

Countermeasures That Work:

A Highway Safety Countermeasure Guide For State Highway Safety Offices Ninth Edition, 2017



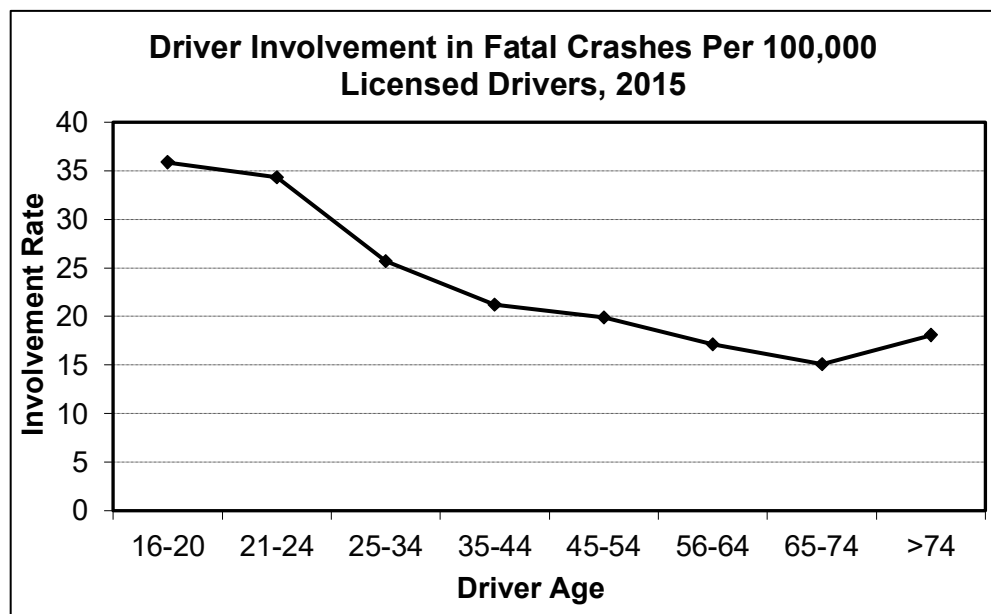
U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**



6. Young Drivers

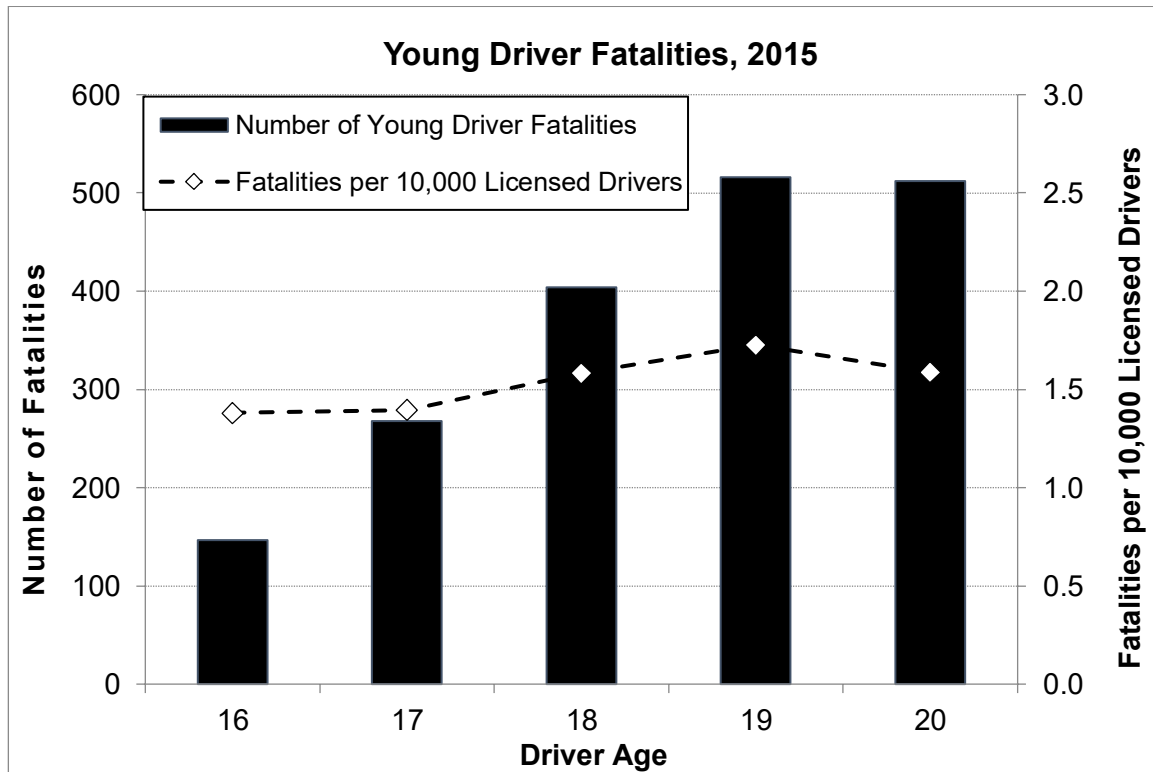
Overview

Motor vehicle crashes are the leading cause of death for teenagers in the United States. In 2015, 1,886 drivers 15 to 20 years old were killed and an estimated 195,000 were injured in motor vehicle crashes (NCSA, 2017). In comparison with adult drivers, young drivers are substantially over-involved in crashes. In 2015, drivers 15 to 20 made up 5.4% of licensed drivers in the United States, yet they made up 9% of total drivers in fatal crashes, and 12% of drivers in all crashes (NCSA, 2017). As shown in the figure below, drivers 16 to 20 years old have the highest involvement in fatal crashes of any age group.



Source: NHTSA (2017), Table 62

As shown in the figure below, young driver involvement in fatal crashes increases with age. However, the rate of young driver fatalities per 10,000 licensed drivers is relatively stable - between 1.0 and 1.6.



Sources: NCSA (2017), FHWA (2016)

Per mile driven, young drivers are even more over-involved than older drivers. In 2008 drivers 16 to 19 years old were involved in 4.6 fatal crashes per 100 million miles of travel, compared to 3.8 for drivers 20 to 24 and 1.2 for drivers 30 to 59 years old (McCartt & Teoh, 2014). Only 37% of the people killed in young driver crashes are the teen driver themselves; the majority of fatalities in young driver crashes (63%) are passengers of the teen driver, occupants of other vehicles, or nonmotorists (Shults & Ali, 2010).

Trends. From 2006 to 2015 there was a 43% decrease in the number of young drivers (aged 15 to 20) involved in fatal crashes, compared to a 16% decrease in all drivers involved during the same period (NCSA, 2017). The number of young drivers involved in police reported crashes decreased 13% from 2006 to 2015 (NCSA, 2008; NCSA, 2015). The reasons for the reductions in fatal and police-reported crashes among young drivers are not entirely known; however, it is noteworthy that most States implemented new, multi-stage licensing systems during this time period.

Young-driver characteristics. Young drivers have high crash risks for two main reasons, as documented by extensive research summarized in Hedlund, Shults, and Compton (2003). First, they are inexperienced, just learning to drive. The mechanics of driving require much of their attention, so safety considerations frequently are secondary. They do not have experience in recognizing potentially risky situations or in reacting appropriately and controlling their vehicles in these situations. Second, normal adolescent development involves an increase in novelty seeking and risk taking behaviors (Kelley, Schochet, & Landry, 2004). In fact, research on adolescent development suggests that key areas of the brain involved in judgments and decision making are not fully developed until the mid-20s (Dahl, 2008; Keating, 2007; Steinberg, 2007).

Inexperience makes certain circumstances more dangerous for younger drivers. In addition, immaturity increases the likelihood of young drivers putting themselves in risky circumstances. NHTSA has identified five areas of concern in relation to younger drivers:

- **Nighttime Driving:** Driving is more difficult and dangerous at night for everyone, but particularly for teenagers. Young drivers have less experience driving at night than during the day, and drowsiness and alcohol may be more of a factor at night (Lin & Fearn, 2003; Williams, 2003).
- **Drinking and Driving:** Young drivers' inexperience with both driving and drinking means that they have a higher crash risk at all BAC levels than older drivers (Voas, Torres, Romano, & Lacey, 2012; Williams, 2003).
- **Passenger Interactions:** Teenage passengers can distract young drivers and encourage them to take risks (Foss & Goodwin, 2014; Lin & Fearn, 2003; Williams, 2003).
- **Belt Use:** Seat belts reduce the risk of injury or fatality in a crash (see Chapter 2, Overview), but teenage drivers and passengers have slightly lower belt use rates than older drivers and passengers (Ferguson, 2003).
- **Cell Phone Use:** All drivers are at higher risk when talking or texting (see Appendix A4, Section 1.2); however, young drivers have more difficulty handling distractions (Lee, 2007).

Strategies to Reduce Crashes Involving Young Drivers

Graduated driver licensing (GDL) addresses both the inexperience and immaturity of young drivers. GDL provides a structure in which beginning drivers gain substantial driving experience in less-risky situations. GDL raises the minimum age of full licensure and helps parents manage their teenage drivers. GDL's effectiveness in reducing young driver crashes has been demonstrated many times (Masten, Foss, & Marshall, 2013; Russell, Vandermeer, & Hartling, 2011; Shope, 2007; Simpson, 2003; Williams, Tefft, & Grabowski, 2012).

Driver education was developed to teach both driving skills and safe driving practices. Based on evaluations to date, driver education for beginning drivers does a good job at teaching driving skills, but has not definitively been shown to reduce the number of crashes or crash rate. Rather, some research has suggested that it lowers the age at which teenagers become licensed, and therefore increases exposure, so its overall effect is to *increase* the number of crashes (Roberts et al., 2006; Thomas, Blomberg, & Fisher, 2012a; Vernick et al., 1999). Current research is investigating ways to integrate driver education with GDL and is developing second-level programs for drivers who have acquired basic driving skills and have been, or are nearing, licensure. Driver education must be combined with an effective GDL program that does not allow a lower licensing age. Many States have completed NHTSA-sponsored driver education assessments in an effort to strengthen their programs and align with national standards.

Parents play a key role in their teenagers' driving. In many States a parent or guardian must sign the driver's license application for a teenager under 18 and parents can withdraw their approval at any time. Parents can set limits on their teenagers' driving. In addition, parents can be involved explicitly and formally through GDL requirements such as minimum hours of supervised driving practice, or they can be involved voluntarily and informally. Several parent-

teen driving guide programs can provide assistance. At least one driving guide program has successfully encouraged parents to impose more driving restrictions on their teens (Simons-Morton, 2007). Recently, technologies have become available to assist parents in monitoring their newly licensed teen driver. When combined with a comprehensive system for providing feedback to parents and teens, these technologies have been promising in reducing the incidence of risky driving behaviors among teens (Carney, McGehee, Lee, Reyes, & Raby, 2010; Farah et al., 2014; McGehee, Raby, Carney, Lee, & Reyes, 2007; Simons-Morton et al., 2013). Finally, several States are now requiring parent involvement in driver education, usually in the form of a mandatory parent orientation class. All of these approaches are promising, though none have been shown as of yet to reduce young driver crashes or fatalities.

Young drivers are subject to several traffic laws that apply only to them. GDL systems have been adopted by all 50 States to help novices gain experience in safe settings. Minimum legal drinking age (MLDA) and zero-tolerance BAC laws apply specifically to persons under 21, and are discussed in Chapter 1. In addition, a number of States have restrictions on cell phone use and texting that apply only to young drivers (see Appendix A4, Section 1.2). With all of these, enforcement is critical if the laws are to have any effect. The law enforcement system faces several problems when dealing with young drivers. In deciding whether to make a traffic stop, it can be difficult for law enforcement officers to determine a person's age to know whether GDL and zero-tolerance laws apply. It has been suggested that a vehicle decal identifying a driver as "young" and subject to GDL requirements, may be beneficial for enforcement reasons. New Jersey is the first State to pass legislation requiring young drivers subject to GDL restrictions to be identified via a vehicle decal. Recent studies examining the effectiveness of the decal requirement in New Jersey found that citations for violations of licensing restrictions sharply increased and police reported crashes decreased the year after the decal requirement went into effect (Curry, Pfeiffer, Localio, & Durbin, 2013; McCartt, Oesch, Williams, & Powell 2012). Even if the driver is young, teens may only be stopped for a primary offense, such as speeding. Once stopped, there may be a tendency for officers in some situations not to make arrests or for prosecutors to dismiss charges because the offender is "just a kid." Finally, the legal system imposes additional requirements for people under the age of legal adulthood (18 in most States). See NHTSA and NIAAA (1999) for a discussion of these requirements and processes for alcohol-related offenses.

Young drivers are discussed in other chapters of this guide. See:

- Chapter 1, Alcohol-Impaired Driving, Sections 6.1-6.4 (minimum-drinking-age-21 laws, zero-tolerance BAC laws, school and youth alcohol programs).
- Chapter 4, Distracted and Drowsy Driving, Sections 1.1 and Appendix A4, Sections 2.1, 2.2, and 3.1 (GDL requirements, communications and outreach, and employer programs).
- Appendix A5, Motorcycle Safety, Section 3.1 (GDL for motorcyclists).

Except for GDL requirements applying to automobile drivers, these discussions are not repeated in this chapter.

Environmental and vehicular strategies can improve safety for young drivers, as they can for all drivers. However, these types of countermeasures are not included because State Highway Safety Offices do not have authority or responsibility in these areas.

Resources

The agencies and organizations listed below can provide more information on young drivers and links to numerous other resources.

- National Highway Traffic Safety Administration:
 - Teen Drivers – www.nhtsa.gov/road-safety/teen-driving; one.nhtsa.gov/Driving-Safety/Teen-Drivers
 - Driver Safety Research Reports: New Drivers – one.nhtsa.gov/Driving-Safety/Research-&-Evaluation/Driver-Safety-Research-Reports:-New-Drivers-and-Older-Drivers
 - Behavioral Safety Research Reports – ntlsearch.bts.gov/tris/ntlc/nhtsa/index.shtm
- Centers for Disease Control and Prevention: www.cdc.gov/Motorvehiclesafety/Teen_Drivers/index.html
- Governors Highway Safety: Association: www.ghsa.org/html/issues/teens/index.html
- Insurance Institute for Highway Safety: www.iihs.org/iihs/topics/t/teenagers/topicoverview
- National Safety Council: www.nsc.org/learn/NSC-Initiatives/Pages/teen-driving.aspx
- American Automobile Association: <http://exchange.aaa.com/safety/teen-driver-safety>

For an overview of young-driver issues and research, see the papers in the June 2006 Supplement of *Injury Prevention* (injuryprevention.bmj.com/content/12/suppl_1), the special issue of the 2007 *Journal of Safety Research* (www.sciencedirect.com/science/journal/00224375/38/2), or the special issue of the 2008 *American Journal of Preventive Medicine* (www.ajpmonline.org/issue/S0749-3797%2808%29X0014-5). See also Williams et al. (2012) for a summary of much of the research on young driver issues. Additionally, an NCHRP Report 500 guide for the American Association of Motor Vehicle Administrators' Strategic Highway Safety Plan provides a detailed discussion of strategies for reducing crashes involving young drivers (Goodwin, Foss, Sohn, & Mayhew, 2007) and GHSA recently published "Curbing Teen Driver Crashes: An In-Depth Look at State Initiatives" (GHSA, 2012) which describes strategies States are currently employing to reduce teen driver crashes.

Young Driver Countermeasures

Countermeasures to improve young-driver safety are listed in the table below. The table is intended to provide a rough estimate of each countermeasure's effectiveness, use, cost, and time required for implementation. Effectiveness is shown using a five-star rating system:

- Countermeasures that receive ★★★★★ or ★★★★★★ have been determined to be effective.
- Countermeasures that receive ★★★ are considered promising, and likely to be effective.
- Countermeasures that receive ☆ or ☆☆ have NOT been determined to be effective, either because there has been limited or no high quality evidence (☆) or because effectiveness is still undetermined based on the evidence that is available (☆☆).

States, communities and other organizations are encouraged to use ★★★, and especially ★★★★★ or ★★★★★★, countermeasures. They should use caution in selecting ☆ or ☆☆ countermeasures, since conclusive evidence is not available to demonstrate the effectiveness of these countermeasures. If they decide to use a new or emerging countermeasure that has not yet been studied sufficiently to demonstrate that the countermeasure is effective, they are encouraged to have the countermeasure evaluated in connection with its use.

Further details about the symbols and terms used are included after the table. Effectiveness, cost, and time to implement can vary substantially from State to State and community to community. Costs for many countermeasures are difficult to measure, so the summary terms are very approximate.

Each countermeasure to improve young-driver safety is discussed individually in this chapter. Full descriptions are included for ★★★, ★★★★★ and ★★★★★★ countermeasures. Brief descriptions are included for ☆ and ☆☆ countermeasures. Further details about the ☆ and ☆☆ countermeasures are included in Appendix A6 to this report.

1. Graduated Driver Licensing

Countermeasure	Effectiveness	Cost	Use	Time
1.1 Graduated Driver Licensing (GDL)	★★★★★	\$	High	Medium
1.2 Learner's Permit Length, Supervised Hours	★★★★★	\$	High	Medium
1.3 Intermediate – Nighttime Restrictions	★★★★★	\$	High	Medium
1.4 Intermediate – Passenger Restrictions	★★★★★	\$	High	Medium
1.5 Cell Phone Restrictions	☆☆	\$	Medium	Medium
1.6 Belt Use Requirements	☆☆	\$	Low	Medium
1.7 Intermediate – Violation Penalties	☆	\$	High	Medium

2. Driver Education

Countermeasure	Effectiveness	Cost	Use	Time
2.1 Pre-Licensure Driver Education	☆☆	\$\$\$	Medium	Long
2.2 Post-Licensure Driver Education	☆	\$\$\$	Low	Long

3. Parents

Countermeasure	Effectiveness	Cost	Use	Time
3.1 Parent Roles in Teaching and Managing Young Drivers	☆☆	\$\$	Medium	Short

4. Traffic Law Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
4.1 Enforcement of GDL and Zero-Tolerance Laws	★★★	\$\$	Unknown	Short

Effectiveness:

- ★★★★★ - Demonstrated to be effective by several high-quality evaluations with consistent results
- ★★★★ - Demonstrated to be effective in certain situations
- ★★★ - Likely to be effective based on balance of evidence from high-quality evaluations or other sources
- ☆☆ - Effectiveness still undetermined; different methods of implementing this countermeasure produce different results
- ☆ - Limited or no high-quality evaluation evidence

Effectiveness is measured by reductions in crashes or injuries unless noted otherwise. See individual countermeasure descriptions for information on effectiveness size and how effectiveness is measured.

Cost to implement:

- \$\$\$: requires extensive new facilities, staff, equipment, or publicity, or makes heavy demands on current resources
- \$\$: requires some additional staff time, equipment, facilities, and/or publicity
- \$: can be implemented with current staff, perhaps with training; limited costs for equipment or facilities

These estimates do not include the costs of enacting legislation or establishing policies.

Use:

- High: more than two-thirds of the States, or a substantial majority of communities
- Medium: between one-third and two-thirds of States or communities
- Low: fewer than one-third of the States or communities
- Unknown: data not available

Time to implement:

Long: more than 1 year

Medium: more than 3 months but less than 1 year

Short: 3 months or less

These estimates do not include the time required to enact legislation or establish policies.

1. Graduated Driver Licensing

1.1 Graduated Driver Licensing

Effectiveness: ★ ★ ★ ★ ★	Cost: \$	Use: High	Time: Medium
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GDL is a three-phase system for beginning drivers, consisting of a learner's permit, an intermediate license, and a full license. A learner's permit allows driving only while supervised by a fully licensed driver. An intermediate license allows unsupervised driving under certain restrictions. These usually include limits on driving at night or with teenage passengers. The learner's permit and the intermediate license each must be held for a specified minimum period of time.

GDL serves two functions: reducing risk and reducing exposure. GDL allows beginning drivers to acquire driving experience in less-risky situations, under direct supervision during the learner's permit phase. It helps young drivers avoid dangerous conditions such as late-night driving or driving with teenage passengers in the vehicle during the intermediate phase. GDL delays full licensure by requiring a minimum time in both the learner's permit and intermediate phases. Compared to earlier requirements in many jurisdictions, where beginning drivers could receive a full license at 16 (and sometimes earlier) by passing a minimal driving test, GDL reduces the amount of driving by 16-year-olds. GDL also assures that young drivers are more mature when they receive their first unrestricted license. In surveys, both parents and teenagers strongly support GDL overall (Williams, Ferguson, Leaf, & Preusser, 1998). Based on a recent national survey, the majority of parents support GDL policies that are as strong as, or even stronger, than policies currently in place in the United States (Williams, Braitman, & McCartt, 2011).

All States now have some form of GDL in place. However, as of October 2011, no State GDL systems met all of the qualification criteria set forth by MAP-21 for GDL incentive grants. Some States, for example, have night restrictions beginning later than 10 p.m., or allow teens to carry more than one passenger younger than 21. GHSA (2014a) and IIHS (2014a) document GDL laws in each State. These websites are updated monthly. The papers in the special issue of the 2007 *Journal of Safety Research* describe GDL's history, components, effectiveness, parental roles, potential enhancements, and research needs. Strategies for implementing or improving GDL systems are described in NCHRP's *Guide for Reducing Collisions Involving Young Drivers* (Goodwin, Foss, Sohn, & Mayhew, 2007, strategies A1 through A5). See also NHTSA's *Traffic Safety Facts* on GDL (NHTSA, 2008) and Report to Congress (Compton & Ellison-Potter, 2008), and the Traffic Injury Research Foundation's *New GDL Framework: Evidence Base to Integrate Novice Driver Strategies* (Mayhew, 2014).

Use: All States and the District of Columbia had some GDL components in place as of August 2014. In addition, all States and the District of Columbia had a three-phase GDL system in place (GHSA, 2014a; IIHS, 2014a).

Effectiveness: GDL's effectiveness in reducing young driver crashes and fatalities has been well-documented (Baker, Chen, & Li, 2007; Chapman, Masten, & Browning, 2014; Fell, Jones,

Romano, & Voas, 2011; Lyon, Pan, & Li, 2012; McCartt, Teoh, Fields, Braitman, & Hellinga, 2010; Masten, Foss, & Marshall, 2011; Masten et al., 2013; Masten et al., 2015; Russel et al., 2011; Shope, 2007; Simpson, 2003). The most restrictive GDL programs – those with at least a 6-month holding period during the learner stage, a night restriction beginning no later than 10 p.m., and restrictions allowing no more than one teen passenger – are associated with a 38% reduction in fatal crashes and a 40% reduction in injury crashes among 16-year-old drivers (Baker et al., 2007). In addition to reducing crashes, GDL is associated with declines in hospitalization rates and charges for 16-year-old drivers (Margolis, Masten, & Foss, 2007; Pressley, Benedicto, Trieu, Kendig, & Barlow, 2009).

Costs: GDL's primary costs result from the intermediate license, which adds to licensing agency workload by requiring each beginning driver to receive three licenses in succession rather than two. These costs are typically covered by small fees charged by the licensing agency.

Time to implement: Licensing changes typically require up to a year to plan, publicize, and implement.

Other issues:

- **Age of licensure:** In recent years, there has been discussion about the most appropriate age for allowing teenagers to drive independently (Williams, 2009; Williams, McCartt, Mayhew, & Watson, 2013). Licensing ages vary from State to State, from a low of 14½ in South Dakota to a high of 17 in New Jersey. Delaying licensure, either through higher entry ages or GDL requirements such as extended learner stages, can reduce young driver crashes. For example, New Jersey's GDL system has eliminated most crashes among 16-year-old drivers, and has reduced crashes among 17-year-olds by 16% (Williams, Chaudhary, Tefft, & Tison, 2010). However, a national study found a significant increase in fatal crash rates among 18-year-olds associated with stronger GDL components (Masten et al., 2011). In addition, licensure rates have decreased among young teenagers during recent years (HLDI, 2013; Shults & Williams, 2013). Thus, there is concern that teens may be delaying licensure until they are 18 or older in order to avoid GDL provisions, thus leading them to miss out on the safety benefits of GDL. Based on findings from additional studies, it appears the economic recession and lack of employment for young teenagers has been the driving force behind the delay of licensure and not avoidance of GDL, specifically (HLDI, 2013; Tefft, Williams, & Grabowski, 2013a; Williams, 2011).

1.2 GDL Learner's Permit Length, Supervised Hours

Effectiveness: ★ ★ ★ ★ ★	Cost: \$	Use: High	Time: Medium
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With a learner's permit, novices can drive when accompanied by an adult supervisor. The learner's permit allows and encourages beginning drivers to acquire substantial driving experience. To aid this, most States require the learner's permit to be held for a minimum period of time and most require a minimum number of supervised driving hours. Surveys show that parents and teenagers strongly support the learner's permit holding period and supervised driving requirements (Block & Walker, 2008; Mayhew, 2003; McKay, Coben, Larkin, & Shaffer, 2008).

Use: As of August 2014, 48 States and the District of Columbia required learner's permits to be held for at least 6 months, with 8 of these States requiring a minimum holding period of a full year. However, two States (Connecticut and South Dakota) reduce the required length of time for a permit to be held if the young driver completed driver's education (IIHS, 2014a).

Forty-Six States and the District of Columbia required some minimum number of supervised driving hours, about half of them requiring 50 hours. Forty-Two States plus the District of Columbia required that at least some of these hours be obtained at night. In addition, a few States required additional supervised hours to be completed during the intermediate license phase (IIHS, 2014a). Some States reduced or eliminated supervised driving requirements for driver education graduates. This is not recommended, since evidence suggests this practice results in *higher* crash rates among young drivers (Mayhew, 2007).

Effectiveness: Since learner's permit drivers are being supervised, it is not surprising that crash rates during the learner's permit period are very low. For young drivers holding their first unsupervised license, the limited available evidence suggests that crash rates decreased after jurisdictions with no learner's permit holding requirement implemented a 6-month requirement (Ehsani, Bingham, & Shope, 2013; Mayhew, 2003). Moreover, longer permit holding periods appear to result in even larger crash reductions. Masten et al. (2013) found that a 9- to 12-month learner's permit holding period resulted in 26% lower fatal crash incidence among 16-year-old drivers and 17% lower incidence among 17- year-olds. Similarly, Curry et al. (2014) found that intermediate-phase drivers had incrementally smaller increases in crash rates during their initial months of driving independently for every month up to six months that they delayed obtaining full licensure.

However, the effect of supervised hours is currently unclear. Some studies have found supervised hours requirements lead to reductions in fatal crashes, when hourly requirements are combined with a mandatory learner's permit holding period (Baker, Chen & Li, 2006; Lyon et al., 2012). However, recent evaluations have found no relationship between the number of required supervised driving hours and fatal crash involvement among young drivers (Ehsani et al., 2013; Foss, Masten, Goodwin & O'Brien, 2012; Masten et al., 2013; McCartt et al., 2010). Based on telephone interviews with parents in 5 States, only 32% knew the correct number of supervised driving hours their teen was required to complete (Foss et al., 2012; O'Brien, Foss, Goodwin, & Masten, 2013). Therefore, the lack of effect of supervised hours on fatal crash outcomes may be explained, in part, by a lack of parental knowledge of the supervised driving requirements.

Costs: Once GDL is in place, requirements for the learner's permit can be implemented at very little cost.

Time to implement: GDL requirement changes typically require about 6 months to notify the public and implement the changes.

1.3 GDL Intermediate License Nighttime Restrictions

Effectiveness: ★ ★ ★ ★ ★	Cost: \$	Use: High	Time: Medium
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Driving at night increases the fatal crash risk per mile of travel for all drivers, and especially for teenage drivers (Hedlund et al., 2003; Williams, 2003; Tefft, Williams, & Grabowski, 2013b). A recent study found that the rate of driver fatalities was 5 times higher among 16- and 17-year-olds from 10 p.m. to 5:59 a.m. compared to driving during the day (Tefft et al., 2013b). At night, driving is more difficult, driver drowsiness is more common, and alcohol is more likely to be used. Many intermediate license drivers have limited experience driving at night. For these reasons, a night driving restriction helps reduce risk for intermediate level drivers.

The restricted hours vary widely, from 6 p.m. to 6 a.m. in the most restrictive State, to 1 a.m. to 5 a.m. in the least restrictive (GHSA, 2014a; IIHS, 2014a). The most common hours are 11 p.m. or midnight to 5 or 6 a.m. However, a starting time earlier than midnight will prevent more crashes, especially since teenage driver crashes occur more frequently before midnight than after (Foss & Goodwin, 2003; Williams, 2003). NHTSA's Motor Vehicle Occupant Safety Survey found that 73% of the general public believe teenagers should not be allowed to drive unsupervised after 9 p.m. (Block & Walker, 2008). Another national survey of parents found 90% support a nighttime driving restriction, with 77% saying it should be 10 p.m. or earlier (Williams et al., 2011).

Use: As of August 2014 there were 49 States and the District of Columbia that restricted intermediate license drivers from driving during specified nighttime hours (the exception is Vermont). Many States allowed driving during the restricted hours for work or school-related activities (GHSA, 2014a; IIHS, 2014a).

Effectiveness: The effectiveness of nighttime driving restrictions in reducing both nighttime driving and nighttime crashes has been demonstrated conclusively (Fell et al., 2011; Hedlund et al., 2003; Hedlund & Compton, 2005; Lin & Fearn, 2003; Lyon et al., 2012; Masten et al., 2013; McCartt et al., 2010). The earlier a night restriction begins, the greater the reduction in crashes. For example, night restrictions that begin at 9 p.m. are associated with an 18% reduction in fatal crashes compared to no restriction. The reduction is only 9% when the night restriction begins at 1 a.m. (McCartt et al., 2010).

Costs: Once GDL is in place, a nighttime driving restriction can be implemented or modified at very little cost.

Time to implement: GDL requirement changes typically require about 6 months to notify the public and implement the changes.

1.4 GDL Intermediate License Passenger Restrictions

Effectiveness: ★ ★ ★ ★ ★	Cost: \$	Use: High	Time: Medium
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Young passengers are associated with a substantial increase in the risk of a fatal crash for teenage drivers (Chen, Baker, Braver, & Li, 2000; Ouimet et al., 2010; Preusser, Ferguson, & Williams, 1998; Tefft et al., 2013b). Each additional passenger is associated with an additional increase in fatal crash risk (Chen et al., 2000; Preusser et al., 1998; Tefft et al., 2013b). Fatal crash risks are highest when young male drivers carry same age passengers, especially if those passengers are also male (Chen et al., 2000; Ouimet et al., 2010; Tefft et al., 2013b).

To reduce this risk, most States include a passenger restriction in their GDL requirements for intermediate licensees. According to NHTSA's Motor Vehicle Occupant Safety Survey, 86% of the general public believe that teenagers should have a restriction on the number of teenage passengers they can carry (Block & Walker, 2008). Also, in a recent national survey 89% of parents say they support passenger restrictions; 82% think the passengers limit should be one or less (Williams et al., 2011).

Use: As of August 2014 there were 46 States and the District of Columbia that restricted in some way the number of passengers who can be carried by an intermediate license driver (GHSA, 2014a; IIHS, 2014a). The most common passenger restrictions limit teenage drivers to zero or just one passenger. Some restrictions apply to all passengers and some only to passengers younger than a specified age. A few States allow exceptions for transporting family or household members.

Effectiveness: There is growing evidence that passenger restrictions are effective in reducing young driver crashes, though the restrictions sometimes are violated (Carpenter & Pressley, 2013; Fell et al., 2011; Goodwin & Foss, 2004; Lyon et al., 2012; Masten et al., 2013; McCartt et al., 2010; Williams, 2007). California allows no passengers younger than 20 for teenagers who hold intermediate licenses. Four studies demonstrate the positive effects of this restriction. For example, one study showed a 38% decrease in 16-year-old-driver crashes in California in which a teen passenger was killed or injured (Williams, 2007). A NHTSA study evaluated passenger restrictions in three States, California, Massachusetts, and Virginia. Results showed 16-year-old-driver crashes were reduced in all three States, as were motor-vehicle-related injuries among 15- to 17-year-olds (Chaudhary, Williams, & Nissen, 2007). In North Carolina, a teen passenger restriction was enacted independent of any other changes to the State's GDL system. Subsequent to this restriction, 16-year-old-driver crashes involving multiple passengers decreased by 32% (Foss, 2009). Recent national studies have also found large crash rate reductions for passenger restrictions. For example, McCartt et al. (2010) found a 21% reduction in fatal crashes among 15- to 17-year-olds when no passengers were permitted and a 7% reduction when one passenger was allowed. Similarly, Masten et al. (2013) found a 20% lower fatal crash rate among 16-year-old drivers and a 12% lower fatal crash rate among 17-year-old drivers when no more than one young passenger was allowed for at least the first six months of independent driving.

Costs: Once GDL is in place, a passenger restriction can be implemented at very little cost.

Time to implement: GDL requirement changes typically require about 6 months to notify the public and implement the changes.

1.5 GDL Cell Phone Restrictions

Effectiveness: ☆☆	Cost: \$	Use: Medium	Time: Medium
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This countermeasure involves States including cell phone restrictions in their GDL laws. These bans cover *all* cell phone use, not just hand-held phones. In some States, the cell phone restrictions cover teenagers holding a learner's permit and intermediate license; in other States, the restrictions cover all drivers under a certain age, such as 18 or 19 (GHSA, 2014b; IIHS, 2014b).

Effectiveness Concerns: *This countermeasure is widely used. Its effectiveness has been examined in a few research studies. Although there have been some positive research findings, the balance of evidence regarding countermeasure effectiveness remains inconclusive.*

Further information about the known research, potential effectiveness, costs, use, and time to implement is available in Appendix A6, Section 1.5.

1.6 GDL Belt Use Requirements

Effectiveness: ☆☆	Cost: \$	Use: Low	Time: Medium
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This countermeasure involves explicitly requiring belt use under their GDL laws. Note that young drivers are covered by seat belt laws in all States (with the exception of New Hampshire, which only requires seat belts for people under 18) (GHSA 2014c; IIHS, 2014c). An explicit belt use requirement in a State's GDL law may have more influence on beginning drivers than the State's overall belt use law. This may be especially true in States where a GDL belt use requirement is coupled with primary enforcement for young drivers, and in States where seat belt violations result in delayed graduation to the next GDL stage.

Effectiveness Concerns: *To date, there has been only one evaluation of the effects of explicit seat belt use requirements in GDL laws. This evaluation found no evidence that the countermeasure had any effect on teen driver belt use (Freedman & Levi, 2008).*

Further information about the known research, potential effectiveness, costs, use, and time to implement is available in Appendix A6, Section 1.6.

1.7 GDL Intermediate License Violation Penalties

Effectiveness: ☆	Cost: \$	Use: High	Time: Medium
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This countermeasure involves a probationary feature included in the intermediate phase of many graduated licensing systems, which is commonly referred to as *contingent advancement*. Typically, contingent advancement means that an intermediate license holder must maintain a violation free driving record for a specified amount of time before they can obtain a full license.

Effectiveness: *The few evaluations of early stand-alone probationary license systems generally found no substantial benefits (McKnight & Peck, 2003; Simpson, 2003). No recent evaluations have attempted to separate out the effect of penalties for GDL or other traffic law violations from the overall effects of GDL. There is insufficient evaluation data available to conclude that the countermeasure is effective.*

Further information about the known research, potential effectiveness, costs, use, and time to implement is available in Appendix A6, Section 1.7.

2. Driver Education

2.1 Pre-Licensure Driver Education

Effectiveness: ☆☆	Cost: \$\$\$	Use: Medium	Time: Long
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This countermeasure involves some form of driver education before licensure, typically for anyone younger than 18. Most commonly, this includes 30 hours of classroom instruction and 6 hours of behind-the-wheel practice, although requirements vary considerably across States (Thomas et al., 2012a). This training can include either commercial or high school driver education programs.

Effectiveness Concerns: *This countermeasure is used in many States. Its effectiveness has been examined in several research studies. The balance of the evidence suggests that these types of countermeasures are ineffective in the long term.*

Further information about the known research, potential effectiveness, costs, use, and time to implement is available in Appendix A6, Section 2.1.

2.2 Post-Licensure or Second-Tier Driver Education

Effectiveness: ☆	Cost: \$\$\$	Use: Low	Time: Long
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This countermeasure involves post-licensure driver education curricula that are integrated with driver education included in GDL (Smith, 1994). These “second-tier” post-licensure courses teach safety-related information, building on the on-road experience that the students have acquired in their initial months of driving. They should not be confused with “advanced driving performance” courses that teach driving skills such as panic braking, skid control, and evasive lane-changing maneuvers.

Effectiveness Concerns: *This countermeasure has not been systematically examined. There is insufficient evaluation data available to conclude that the countermeasure is effective.*

Further information about the known research, potential effectiveness, costs, use, and time to implement is available in Appendix A6, Section 2.2.

3. Parents

3.1 Parental Roles in Teaching and Managing Young Drivers

Effectiveness: ☆☆	Cost: \$\$	Use: Medium	Time: Short
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This countermeasure involves programs based on direct interaction and engagement with parents to better equip them to supervise and manage their teens' driving during the GDL phase. These programs typically involve a variety of approaches to educate parents and get them involved in promoting their teen's safe driving.

Effectiveness Concerns: *This countermeasure has been examined in several research studies. Although there have been some positive research findings, particularly in terms of behavioral changes, the balance of evidence regarding countermeasure effectiveness remains inconclusive.*

Further information about the known research, potential effectiveness, costs, use, and time to implement is available in Appendix A6, Section 3.1.

4. Traffic Law Enforcement

4.1 Enforcement of GDL and Zero-Tolerance Laws

Effectiveness: ★ ★ ★	Cost: \$\$	Use: Unknown	Time: Short
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Two traffic laws apply only to young drivers: GDL laws and zero-tolerance laws that set a maximum BAC of .02 or less for drivers under 21. As discussed in Chapter 1, Section 6.2, zero-tolerance laws are not actively publicized or enforced. It's likely that increased publicity and enforcement would reduce teenage drinking and driving.

GDL laws, discussed in Chapter 6, Sections 1.1-1.6, also appear not to be enforced vigorously. A study in two States identified modest numbers of citations for some offenses, noting that other GDL restrictions were rarely enforced (AAA Foundation for Traffic Safety, 2014). Some GDL provisions such as nighttime driving restrictions are inherently difficult to enforce because violations are difficult to detect (Hedlund et al., 2003). A study in one State found that intermediate license drivers and their parents were quite aware of their GDL law's nighttime and passenger restrictions. Both restrictions were violated, though not frequently. Teenagers expressed little concern regarding GDL enforcement. Although surveys of law enforcement officers found that most were supportive of GDL, officers were not familiar with GDL details and considered GDL enforcement a low priority (Goodwin & Foss, 2004). Another study found that teen drivers reported frequently violating passenger restrictions, with and/or without their parents' knowledge/permission, because local police did not routinely enforce GDL restrictions (Chaudhary et al., 2007).

Parents are in the best position to enforce GDL requirements (Chapter 6, Section 3.1). However, some law enforcement support for GDL nighttime driving and teenage passenger restrictions may be useful to emphasize that the requirements are important. GDL law violations are penalized by driver license actions, such as suspension or revocation of the learner's permit or intermediate license or an extension of the time before full licensure. This means they can be applied administratively and do not involve criminal court proceedings. As noted in Chapter 1, Section 6.2, administrative penalties for zero-tolerance laws are far easier to enforce than criminal penalties. Another issue with enforcement concerns the difficulties in identifying drivers that qualify as falling under the GDL system in a given State. It has been suggested, and is one of NHTSA's GDL recommendations, that young drivers should be required to affix a vehicle decal identifying them as qualifying for the GDL program to make them more readily identifiable. New Jersey is the first State to implement this potential countermeasure.

Use: The amount of enforcement of zero-tolerance and GDL laws is unknown but probably is low.

Effectiveness: Zero-tolerance law publicity and enforcement likely will reduce teenage drinking and driving, as discussed in Chapter 1, Section 6.2. Similarly, high-visibility enforcement of GDL provisions should encourage compliance with nighttime and passenger restrictions. One study investigated whether well-publicized enforcement, including checkpoints near high schools, could increase compliance with seat belt laws and GDL provisions. The study found

only modest increases in seat belt use and compliance with the GDL passenger restriction, although levels of compliance prior to the enforcement efforts were already high (Goodwin, Wells, Foss, & Williams, 2006).

Recent studies evaluating the effectiveness of vehicle decals in New Jersey have found increases in citations for violations of licensing restrictions and decreases in crash rates among intermediate license holders in the year after the requirement went into effect (Curry et al., 2013; McCartt et al., 2012).

Costs: See Chapter 1, Section 6.2, for zero-tolerance law enforcement strategies and costs. GDL law enforcement costs will depend on how the enforcement is conducted. Enforcement through regular patrols will require moderate costs for training. Special patrols or checkpoints will require additional staff time. All enforcement will require good publicity to both teens and parents. Publicity to teens can be delivered through high schools, colleges, recreational venues attended by youth, and media directed to youth. The cost of vehicle decals can be paid for by the licensee when they receive a learner's permit or intermediate license. In Virginia, vehicle decals cost \$4 for a pair.

Time to implement: Enforcement programs can be implemented within three or four months, as soon as appropriate training, publicity, and equipment are in place.

Other issues:

- **Compliance with restrictions:** Several studies have shown that teenagers do not always comply with GDL restrictions (Goodwin & Foss, 2004; Williams, Nelson, & Leaf, 2002). To the extent that teens do not adhere to restrictions, the effectiveness of GDL may be reduced. It should be noted, however, that GDL has been shown to be effective even in the absence of police enforcement. For example, focus groups with parents and teen drivers conducted in California, Massachusetts, and Virginia revealed that passenger restrictions were frequently violated in all three States, but even incomplete adherence to the restrictions had a positive impact on teen driver crashes (Chaudhary et al., 2007). In general, compliance with restrictions will be higher in States that have well-designed GDL systems with restrictions that are considered reasonable by parents and teens (Foss & Goodwin, 2003).
- **Citation dismissal in the courts:** One study in two States noted relatively high rates of GDL-related citations being dismissed by the courts, which could have a negative impact on the effectiveness of those programs (AAA Foundation for Traffic Safety, 2014).