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Crash Risk of Teen Passengers on Teen Drivers: Synthesis

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Perspectives

- Young drivers are highest risk age group
 - Hazard to themselves
 - Hazard to their passengers and other road users
- Teen passengers can increase risk of young driver crash involvement
 - May vary by driver age and gender
 - Risk higher with male passengers than female passengers
- Expect to see reduced crash risk after passenger restrictions implemented
 - Depends on strength of law and compliance with it
 - Can be difficult to disentangle effects from other protective measures

Deaths and collisions: magnitude of problem

Ages 13-19

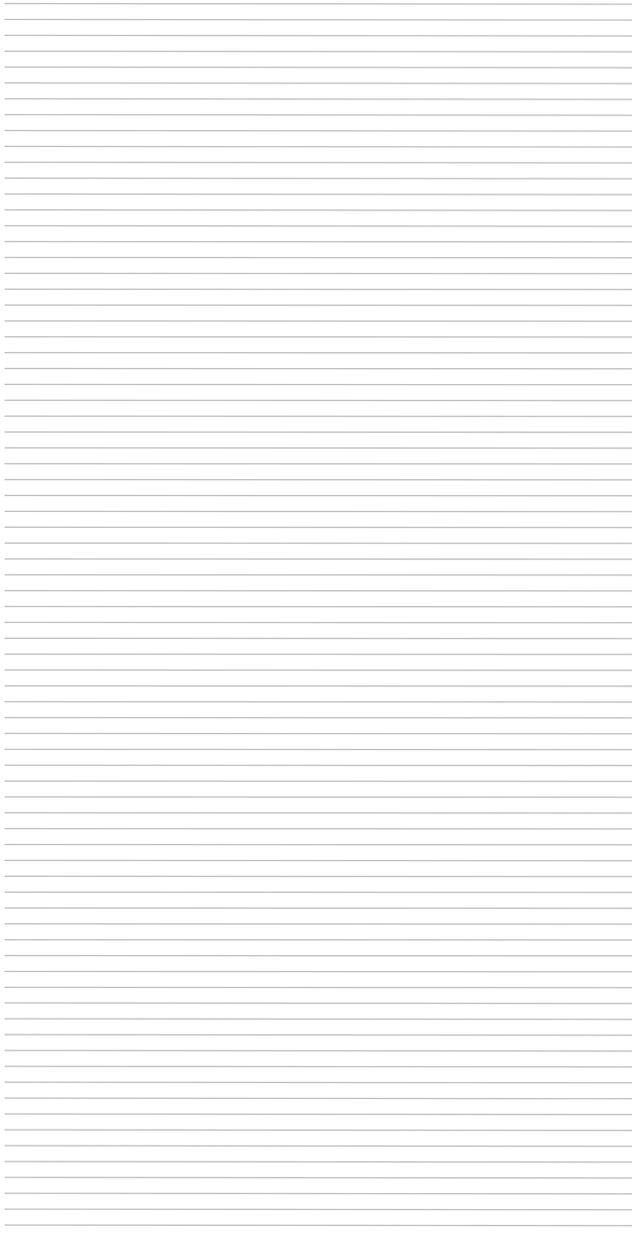
- 1,968 teen passengers died in 2007
 - 61 percent with teen drivers (N=1,200)
- 2,168 teen drivers died in 2007
 - 40 percent had any passengers (N=861)
 - 32 percent had teen passengers (N=687)

Ages 16-19

- 255,294 collision claims during January 2005-November 2006 among vehicles up to 9 years old
- 12-13 claims per 100 teen drivers per year vs. 6 per 100 among drivers ages 30-39

16-year-old drivers involved in fatal crashes by passenger presence, 2007

	involved	percent
no passengers	281	39
teen passengers only	306	43
one	173	
two	75	
three or more	58	
other passenger combinations	132	18
total	719	100



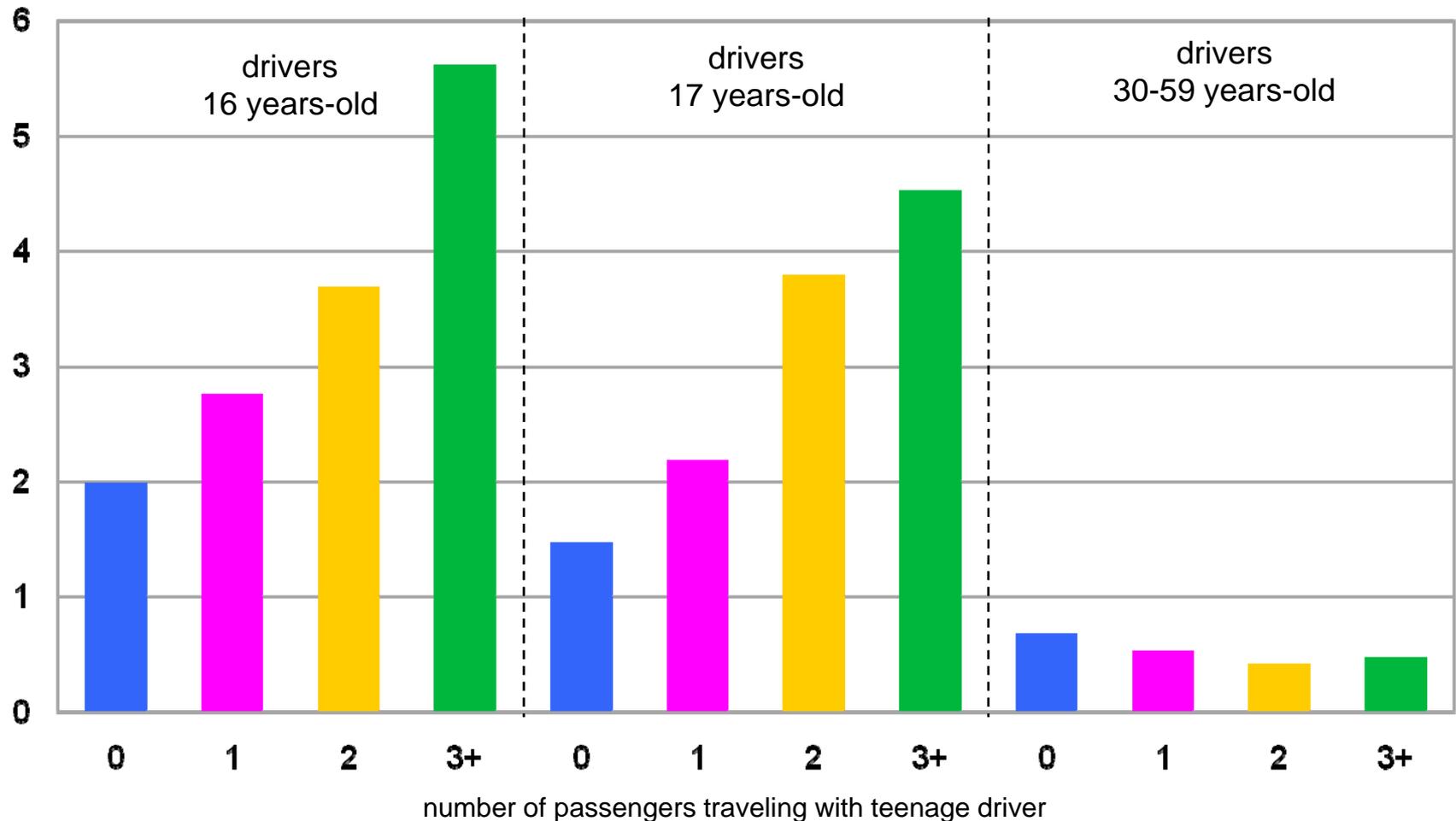
Key crash risk studies of teen drivers

Studies examining events per unit of travel

authors, year	outcomes	location	conclusions
Chen, Baker, Braver, Li, 2000	driver deaths, ages 16-17	USA	<ul style="list-style-type: none"> • increased risk of death with any passengers • higher risk with 2+ passengers • passengers protective for ages 30-59
Doherty, Andrey, MacGregor, 1998	driver involvements in fatal, injury, property damage only crashes	Ontario	<ul style="list-style-type: none"> • any passengers increased crash risk for drivers 16-19 • higher risk with 2+ passengers
Keall, Frith, Patterson, 2002	nighttime driver deaths (Friday, Saturday)	New Zealand	<ul style="list-style-type: none"> • controlled for blood alcohol • teen drivers and drivers ages 20-29 and 30+: <ul style="list-style-type: none"> - 1 passenger <u>reduced</u> risk - 2+ passengers increased risk

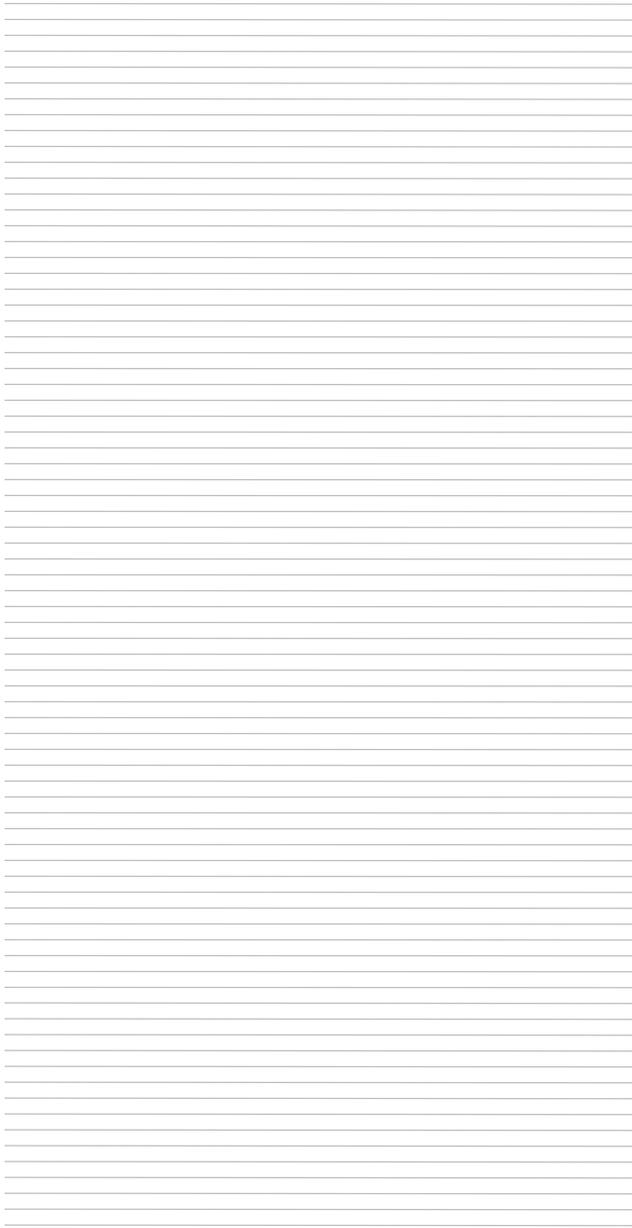
Driver death rates per 10,000 trips by driver age and passenger presence

Chen, Baker, Braver, Li, 2000



Studies examining risk of being at-fault

authors, year	population	location	conclusions
Preusser, Ferguson, Williams, 1998	drivers ages 16-19	USA	<ul style="list-style-type: none"> • Passenger presence increased odds of at-fault involvement in fatal crashes • Risk higher with 2+ teen passengers
Aldridge, Himmler, Aultman-Hall, Stamatiadis, 1999	drivers ages 16-20	Kentucky	<ul style="list-style-type: none"> • 2+ peer (ages 12-24) passengers increased at-fault odds in single and 2-vehicle crashes • protective effects from adult /child passengers
Padlo, Aultman-Hall, Stamatiadis, 2005	drivers ages 16-20	Connecticut	<ul style="list-style-type: none"> • 2+ teen passengers increased at-fault odds in single-vehicle crashes • mixed findings for 2-vehicle crashes • protective effects from adult passengers
Rice, Peek-Asa, Kraus, 2003	drivers ages 16-17	California	<ul style="list-style-type: none"> • controlled for blood alcohol, time of day, driver gender • young male passengers increased at-fault odds of crash resulting in severe/fatal injury to driver



Effects of gender: teen drivers and passengers

Studies of effects of gender

authors, year	focus	location	conclusions
Chen, Baker, Braver, Li, 2000	driver gender driver/passenger gender combinations	USA	<ul style="list-style-type: none"> passengers increased risk of death for both male and female drivers relative risks higher for male drivers driver deaths/crash higher when carrying any male passengers vs. solo driving; also increased when carrying 2+ female passengers
Rice, Peek-Asa, Kraus, 2003	passenger gender	California	<ul style="list-style-type: none"> controlled for driver gender, blood alcohol, time of day 3+ male passengers increased at-fault odds for any driver injury crash; 1+ young male passengers increased at-fault odds for severe or fatal driver injury protective effects from carrying only female passengers
Doherty, Andrey, MacGregor 1998	driver gender	Ontario	<ul style="list-style-type: none"> passengers increased risk of crash involvement for both male and female drivers

Does crash risk decrease when passenger restrictions are implemented?

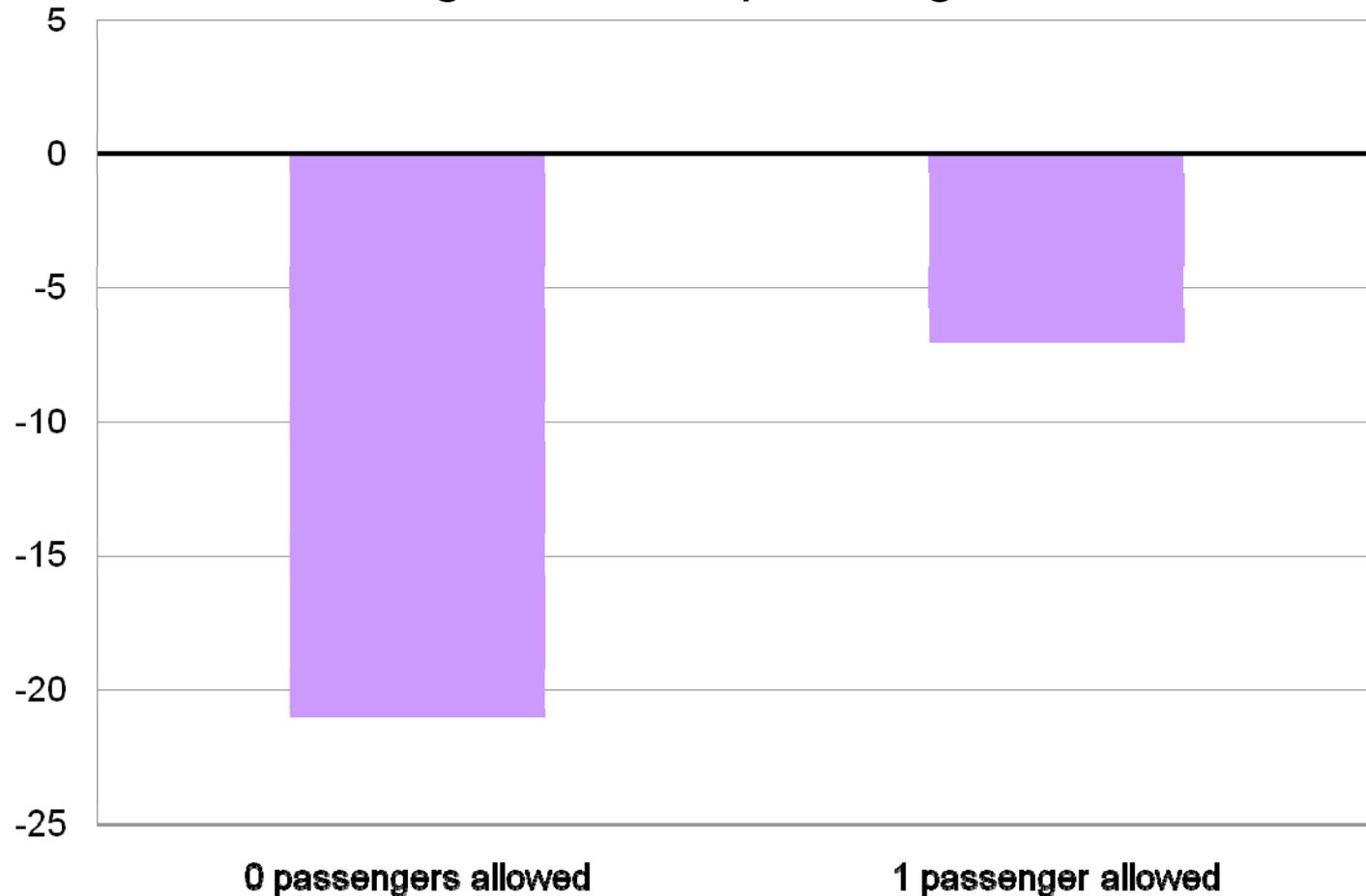
National study of effects of graduated licensing on fatal crash rates

McCartt, Teoh, Fields, Braitman, Hellinga, 2009

- What specific components of teen licensing laws are important in lowering fatal crash rates of teen drivers?
- Quarterly state-level data during 1996-2007
 - Fatal crash rate per population of teens ages 15-17
 - Fatal crash rate of drivers ages 30-59 accounted for state crash trends

Effects of passenger restrictions

Percent change in fatal crashes of 15-17 year-olds per population, compared with allowing 2 or more passengers, 1996-2007



McCartt, Teoh, Fields, Braitman, Hellinga, 2009

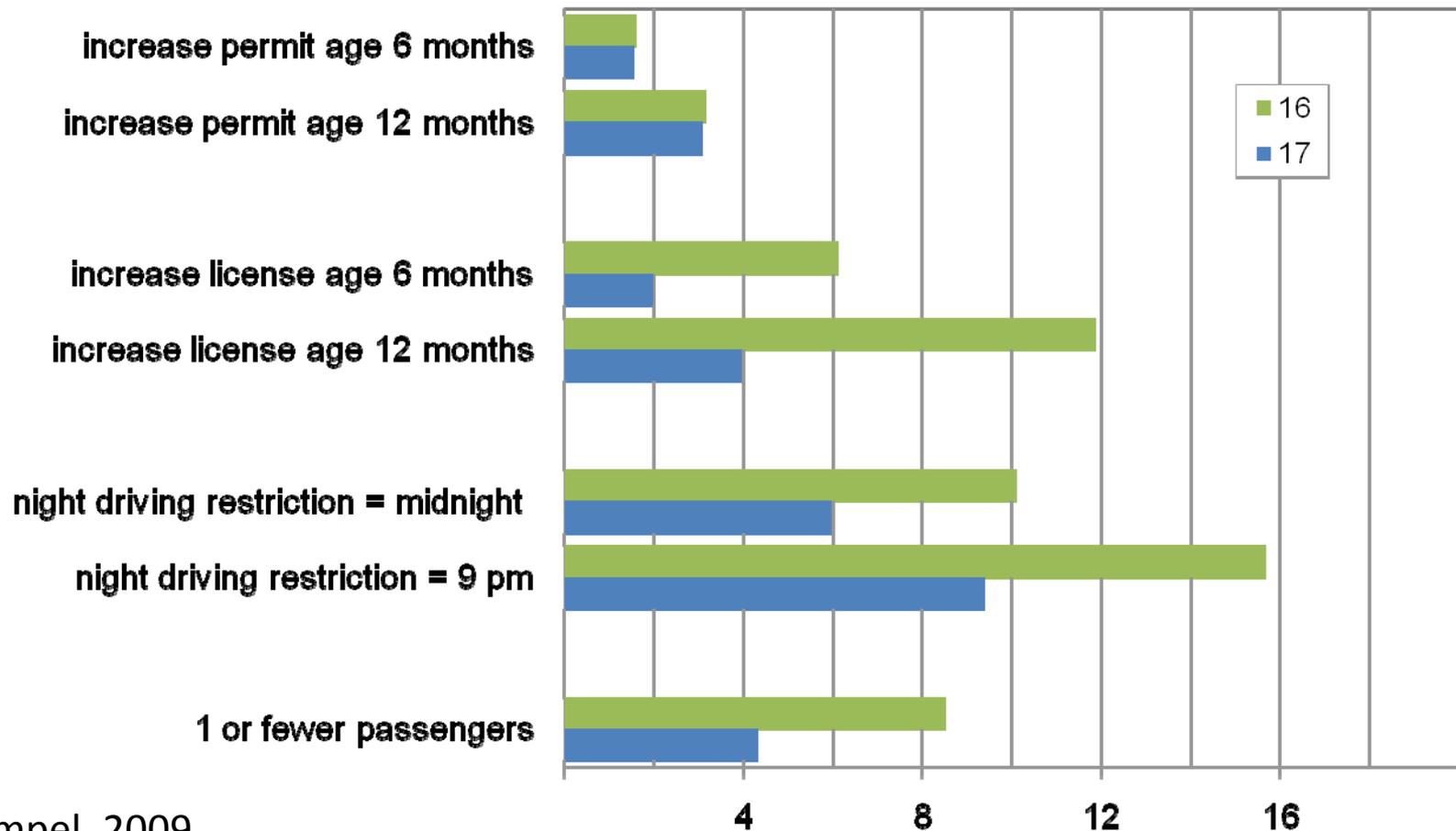
How have components of teen licensing laws affected likelihood of collision claims?

Trempel, 2009

- Highway Loss Data Institute data include licensed drivers only
- All states except New Jersey and Massachusetts
- Vehicles up to 3 years old during calendar years 1996-2006
- Collision claim frequencies (claims per insured vehicle year) by state and year for rated drivers 16-17
- Claim frequencies for ages 35-55 used as covariate to control for state collision claims trends

Predicted percent reduction in collision claim frequencies

Rated drivers 16 and 17 years old, by licensing law component



Trempel, 2009

Why do teen passengers increase risk of teen driver crash?

- Immature and inexperienced drivers
 - Less able to manage distractions, leading to driver errors
- Social interplay leading to risk-taking
 - Speeding
 - Lower belt use rates
 - Tailgating
 - Passing other vehicles
 - Horseplay in vehicle

Methodological challenges

- Measuring exposure to passengers of various age groups and genders
 - National Household Travel Survey is conducted infrequently, can have relatively small numbers of teen trips, harder to get representative sample in era of cellphones
- At-fault studies are useful for identifying risk factors but have limitations
 - Inconsistency in fault assignment, with potential age bias
 - Passenger presence might influence officers' judgments
 - Incomplete police records of uninjured passengers
- Studies need to adjust for confounding factors associated with both likelihood of having passengers and crash risk (e.g., time of day)

Conclusions

- The preponderance of evidence indicates young passengers can increase the crash risk of young drivers
- Findings are not uniform
 - Differences by country
 - Differences by gender of passenger
 - Differences by number of passengers
- There is evidence that crash risk is lowered by passenger restrictions that reduce exposure to young passengers
- Further research
 - Duration of period at risk, numbers of passengers (0 or 1), passenger age restrictions, circumstances in which passengers may be protective, regional variation.

Useful references

Aldridge, Himmler, Aultman-Hall, Stamatiadis. Impact of passengers on young driver safety. *Transportation Research Record* 1693 (1999):25-30.

Chen, Baker, Braver, Li. Carrying passengers as a risk factor for crashes fatal to 16- and 17-year-old drivers. *JAMA* 283 (2000):1578-82.

Doherty, Audrey, MacGregor. The situational risks of younger drivers: the influence of passengers, time of day and day of week on accident rates. *Accident Analysis and Prevention* 30 (1998):45-52.

Keall, Frith, Patterson. The influence of alcohol, age and number of passengers on the night-time risk of driver fatal injury in New Zealand. *Accident Analysis and Prevention* 925 (2002):1-15.

McCartt, Teoh, Fields, Braitman, Hellinga. Graduated licensing laws and fatal crashes of teenage drivers: a national study. Arlington, VA: Insurance Institute for Highway Safety (2009).

Padlo, Aultman-Hall, Stamatiadis. Passengers and other factors affecting the safety of young and older drivers. *Transportation Research Record* 1937 (2005):7-13.

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Preusser, Ferguson, Williams. The effect of teenage passengers on the fatal crash risk of teenage drivers. *Accident Analysis and Prevention* 30 (1998): 217-222.

Rice, Peek-Asa, Kraus. Nighttime driving, passenger transport, and injury crash rates of young drivers. *Injury Prevention* 9 (2003):245-250.

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