



INSURANCE INSTITUTE  
FOR HIGHWAY SAFETY

HIGHWAY LOSS  
DATA INSTITUTE

# Colorado Teen Motor Vehicle Conference

July 17, 2009

[www.iihs.org](http://www.iihs.org)

# Insurance Institute for Highway Safety (IIHS)

- Nonprofit, independent research and communications organization
- IIHS mission to save lives, prevent injuries, and reduce property damage in crashes
- Research goal to determine what works and what doesn't to improve highway safety
- Funded by automobile insurance companies

# Graduated Driver Licensing (GDL)

- Seeks to increase amount of supervised practice driving
- Keeps young drivers out of hazardous situations initially
- Limits when and with whom teenagers can drive, once licensed
- Often has the effect of delaying licensure

# Example graduated licensing laws

## Learner's phase

- Minimum of 6 months beginning no sooner than 16
- Minimum of 30 hours of supervised driving, certified by parents

## Intermediate phase

- Nighttime driving restriction starting no later than 9 or 10 pm
- Passenger restriction allowing no more than 1 young passenger

## Minimum age eligible for full license

- At least 1 year after start of intermediate phase, preferably age 18

# IIHS rating system



## learner's phase

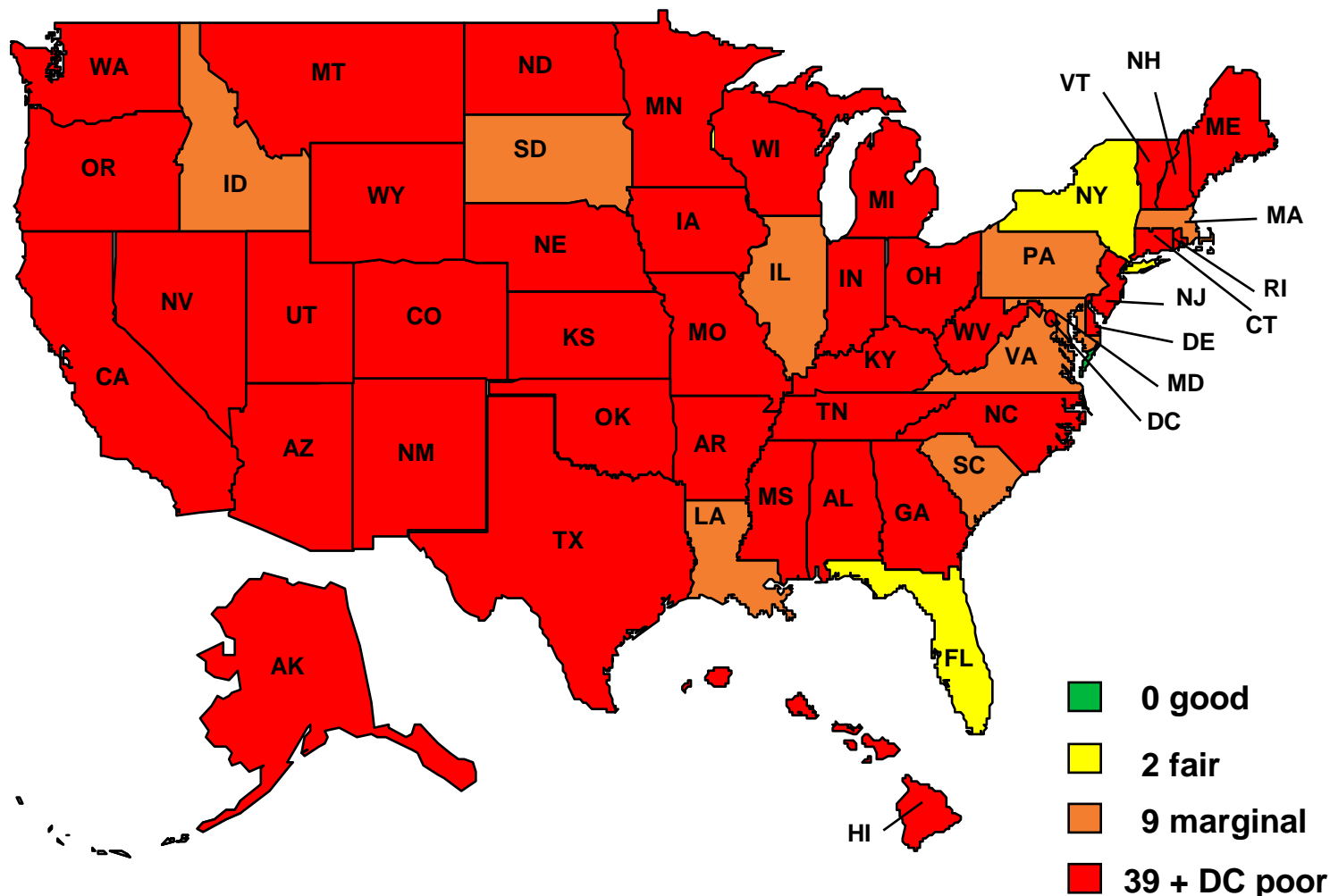
entry age
holding period
supervised driving certification

## intermediate phase

entry age
nighttime driving restriction
passenger restriction
duration of restrictions

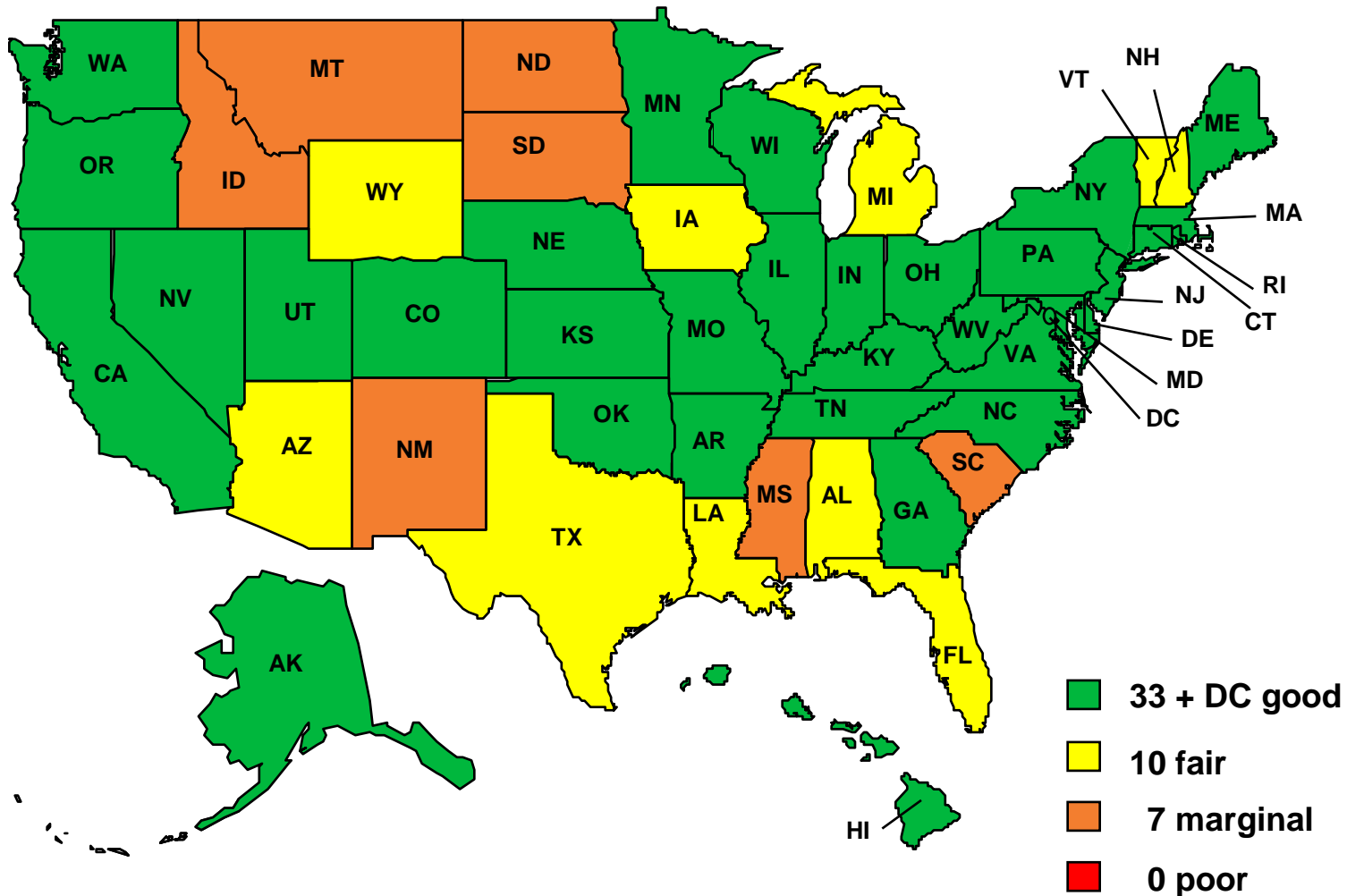
# IIHS ratings of graduated licensing laws

July 1996, using current rating system



# IIHS ratings of graduated licensing laws

July 2009



# Licensing requirements in 1995 vs. 2009

July 2009

	number of states + DC	
	1995	2009
minimum learner's age 16 or older	8	8 + DC
learner's permit for at least 6 months	0	46 + DC
30 or more hours of certified driving	0	38 + DC
night driving restriction once licensed	9	48 + DC
passenger restriction once licensed	0	42 + DC



# Effects of US graduated licensing programs

	age groups	crash reductions
Florida	15-17	9%
Iowa	16-17	25-30%
Michigan	16	29%
North Carolina	16	23%
Ohio	16-17	23%
Wisconsin	16	14%

# STATUS REPORT

INSURANCE INSTITUTE  
FOR HIGHWAY SAFETY

Vol. 43, No. 7, September 9, 2008

## ***“YOU CAN HEAR A PIN DROP,”***

says a state legislator in Maryland, when you tell a class full of 15 year-olds that you'd vote to raise the driving age. Similar silence greets like-minded policymakers in other states.

“It's a tough sell, all right,” says Anne McCartt, Institute senior vice president for research, “but it's an important enough issue to challenge the silence and at least consider changing the age at which we allow teenagers to get their licenses to drive. After all, graduated licensing has been successful ever since states began to adopt these programs more than a decade ago, and raising



### TOP NEWS

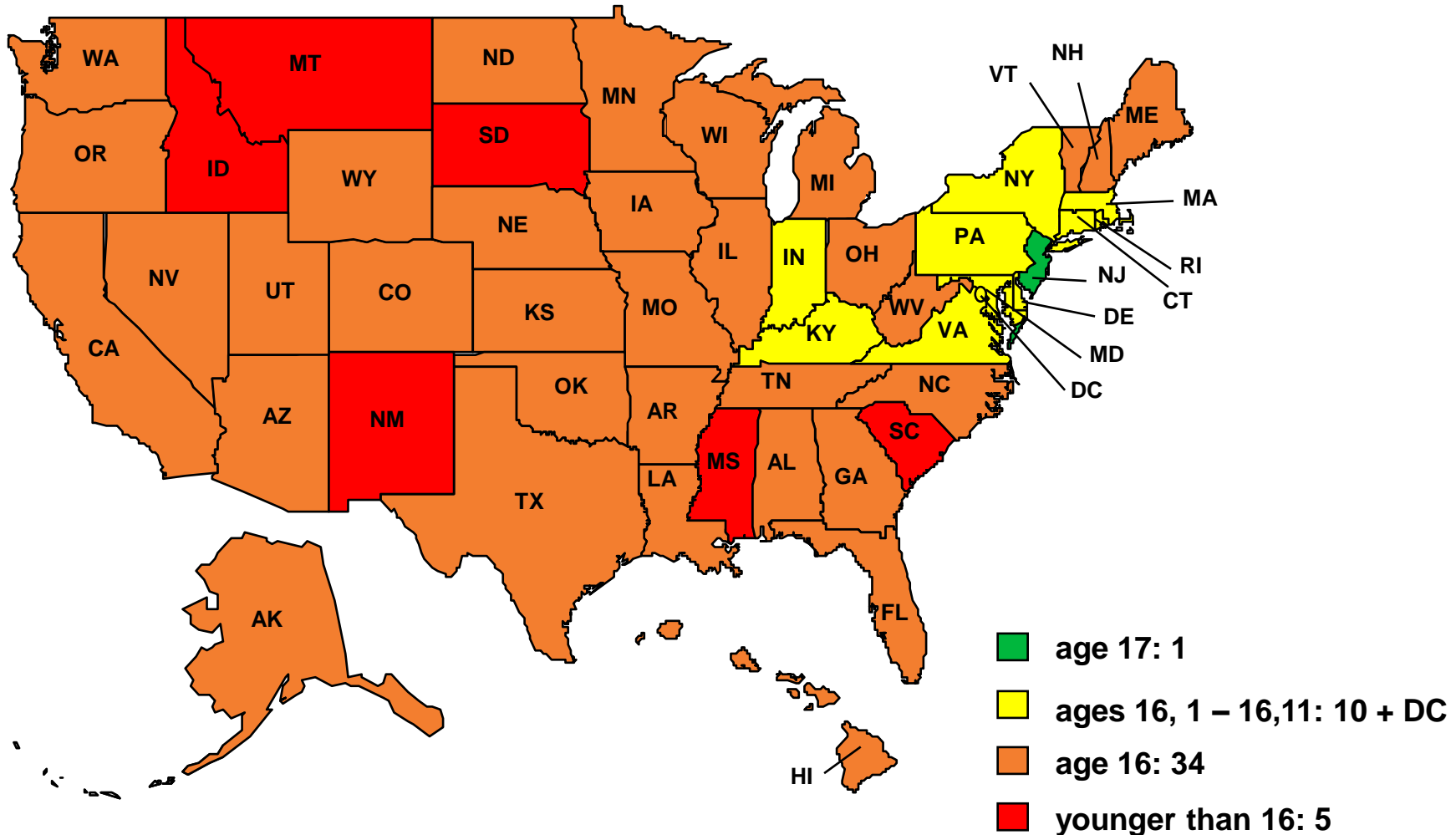


New Institute report:  
Raising the driving age would save lives  
*Status Report* cover story (PDF)  
Research papers (PDF): Licensing age variations and  
Effects of age and experience on young driver crashes

**Special issue:  
teen driving age  
September 9, 2008**

# Minimum intermediate licensing age

July 2009



# Teenage fatal crash rates in New Jersey (license at 17) and Connecticut (license at 16)

Drivers in fatal crashes per 100,000 population, 1992-96

age	New Jersey	Connecticut
16	4.4	20.7
17	32.3	31.1
16-17	18.2	25.9

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SPECIAL ISSUE: TEENAGE DRIVERS

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Vol. 44, No. 5, May 7, 2009

## **WHEN PARENTS ARE WATCHING**

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**Special issue:  
teen drivers**

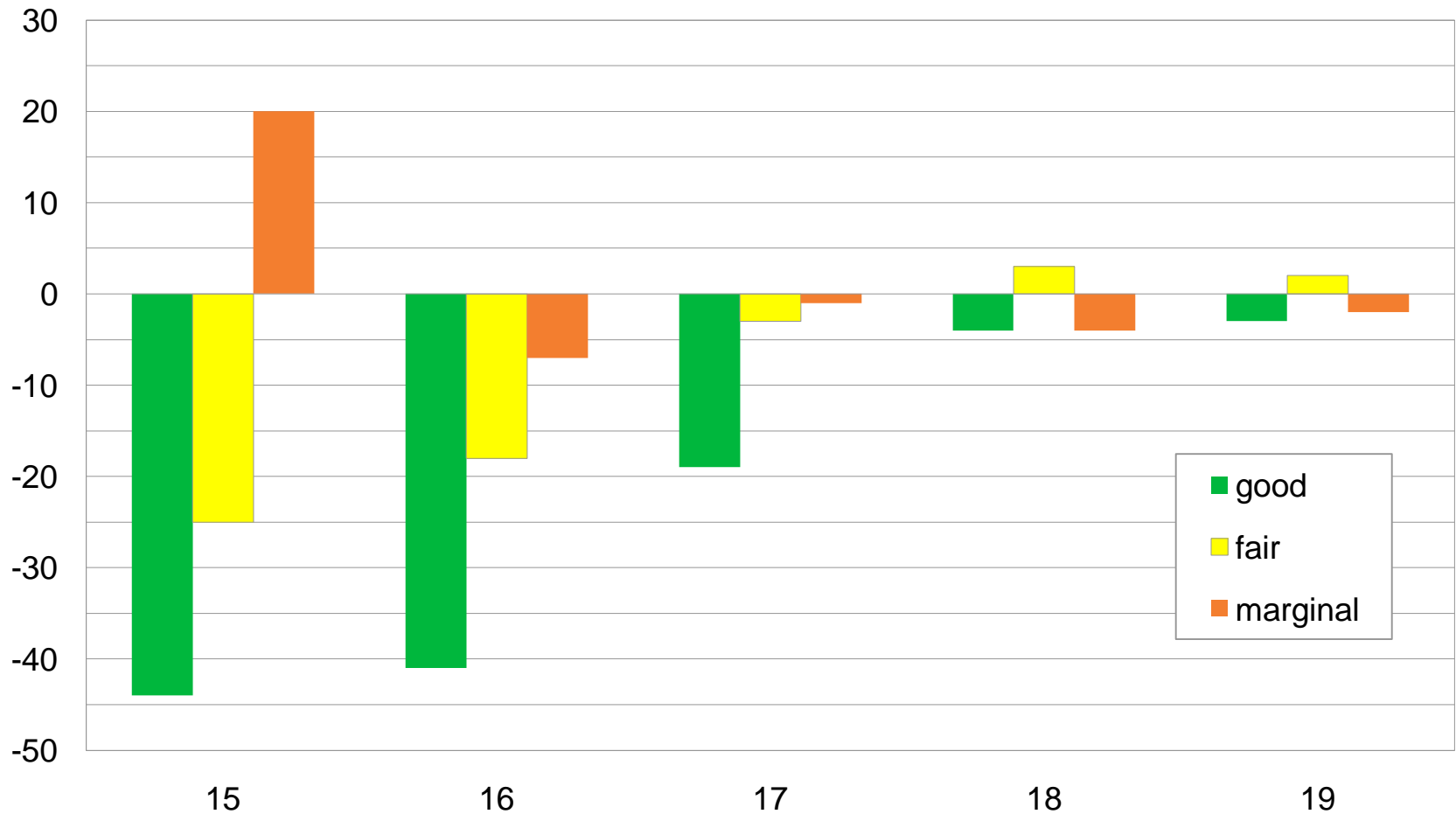
**May 7, 2009**

# National study of effects of graduated licensing on fatal crash rates

- Examined overall IIHS ratings of teenage licensing laws and specific provisions
- Examined per population fatal crashes of teenage drivers (ages 15-17)
- Quarterly state-level data during 1996-2007
  - Fatal crash rate per population of teenagers
  - Fatal crash rate of drivers ages 30-59 accounted for state crash trends, etc.

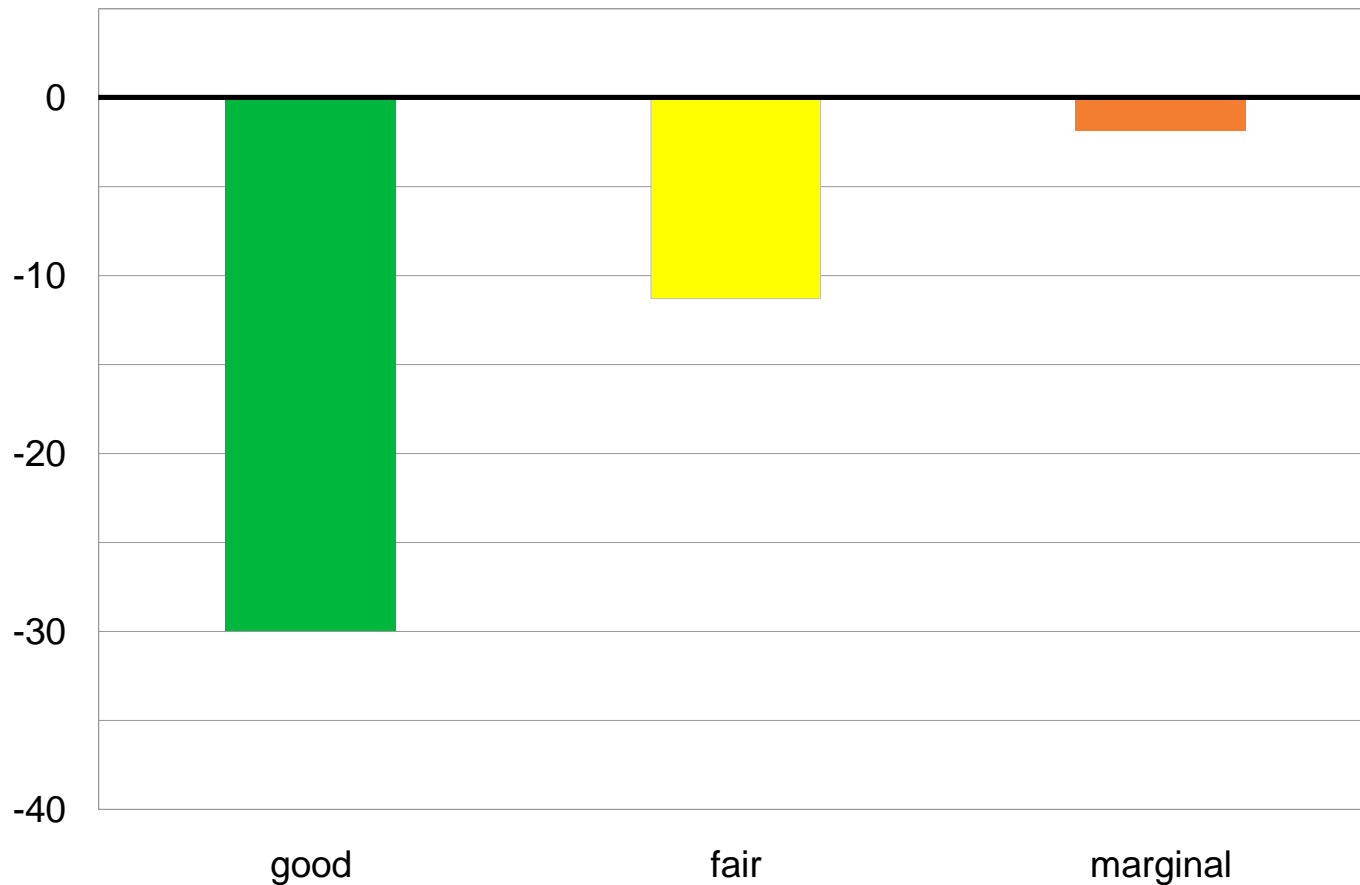
# Percent change in fatal crashes of 15-19 year-olds per population for good, fair, or marginal rating

Compared with poor rating, 1996-2007



# Percent change in fatal crashes of 15-17 year-olds per population for good, fair, or marginal rating

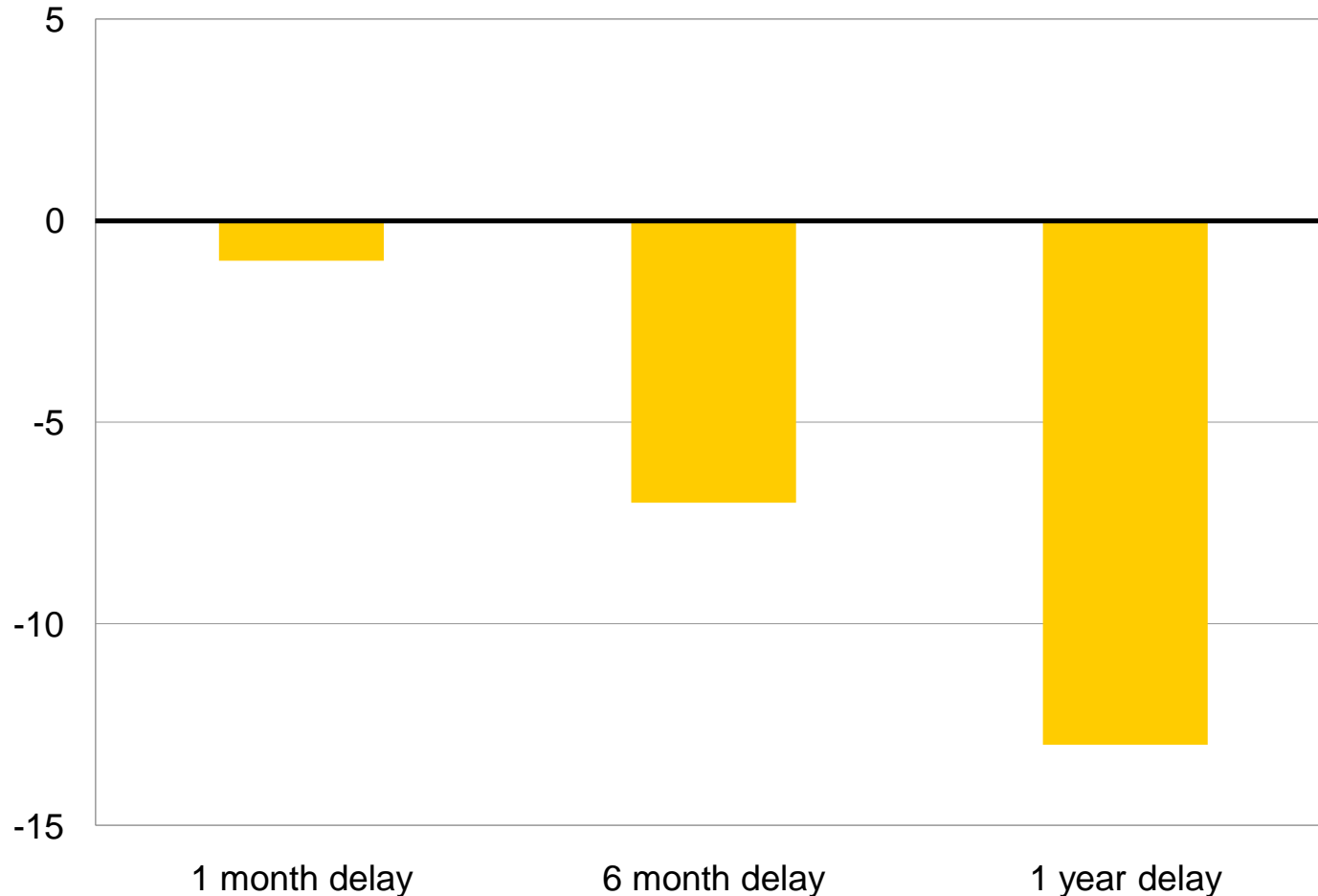
Compared with poor rating, 1996-2007





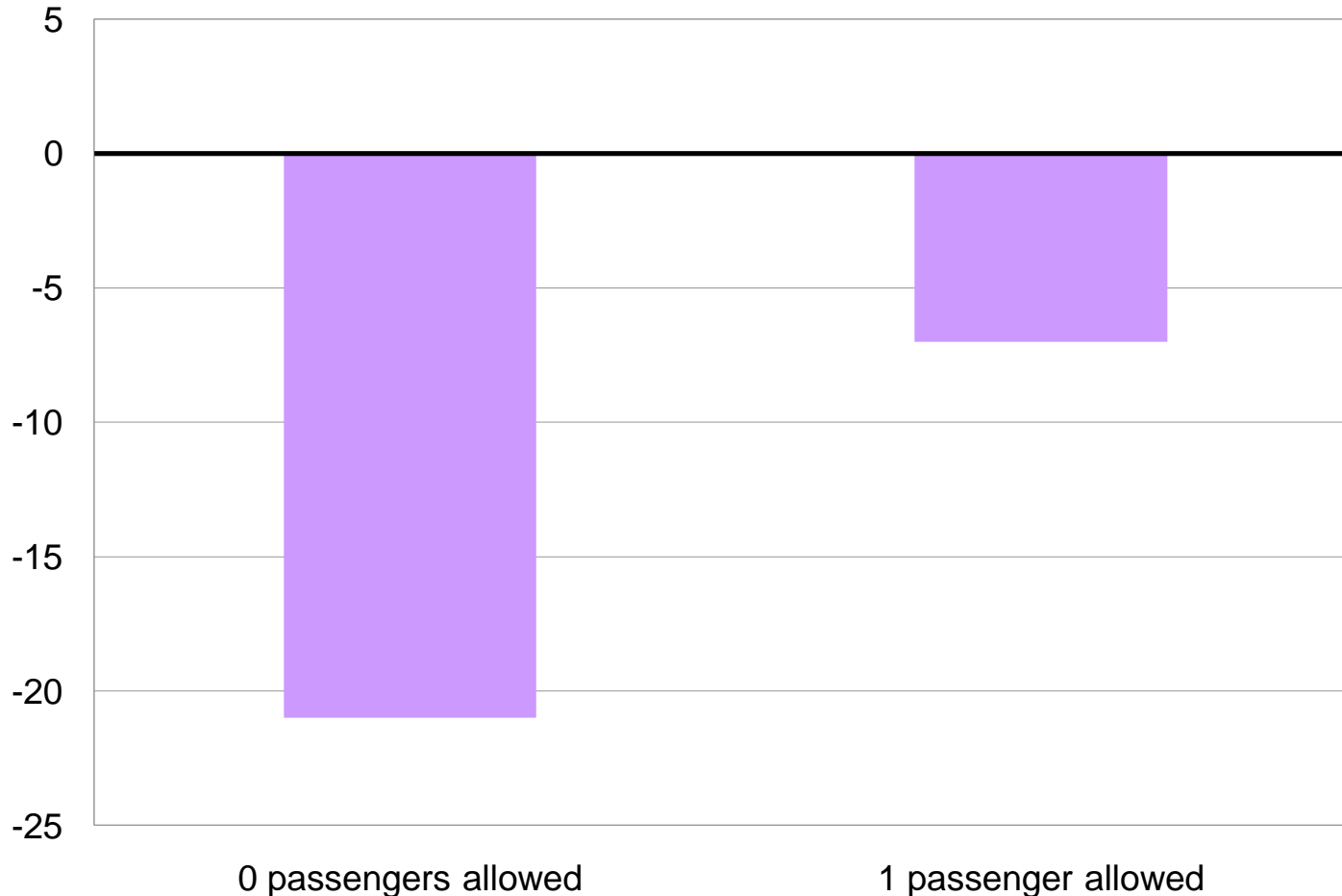
# Effects of delaying age of licensure

Percent change in fatal crashes of 15-17 year-olds per population, 1996-2007



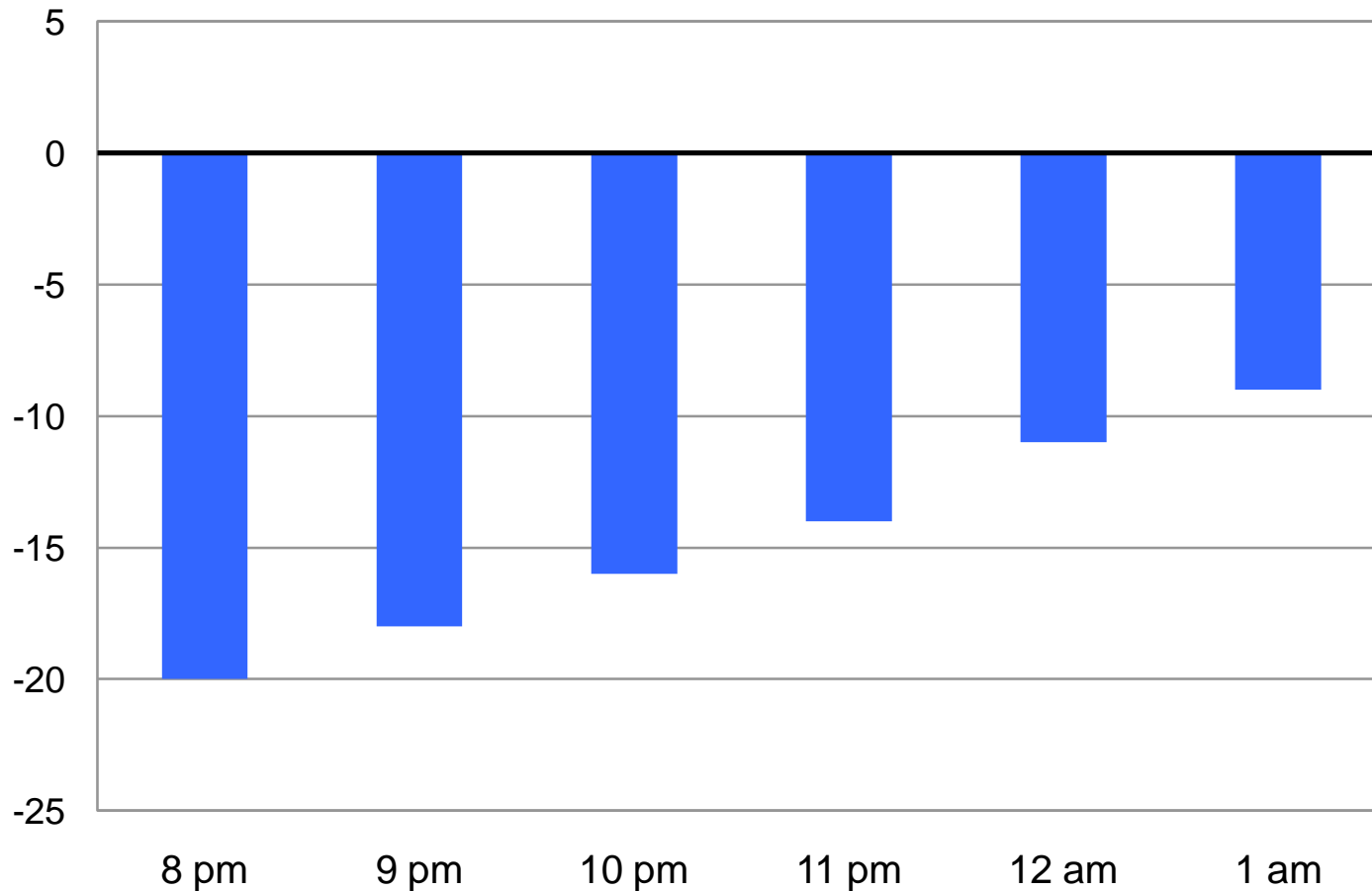
# Effects of passenger restrictions

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



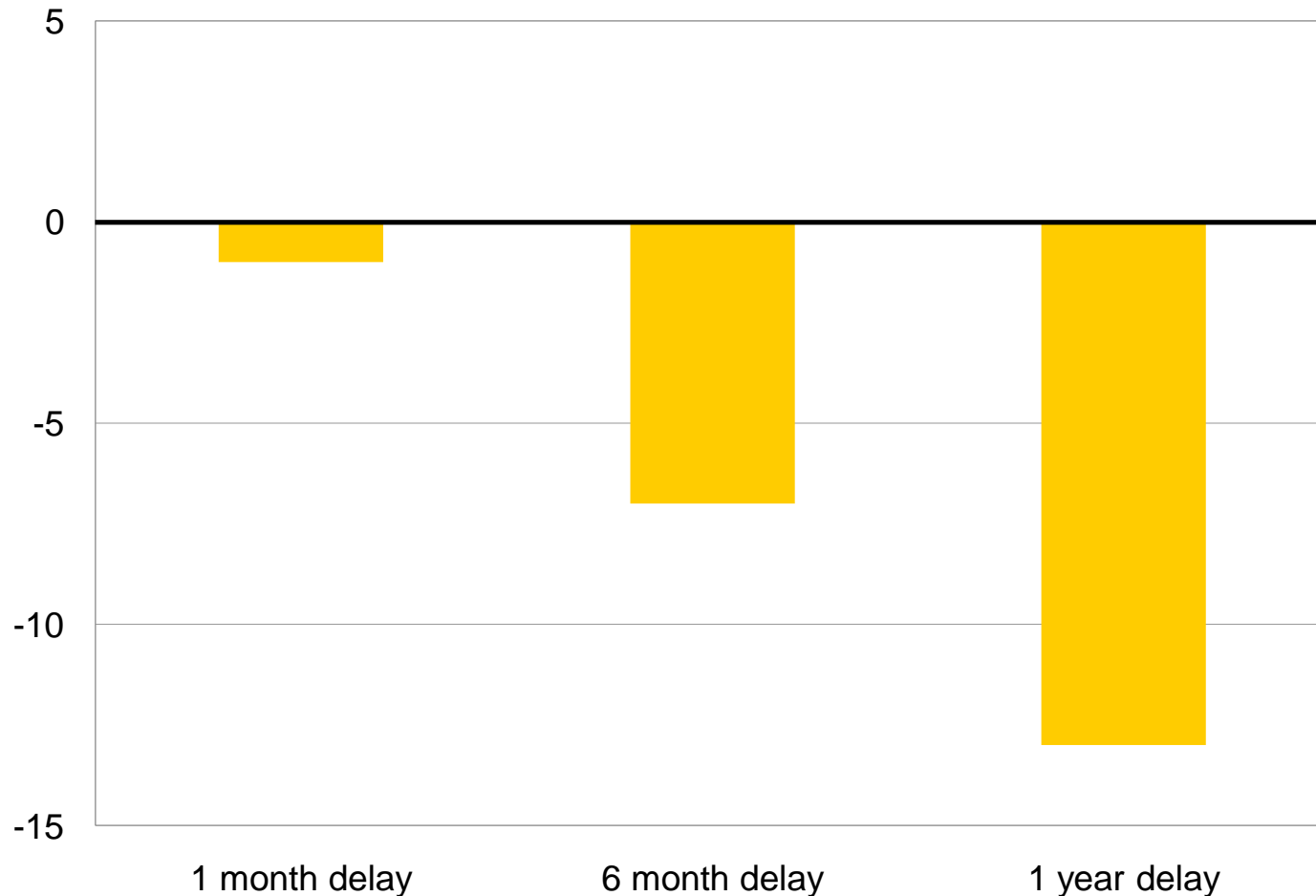
# Effects of nighttime driving restrictions

Percent change in fatal crashes of 15-17 year-olds per population, 1996-2007



# Effects of delaying age of permit

Percent change in fatal crashes of 15-17 year-olds per population, 1996-2007



# Conclusions

- IIHS ratings of young driver licensing laws line up well with fatal crash experience
- Individual components of laws are beneficial
  - 1 year licensing age delay, 1 year permit age delay, and strong nighttime and passenger restrictions on beginning drivers have substantial benefits
  - After the effects of any related delay in licensure were accounted for, an increase in the minimum learner's permit holding period showed no effect on fatal crash rates
  - An increase in required practice driving hours did not appear to have an independent effect on fatal crash rates

# Highway Loss Data Institute graduated licensing study

- Data include licensed drivers only; permit stage drivers not present
- All states except New Jersey and Massachusetts
- Vehicles up to 3 years old during calendar years 1996-2006
- Collision claim frequencies by state and year for rated drivers 16-17
- Claim frequencies for ages 35-55 used as a covariate to control for state collision trends, etc.

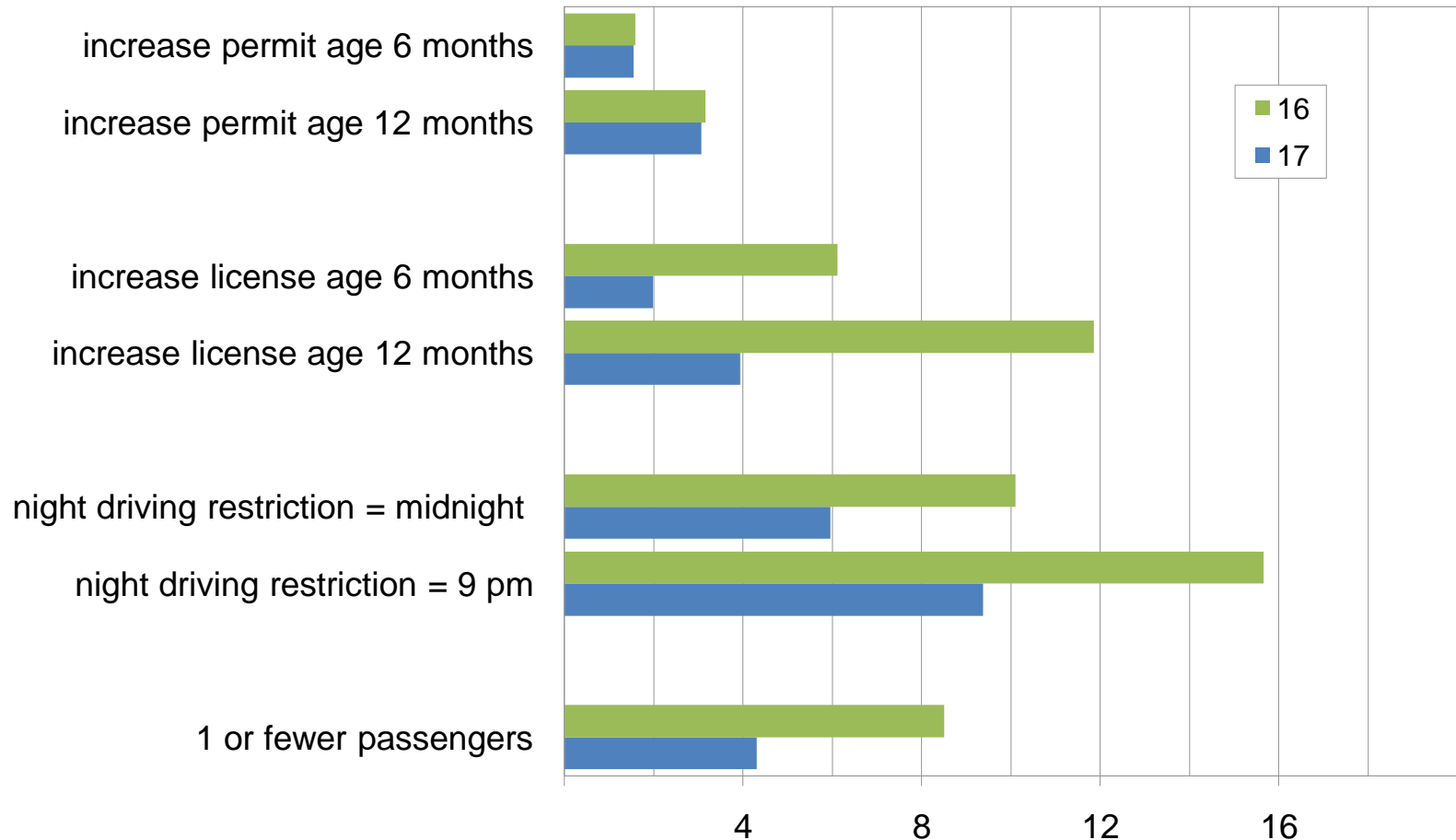
# Predicted percent reduction in collision claim frequencies

16-17 year-olds, by graduated licensing law rating



# Predicted percent reduction in collision claim frequencies

Rated drivers 16-17 years old, by graduated licensing law component





# Current Colorado laws versus potential improvements

	current Colorado laws	potential improvement
minimum learner's permit age	15	16
minimum intermediate license age	16	16,6
hours of certified driving	50	no change
night driving restriction once licensed	midnight	9 or 10 pm
teen passengers allowed once licensed	0	no change

# Percent reduction in 16-year-old drivers' fatal crashes per capita for potential changes in Colorado laws

minimum permit age of 16 versus 15	20
minimum intermediate license age of 16,6 versus 16	10
night restriction of 10 pm versus midnight	8
night restriction of 9 pm versus midnight	12
combined effect of minimum permit age 16; minimum intermediate license age 16,6; and 10 pm night restriction	34

# Young drivers and cellphones



It starts young!

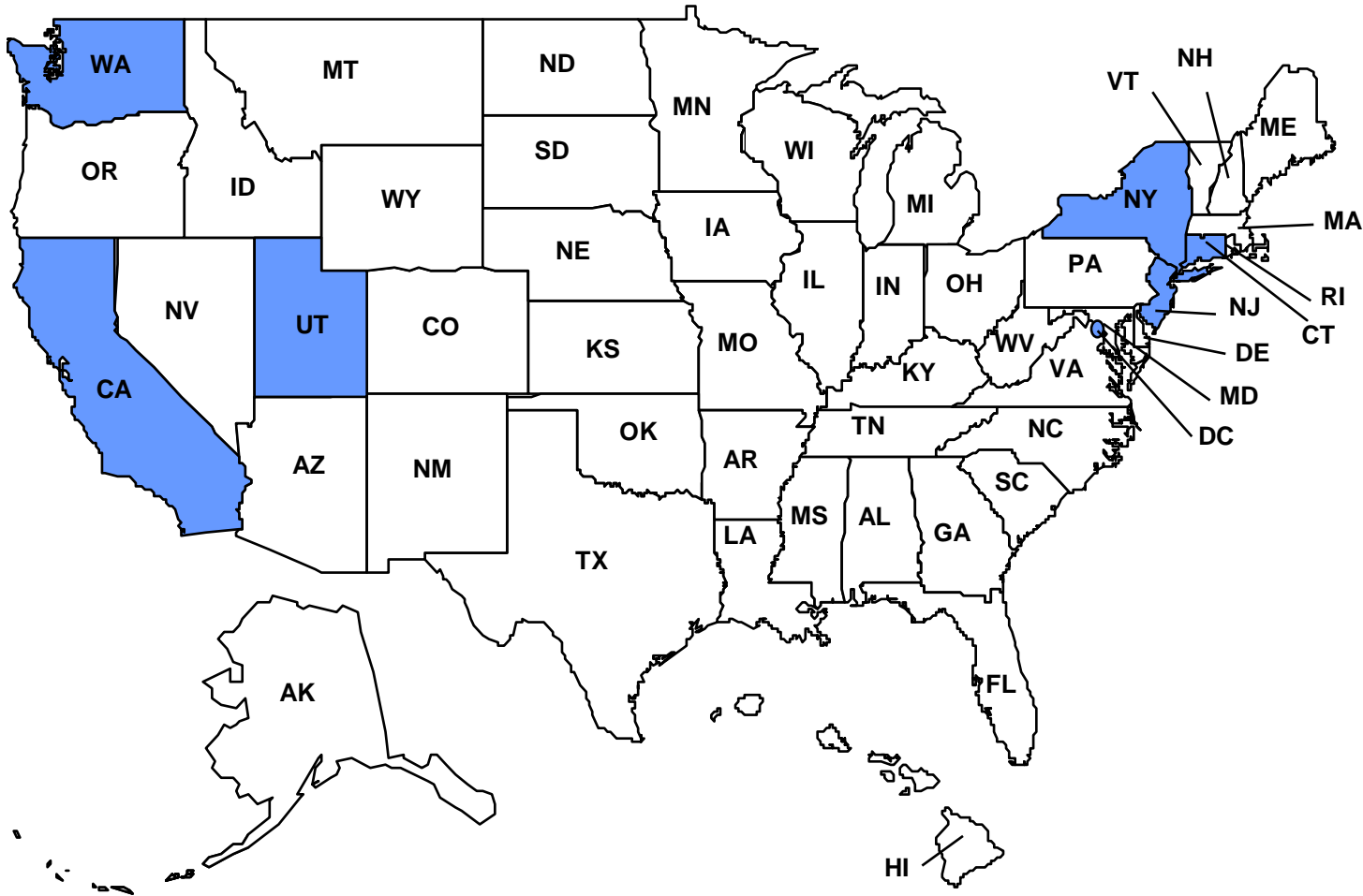


# Cell phones and crash risk

- Police crash reports do not reliably document drivers' phone use
- Two controlled studies link talking on a phone directly to involvement in a crash
  - Crash-involved driver cellphone use verified from phone billing records
  - Canadian study found 4-fold increased risk of property-damage crashes when talking on phone
  - Study of Australian drivers found 4-fold increased risk of injury crash when talking on phone

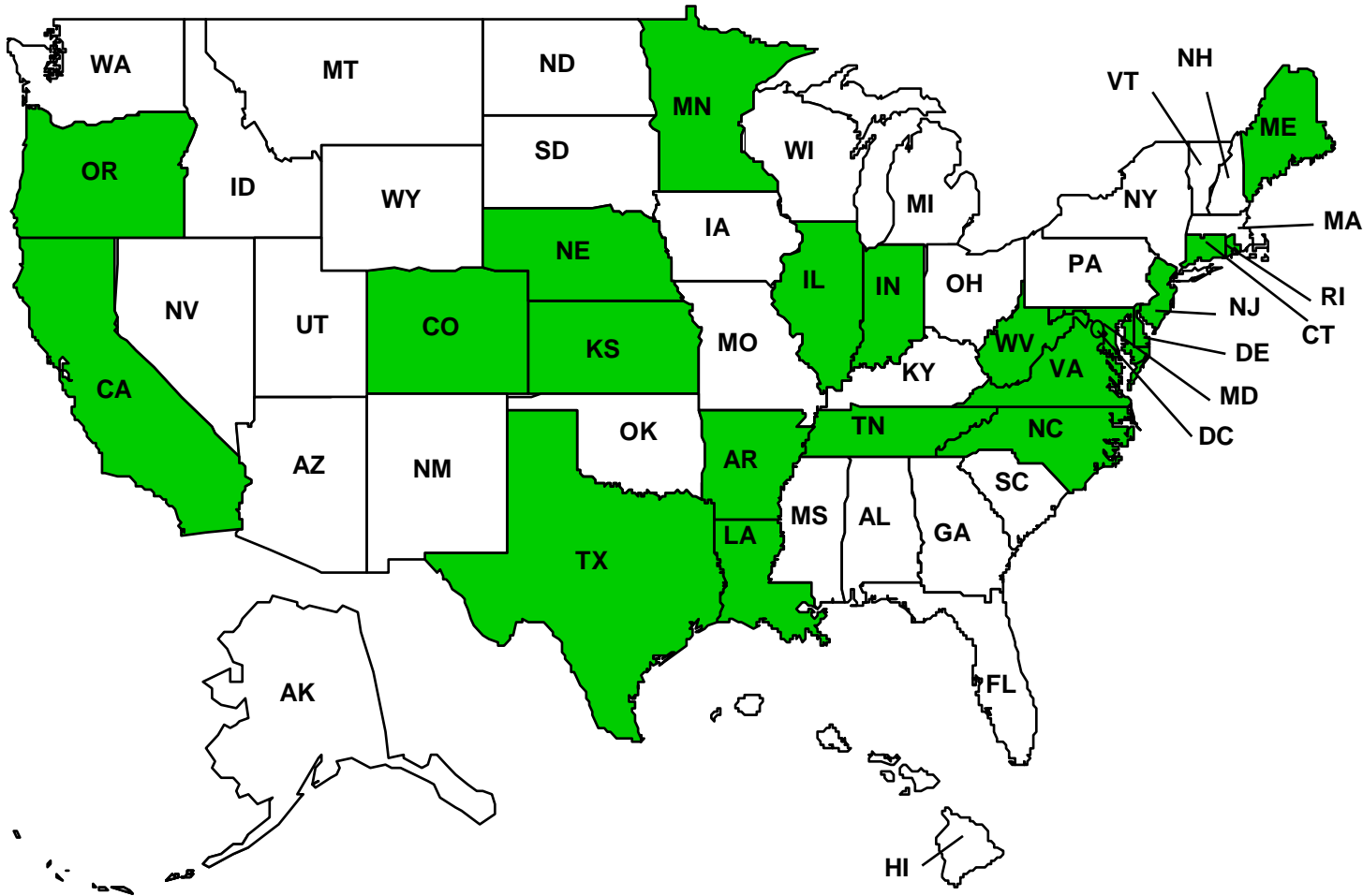
# Statewide bans on hand-held phones

July 2009



# Cellphone bans for teenage drivers

July 2009



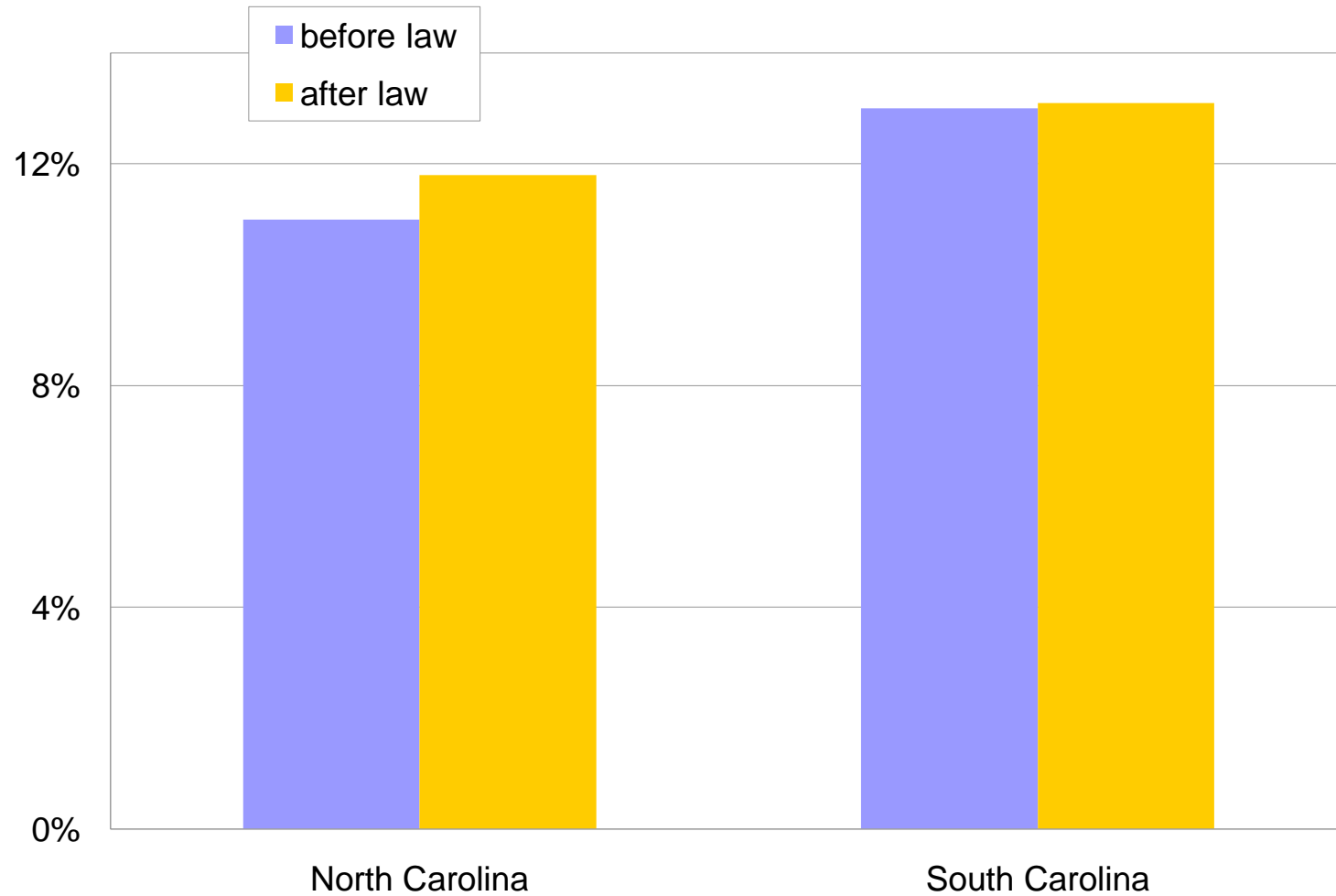
# North Carolina's cellphone restriction for teen drivers

Effective December 1, 2006

- Prohibits use of any telecommunications device including text messaging by drivers younger than 18
- Levies \$25 fine and 6-month delay before advancing to next licensing level
- Excludes calls for emergencies or to parents, guardians, or spouses



# Teenage drivers observed using cellphones as they left school at the end of the day



# Parents' and teenagers' views about cellphone law and parental restrictions

After law

	teenagers	parents
know about law	64%	39%
approve of law	74%	95%
believe law being enforced fairly often/a lot	22%	13%
if teenager has cellphone, parent restricts teenager's phone use while driving	66%	88%

# Conclusions

- Cellphone use increases crash risk, and the risk is similar for hand-held and hands-free phones
- Laws targeting teenage drivers' phone use are difficult for police officers to enforce
- Parents also may find cellphone restrictions harder to enforce than nighttime driving or other restrictions
- Primary enforcement laws applying to all phones and all drivers make most sense, based on evidence
- Passage of laws is the first step, but compliance will likely be low without publicized enforcement
- Effects of laws on crashes unknown

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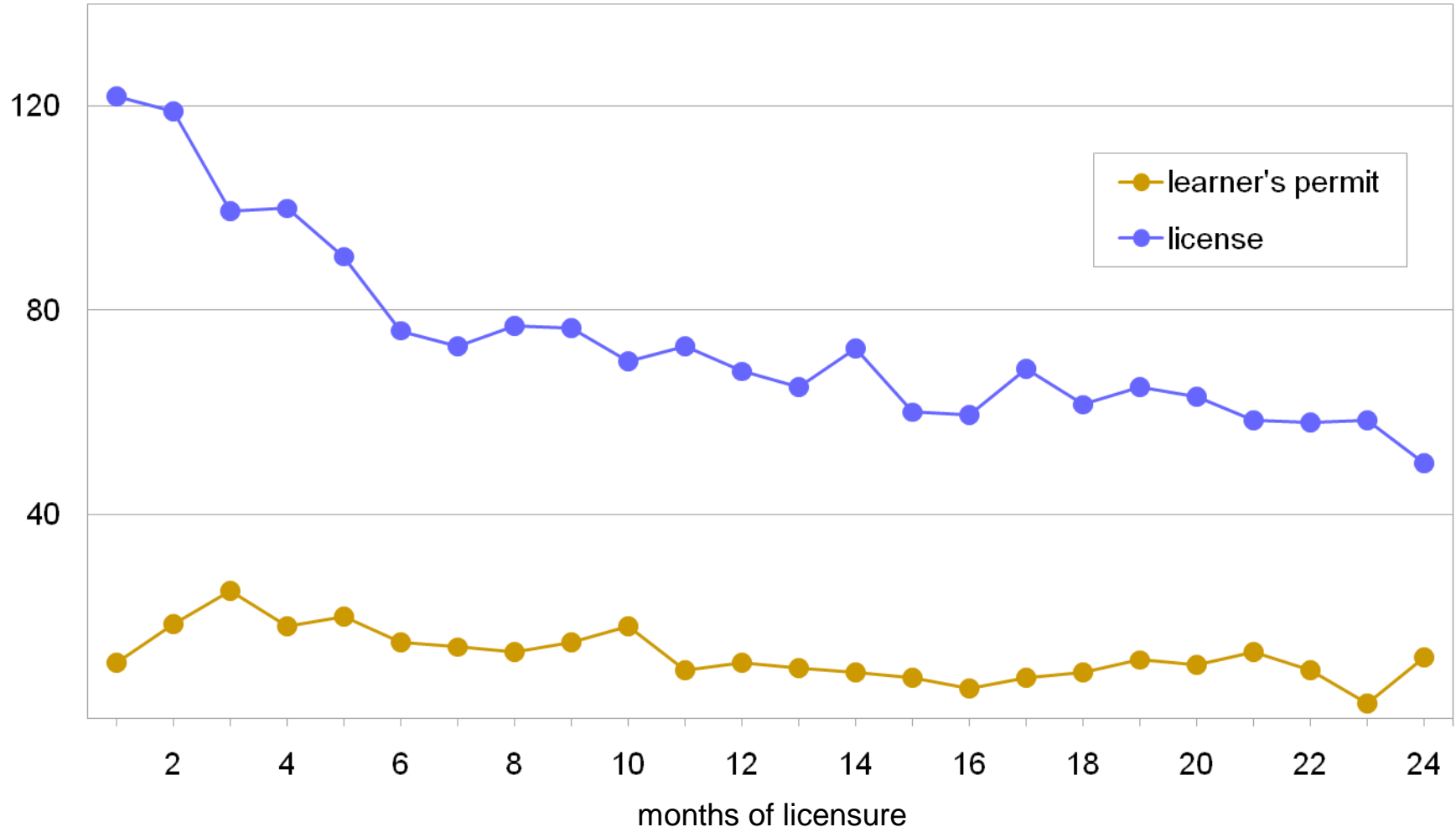


**Special issue:  
teen drivers**

**May 7, 2009**

# Crashes by license status and months of licensure

Per 10,000 learner/licensed drivers



# Percent of parents willing to use in-vehicle monitoring devices

3-state survey, 2006

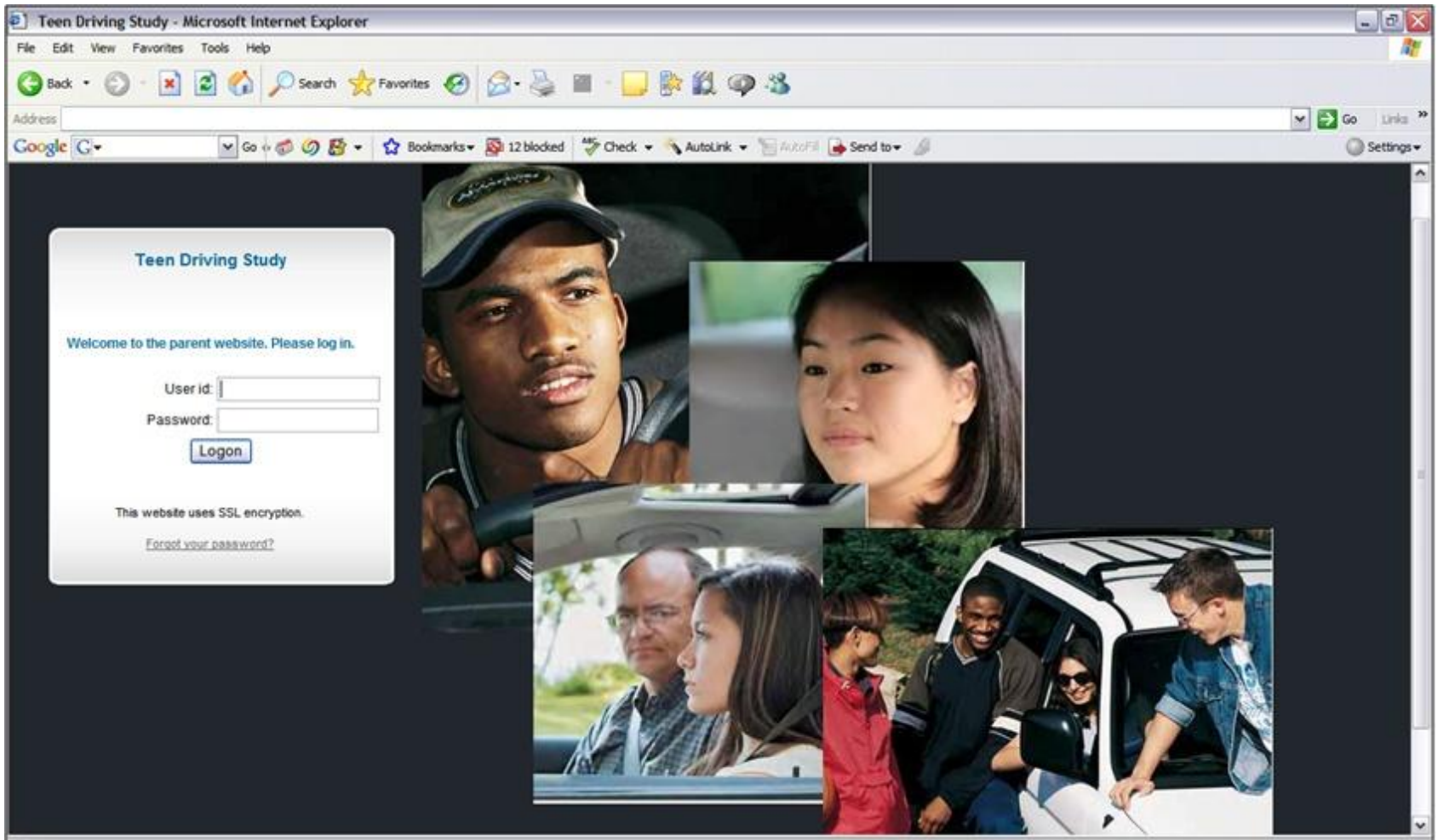
	video camera	computer chip	cellphone GPS
Would consider using	32	51	48
If no, why not?			
trust teen	62	69	63
invasion of privacy	33	6	26
won't improve driving	4	21	12
expense	19	3	16

# Technology

- Shoebox-size black box in vehicle cargo area, GPS, satellite modem, and small speaker box beneath dashboard
- Records location and miles driven
- Detects
  - All sudden braking and all sudden acceleration (longitudinal deceleration/acceleration more than 0.5 g)
  - Driver not using belt
  - Speed 2.5 mph faster than limit
  - Speed more than 10 mph faster than limit

# www.teendriverstudy.com

Website with secure login, personal ID, and password





# Homepage shows recent trends in notifications

HOME NOTIFICATIONS MAP FAQ | Logout

Home

Thank you for participating in this study of teen driving behavior. Hazardous actions such as speeding, lack of seat belt use, sharp turns, and extreme braking or acceleration are documented here for your teen.

Simply click the NOTIFICATIONS tab above for details of any such events. Clicking on the MAP tab will allow you to view the location of each event.

Although alarms inside the vehicle are meant to dissuade teens from hazardous driving, parental feedback may be even more effective. We therefore encourage you to check this web site often and discuss any listed events with your teen.

Messages:  
Please call 240-314-2424 to schedule a check-up of your equipment

Figures show recent trends in notifications for teen

Total number of notifications per week

Week	Notifications
1	10
2	3
3	8
4	3
5	4
6	28
7	23
8	7
9	7
10	0
11	0
12	0
13	0
14	0
15	0
16	9
17	13
18	19
19	22
20	7
21	13
22	24
23	7
24	8
25	14
26	1

Driving Notifications (previous 7 days)

Category	Notifications
Hard Turn	1
Hard Acceleration	0
Hard Brake	0
Seat Belt	0
Speeding	0

# Notification of events where vehicle exceeded criteria for speeding, sudden acceleration, etc.

HOME NOTIFICATIONS MAP FAQ | Logout

**Notifications**

Customize view by selecting notification type or timeframe

Notification Type: All Notifications, Hard Acceleration, Hard Brake

Notification Date: Last 30 Days, Last Known Position, Last Day, Last 7 Days, Last 14 Days, Last 30 Days

Refresh

Notification Time	Type	Location	Data	Odometer	Driving Minutes
2007-09-04 08:54:26; EST	Hard Turn	-77.0817:38.8717	DeltaVX: -0.4 DeltaVY: 0.1	50836	0
2007-08-31 15:16:30; EST	Hard Turn	-77.1164:38.8747	DeltaVX: -0.4 DeltaVY: 0.2	50830	3
2007-08-23 08:59:53; EST	Hard Turn	-77.111:38.8856	DeltaVX: -0.5 DeltaVY: 0.16	50819	0
2007-08-22 17:19:56; EST	Speeding	-77.127:38.869	Avg Speed: 36 mph Posted Speed: 35 mph Top Speed: 42 mph Distance: 0.4 Avg RPM: N/A	50812	1
2007-08-21 20:07:22; EST	Speeding	-76.9912:38.8664	Avg Speed: 45 mph Posted Speed: 35 mph Top Speed: 53 mph Distance: 0.9 Avg RPM: N/A	50801	2
2007-08-21 19:55:53; EST	Speeding	-76.9079:38.9209	Avg Speed: 59 mph Posted Speed: 55 mph Top Speed: 67 mph Distance: 1 Avg RPM: N/A	50794	1
2007-08-21 19:36:44; EST	Speeding	-76.5327:38.987	Avg Speed: 63 mph Posted Speed: 55 mph Top Speed: 67 mph Distance: 2.2 Avg RPM: N/A	50773	2
2007-08-21 19:33:30; EST	Speeding	-76.4974:39.012	Avg Speed: 60 mph Posted Speed: 55 mph Top Speed: 66 mph Distance: 3.2 Avg RPM: N/A	50770	3
2007-08-21 19:25:09; EST	Speeding	-76.3615:38.9898	Avg Speed: 59 mph Posted Speed: 45 mph Top Speed: 59 mph Distance: 0.8 Avg RPM: N/A	50761	1
2007-08-21 19:24:07; EST	Speeding	-76.3466:38.9862	Avg Speed: 53 mph Posted Speed: 45 mph Top Speed: 58 mph Distance: 0.9 Avg RPM: N/A	50760	2
2007-08-21 18:50:56; EST	Speeding	-75.8205:38.8786	Avg Speed: 47 mph Posted Speed: 40 mph Top Speed: 56 mph Distance: 0.2 Avg RPM: N/A	50727	1
2007-08-21 18:43:19; EST	Speeding	-75.7669:38.829	Avg Speed: 38 mph Posted Speed: 30 mph Top Speed: 54 mph Distance: 0 Avg RPM: N/A	50722	4
2007-08-21 18:31:53; EST	Speeding	-75.6178:38.7603	Avg Speed: 50 mph Posted Speed: 40 mph Top Speed: 57 mph Distance: 1.9 Avg RPM: N/A	50713	7
2007-08-21 18:21:19; EST	Speeding	-75.5229:38.709	Avg Speed: 58 mph Posted Speed: 50 mph Top Speed: 61 mph Distance: 0.5 Avg RPM: N/A	50704	1
2007-08-21 18:19:48; EST	Speeding	-75.4922:38.6969	Avg Speed: 56 mph Posted Speed: 50 mph Top Speed: 61 mph Distance: 0.7 Avg RPM: N/A	50703	2
2007-08-21 17:58:21; EST	Hard Turn	-75.2777:38.5668	DeltaVX: -0.5 DeltaVY: 7.3 DeltaVZ: 0.5 Speed: 36	50686	3
2007-08-18 16:21:16; EST	Speeding	-75.1232:38.4735	Avg Speed: 40 mph Posted Speed: 30 mph Top Speed: 47 mph Distance: 0.3 Avg RPM: N/A	50669	1
2007-08-18 16:19:58; EST	Speeding	-75.158:38.4839	Avg Speed: 46 mph Posted Speed: 40 mph Top Speed: 52 mph Distance: 1.5 Avg RPM: N/A	50669	2
2007-08-18 14:59:48; EST	Speeding	-75.6169:38.7609	Avg Speed: 46 mph Posted Speed: 40 mph Top Speed: 53 mph Distance: 1.4 Avg RPM: N/A	50632	3
2007-08-18 13:26:45; EST	Speeding	-76.4824:39.0183	Avg Speed: 61 mph Posted Speed: 55 mph Top Speed: 66 mph Distance: 3.6 Avg RPM: N/A	50579	4
2007-08-18 12:56:10; EST	Hard Turn	-76.9314:38.9176	DeltaVX: -0.5 DeltaVY: 22.8 DeltaVZ: 0.5 Speed: 30	50549	1
2007-08-18 12:52:51; EST	Speeding	-76.9626:38.8857	Avg Speed: 53 mph Posted Speed: 45 mph Top Speed: 56 mph Distance: 1.4 Avg RPM: N/A	50547	3
2007-08-16 17:21:38; EST	Hard Turn	-77.0917:38.8596	DeltaVX: -0.5 DeltaVY: 9.4 DeltaVZ: 0.5 Speed: 14	50528	4
2007-08-15 17:15:10; EST	Speeding	-77.1344:38.8664	Avg Speed: 37 mph Posted Speed: 30 mph Top Speed: 41 mph Distance: 0.4 Avg RPM: N/A	50510	2
2007-08-12 21:35:34; EST	Speeding	-77.1784:38.7838	Avg Speed: 45 mph Posted Speed: 45 mph Top Speed: 59 mph Distance: 0.3 Avg RPM: N/A	50479	2
2007-08-12 21:27:08; EST	Speeding	-77.2352:38.6762	Avg Speed: 65 mph Posted Speed: 55 mph Top Speed: 67 mph Distance: 1.3 Avg RPM: N/A	50471	1

# Map shows locations of notifications

HOME NOTIFICATIONS **MAP** FAQ [Logout](#)

Notification Type:  
All Notifications  
Hard Acceleration  
Hard Brake

Longitude: -78.3791 Latitude: 38.2685

Speeding  
2007-08-06 10:38:00; EST  
Avg Speed: 36 mph Posted Speed: 30 mph Top Speed: 43 mph Distance: 1.1 Avg RPM: N/A

VRC

Click on blue speeding circles for more information about speed limit, vehicle's average and top speed, etc.

Circles indicate where notifications occurred

Map Satellite Hybrid

Map data ©2007 Tele Atlas - [Terms of Use](#)

POWERED BY Google

2000 ft Rd  
500 m

0 Hard Turn  
1 Hard Turn  
2 Hard Turn  
3 Speeding  
4 Speeding  
5 Speeding  
6 Speeding  
7 Speeding  
8 Speeding  
9 Speeding  
10 Speeding  
11 Speeding  
12 Speeding  
13 Speeding  
14 Speeding  
15 Hard Turn  
16 Speeding  
17 Speeding  
18 Speeding  
19 Speeding

# Study design

- Random assignment of 85 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 in study groups relative to control group
- Interviewed teenagers and parents after study about device and website use, perceived effects on behavior, attitudes, etc.

# Four study groups with in-vehicle monitoring system

- Alerts driver and immediately notifies website
- Alerts driver and 20 seconds later notifies website if behavior not corrected
- Notifies website but no in-vehicle alert
- Control group with monitoring but no alert or notification

# Interest level

- Recruitment proceeded very slowly initially
  - After several months of PTA presentations, advertisements in local papers, and recruitment at state DMVs, only a few teens had enrolled
  - Recruitment picked up with \$500 payment and letters to newly licensed Virginia teenagers
- After enrolling, most parents accessed the website infrequently
  - After initiating an email “report card,” parents accessed the website even less frequently
  - However, report cards appeared important for final results

# Effectiveness

- Among control teen drivers (no alerts, no website)
  - Belt use tended to decrease over the 20 weeks of monitoring, but was never low (fewer than 10 percent of miles were driven unbelted)
  - Both speeding and sudden accelerations/decelerations increased
- Belt use also was high in the other groups, and increased to virtually 100 percent of miles during the 20 week study
- Speeding and sudden acceleration/deceleration were more difficult to change
  - No experimental group affected both speeding and sudden acceleration to a significant extent
  - The group with the most consistently good results received in-vehicle alerts with the opportunity to correct their behavior before website notification and the parents received report cards

# Percent of teens who reacted in various ways to in-vehicle alerts

alerts changed the way they drove	86
some alerts undeserved	88
alerts distracted them from driving safely	31
did something to drown out alerts	64



# Percent of parents who reacted in various ways to website information

ever checked website	97
checked website regularly	70
checked website less in last month than in first	78
experienced difficulties using website	43
said device/website helped them talk to their teens about driving behavior	97

# Did you drive more safely because device was in your vehicle?

Teen survey

	yes	no
alert and web	95%	5%
alert then web	75%	25%
web only	81%	19%
control	35%	65%
total	72%	28%

# Overall views about system

- Parents thought the most effective system would be an in-vehicle alert with immediate website notification; teens preferred conditional notification
- Virtually all parents would recommend this or a similar device to other parents of teen drivers



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Dedicated to reducing deaths, injuries,  
and property damage on the highway