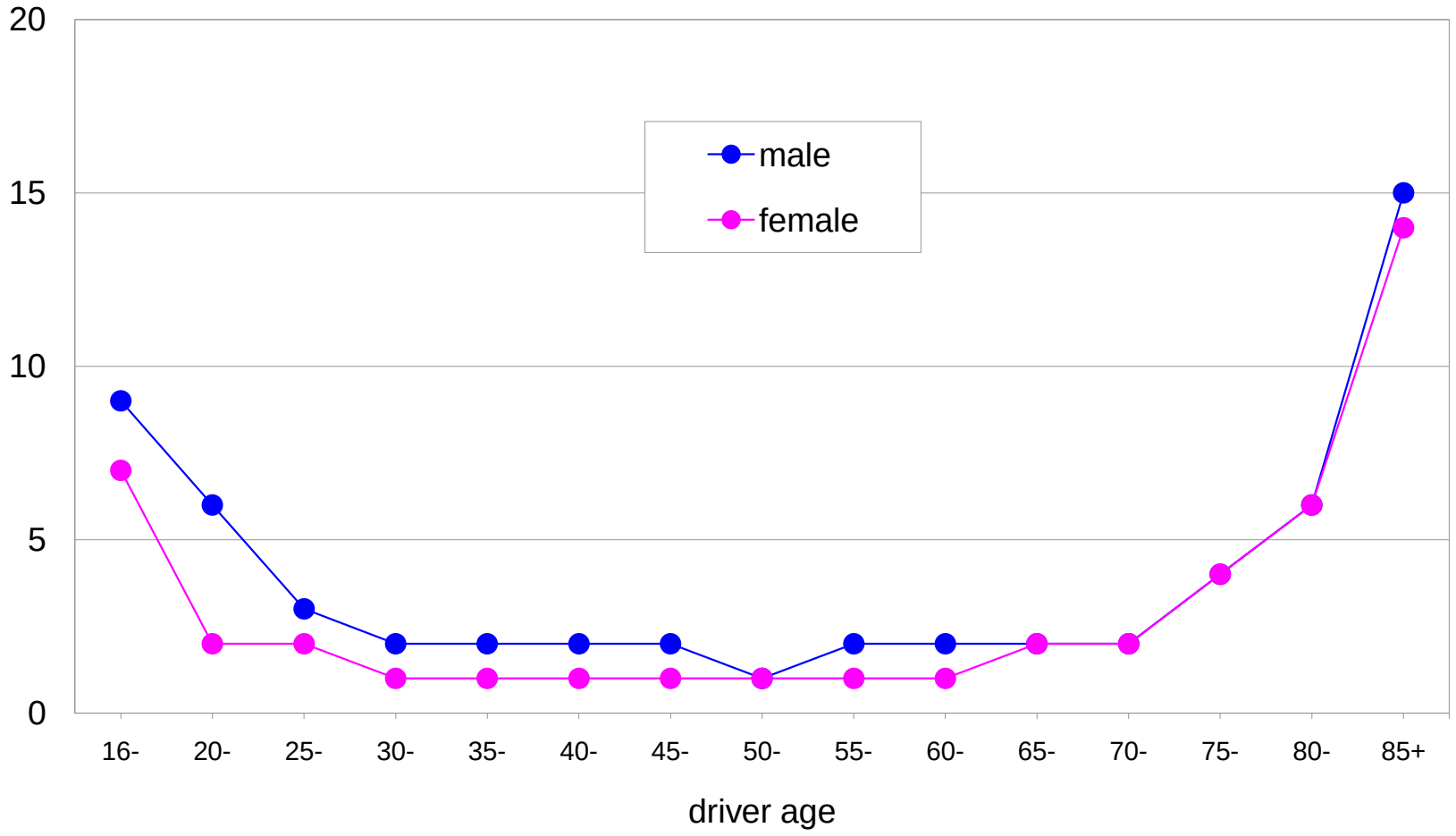
National Household Travel Survey

Federal Highway Administration

- Nationally representative sample of household and individual travel
  - Diary used to record and describe all trips during an assigned travel day
  - Household members interviewed
- Surveys conducted in 1969, 1977, 1983, 1990, 1995, 2001, 2008
- Latest survey conducted March 2008-April 2009; sample “enhancement” underway with estimated release in several months
- Examples of data gathered
  - Household demographics, vehicles, drivers
  - Trip data (e.g., length, purpose, means of transportation, time of day)
  - Additional data on private trips (e.g., travel party, type of vehicle, driver characteristics)
  - Geographic area of household and workplace

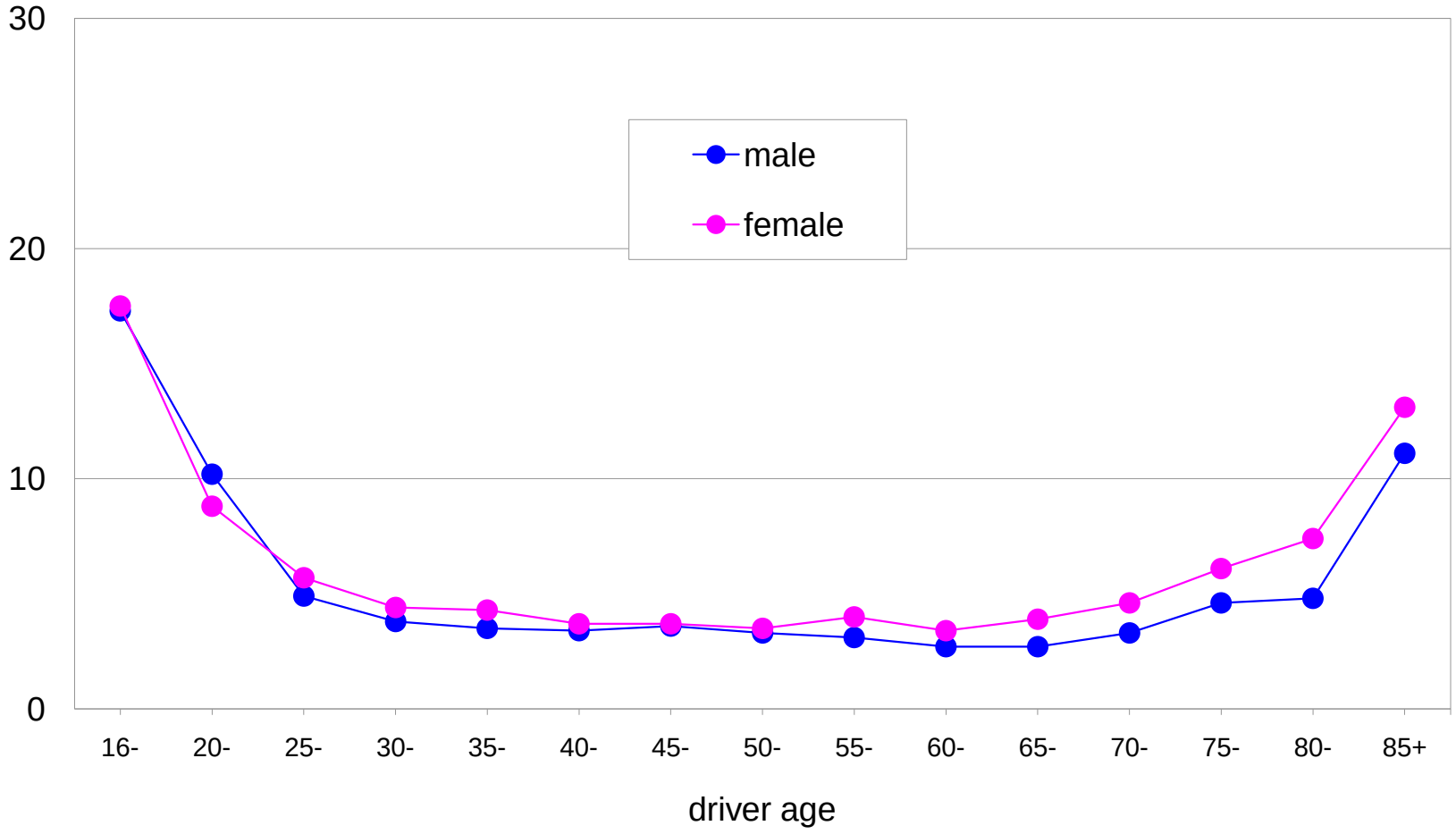
Fatal passenger vehicle crashes per 100 million miles traveled

By driver age, NHTS 2001-02



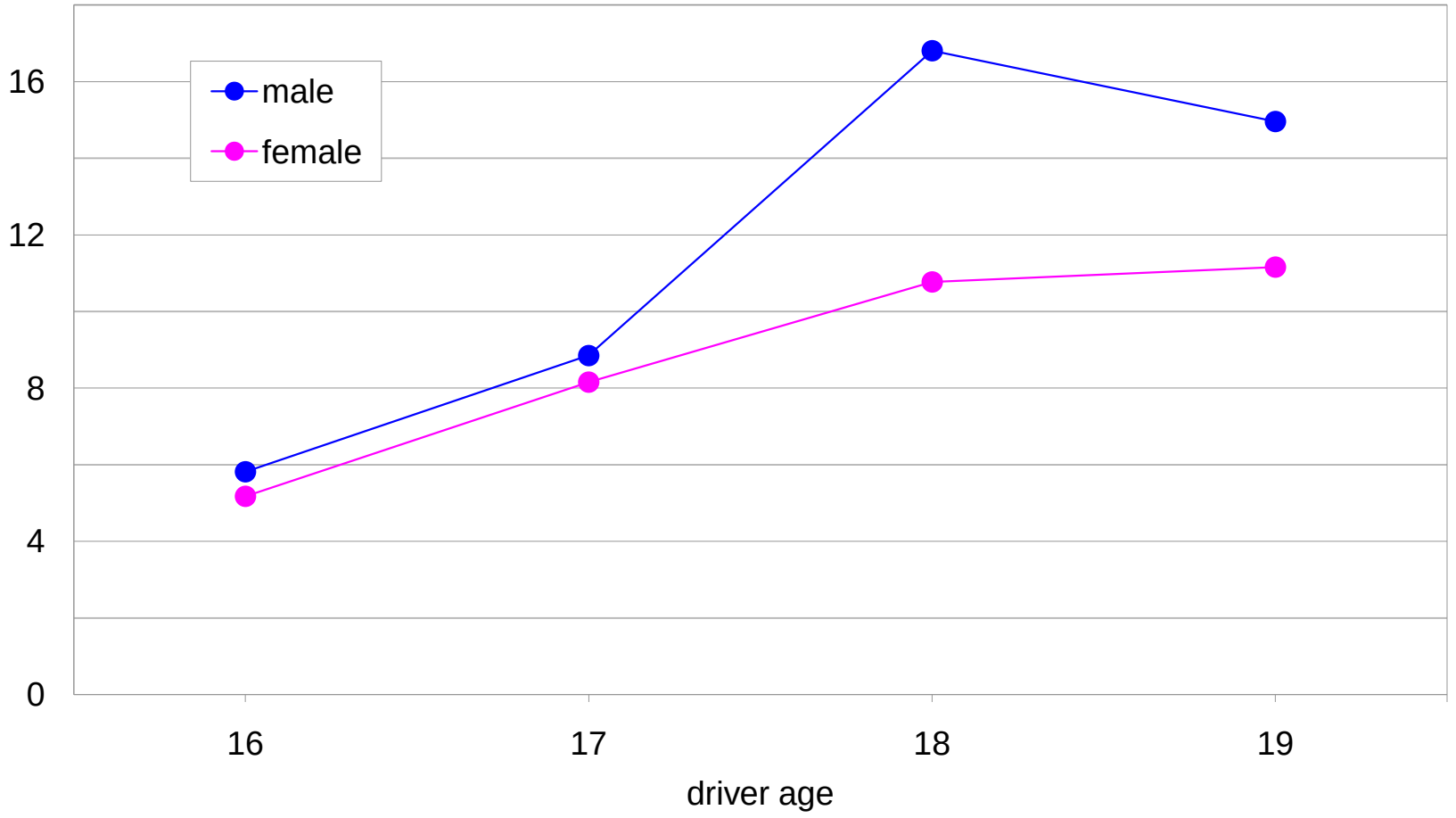
Passenger vehicle crashes per million miles traveled

By driver age, NHTS 2001-02



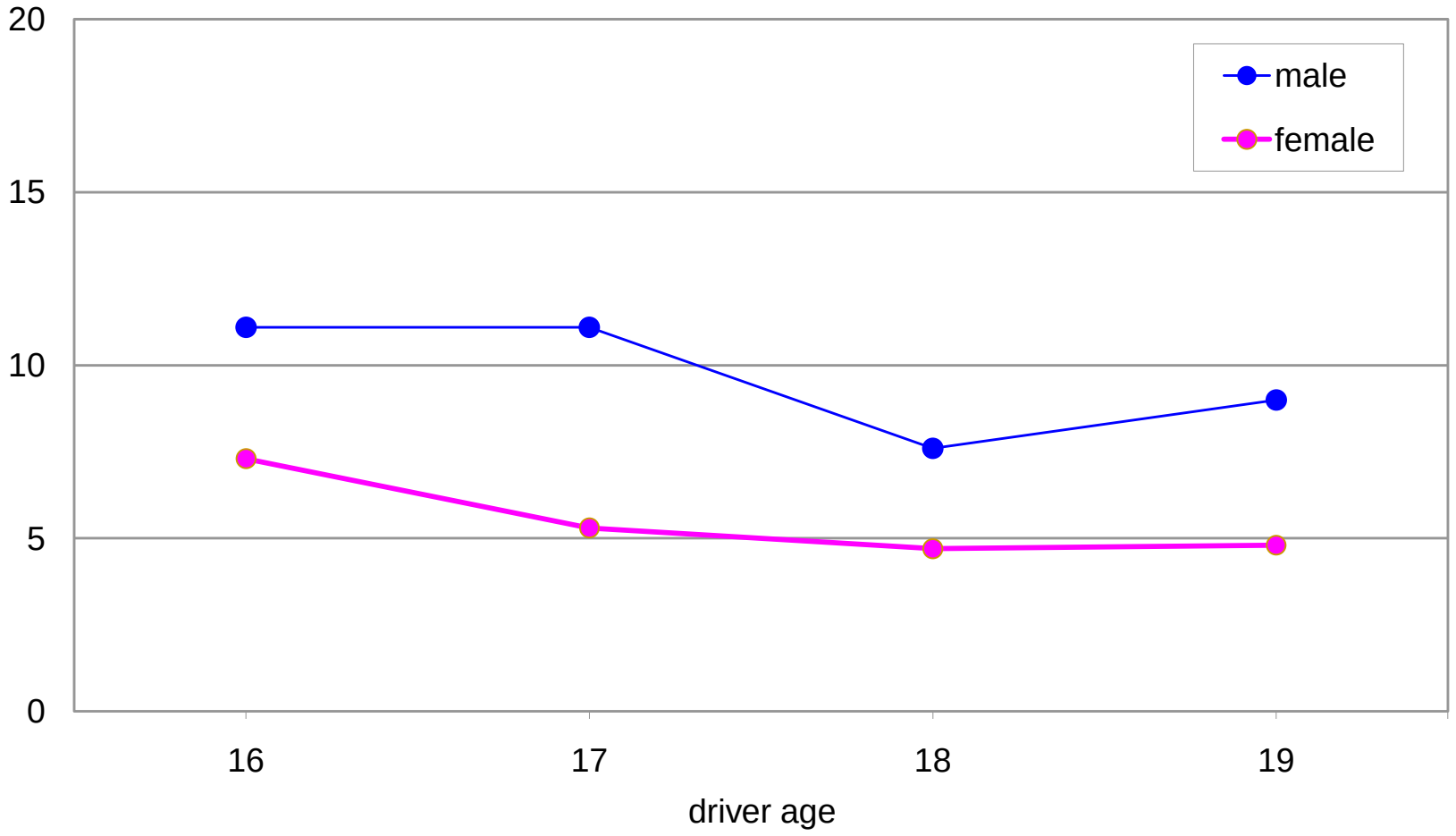
Number of passenger vehicle miles traveled (billions)

By driver age and gender, NHTS 2001-02



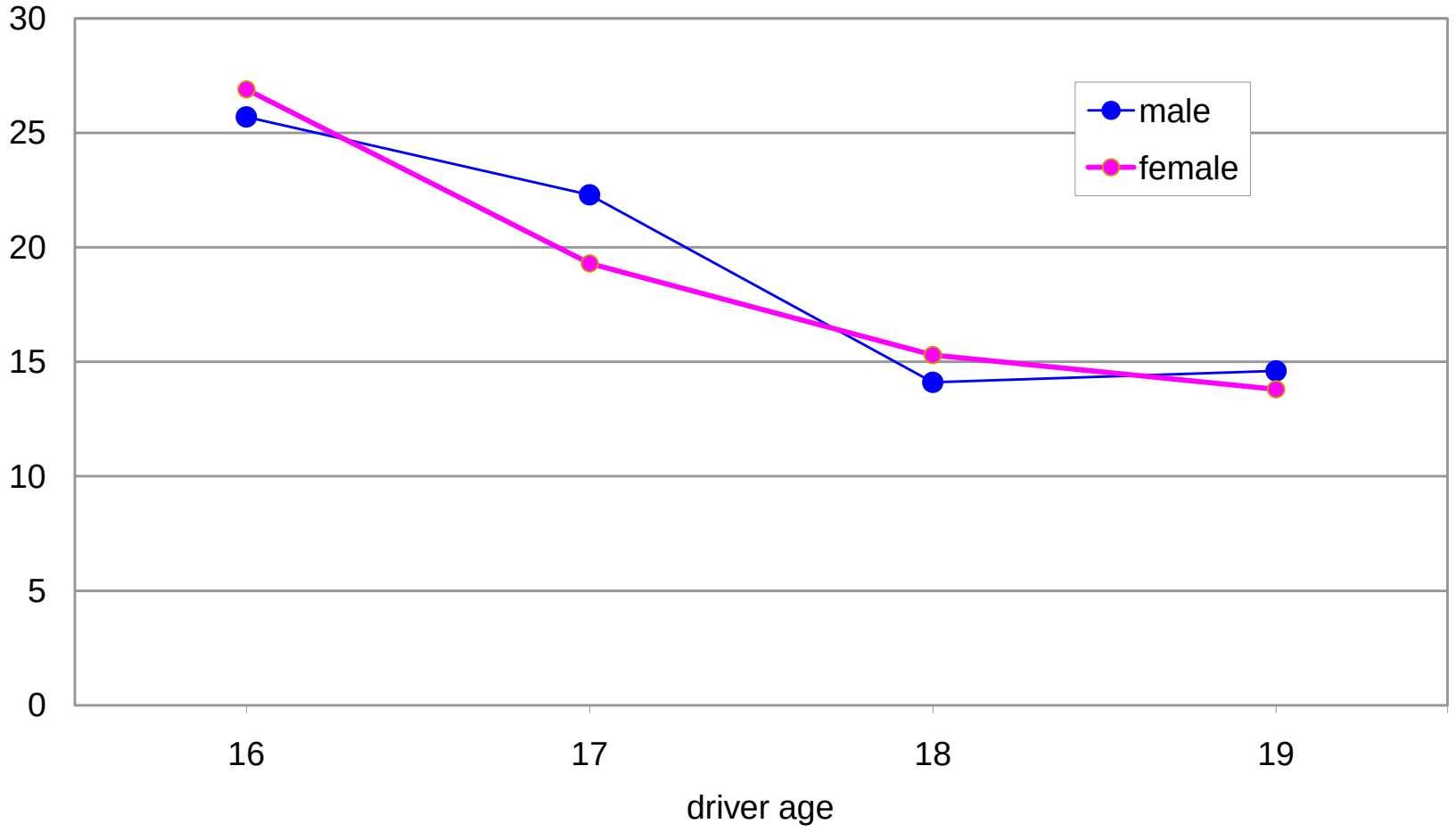
Teen passenger vehicle drivers involved in fatal crashes per 100 million miles traveled

By driver age and gender, NHTS 2001-02



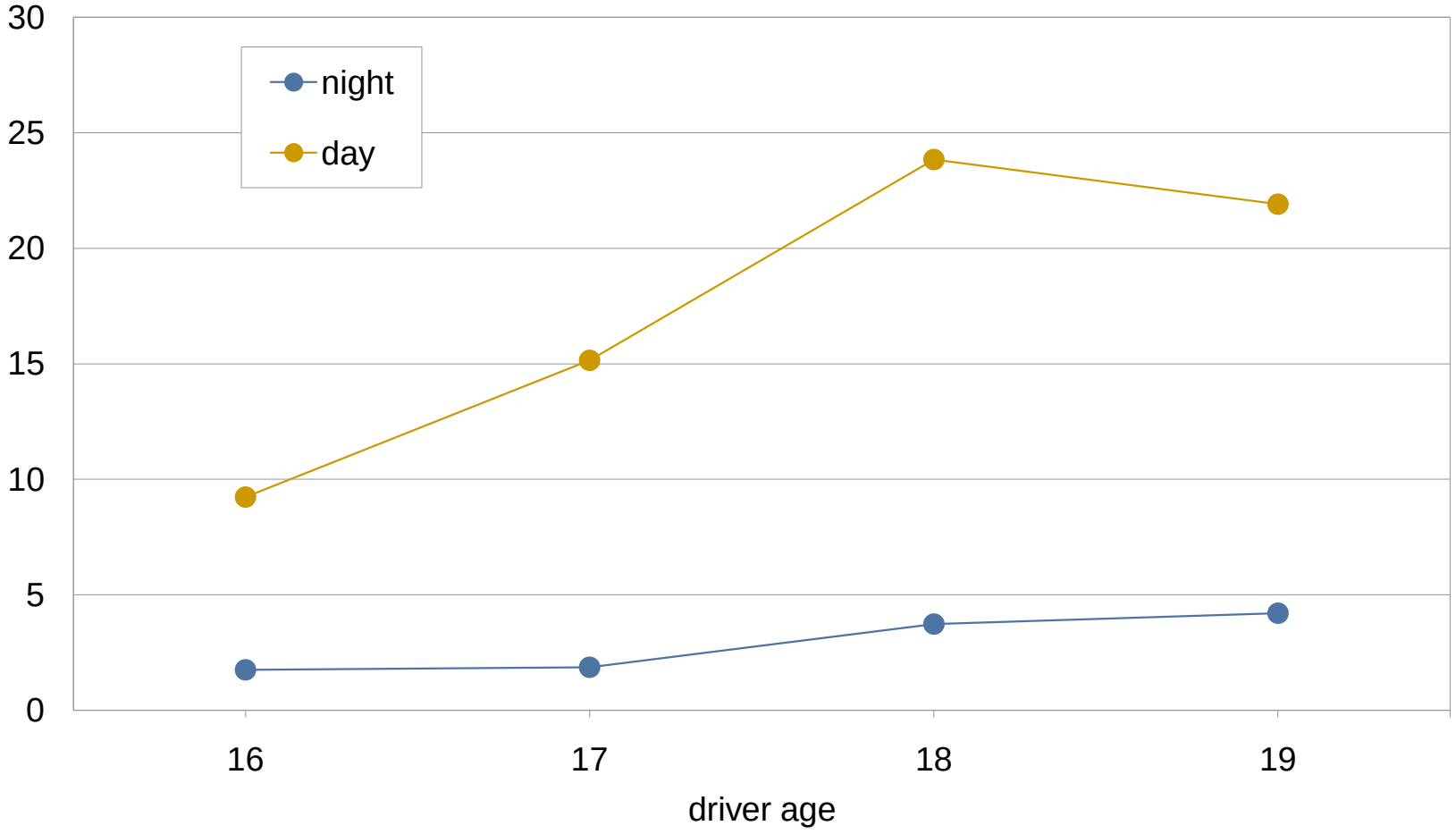
Teen passenger vehicle drivers involved in crashes per million miles traveled

By driver age and gender, NHTS 2001-02



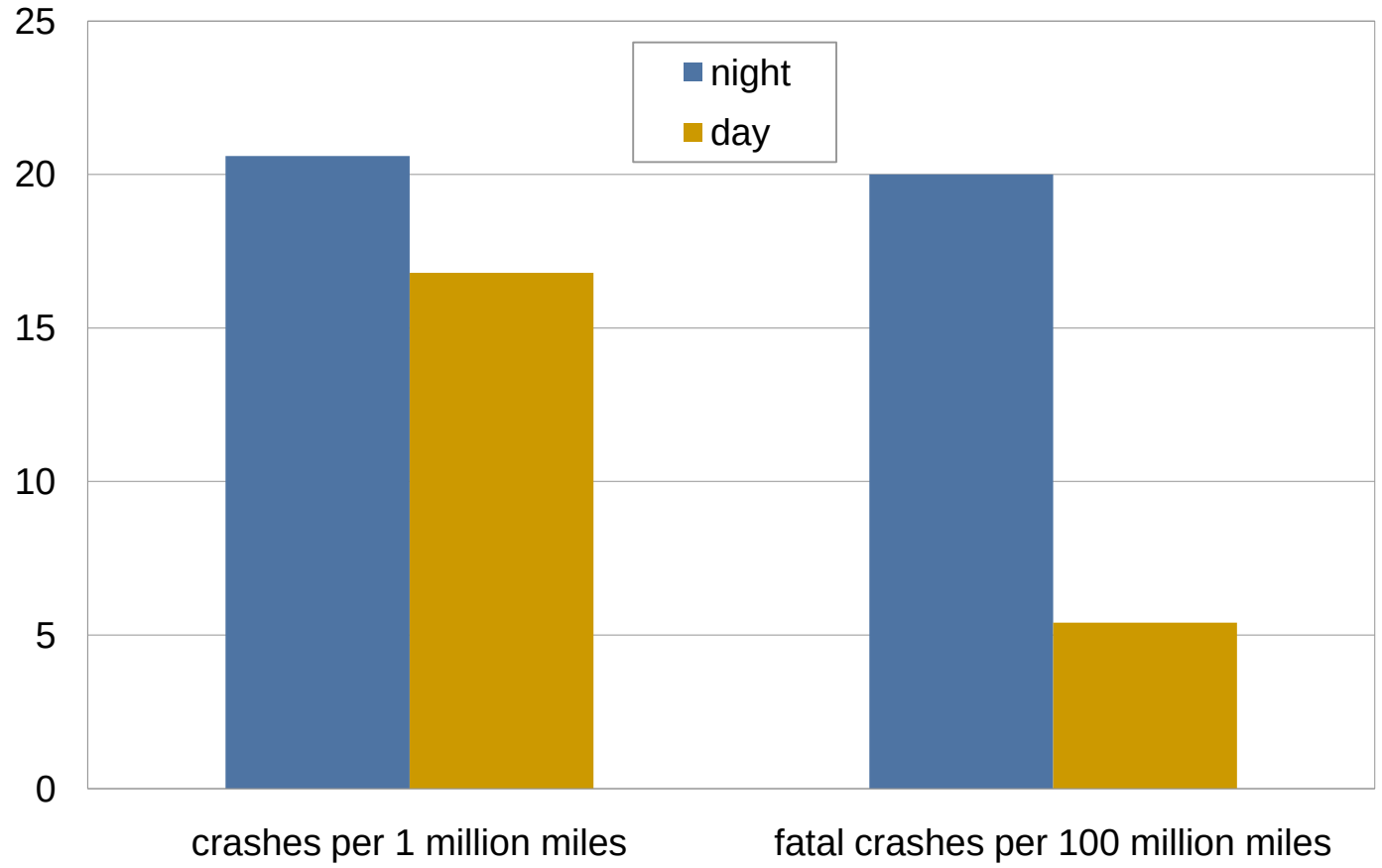
Number of passenger vehicle miles traveled (billions)

By driver age and time of day, NHTS 2001-02



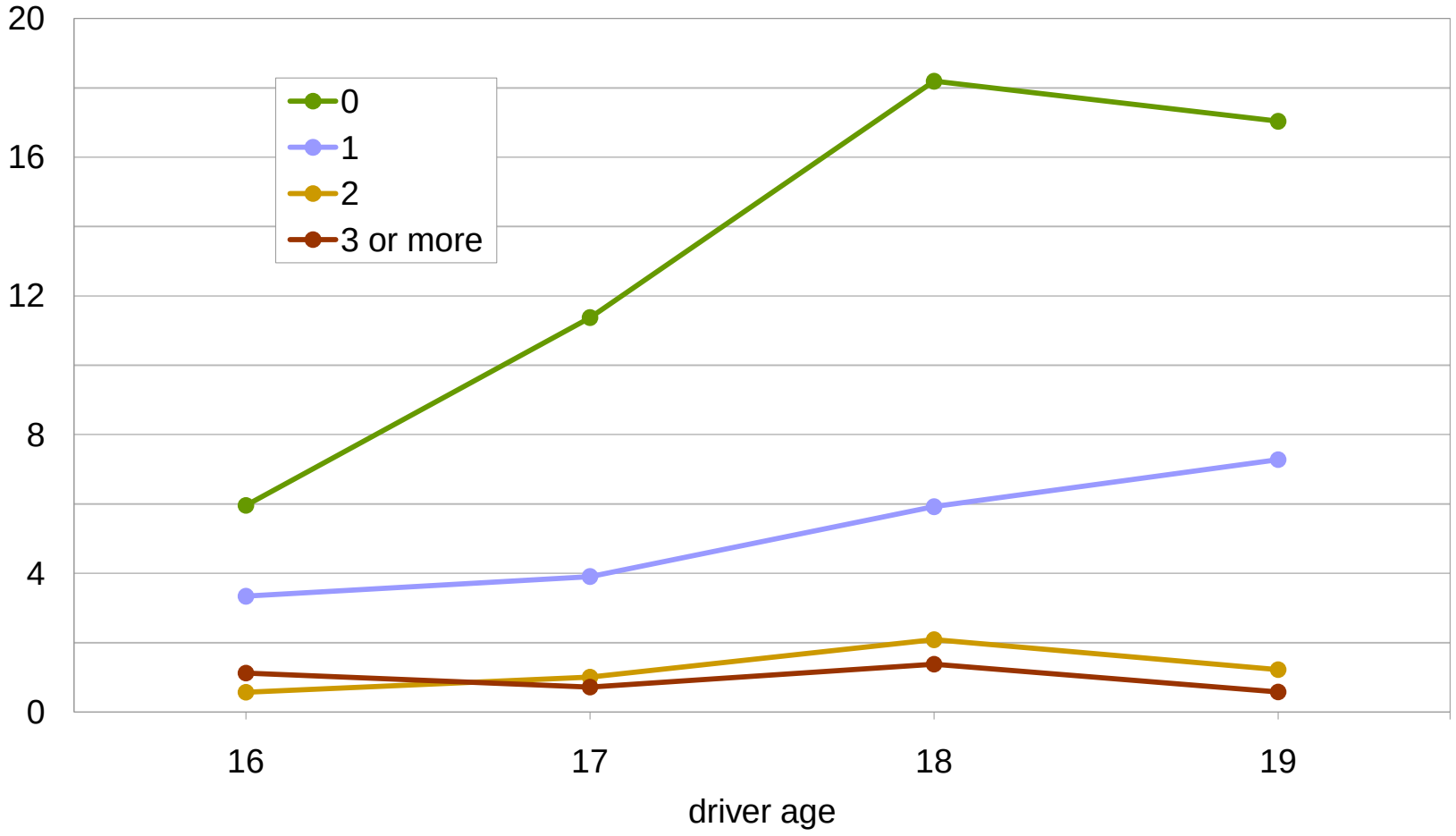
16-19 year-old passenger vehicle drivers involved in crashes, per mile traveled

By time of day, NHTS 2001-02



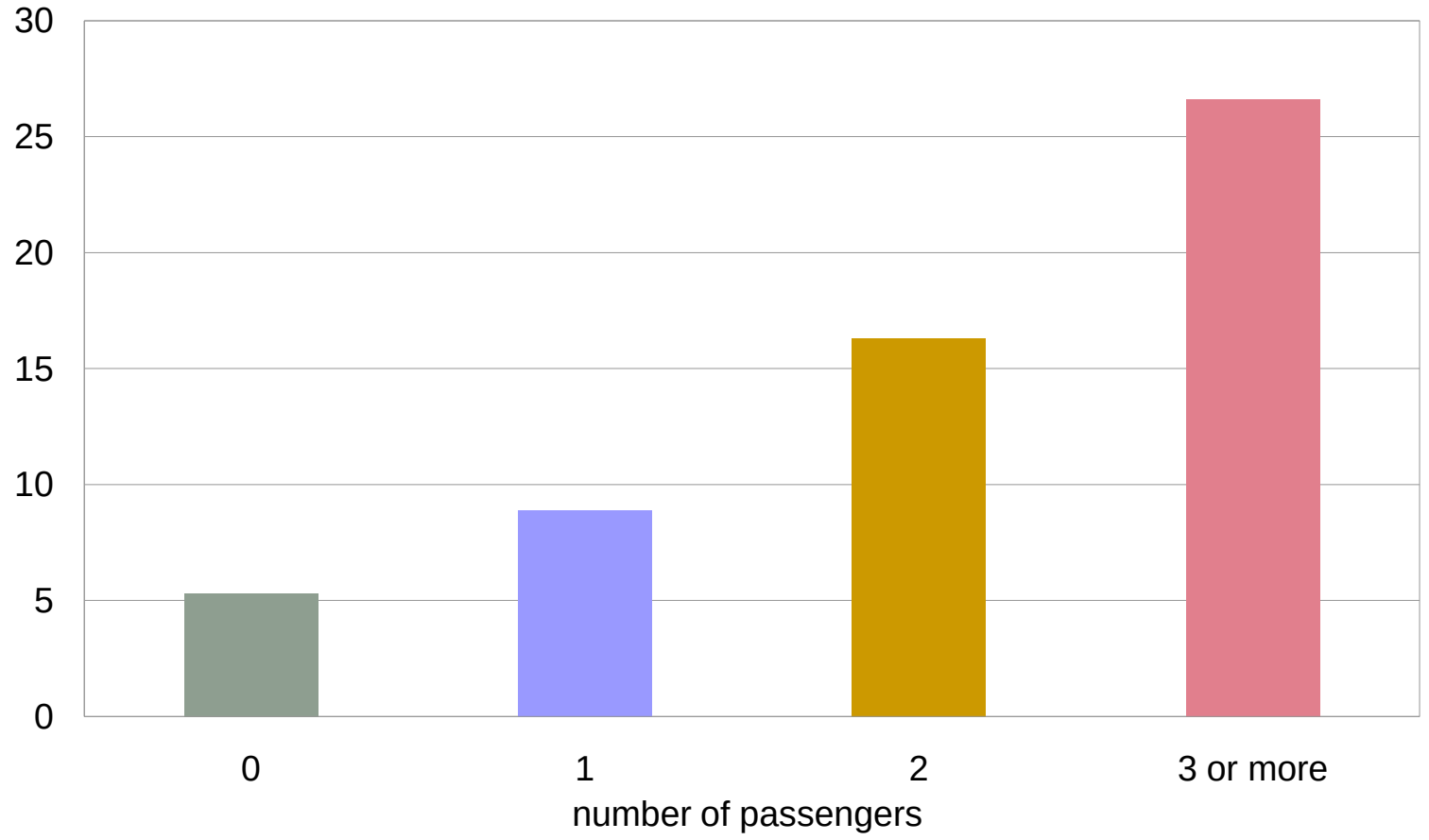
Number of passenger vehicle miles traveled (billions)

By driver age and number of passengers, NHTS 2001-02



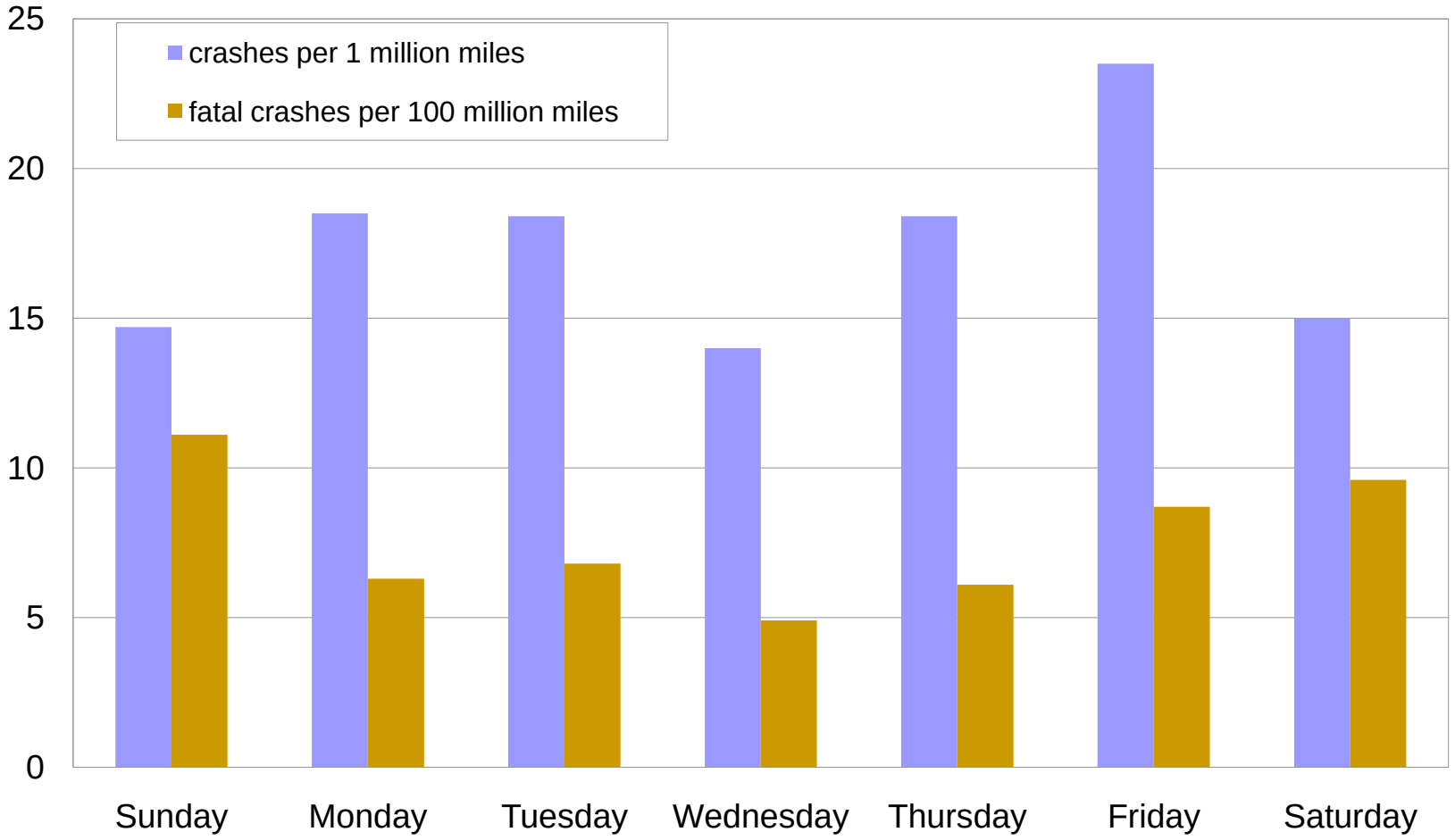
16-19 year-old passenger vehicle drivers involved in fatal crashes, per mile traveled

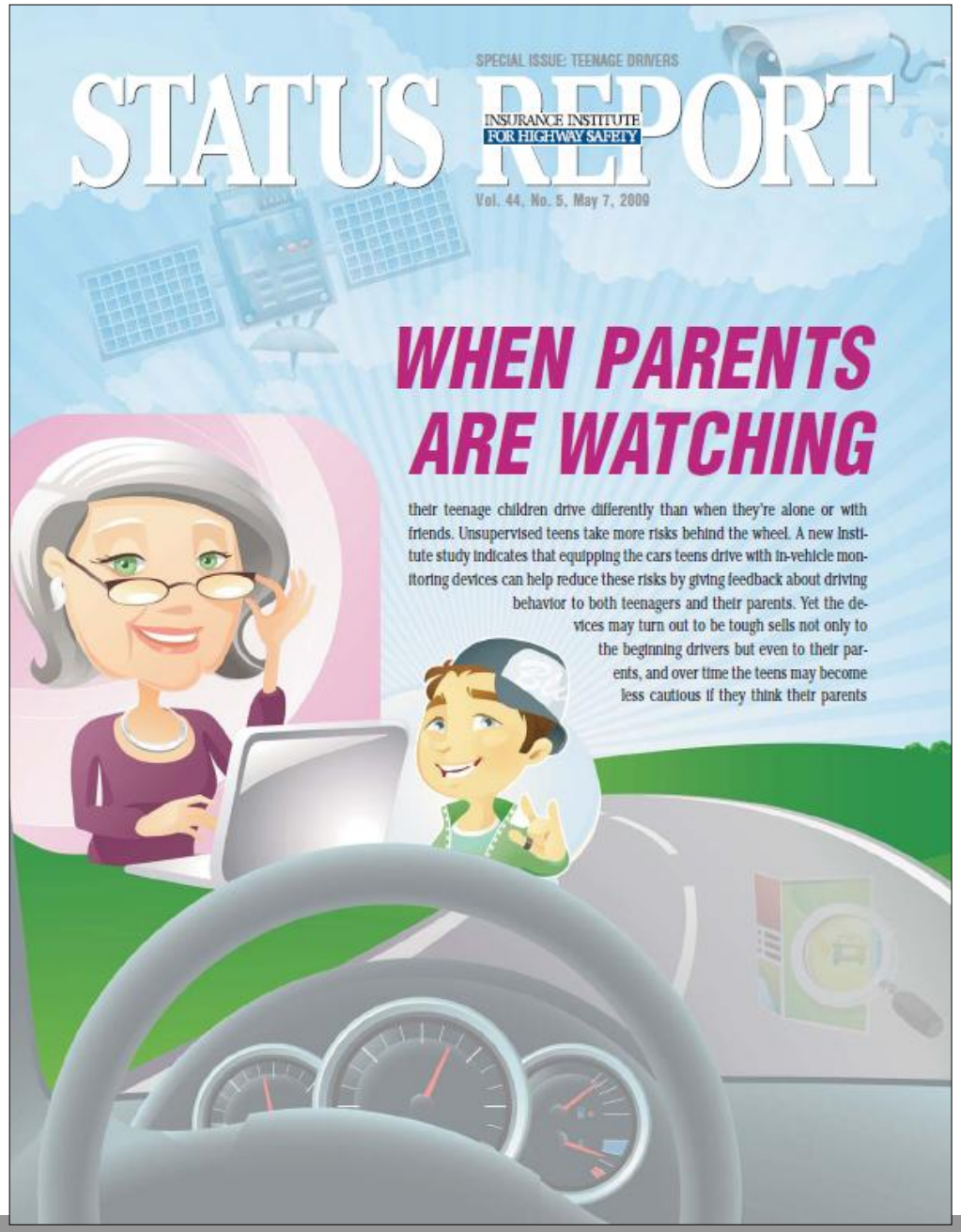
By number of passengers, NHTS 2001-02



16-19 year-old passenger vehicle drivers involved in crashes, per mile traveled

By day of week, NHTS 2001-02





Special issue: teen drivers

May 7, 2009

Effects of electronic feedback on teenagers' driving

- Shoebox-size black box in vehicle cargo area, GPS, satellite modem, and small speaker box beneath front dashboard
- Device recorded time, location, and odometer reading for
  - Sudden braking/acceleration (longitudinal deceleration/acceleration > 0.5 g)
  - Hard turns (lateral acceleration > 0.4 g)
  - Driver seat belt non-use
  - Vehicle speeds above posted speed limit
- Families of 84 recently licensed 16- and 17-year-olds in suburban Washington, DC area participated in study
  - Teenager primary driver of monitored vehicle
  - Parents with Internet access

Study design

- Random assignment of 84 families to study and control groups
- Vehicle monitoring: 2 weeks baseline, 20 weeks alerts and website, 2 weeks post-treatment
- Before/after changes in driving behavior (per mile driven) in 3 study groups relative to control group
  - Group 1: alerts driver and immediately notifies website
  - Group 2: alerts driver and 20 seconds later notifies website if behavior not corrected
  - Group 3: notifies website but no in-vehicle alert
  - Group 4: control group with monitoring but no alert or notification

Measures of effect

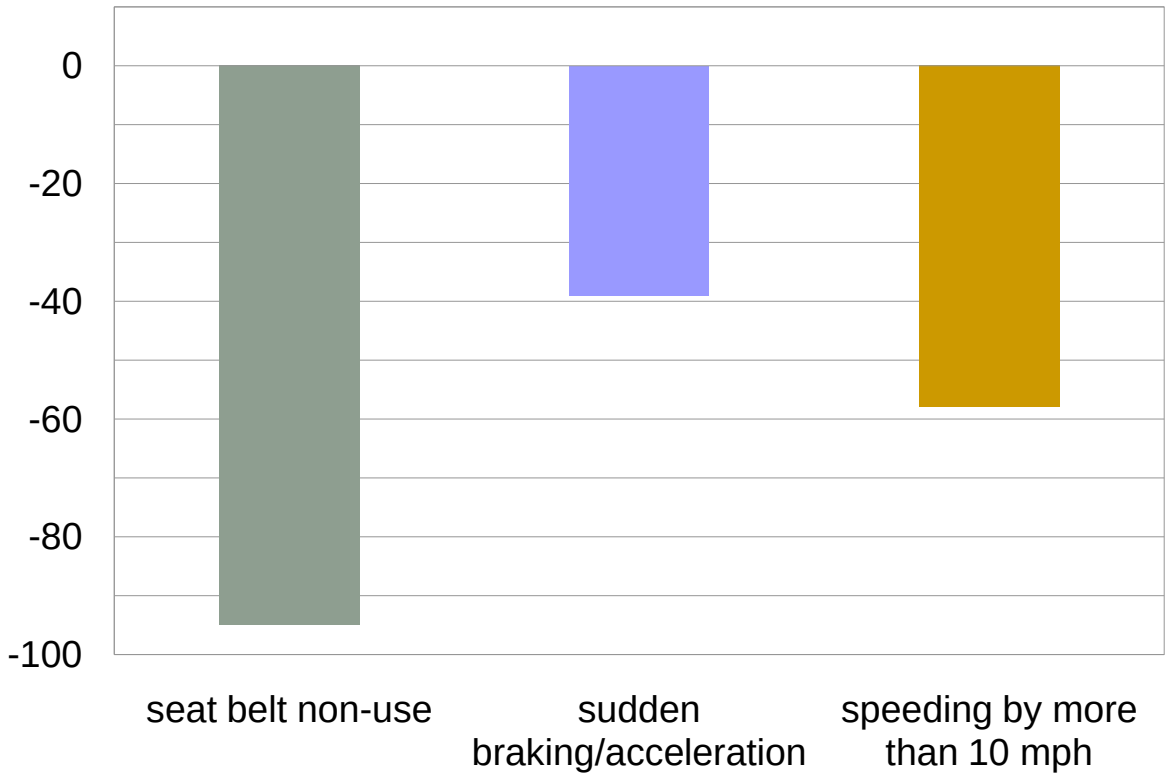
- Number of sudden brakings per miles driven
- Number of sudden accelerations per miles driven
- Miles of seat belt nonuse per miles driven
- Miles speeding $\geq$ 2.5 mph per miles driven
- Miles speeding > 10 mph per miles driven

- Parents' website visits

Percent reduction in risky behaviors with monitoring device

With alert in vehicle, delayed parent notification, parent report card

Institute research found that a device worked best when teenagers first heard an alert in the vehicle, had a chance to correct behavior before parents were notified, and parents received periodic report cards on their teen's driving.

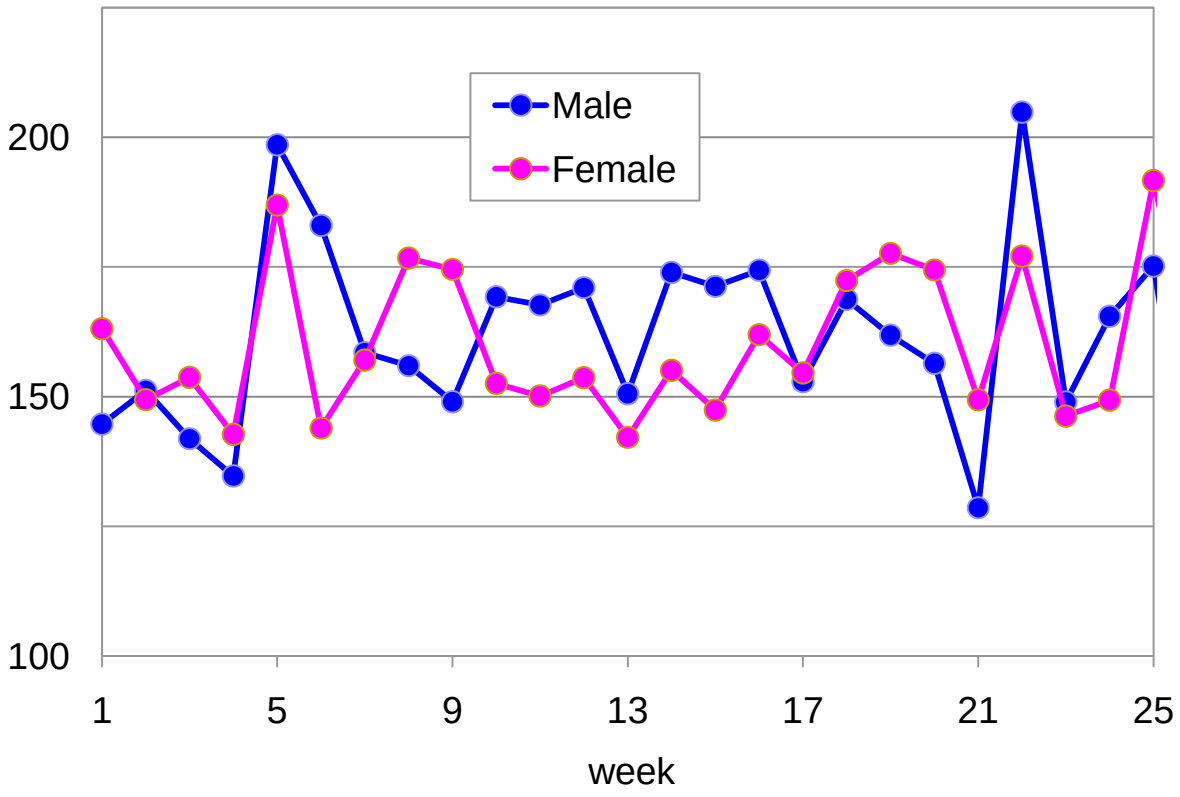


Average miles driven per week by teenage drivers

Gender differences

Male drivers averaged 162 miles per week.

Female drivers averaged 159 miles per week.

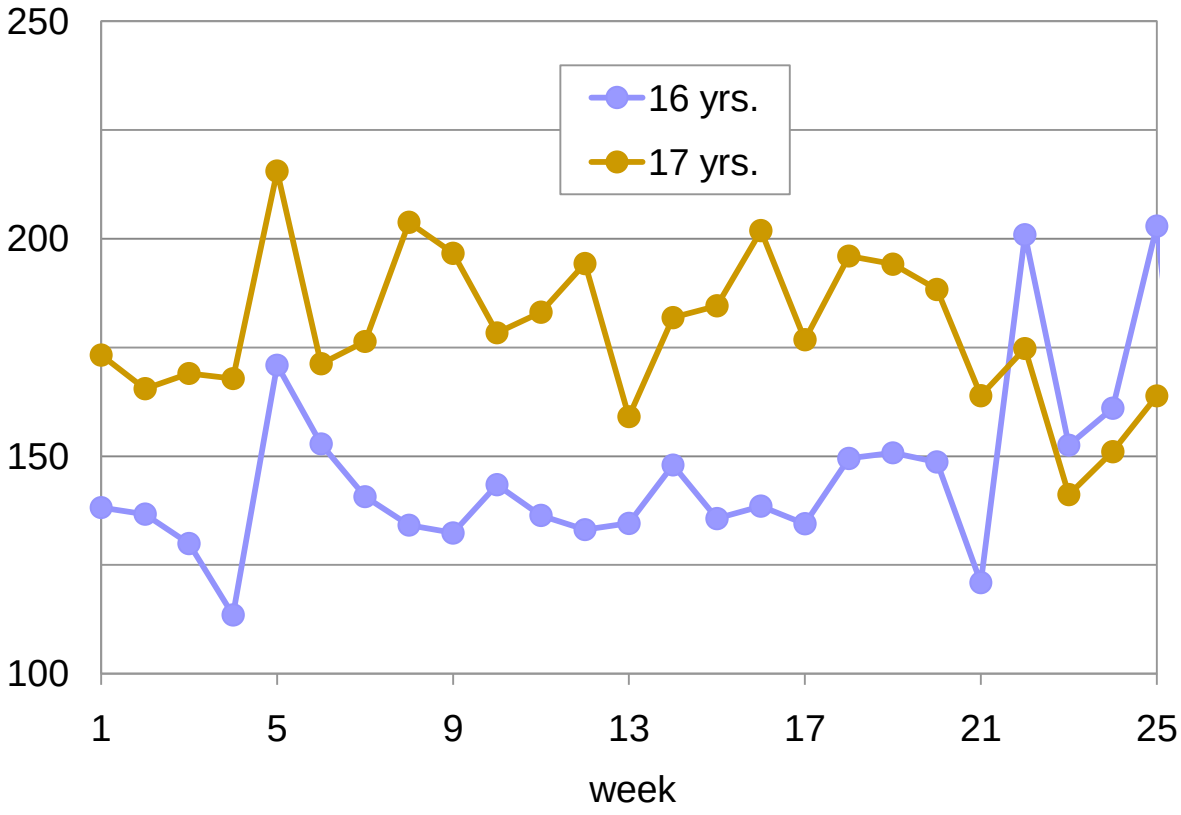


Average miles driven per week by teenage drivers

Age differences (age at week 1)

16-year-old drivers averaged 143 miles per week.

17-year-old drivers averaged 180 miles per week.



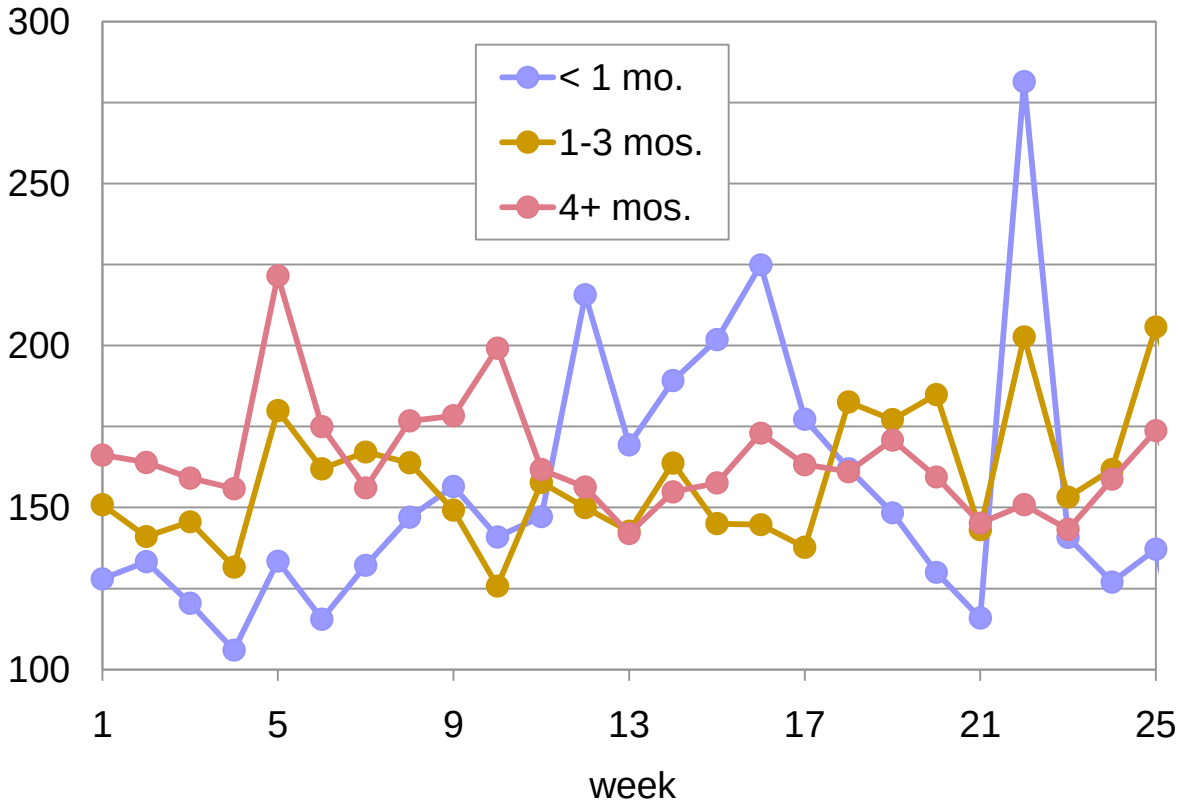
Average miles driven per week by teenage drivers

Experience differences (months licensed at week 1)

Brand new drivers averaged 156 miles per week.

Drivers with little experience averaged 157 miles per week.

Drivers with more experience averaged 165 miles per week.



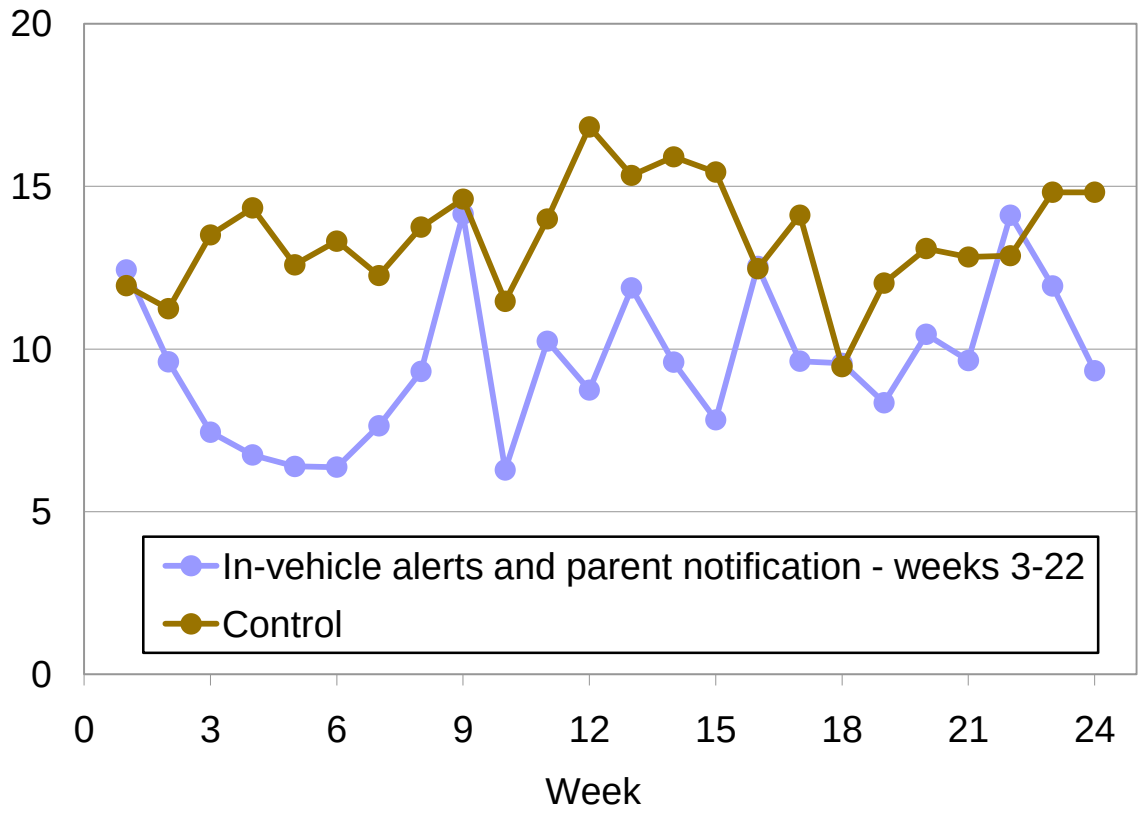
Percent of miles driven at speeds >10 mph above the posted limit

42 drivers received in-vehicle alerts and parents were notified

21 drivers received no feedback

Drivers with feedback were speeding for 10 percent of their miles

Drivers without feedback were speeding for 13 percent of their miles.



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