

Graduated Driver Licensing Night Driving Restrictions and Drivers Aged 16 or 17 Years Involved in Fatal Night Crashes — United States, 2009–2014

Ruth A. Shults, PhD¹; Allan F. Williams, PhD²

Fatal crash risk is higher at night for all drivers, but especially for young, inexperienced drivers (1). To help address the increased crash risk for beginner teen drivers, 49 states and the District of Columbia include a night driving restriction (NDR) in their Graduated Driver Licensing (GDL) system. NDRs have been shown to reduce crashes among newly licensed teens, with higher reductions associated with NDRs starting at 10:00 p.m. or earlier (2–3). However, in 23 states and the District of Columbia, NDRs begin at 12:00 a.m. or later, times when most teen drivers subject to GDL are not driving. CDC analyzed 2009–2014 national and state-level data from the Fatality Analysis Reporting System (FARS) to determine the proportion of drivers aged 16 or 17 years involved in fatal crashes who crashed at night (9:00 p.m.–5:59 a.m.) and the proportion of these drivers who crashed before 12:00 a.m. Nationwide, among 6,104 drivers aged 16 or 17 years involved in fatal crashes during 2009–2014, 1,865 (31%) were involved in night crashes. Among drivers involved in night crashes, 1,054 (57%) crashed before 12:00 a.m. State-level analyses revealed an approximately twofold variation among states in both the proportions of drivers aged 16 or 17 years involved in fatal crashes that occurred at night and the proportions of night fatal crash involvements that occurred before 12:00 a.m. Because nearly all of the night driving trips taken by drivers aged 16 or 17 years end before 12:00 a.m., NDRs beginning at 12:00 a.m. or later provide minimal protection. States could consider updating their NDR coverage to include earlier nighttime hours. This descriptive report summarizes the characteristics of NDRs, estimates the extent to which drivers aged 16 or 17 years drive at night, and describes their involvement in fatal nighttime crashes during 2009–2014. The effects of NDRs on crashes were not evaluated because of the small state-level sample sizes during the 6-year study period.

NDRs are applied when teen drivers receive their GDL provisional license, which permits driving without an adult supervisor in the vehicle under prescribed conditions. NDRs specify the nighttime hours that a teen holding a GDL provisional license may not drive without an adult supervisor. As of January 2012, the District of Columbia and every state except Vermont had an NDR as a cornerstone of their GDL system.* GDL is designed to help young beginner drivers gain experience under lower-risk conditions. Two national evaluations conducted during 1986–2007 and 1996–2007 indicated

* Insurance Institute for Highway Safety. GDL laws history. Effective dates of GDL law components. 2015. Arlington, VA. <http://www.iihs.org/iihs/topics/laws/graduatedlicenseintro>.

INSIDE

- 731 Mumps Outbreak at a University and Recommendation for a Third Dose of Measles-Mumps-Rubella Vaccine — Illinois, 2015–2016
- 735 State and Regional Prevalence of Diagnosed Multiple Chronic Conditions Among Adults Aged ≥18 Years — United States, 2014
- 739 Update: Interim Guidance for Health Care Providers Caring for Pregnant Women with Possible Zika Virus Exposure — United States, July 2016
- 745 Update: Interim Guidance for Prevention of Sexual Transmission of Zika Virus — United States, July 2016
- 748 Notes from the Field: Kratom (*Mitragyna speciosa*) Exposures Reported to Poison Centers — United States, 2010–2015
- 750 QuickStats

Continuing Education examination available at http://www.cdc.gov/mmwr/cme/conted_info.html#weekly.



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

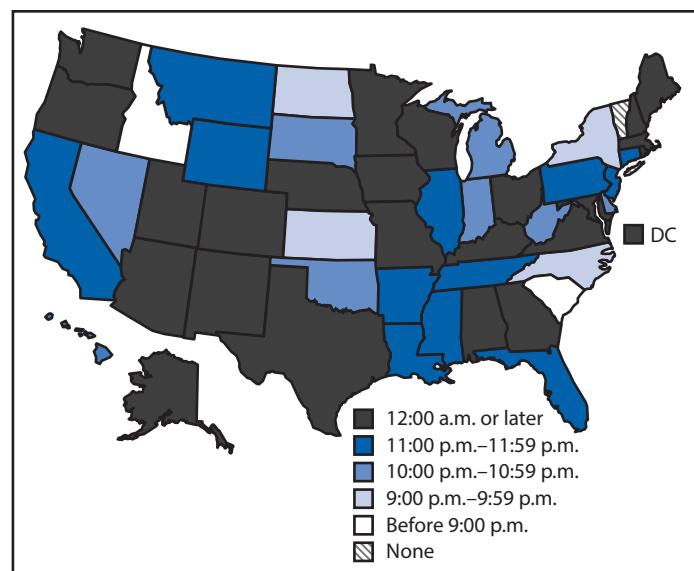
that NDRs reduced crashes among newly licensed teens, with higher reductions associated with NDRs starting at 10:00 p.m. or earlier (2–3). However, in 23 states and the District of Columbia, NDRs begin at 12:00 a.m. or later (Figure).

NDRs also vary in terms of the ages covered. The NDR remains in effect until either the driver reaches a designated age (e.g., 18 years, 0 months), until the provisional license has been held for a specified period (e.g., 6 or 12 months), or some combination of age and time since licensure (e.g., 6 months or aged 18 years, whichever comes first). In 15 states and the District of Columbia, graduation from the NDR is not possible until age 18 years. In the remaining 34 states with an NDR, graduation is possible before age 18 years.

For this study, the ages and hours covered by NDRs were obtained from the compendium of GDL laws maintained by the Insurance Institute for Highway Safety. National estimates of the proportion of trips taken by drivers aged 16 or 17 years by time of day were obtained from the 2009 National Highway Travel Survey (NHTS), the most recent survey.[†] Fatality data were obtained from FARS, a census of fatal traffic crashes maintained by the National Highway Traffic Safety Administration. FARS defines a fatal crash as one in which at least one vehicle occupant or nonoccupant (e.g., bicyclist or pedestrian) involved in a crash died within 30 days of the crash. Analyses were restricted to drivers of passenger vehicles

[†] U.S. Department of Transportation, Federal Highway Administration, 2009 National Household Travel Survey. <http://nhts.ornl.gov>.

FIGURE. Graduated driver licensing night driving restriction starting hours* — United States,[†] 2016



Source: Insurance Institute for Highway Safety (<http://www.iihs.org/iihs/topics/laws/graduatedlicenseintro/mapyoungnighttimerestrictions?topicName=teenagers#map>).

* Night driving restriction starting hours varied by day of the week for the District of Columbia, Illinois, and Mississippi; weekend starting hours are presented.

[†] Long Island does not allow teens with a New York provisional license (junior license) to drive unaccompanied, so there is no need for a night driving restriction.

(i.e., automobiles, sport utility vehicles, pickup trucks, and vans) aged 16 or 17 years. Records of 30 drivers were excluded because the time of the crash was unknown.

The MMWR series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. MMWR Morb Mortal Wkly Rep 2016;65:[inclusive page numbers].

Centers for Disease Control and Prevention

Thomas R. Frieden, MD, MPH, *Director*
 Harold W. Jaffe, MD, MA, *Associate Director for Science*
 Joanne Cono, MD, ScM, *Director, Office of Science Quality*
 Chesley L. Richards, MD, MPH, *Deputy Director for Public Health Scientific Services*
 Michael F. Iademarco, MD, MPH, *Director, Center for Surveillance, Epidemiology, and Laboratory Services*

MMWR Editorial and Production Staff (Weekly)

Sonja A. Rasmussen, MD, MS, *Editor-in-Chief*
 Charlotte K. Kent, PhD, MPH, *Executive Editor*
 Jacqueline Gindler, MD, *Editor*
 Teresa F. Rutledge, *Managing Editor*
 Douglas W. Weatherwax, *Lead Technical Writer-Editor*
 Soumya Dunworth, PhD, Teresa M. Hood, MS,
Technical Writer-Editors

Martha F. Boyd, *Lead Visual Information Specialist*
 Maureen A. Leahy, Julia C. Martinroe,
 Stephen R. Spriggs, Moua Yang, Tong Yang,
Visual Information Specialists
 Quang M. Doan, MBA, Phyllis H. King, Terraye M. Starr,
Information Technology Specialists

MMWR Editorial Board

Timothy F. Jones, MD, *Chairman*
 Matthew L. Boulton, MD, MPH
 Virginia A. Caine, MD
 Katherine Lyon Daniel, PhD
 Jonathan E. Fielding, MD, MPH, MBA
 David W. Fleming, MD

William E. Halperin, MD, DrPH, MPH
 King K. Holmes, MD, PhD
 Robin Ikeda, MD, MPH
 Rima F. Khabbaz, MD
 Phyllis Meadows, PhD, MSN, RN
 Jewel Mullen, MD, MPH, MPA

Jeff Niederdeppe, PhD
 Patricia Quinlisk, MD, MPH
 Patrick L. Remington, MD, MPH
 Carlos Roig, MS, MA
 William L. Roper, MD, MPH
 William Schaffner, MD

National and state-level FARS data from 2009–2014 were examined to determine the proportion of all drivers aged 16 or 17 years involved in fatal crashes (fatal crash involvement) that occurred at night (9:00 p.m.–5:59 a.m.) and the proportion of these drivers who crashed before 12:00 a.m. For the state-level analysis, six states that licensed drivers before age 16 years (Idaho, Montana, New Mexico, North Dakota, South Carolina, and South Dakota) were excluded because drivers could typically graduate from the NDR at age 16 years. Vermont, which does not have an NDR, also was excluded. State-level results were included for the states with ≥20 drivers in fatal crashes (N = 40) and ≥20 drivers in fatal night crashes (N = 30), respectively.

Nationwide, 1,865 (31%) of the 6,104 drivers aged 16 or 17 years involved in fatal crashes during 2009–2014 were involved in night crashes (27% of drivers aged 16 years and 33% of drivers aged 17 years). Among drivers involved in night crashes, 1,054 (57%) crashed before 12:00 a.m. (60% of drivers aged 16 years and 55% of drivers aged 17 years). According to the 2009 NHTS data, drivers aged 16 or 17 years took an estimated 3.4 billion trips, with 10% ending during 9:00 p.m.–11:59 p.m. and 0.8% ending during 12:00 a.m.–5:59 a.m.; 93% of night trips ended before 12:00 a.m. (Table 1).

Among the 40 included states, 20 had NDRs that began at 12:00 a.m. or later as of December 31, 2014 (Table 2). Seven states either implemented an NDR or updated their NDR early in the 6-year study period (Table 2). Five NDRs had mixed starting times, depending on day of week, month, age, or length of time a license had been held; details are available at the Insurance Institute for Highway Safety website (<http://www.iihs.org>). In 13 states, the youngest exit age was 18 years, and in the 27 remaining NDRs, exit ages ranged from 16 years, 6 months to 17 years, 11 months.

Across the 40 included states, the proportion of drivers aged 16 or 17 years involved in fatal crashes that occurred at night varied from 19% in Kentucky to 44% in New Hampshire (median = 31%) (Table 3). The proportion of drivers aged 16 or 17 years involved in night fatal crashes that occurred before 12:00 a.m. varied from 35% in Washington to 78% in Indiana (median = 56%) across the 30 included states.

Discussion

Approximately one third (31%) of U.S. drivers aged 16 or 17 years involved in fatal crashes during 2009–2014 crashed during the night hours of 9:00 p.m.–5:59 a.m., hours during which only about 11% of all trips made by these drivers occurred. These findings illustrate the increased risk for fatal crashes associated with nighttime versus daytime driving for newly licensed teens. The increased risk is attributed in part to teens' inexperience with driving in the dark and high-risk behaviors, such as speeding, driving after drinking alcohol, and carrying teen passengers (4–6).

Nearly all (93%) of the night trips taken by drivers aged 16 or 17 years ended before 12:00 a.m. However, 23 states and the District of Columbia currently have NDRs that begin at 12:00 a.m. or later. State-level analyses revealed an approximately twofold variation among states in both the proportions of all drivers aged 16 or 17 years involved in fatal crashes that occurred at night and the proportions of night fatal crash involvements that occurred before 12:00 a.m. These results illustrate the importance of each state examining and balancing the unique needs for both mobility and safety of their teen population, particularly related to nighttime travel.

The findings in this report are subject to at least four limitations. First, the NHTS was last conducted in 2009. Whether national driving patterns among teens aged 16 or 17 years have changed since then is unknown. Second, because of the sharp decline in fatal crash involvement by drivers aged 16 or 17 years in the past decade (1), 6 years of FARS data were needed to provide state-level sample sizes of ≥20 for most states. Data for the entire study period from Arkansas and Kansas, which implemented NDRs in 2009 and 2010, respectively, were included. Third, the FARS analysis included all drivers aged 16 or 17 years involved in fatal crashes without regard to whether or not they were subject to their state's NDR. Therefore, the reported fatal crash involvements should not be interpreted to indicate that teen drivers were noncompliant with their state's NDR. Finally, caution should be used in interpreting the differences in proportions of night fatal crash involvements among states. In addition to differences in NDR coverage and small state-level sample sizes, other factors that vary by state,

TABLE 1. Estimated annual number and proportion of trips taken by drivers aged 16 or 17 years, by time of day — United States, 2009

Age group (yrs)	Driver trips by end time*			
	6:00 a.m.–8:59 p.m.		12:00 a.m.–5:59 a.m.	
	No. (millions) (%)	No. (millions) (%)	No. (millions) (%)	Total
16	1,047 (31)	102 (3)	8 (0.2)	1,158 (34)
17	2,012 (59)	230 (7)	17 (0.6)	2,260 (66)
Total	3,060 (90)	332 (10)	24 (0.8)	3,417 (100)

Source: National Household Travel Survey. <http://nhts.ornl.gov>.

* Some numbers and proportions do not add to their totals because of rounding.

TABLE 2. Distribution of characteristics of graduated driver licensing night driving restrictions — 40 states,* 2014

Night driving restriction characteristic†	No. of states
Starting hours§	
9:00 p.m.	3
10:00 p.m.	6
11:00 p.m.	10
11:30 p.m.	1
12:00 a.m.	15
12:30 a.m.	2
1:00 a.m.	3
Ending hours§	
4:00 a.m.	3
5:00 a.m.	28
6:00 a.m.	9
Youngest exit age group	
18 yrs, 0 mos	13
17 yrs, 11 mos	1
17 yrs, 0 mos	17
16 yrs, 9 mos	3
16 yrs, 6 mos	6

* Alaska, District of Columbia, Hawaii, and Rhode Island were excluded because they had <20 drivers aged 16 or 17 years involved in fatal crashes during 2009–2014; Idaho, Montana, New Mexico, North Dakota, South Carolina, and South Dakota were excluded because they permit licensure before age 16 years; Vermont was excluded because it did not have a night driving restriction.

† Arkansas introduced a night driving restriction on July 30, 2009; Kansas introduced a night driving restriction on January 1, 2010; Indiana modified the start times from 11:00 p.m./1:00 a.m. to 10:00 p.m./11:00 p.m. effective July 1, 2009; Oklahoma modified the start time from 11:00 p.m. to 10:00 p.m. effective November 11, 2009; West Virginia modified the start time from 11:00 p.m. to 10:00 p.m. effective July 1, 2009; Michigan modified the start time from 12:00 a.m. to 10:00 p.m. effective March 30, 2011; New Jersey modified the start time from 12:00 a.m. to 11:00 p.m. effective May 1, 2010.

§ Five states had varying starting hours depending on day of the week (Illinois, Mississippi; weekend hours are presented), driver age (Florida), or length of time the driver has been licensed (Indiana, Ohio).

such as rurality and alcohol-impaired driving, contribute to nighttime crash risk among teens.

Because approximately one third of fatal crash involvements by drivers aged 16 or 17 years occur at night, broader implementation of targeted strategies to reduce the risk for these night crashes seems warranted. Because nearly all of the night driving trips taken by drivers aged 16 or 17 years end before 12:00 a.m., NDRs beginning at 12:00 a.m. or later provide minimal protection. States could consider updating their NDR coverage to include earlier nighttime hours (1–4,7–10).

Summary

What is already known about this topic?

Driving at night increases the risk for fatal crashes all drivers, especially for young, inexperienced drivers. In recognition of this increased risk, 49 states and the District of Columbia include a night driving restriction (NDR) in their Graduated Driver Licensing (GDL) system. However, in 23 states and the District of Columbia, NDRs begin at 12:00 a.m. or later, times when most teen drivers subject to GDL are not driving.

What is added by this report?

Approximately one third (31%) of U.S. drivers aged 16 or 17 years involved in fatal crashes during 2009–2014 crashed during the night hours of 9:00 p.m.–5:59 a.m. Among drivers involved in night crashes, 57% crashed before 12:00 a.m. State-level analyses revealed an approximately twofold variation among states in both the proportions of all drivers aged 16 or 17 years involved in fatal crashes that occurred at night and the proportions of night fatal crash involvements that occurred before 12:00 a.m.

What are the implications for public health practice?

Because nearly all of the night driving trips taken by drivers aged 16 or 17 years end before 12:00 a.m., NDRs beginning at 12:00 a.m. or later provide minimal protection. As states examine strategies to further reduce total fatal crashes among newly licensed teen drivers, they could consider updating their NDR to include earlier nighttime hours. The study results illustrate the importance of each state examining and balancing the unique needs for both mobility and safety of their teen population, particularly related to nighttime travel.

Extending the exit age requirement to 18 years has been recommended (8), although its effectiveness has not been fully evaluated. GDL resources tailored for use by decision makers and practitioners are available online (7–10). In addition, communities could fully enforce laws known to reduce fatal crashes involving teen drivers, including primary seat belt laws and minimum legal drinking age laws.§

§ The Guide to Community Preventive Services. Motor vehicle-related injury prevention. <http://www.thecommunityguide.org/mvoi/index.html>.

TABLE 3. Night driving restrictions, the proportion of all drivers aged 16 or 17 years involved in fatal crashes that occur at night (9:00 p.m.–5:59 a.m.), and the proportion of drivers aged 16 or 17 years involved in night fatal crashes that occur before 12:00 a.m. — 40 states,* 2009–2014

State	Night driving restriction (NDR) hours	NDR earliest exit age (yrs)	Total no. drivers in fatal crashes†	No. of drivers in fatal crashes that occurred at night	Proportion of drivers in fatal crashes that occurred at night (%)	No. of drivers in night fatal crashes that occurred before 12:00 a.m.	Proportion of drivers in night fatal crashes that occurred before 12:00 a.m. (%)
Alabama	12:00 a.m.–6:00 a.m.	17	240	65	27	35	54
Arizona	12:00 a.m.–5:00 a.m.	16.5	125	39	31	22	56
Arkansas	11:00 p.m.–4:00 a.m.	18	94	26	28	14	54
California	11:00 p.m.–5:00 a.m.	17	299	105	35	56	53
Colorado	12:00 a.m.–5:00 a.m.	17	99	27	27	15	56
Connecticut	11:00 p.m.–5:00 a.m.	18	35	11	31	—§	—§
Delaware	10:00 p.m.–6:00 a.m.	17	21	8	38	—	—
Florida	11:00 p.m.–6:00 a.m. or 1:00 a.m.–5:00 a.m.**	18	351	114	32	56	49
Georgia	12:00 a.m.–5:00 a.m.	18	253	71	28	49	69
Illinois	10:00 or 11:00 p.m.–6:00 a.m.**	18	216	53	25	33	62
Indiana	10:00 or 11:00 p.m.–5:00 a.m.**	18	154	40	26	31	78
Iowa	12:30 a.m.–5:00 a.m.	17	80	27	34	11	41
Kansas	9:00 p.m.–5:00 a.m.	16.5	95	35	37	19	54
Kentucky	12:00 a.m.–6:00 a.m.	17	141	27	19	19	70
Louisiana	11:00 p.m.–5:00 a.m.	17	145	57	39	33	58
Maine	12:00 a.m.–5:00 a.m.	16.75	33	12	36	—	—
Maryland	12:00 a.m.–5:00 a.m.	18	69	24	35	13	54
Massachusetts	12:30 a.m.–5:00 a.m.	18	56	21	38	11	52
Michigan	10:00 p.m.–5:00 a.m.	17	212	71	33	39	55
Minnesota	12:00 a.m.–5:00 a.m.	16.5	104	23	22	14	61
Mississippi	10:00 or 11:30 p.m.–6:00 a.m.**	16.5	140	41	29	25	61
Missouri	1:00 a.m.–5:00 a.m.	17.9	218	72	33	42	58
Nebraska	12:00 a.m.–6:00 a.m.	17	64	16	25	—	—
Nevada	10:00 p.m.–5:00 a.m.	18	34	11	32	—	—
New Hampshire	1:00 a.m.–4:00 a.m.	18	27	12	44	—	—
New Jersey	11:00 p.m.–5:00 a.m.	18	86	28	33	17	61
New York	9:00 p.m.–5:00 a.m.	17	148	52	35	35	67
North Carolina	9:00 p.m.–5:00 a.m.	16.5	255	71	28	39	55
Ohio	12:00 a.m.–6:00 a.m. or 1:00 a.m.–5:00 a.m.**	18	223	60	27	34	57
Oklahoma	10:00 p.m.–5:00 a.m.	16.5	164	56	34	33	59
Oregon	12:00 a.m.–5:00 a.m.	17	51	12	24	—	—
Pennsylvania	11:00 p.m.–5:00 a.m.	17	213	69	32	39	57
Tennessee	11:00 p.m.–6:00 a.m.	17	192	50	26	34	76
Texas	12:00 a.m.–5:00 a.m.	18	551	181	33	99	55
Utah	12:00 a.m.–5:00 a.m.	17	63	12	19	—	—
Virginia	12:00 a.m.–4:00 a.m.	18	130	48	37	27	56
Washington	1:00 a.m.–5:00 a.m.	17	93	23	25	8	35
West Virginia	10:00 p.m.–5:00 a.m.	17	48	15	31	—	—
Wisconsin	12:00 a.m.–5:00 a.m.	16.75	124	41	33	21	51
Wyoming	11:00 p.m.–5:00 a.m.	16.75	24	7	29	—	—

* Alaska, District of Columbia, Hawaii, and Rhode Island were excluded because they had <20 drivers aged 16 or 17 years involved in fatal crashes during 2009–2014; Idaho, Montana, New Mexico, North Dakota, South Carolina, and South Dakota were excluded because they permit licensure before age 16 years; Vermont was excluded because it did not have a night driving restriction.

† Thirty records were excluded because the time of crash was unknown.

§ Numbers and proportions suppressed because night crashes <20.

** Five states had varying starting hours depending on day of the week (Illinois, Mississippi), driver age (Florida), or length of time the driver has been licensed (Indiana and Ohio).

Acknowledgment

Tonja Lindsey, National Highway Traffic Safety Administration.

¹Division of Unintentional Injury Prevention, National Center for Injury Prevention and Control, CDC; ²Allan F. Williams, Bethesda, Maryland.

Corresponding author: Ruth A. Shults, rshults@cdc.gov, 770-488-4638.

References

- McCartt AT, Teoh ER. Tracking progress in teenage driver crash risk in the United States since the advent of graduated driver licensing programs. J Safety Res 2015;53:1–9. <http://dx.doi.org/10.1016/j.jsr.2015.01.001>
- Masten SV, Foss RD, Marshall SW. Graduated driver licensing program component calibrations and their association with fatal crash involvement. Accid Anal Prev 2013;57:105–13. <http://dx.doi.org/10.1016/j.aap.2013.04.013>

3. McCart AT, Teoh ER, Fields M, Braitman KA, Hellinga LA. Graduated licensing laws and fatal crashes of teenage drivers: national study. *Traffic Inj Prev* 2010;11:240–8. <http://dx.doi.org/10.1080/15389580903578854>
4. Carpenter D, Pressley JC. Graduated driver license nighttime compliance in U.S. teen drivers involved in fatal motor vehicle crashes. *Accid Anal Prev* 2013;56:110–7. <http://dx.doi.org/10.1016/j.aap.2011.12.014>
5. Williams AF, West BA, Shults RA. Fatal crashes of 16- to 17-year-old drivers involving alcohol, nighttime driving, and passengers. *Traffic Inj Prev* 2012;13:1–6. <http://dx.doi.org/10.1080/15389588.2011.633235>
6. Rice TM, Peek-Asa C, Kraus JF. Nighttime driving, passenger transport, and injury crash rates of young drivers. *Inj Prev* 2003;9:245–50. <http://dx.doi.org/10.1136/ip.9.3.245>
7. National Highway Traffic Safety Administration. Countermeasures that work: a highway safety countermeasure guide for state highway safety offices. 8th ed. Washington, DC: National Highway Traffic Safety Administration; 2016. www.nhtsa.gov/staticfiles/nti/pdf/812202-CountermeasuresThatWork8th.pdf
8. Mayhew DR, Williams AF, Pashley C. A new GDL framework: evidence base to integrate novice driver strategies. Ottawa, Canada: Traffic Injury Research Foundation; 2014. http://www.nsc.org/TeenDrivingDocuments/NSC_GDL_Report%20_6.pdf
9. Insurance Institute for Highway Safety. GDL crash reduction calculator. Arlington, VA: Insurance Institute for Highway Safety; 2016. http://www.iihs.org/iihs/topics/laws/gdl_calculator
10. CDC. 2016. Prevention status Reports 2015: motor vehicle injuries. Atlanta, GA: US Department of Health and Human Services, CDC; 2015. <http://www.cdc.gov/psr/index.html>