

Countermeasures That Work:

A Highway Safety Countermeasure Guide
For State Highway Safety Offices
Eighth Edition, 2015



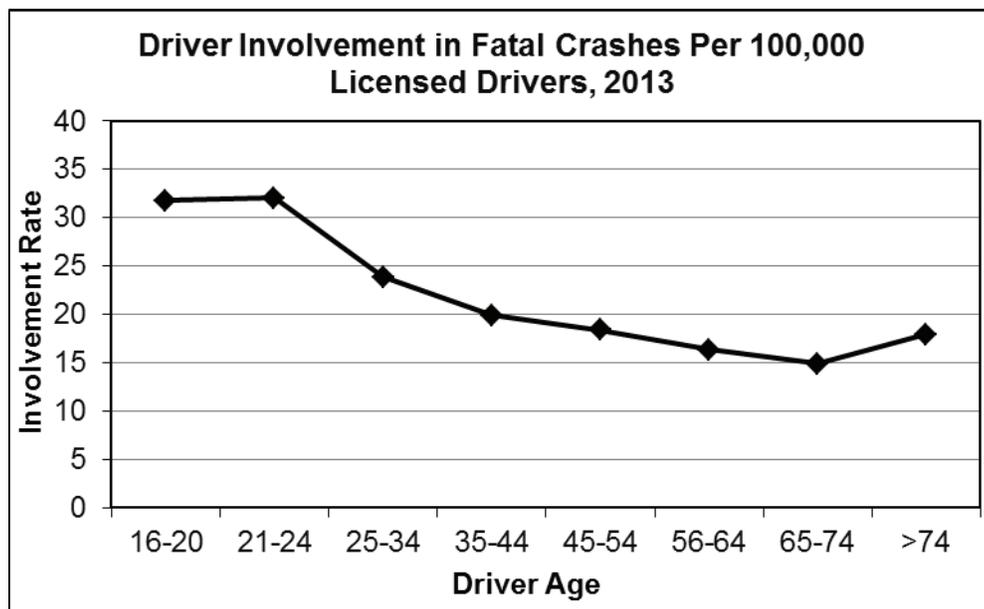
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6. Young Drivers

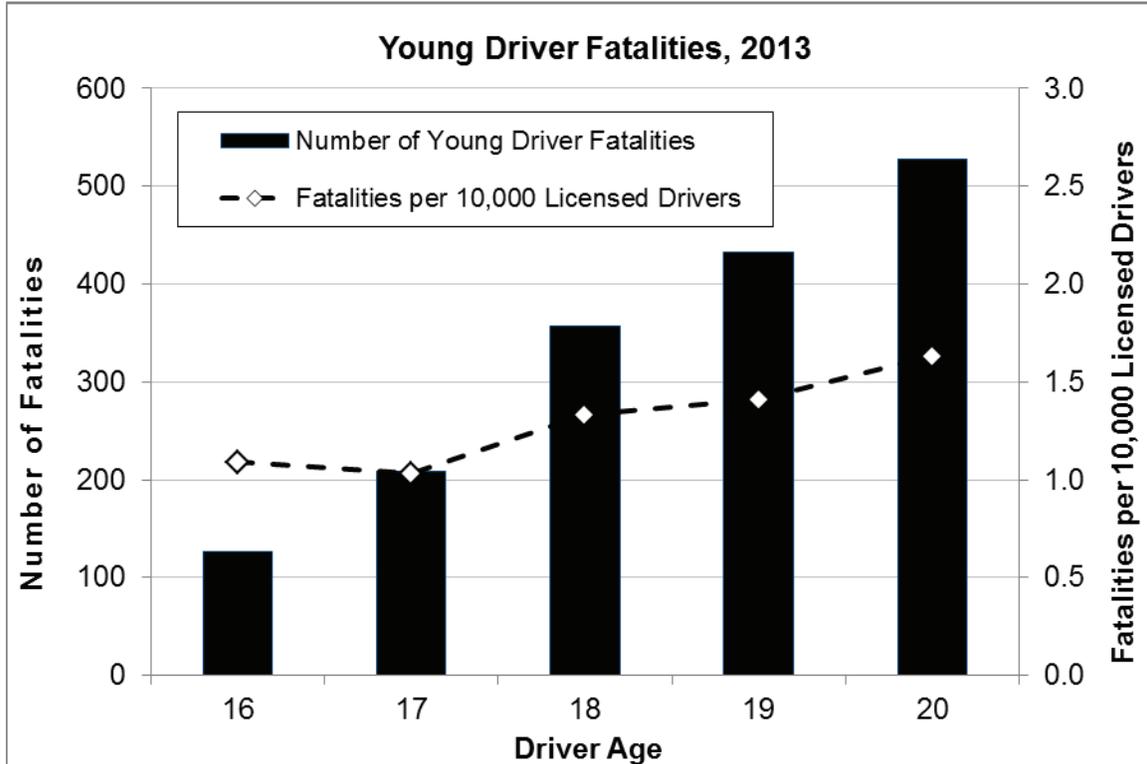
Overview

Motor vehicle crashes are the leading cause of death for teenagers in the United States. In 2013, 1,691 drivers 15 to 20 years old were killed and another estimated 177,000 were injured in motor vehicle crashes (FARS data). In comparison with adult drivers, young drivers are substantially over-involved in crashes. In 2013, drivers 15 to 20 made up 5.8% of licensed drivers in the United States, yet they made up 9% of total drivers in fatal crashes, and 13% of drivers in all crashes (FARS data). 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 (2015), 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: Analysis of data from the U.S. Department of Transportation's Fatality Analysis Reporting System (FARS data)

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. Between 1996 and 2012, there was a 74% decrease in the fatal crash rate for 16-year-old drivers per population, and a 64% decrease for 17-year-old drivers. By comparison, fatal crash rates declined by 34% among adult drivers 30 to 59 (McCartt & Teoh, 2014). There was a similarly large decrease in police reported crashes during the same time period. Police-reported crashes per population fell 65% for 16-year-olds and 50% for 17-year-olds (McCartt & Teoh, 2014). The reasons for the dramatic reductions in fatal and police-reported crashes among 16- and 17-year-olds 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, & 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 Chapter 4, 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 Chapter 4, 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 in particular:

- 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, 2.1, 2.2, and 3.1 (GDL requirements, communications and outreach, and employer programs).
- Chapter 5, 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/Teen-Drivers
 - Driver Safety Research Reports: New Drivers - www.nhtsa.gov/Driving+Safety/Research+&+Evaluation/Driver+Safety+Research+Reports:+New+Drivers+and+Older+Drivers
 - Behavioral Safety Research Reports - <http://ntlsearch.bts.gov/repository/ntl/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/safety_road/TeenDriving/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* (ip.bmjournals.com/content/vol12/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 (NCHRP, 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.

Countermeasures That Work

Countermeasures to improve young-driver safety are listed below and discussed individually in this chapter. The table is intended to give a rough estimate of each countermeasure's effectiveness, use, cost, and time required for implementation. The symbols and terms used are described below. 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. See each countermeasure discussion for more information.

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	★★	\$\$	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 one year
- Medium: more than three months but less than one year
- Short: three 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* (NCHRP, 2007, strategies A1 through A5). See also NHTSA's *Traffic Safety Facts* on GDL (NHTSA, 2008) and Report to Congress (Compton & Ellison-Potter, 2008).

Use: All States and the District of Columbia had some GDL components in place as of August 2014. In addition, all States and D.C. 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; Fell, Jones, Romano, & Voas, 2011; Lyon, Pan, & Li, 2012; McCartt, Teoh, Fields, Braitman, & Hellinga, 2010; Masten, Foss, & Marshall, 2011; Masten et al., 2013; 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 D.C. 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, 20013; 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.

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 all of 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, 49 States and the District of Columbia 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, 46 States and the District of Columbia 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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As discussed in Chapter 4, Section 1.2, young drivers are at a greater risk of crashing when they engage in distracting behaviors (Ferguson, 2003; Klauer et al., 2014). Specifically with regards to cell phone use, young drivers are at higher risk of crashing when they reach for a cell phone, dial a cell phone, or text while driving compared to when they do not engage in these behaviors (Klauer et al., 2014). To reduce this risk, a growing number of States include cell phone restrictions in their GDL laws. See Chapter 4, Section 1.2 for a discussion of cell phone laws applying to all drivers.

Use: As of August 2014, 38 States and the District of Columbia prohibit cell phone use for young drivers. 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). Fourteen States and D.C. prohibit hand-held cell phone use for all drivers. In addition, 44 States and D.C. prohibit text messaging for all drivers and 4 States ban text messaging among young drivers (see Chapter 4, Section 1.2).

Effectiveness: There is conflicting evidence regarding the effectiveness of cell phone restrictions on young drivers’ behaviors and crash outcomes. In 2009, a study examined the short-term effects of a teenage driver cell phone restriction in North Carolina, and found that 5 months after a ban on cell phones took effect, the proportion of teens using cell phones while driving was unchanged (Foss, Goodwin, McCartt, & Hellinga, 2009). A follow-up study evaluated the long-term effect of North Carolina’s cell phone restriction two years after the law went into effect (Goodwin, O’Brien, & Foss, 2011). Teenagers were observed at high schools in North Carolina and also in South Carolina, which did not have a cell phone restriction. In both States, there was a decrease in cell phone use. However, the decrease in cell phone use did not significantly differ between the two States, despite increased awareness of the restriction among licensed teens in North Carolina (Goodwin et al., 2011).

Two studies have examined the effects of cell phone bans on young driver crashes (Lim & Chi, 2013; Ehsani, Bingham, Ionides, & Childers, 2014). Lim and Chi (2013) examined the relationship between cell phone bans and fatal crashes among drivers 20 years old and younger. They compared States across the United States that had no cell phone restrictions, cell phone restrictions that applied only to young drivers, and cell phone restrictions that applied to all drivers regardless of age. They found that cell phone restrictions that applied to all drivers regardless of age were associated with a decrease in fatal crashes among young drivers. However, States that had cell phone restrictions that only applied to young drivers had no significant effect. Conversely, Ehsani et al. (2014) examined the effects of Michigan’s universal texting law on crash types among 16- and 17-year-old drivers and found a slight increase in more serious types of crashes including fatal/disabling injury crashes and non-disabling injury crashes. However, they found a slight decrease in less severe crashes (e.g., possible injury/PDO crashes).

Costs: Once GDL is in place, a cell phone 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.

1.6 GDL Belt Use Requirements

Effectiveness: ★ ★	Cost: \$	Use: Low	Time: Medium
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Properly worn seat belts can dramatically reduce the risk of injury or death to vehicle occupants in the event of a crash (NHTSA, 2001; NCSA, 2015). Seat belts are particularly important for teenage drivers because of their elevated crash risk. Nonetheless, teenage drivers and passengers have lower seat belt use rates than older drivers and passengers (NHTSA, 2009). Belt use is particularly low among teenagers who are male, drive pickup trucks, and live in rural areas (Kim, Depue, Spence, & Reine, 2009).

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). Some States explicitly require belt use under their GDL laws. 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, especially 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.

Use: In 2005, GDL laws in 15 States explicitly required seat belt use (AAA, 2005). Sanctions for violating this requirement varied across the States.

Effectiveness: To date, there has been only one evaluation of the effects of explicit seat belt use requirements in GDL laws. Tennessee and Wisconsin both have a seat belt restriction within their States' GDL program. Evaluations of the restrictions in these two States found little, if any, effect on teen driver belt use (Freedman & Levi, 2008). One problem is that teens (and parents) may not be aware when seat belt laws are part of a State's GDL system. For example, surveys in North Carolina have shown very high awareness for the State's nighttime and passenger restrictions, but only 3% of teens and 5% of parents were aware of the special GDL provision concerning seat belts (Goodwin & Foss, 2004).

Costs: Once GDL is in place, a belt use requirement 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.

1.7 GDL Intermediate License Violation Penalties

Effectiveness: ★	Cost: \$	Use: High	Time: Medium
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A probationary feature is 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.

Use: Almost all States penalize some GDL or traffic law violations by delaying full licensure (IIHS & TIRF, 2004).

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.

An enforcement/education program dubbed “*Ticket Today = License Delay*” (the equals sign is not pronounced) highlighted the resulting delay in licensure for teenagers who are convicted of a moving violation, seat belt violation or GDL violation. Although teens and their parents clearly perceived the increased enforcement, the program had only minimal effects on seat belt use and compliance with GDL restrictions (Goodwin, Wells, Foss, & Williams, 2006). In general, it appears that awareness of penalties for license violations among parents and teens is relatively low, enforcement is rare, and licensing delays are not always applied even when violations are enforced (Goodwin & Foss, 2004; Steenbergen et al., 2001; Williams, 2007).

Costs: Once GDL is in place, penalties for violating its provisions can be changed at very little cost.

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

2. Driver Education

2.1 Pre-Licensure Driver Education

Effectiveness: ★	Cost: \$\$\$	Use: Medium	Time: Long
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Driver education has long been advocated and used to teach both driving skills and safe driving practices. Driver education in high schools grew in popularity in the 1950s, using a standard curriculum of at least 30 hours classroom instruction and 6 hours on-the-road driving practice. By about 1970, approximately 14,000 high schools taught driver education to about 70% of all eligible teenagers. Many States and insurance companies encouraged driver education: States licensed graduates at an earlier age and insurance companies reduced auto insurance premiums for graduates. During the 1980s driver education offerings decreased as State and Federal funding for driver education decreased. By the early 1990s fewer than half of all high schools offered driver education and the majority of beginning drivers did not take driver education. See Smith (1994), Mayhew (2007), or Williams, Preusser, and Ledingham (2009) for a concise review of the history of driver education in the United States, and see Beanland, Goode, Salmon, and Lenné (2013) for a recent review of the effectiveness of driver training programs.

The study most well known in the United States for evaluating the effect of driver education on crash rates is the extensive NHTSA-sponsored study in DeKalb County, Georgia, in the late 1970s. Over 16,000 students were randomly assigned to three groups: standard driver education; an 80-hour long course including classroom, simulation, driving range, and on-the-road components; and a control group of no formal driver education. The initial analysis found no significant difference in crashes or traffic violations among the three groups (Smith, 1994). A second analysis, which tracked the students' driving records for a longer period of time, found a slight crash reduction for standard course graduates during their first months of driving only, and no difference between the long course and no course graduates (Smith, 1994). See Vernick (1999) or Williams et al. (2009) for brief summaries of all DeKalb study analyses.

Roberts et al. (2006) concluded from three well-designed evaluations in Australia, New Zealand, and the United States that driver education may lower the age at which teenagers become licensed but does not affect their crash rates once they do become licensed. The net effect of driver education may increase crashes because it puts more young drivers on the road. Vernick et al. (1999) reached the same conclusion from a review of 9 studies, 8 from the United States, and 1 from Australia. It has been suggested that crash outcomes are not appropriate or fair measures for driver education, and are unrealistic to expect (Waller, 2003).

In contrast, a recent archival study concluded there is a decrease in crash risk associated with driver education (4.3%, AAA, 2014), but this reduction is modest compared with those associated with GDL. This result is consistent with the suggestion that it may be unreasonable to expect pre-licensure driver education to produce sizable changes in crash risk given the amount of time and resources dedicated to it (Waller, 2003). Given that an effect of this size would require research that includes over 140,000 students to reliably detect differences in crash rates between students who do and do not complete driver education, it is unsurprising that most previous evaluations have failed to detect any effect of driver education.

Based primarily on results that indicated no consistent notable effect of driver education, NHTSA concluded that driver education should be integrated into State GDL programs (Compton & Ellison-Potter, 2008; Thomas et al., 2012a). It also concluded that driver education should be “distributed over time.” NHTSA proposed a two-stage driver education system, both pre-licensure and post-licensure. (See Chapter 6, Section 2.2 for further discussion.) In addition, NHTSA and the driver education community has developed national administrative standards to enhance driver education delivery in the States (NHTSA, 2010). NHTSA offers a State Assessment Program to assist States in meeting those standards. At the request of a State, NHTSA will send a team of experts who will analyze and make recommendations for improving the driver education program.

Many States offer incentives for taking driver education. Twenty-five States encourage driver education by allowing teens to get unrestricted licenses at an earlier age if they complete driver education, and 18 States offer other incentives such as reducing the required number of supervised driving hours, waiving portions of licensing tests, or lowering the minimum permit age (Thomas et al., 2012a). Research shows that driver education “discounts” increase, rather than reduce, crashes (Mayhew, 2007). For example, a study in British Columbia found that crash rates were 27% higher for driver education graduates who reduced their learner’s permit holding period by three months, than for non-graduates (Wiggins, 2004).

Use: NHTSA recently completed an investigation of driver education requirements in the United States and found that 23 States and the District of Columbia require some form of driver education before licensure for anyone younger than 18 (Thomas et al., 2012a). Most commonly this includes 30 hours of classroom instruction and 6 hours of behind-the-wheel practice, although requirements vary considerably across States. For example, 15 States now accept online driver education in lieu of standard in-person classroom-based instruction (Thomas et al., 2012b). Most States offer both commercial and high school driver education programs (Thomas et al., 2012a).

Effectiveness: Driver education leads to earlier licensure in some States and does not reduce crash rates (Mayhew, 2007; Roberts et al, 2006; Thomas et al., 2012a; Vernick et al., 1999; Williams et al., 2009). Nonetheless, there has been a growing interest in improving and evaluating driver education. Future directions for driver education were summarized in a research circular by the Transportation Research Board (TRB, 2006). In addition, the AAA Foundation for Traffic Safety has produced a series of publications that provide practical information on how to conduct evaluations of driver education (Clinton & Lonero, 2006), and NHTSA conducted a feasibility study on evaluating driver education curriculum (Williams et al., 2009).

In addition, there have been recent advances in the development in new types of driver education programs (summarized in Thomas et al., 2012a). Given that visual scanning, attention maintenance, and speed management are likely responsible for many crashes among young drivers, a number of new programs have been developed that focus on teaching these higher-order knowledge and skills, generally using computer simulation. Although many of these programs have demonstrated short-term training effects, it is still unknown how long the training effects are maintained. More importantly, it is unknown if the training effects will carry over into

real world driving environments and result in crash reductions among young drivers (Thomas et al., 2012a).

Costs: Even a minimal driver education course of 30 hours in the classroom and 6 hours on the road requires extensive funds. Driver education also requires students to find time for it in their schedules of high school classes, extracurricular and summer activities, and jobs.

Time to implement: A driver education course requires at least a year to plan and implement.

Other issues:

- **Parent involvement:** There has been a growing interest in integrating parents into driver education. For example, three States (Connecticut, Massachusetts, and Montana) and four counties in Northern Virginia require parents to attend a parent information/orientation session as a part of their teen's driver education requirements (GHSA, 2013). Virginia passed legislation in 2009 requiring a minimum of 90 minutes of parent participation in the in-classroom portion of driver education. Similarly, Massachusetts and Connecticut require a parent to attend a 2-hour driver education orientation program. In 2012, Montana revised their Traffic Education Standards to include a provision that parents of teens in driver education must attend a mandatory session and the State specified the content that must be included in the information session. Parents appear to support these requirements. In a recent national survey, a majority (70%) of parents reported that orientation courses should be required (Williams et al., 2011). Nonetheless, research has not yet determined the most effective way to involve parents in the driver education process (GHSA, 2013).

2.2 Post-Licensure or Second-Tier Driver Education

Effectiveness: ★ [†]	Cost: \$\$\$	Use: Low	Time: Long
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[†]Post-licensure driver education received a one star rating because its effectiveness has not yet been evaluated

As discussed in Chapter 6, Section 2.1, standard pre-licensure driver education leads to earlier licensure but does not reduce crash rates. Based on this conclusion, driver education research has sought to develop post-licensure driver education curricula and to integrate driver education with 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.

Previous post-licensure driver education courses were remedial, directed at drivers who had accumulated enough violations or crashes to warrant some attention. For this audience, post-licensure driver education had no effect (Ker et al., 2005, 2006).

Initiatives in Australia and Europe may provide insight on potential approaches for post-license training for beginning drivers (Senserrick, 2007; Twisk & Stacey, 2007). Christie and colleagues have developed a model “best practice” curriculum for intermediate license drivers with at least 6 months of driving experience in Australia (Christie, Harrison, & Johnston, 2004). The 8-hour curriculum consists of eight modular sessions with a mentor or coach, including one-on-one driving and discussion, group observation and discussion of driving behavior, and telephone follow-up. However, this curriculum has yet to be evaluated.

NHTSA has completed a feasibility study in anticipation of a major evaluation of the benefits of an integrated driver education and GDL program (Hedlund & Compton, 2005).

Use: Post-licensure driver education is still under development. Michigan is the only State that has adopted a two-stage system of driver education (Mayhew, 2007).

Effectiveness: Post-licensure driver education has not yet been evaluated.

Costs: If a post-licensure driver education program proves to be effective, it likely will require substantial funds to implement.

Time to implement: Any course requires at least a year to plan and implement.

3. Parents

3.1 Parental Role in Teaching and Managing Young Drivers

Effectiveness: ★ ★	Cost: \$\$	Use: Medium	Time: Short
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Most parents are heavily involved in teaching driving skills to their beginning teenage drivers and supervising their driving while they have a learner's permit. Parents are in the best position to enforce GDL restrictions for intermediate drivers and to impose additional driving restrictions on their teenagers. Parents strongly support GDL; however, many parents do not understand the dangers of high-risk situations, such as driving with teenage passengers. Parents could use guidance and assistance in during this process (Hedlund et al., 2003; NCHRP, 2007, Strategies C1-C3). For summaries of the research on parent involvement in teen driving, see Simons-Morton and Ouimet (2006) or Simons-Morton, Ouimet, and Catalano (2008). For a recent review of promising parent programs, see GHSA (2013).

The majority of States provide some form of guidance materials to parents of teen drivers in the form of booklets/brochures and/or videos, and many of the materials are provided online. However, it has been demonstrated that passive dissemination of information to parents is not an effective method to change parents' behaviors and ultimately reduce teen driver crashes (Chaudhary, Ferguson, & Herbel, 2004; Goodwin, Waller, Foss, & Margolis, 2006). In hopes of better equipping parents to supervise and manage their teens' driving, there has been a growing interest in programs that involve direct interaction and engagement with parents. Although many such programs have been developed, the following four programs are highlighted because they have been evaluated and shown promising results: *Checkpoints*, *Green Light for Life*, *Steering Teens Safe*, and *Teen Driving Plan*

Checkpoints: The original *Checkpoints* program, developed by Simons-Morton and colleagues at the National Institute of Child Health and Human Development, is a program that uses videos and periodic newsletters to reinforce the need for parents to limit their newly licensed teens' driving under risky conditions. A central feature of the program is a written agreement that parents and teens review and sign. The agreement limits teens' driving under various high-risk situations, such as driving at night, with other teens in the car, or in bad weather (Simons-Morton & Hartos, 2003). The facilitated *Checkpoints* program has been adapted from the original version to include a 30-minute in-person session to introduce teens and parents to the *Checkpoints* program, and to have them work in pairs to begin developing a parent-teen driving agreement (Zakrajsek, Shope, Ouimet, Wang, & Simons-Morton, 2009).

Green Light for Life (GLL): This program has been implemented in Israel since 2005 (Taubman & Lotan, 2011; Toledo, Lotan, Taubman, & Grimberg, 2012). From 2005-2008 approximately 130,000 families have participated in the program. GLL consists of an in-person, 45-minute meeting with a parent and their young driver prior to entering the accompanied driving phase, otherwise known as the learner's permit stage in the United States During the meeting, parents and teens are encouraged to get as much supervised driving practice as possible in a variety of conditions. Parents are encouraged to share their hazard perception knowledge and skills with

their teen driver. Strategies for dealing with in-vehicle dynamics between the teen and parent are also discussed. Families are given a booklet and CD to take home.

Steering Teens Safe: This is a 45-minute in-person program that focuses on improving parents' communication skills by teaching them to use motivational interviewing techniques to talk to their teens about safe driving. Parents receive a DVD and a workbook with 19 safe driving lessons to help parents to discuss, demonstrate, and practice safe driving behaviors and skills with their teens. *Steering Teens Safe* is intended for parents of teens who are in the learner permit phase (Peek-Asa et al., 2014; Ramirez et al., 2013).

Teen Driving Plan (TDP): This is a web-based program for parents to use during the learner permit phase to increase the quantity and quality of their supervised driving practice. The *Teen Driving Plan* includes 53 web-based videos, a web-based planner to help teens and parents structure their practice sessions, and a web-based log to record and rate driving practice sessions (Mirman et al., 2014).

Use: *Checkpoints* is available on the web. *Steering Teens Safe* and *Teen Driving Plan* are still being evaluated and are not available for the public. *Green Light for Life* is not currently available in the United States.

Effectiveness:

Checkpoints: Results from testing in several States show the original *Checkpoints* program produces modest increases in parents' restrictions on teen driving (Simons-Morton & Hartos, 2003; Simons-Morton, Hartos, Leaf, & Preusser, 2005). However, a study in Connecticut found no differences in violations or crashes for families who participated in the *Checkpoints* program when compared with families who did not participate in the program (Simons-Morton, Hartos, Leaf, & Preusser, 2006).

The facilitated *Checkpoints* program has recently been evaluated and has had promising results. Zakrajsek et al. (2009) evaluated the program delivered by trained health educators in driver education classes and found that, relative to a comparison group, parents who participated in the facilitated *Checkpoints* program showed greater awareness of teen driving risks, were more likely to complete a parent-teen driving agreement, and reported setting stricter limits on their teens' driving during the intermediate license phase. Zakrajsek et al. (2013) conducted an evaluation of the facilitated *Checkpoints* program delivered by driver education instructors and also found that parents who participated in the program were more likely to report that they used a parent teens driving agreement and had stricter limits on their teens' driving. Teens also self-reported less risky driving. However, they found no differences in crashes for teens who participated in the program compared to teens who did not participate.

Green Light for Life: To date, *Green Light for Life* has undergone two evaluations. Taubman and Lotan (2011) examined the effectiveness of the GLL program by comparing self-reports of 362 teenagers who participated in the program with 376 teens who did not. They found no difference in the amount of accompanied driving teens obtained during the supervised driving phase or the level of reckless driving reported. However, teenagers who participated in the program reported

more positive attitudes about the supervised driving phase and reported less crash involvement. A recent national study evaluated injury crash involvement between teens who participated in the GLL program during 2005-2007 compared to teens that did not participate in the program. Based on analysis of injury crash data during the first two years after licensing, teens who participated in GLL had 10% lower injury crash rates (Toledo et al., 2012). Nonetheless, both studies suffered from the possible effects of self-selection bias. A follow-up study is underway to examine behavior and crash data of young drivers at the individual level, in an attempt to address this potential bias.

Steering Teens Safe: To date, the *Steering Teens Safe* program has been evaluated via one randomized controlled trial (Peek-Asa et al., 2014). The study examined the effectiveness of parent communication about driving safety as perceived by the teen driver, and the teens' self-reported risky driving. Teens in the *Steering Teens Safe* program reported a higher quality of parent communication than control teens, and the teens in the program reported a 21% reduction in self-reported risky driving compared with control teens.

Teen Driving Plan: To date, one randomized controlled trial has been conducted to measure the effects of the *Teen Driving Plan*. Mirman et al. (2014) found that families who used the *Teen Driving Plan* reported more driving practice in various environments and situations (i.e., night and bad weather) compared to teens not in the program. In addition, teens that were in the *Teen Driving Plan* group were less likely to be terminated during an on-road driving test compared to teens not in the program (6% and 15%, respectively).

Although evaluations of programs to assist parents have not yet shown reductions in young driver crashes, there is still reason to be optimistic. Programs such as *Checkpoints* have increased parent limit setting, and several studies show that teenagers whose parents impose more strict driving limits report fewer risky driving behaviors, traffic violations and crashes (see Simons-Morton, 2007, for a review). Educational programs alone are unlikely to produce changes in behavior. However, education in combination with other strategies may deliver stronger results.

Costs: Checkpoints is available on the web; however, in order to use the facilitated version, staff time would be needed to implement in the in-person session.

Time to implement: The original *Checkpoints* program and the facilitated program are available immediately. However, to implement the facilitated *Checkpoints* program on a large scale, it would likely take a year for planning, staff training, and dissemination. *Green Light for Life*, *Steering Teens Safe*, and the *Teen Driving Plan* program are not yet available.

Other issues:

- **Electronic monitoring:** Various technologies have been developed to aid parents in monitoring their teenage drivers. For example, many GPS companies offer “teen tracking” services that will notify parents if their teens go beyond boundaries, or are speeding at any given time. Video-based devices, such as DriveCam, can provide visual monitoring of teen drivers. When these technologies are combined with weekly report cards to parents, they can reduce the incidence of risky driving behaviors among teens (Carney et al., 2010; Farah et al., 2014, Farmer, Kirley, & McCartt, 2010; McGehee et

al., 2007; Musicant & Lampel, 2010, Simons-Morton et al., 2013). However, more research is needed to determine the impact of electronic monitoring on crashes and fatalities among young drivers.

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. 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).

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