

ALASKA YOUNG DRIVER SAFETY:
DISTRACTED DRIVING, SEAT BELT USE AND DRINKING AND DRIVING

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A
PRACTICUM PROJECT REPORT

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ABSTRACT

United States teenagers have the highest crash rate of any group in the nation. The data tell us that there are eight identified leading causes of teen injuries and deaths associated with vehicle collisions: Driver inexperience; driving with teen passengers; nighttime driving; not using seat belts; distracted driving; drowsy driving; reckless driving; and impaired driving (CDC, 2014). Alaska data tell a similar story. The leading causes of crashes for Alaskan teen drivers are: driver inattention, unsafe speed, failure to yield and driver inexperience (Alaska Injury Prevention Center, 2012).

In partnership with the Alaska Injury Prevention Center, this practicum project created a resource guide identifying best practices in teen driving interventions connected to three of these areas: distracted driving, seat belt use and drinking and driving. The *Strategies to Support Safe Teen Driving in Alaska* resource guide is intended as a tool for community partners to access information about interventions for distracted driving, seat belt use and drinking and driving for Alaska teens and to work to put those interventions into action in their local communities.

Project research efforts included a synthesis review of available intervention reports, including a multi-step filtering process that distilled available program literature down to a final collection of strategies based on best available evidence. These resulting strategies were categorized into a taxonomy identifying currently available approaches, and were also classified into levels of promise associated with certainty of effectiveness and potential population impact.

Upon evaluation of intervention types within a Promise Table structure, the strategies found to be most promising were all public policy efforts surrounding graduated drivers' licensing programs, a minimum legal drinking age at 21, cell phone restrictions while driving and seat belt requirements. In addition, the community role of creating partnerships to prevent unsafe teen driving behaviors, as well as the parental role of boundary setting and monitoring their teen's driving behavior, were found to have equal levels of promise. Of most significance was the finding identifying the importance of executing teen driving strategies with diverse influences, including all levels of the Social Ecological Model's influence (i.e. public policy, community, organizational, interpersonal and intrapersonal).

Additional priority areas included attention to matters of community culture, public policy, enforcement and parental influence. Resulting recommendations include multiple public policy enhancements in the state of Alaska, including graduated driver's license program modifications, enhancement of the state's zero-tolerance policy and broad scale restrictions of driver cell-phone use.

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CHAPTER ONE: INTRODUCTION

The statistics are definitive; United States teenagers have the highest crash rate of any group in the nation. In 2013 (most recent available data), 963,000 drivers aged 16-19 were involved in police-reported crashes, resulting in 383,000 injuries and 2,865 deaths (AAA Foundation, 2015). In AIPC's review of Alaska crash data from 2002 to 2012, 17 percent of crashes involve a teen driver, while the 2010 census reported Alaska teens only make up 7 percent of the State's population (Alaska Injury Prevention Center, 2012)

Based on these numbers, it is no surprise that motor vehicle collisions are the leading cause of death for U.S. teens. Seven teenage drivers aged 16 to 19 die every day from motor vehicle injuries (CDC, 2014). While teen drivers make up 6 percent of all licensed drivers, they are involved in 14 percent of fatal crashes and 18 percent of all serious police-reported crashes (Cazzulino et al., 2014). For every mile driven, teen drivers are nearly three times more likely than drivers aged 20 and older to experience a fatal crash (CDC, 2014).

Challenges in public health practice

Many of these high crash rates for young drivers are partially attributed to immaturity and inexperience in operating a vehicle. This combination of factors can lead to engagement in high-risk driving behaviors, such as speeding, tailgating, driving under the influence of alcohol or drugs, underestimating hazardous driving situations, and driver distractions (Goldzweig et al., 2013). As new drivers, not having yet acquired the skills and knowledge that older drivers have come to attain over many years of driving, teenagers lack the experience to accurately assess and safely react to certain conditions (Adeola & Gibbons, 2013).

The data tell us that there are eight identified leading risk factors of teen crashes: (1) driver inexperience; (2) driving with teen passengers; (3) nighttime driving; (4) not using seat belts; (5) distracted driving; (6) drowsy driving; (7) reckless driving; and (8) impaired driving (CDC, 2014). For Alaska teen drivers, the leading causes of crashes are (1) driver inattention, (2) unsafe speed, (3) failure to yield and (4) driver inexperience (Alaska Injury Prevention Center, 2012).

It appears that gender plays a role in the likelihood of a significant incident while driving. Young people aged 15-24 represent only 14 percent of the U.S. population. However, they account for 30 percent (\$19 billion) of the total costs of motor vehicle injuries among males and 28 percent (\$7 billion) of the total costs of motor vehicle injuries among females (CDC, 2014). Interestingly, teens' perception of their safety risks appear to be out of sync with the risk and cost data, as 32 percent of male teen survey respondents reported that they were extremely safe drivers, whereas

only 18 percent of females participating in the survey reported that they were extremely safe drivers (Barr et al., 2015).

Essential services of public health

According to the Centers for Diseases Control and Prevention (CDC) website, the *10 Essential Public Health Services* describe the public health activities that public health professionals provide and communities engage with, to serve as the framework for public health practice. Public health systems should:

1. monitor health status to identify and solve community health problems;
2. diagnose and investigate health problems and health hazards in the community;
3. inform, educate, and empower people about health issues;
4. mobilize community partnerships and action to identify and solve health problems;
5. develop policies and plans that support individual and community health efforts;
6. enforce laws and regulations that protect health and ensure safety;
7. link people to needed personal health services and assure the provision of health care when otherwise unavailable;
8. assure competent public and personal health care workforce;
9. evaluate effectiveness, accessibility, and quality of personal and population-based health services; and
10. research for new insights and innovative solutions to health problems.

Of these ten essential services, a significant number of them put public health practitioners in a position to be able to act on staggering teen driving statistics. In efforts to curb the injuries and mortality associated with teens driving, practitioners are able to assist by:

- monitoring the ongoing status of harmful teen driving incidences;
- investigating the underlying factors that contribute to the current issues associated with teen driving;
- informing, educating and empowering teens, their family members, and communities about potential solutions to combat the current problems;
- mobilizing community partnerships in order to enact solutions to support safer driving environments for all community members;
- working on the development and implementation of policies and plans to support safe teen driving;

- advocating for strict enforcement of laws and regulations that contribute to safe driving, such as seat belt requirements or prohibition of texting while driving;
- educating on the significant issues related to unsafe teen driving;
- working to identify best practices in safe driving programs for teens, in order to ensure high quality intervention strategies are available wherever possible; and
- continuing to seek out new ways of engaging with young people, in order to foster safe driving behaviors.

Alaska Injury Prevention Center as a public health community partner

The Alaska Injury Prevention Center (AIPC) is a nonprofit organization governed by a board of directors. AIPC has a mission to prevent injuries across Alaska, and has taken on the challenge of working to increase safe teen driving conditions throughout the state (Alaska Injury Prevention Center, 2015).

AIPC was first established in 1996. Originally known as the Anchorage Safe Communities Coalition, this group of injury prevention professionals, health care providers, and concerned citizens joined together to implement community interventions to reduce the number of deaths and injuries from preventable causes in their Anchorage community. Coalition members were responsible for Anchorage becoming the second internationally designated safe community in the world, through work with the World Health Organization (WHO) (Institute for Circumpolar Health Studies, 2001).

Since their original inception, the Anchorage Safe Communities Coalition has evolved, including a name change in 2000 to the Alaska Injury Prevention Center. The Coalition has changed and expanded its focus over time to meet the needs of the community and the interests of its members. This has been a successful enterprise that has maintained both interest and momentum for the past nearly twenty years (Institute for Circumpolar Health Studies, 2001)

Today, the Alaska Injury Prevention Center continues to monitor trends in injury data to prioritize prevention efforts. Current projects include Motor Vehicle, Bicycle and Pedestrian Safety; Suicide Prevention; Elder Safety and Kid Safety; with a strong emphasis on Evaluation (Alaska Injury Prevention Center, 2015).

AIPC efforts to support safe driving

AIPC believes in approaching public health interventions with thorough consideration of available data, including analyzing the epidemiology of a type of injury or cause of death, and

considering potential interventions relevant to both the mechanical causes as well as the human elements. The Center seeks to implement interventions that address the specific elements of causation and to design interventions relevant and appropriate to their targeted populations (Institute for Circumpolar Health Studies, 2001).

In collaboration with a number of community partners, AIPC was awarded a grant for their Safe Streets initiative on October 1, 2014. As the project lead, the organization has worked with partners throughout Alaska to fulfill components of the project over the months since its award, and continues to work toward the finalization of additional items before the project's completion on September 30, 2015.

In partnership with AIPC, the practicum project, described herein, contributed to the Safe Streets project, by developing a resource guide. The *Strategies to Support Safe Teen Driving in Alaska* resource guide is intended to be a tool for community partners to access information about available interventions for distracted driving, seat belt use and drinking and driving for Alaska teens. In keeping with the center's approach, all recommendations in the guide were evaluated for alignment with best practice.

Upon completion in September 2015, the guide will be made available on AIPC's website, as well as through all of their social media outlets. It will be made available to a variety of local, as well as statewide partners, including schools. It will also be publicized with the South East Alaska Regional Health Consortium (SEARHC), as well as with the Alaska Native Tribal Health Consortium (ANTHC), for distribution to other regional hubs for injury prevention across the state.

Scope of project

The *Strategies* resource guide is intended to be most relevant to high school students in Alaska who are or will be driving licensed vehicles on the state's road systems.

The guide is also specifically targeted toward three major factors that contribute to teen driving safety: reducing distracted driving, increasing seat belt use and decreasing drunk driving. As these three areas of emphasis were identified as priorities by the Safe Streets project team, the guide will primarily evaluate interventions specifically related to these topics, in order to maintain an evaluation closely aligned with the outcomes of interest.

CHAPTER TWO: BACKGROUND AND SIGNIFICANCE

The research in development of a resource guide for Alaska teen driving interventions will focus on three subject areas: distracted driving, seat belt use, and drinking and driving.

Distracted driving

Distracted driving is an increasing problem in the United States. Distracted driving is defined as any activity that could divert a person's attention away from the primary task of driving, endangering drivers, as well as passenger and bystander safety. These types of distractions include: texting; using a cell phone or smart phone; eating and drinking; talking to passengers; grooming; reading, including maps; using a navigation system; watching a video; or adjusting a radio, CD player, or MP3 player (U.S. Department of Transportation, 2014). A distracted driver may experience slow reaction time, degraded awareness of exterior objects, roadway signs or traffic signals, and reduced vehicle control, such as drifting into other lanes or into the shoulder of the road (Adeola & Gibbons, 2013).

Young drivers are the age group most likely to be involved in a crash or near-crash because of distracted driving (Adeola & Gibbons, 2013). Teens make up the largest group of distracted drivers, and 11 percent of teen drivers in fatal auto accidents were reported as distracted at the time of the crash (Bratsis, 2013). In a recently completed study by AAA that analyzed video footage of more than 1,700 accidents, video analysis found that distraction was a factor in nearly 6 out of 10 moderate-to-severe teen crashes, which is four times as many as official estimates based on police reports (AAA Foundation, 2015). Results showed that distraction was a factor in 58 percent of all crashes studied; including 89 percent of road-departure crashes and 76 percent of rear-end crashes. The National Highway Traffic Safety Administration (NHTSA) previously had estimated that distraction is a factor in only 14 percent of all teen driver crashes (AAA Foundation, 2015).

The illusion of invincibility is a normal phase of social and cognitive adolescent development that can lead teens and young adults to mistakenly believe that they are immune to the consequences of high-risk behaviors. When empowered with no fear of consequence, teens and young adults are more likely to engage in high-risk behaviors. Feelings of invincibility allow young drivers to falsely assume that they are immune from injuries and consequences associated with the high-risk behavior of distracted driving (Adeola & Gibbons, 2013). Furthermore, in recent years, automakers have standardized the incorporation of electronic devices into motor vehicle design, with Bluetooth® wireless technology, dashboard Internet connection, and GPS navigation systems. The integration of such wireless technologies into everyday driving and non-driving life can lead

drivers to assume that mobile technologies can be used safely behind the wheel. However, using these devices while driving can have devastating consequences (Adeola & Gibbons, 2013).

There are three main types of distraction—visual, manual, and cognitive. A visual distraction is any distraction that takes the driver's eyes off the road; manual distractions are distractions that take the driver's hands off the steering wheel; and a cognitive distraction is any distraction that takes the driver's mind off the task of driving (Adeola & Gibbons, 2013). Because text messaging requires visual, manual, and cognitive attention from the driver, it is by far the most alarming distraction (Distraction.Gov, 2014). At any given daylight moment across America, approximately 660,000 drivers are using cell phones or manipulating electronic devices while driving, a number that has held steady since 2010 (Distraction.Gov, 2014).

Nearly half of U.S. teens say they have been in a car when the driver was texting (Bratsis, 2013). Although almost all drivers believe that texting while driving is unsafe, 52 percent of drivers aged 18 years or less reported texting while driving on a daily basis. Seventy percent of young drivers reported initiating texts while driving; 81 percent reported replying to texts while driving, and 92 percent reported reading texts while driving (Adeola & Gibbons, 2013). A quarter of teens respond to a text message once or more every time they drive. (Distraction.Gov, 2014). Upperclassmen, the students most likely to drive, are the worst violators: 58 percent of seniors and 42.9 percent of juniors said they had texted at least once while driving in the past 30 days (Bratsis, 2013).

A concerning 20 percent of teens and 10 percent of parents also admit that they have extended, multi-message text conversations while driving (Distraction.Gov, 2014). Statistics tell us that young men are more likely than their female counterparts to use their phone while driving, as well as text (Barr et al., 2015). In Alaska, 34.2 percent of high school students who drove a car or other vehicle during the past 30 days, texted or emailed while driving on one or more of the past 30 days. This is lower than the National average of 41.4 percent (State of Alaska, 2014).

The concentration needed for safe driving makes texting safely at the same time impossible, research shows (Bratsis, 2013). A driver's reaction time doubles when sending or reading a text. Sending or reading a text takes a driver's eyes off the road for an average of 4.6 seconds. At 55 mph, that's like driving the length of a football field blindfolded (Bratsis, 2013). Crash risk estimates based on observation studies of driver behavior suggest that driving while texting is at least five to six times as bad as drunk driving (Atchley, Hadlock & Lane, 2012).

Alaska state law currently prohibits all drivers from texting while driving. Drivers who are identified as operating a vehicle while texting are subject to the following punishments:

- Texting and driving (only) is a Class A Misdemeanor with up to a \$10,000 fine and one year in prison.
- Texting and driving that results in an injury is a Class C Felony with up to a \$50,000 fine and five years in prison.
- Texting and driving that results in a serious injury is a Class B Felony with up to a \$100,000 fine and ten years in prison.
- Texting and driving that results in a fatality is a Class A Felony with up to a \$250,000 fine and twenty years in prison (State of Alaska Department of Public Safety, 2015)

Seat belt use

Evidence-based recommendations from the US Task Force on Community Preventive Services state, “Safety belts are the single most effective means for vehicle occupants to reduce the risk of death and serious injury” (Reisner et al., 2013). Each year, safety belts prevent an estimated 15,700 fatalities, 350,000 serious injuries, and \$67 billion in costs associated with traffic injuries and deaths (Melnick et al., 2010).

Although seat belts are one of the most important safety inventions in automotive history, there are still teens that do not use them. Results of a survey indicated that in Alaska, 10.1 percent of high school students reported that they rarely or never wore a seat belt when riding in a car driven by someone else (compared with 7.6 percent as the national average) (State of Alaska, 2014). Observations of Anchorage teens driving to school show a seatbelt use rate of 90.3% (Alaska Injury Prevention Center, 2015). Correspondingly, adult seatbelt use in Alaska in 2015 is 89.3%. (Alaska Injury Prevention Center, 2015)

Black and Hispanic drivers were still less likely to use seat belts while driving compared to white drivers. Female drivers and drivers who had passengers in their vehicle had increased odds of seat belt use (Goldzweig et al., 2013). Findings identified a 6 percent increase in the risk of seat belt omission for each additional year of the respondent’s age, finding that the seat belt use rate for 18- to 19-year-old drivers was 33 percent lower than for 16- to 17-year-old drivers. Zuckerman (1983) observed that seat belt omission peaks around age 19 or 20 (Melnick et al., 2010).

While important that people of any age wear seat belts, it is especially important for teenagers, because their crash rate is much higher than other age groups in the United States (Goldzweig et al., 2013). In combination with this high crash rate, when compared with other age groups, teens also have the lowest rate of seat belt use. Despite substantial efforts aimed at increasing belt use among teens, observed seat belt use among teens and young adults (16–24 years old) was 81 percent in

2009 and dropped to 79 percent in 2010, representing the lowest for any age group (Goldzweig et al., 2013). Statistics show that nonuse of safety belts is even more common for adolescent passengers than drivers (Reisner et al., 2013). In 2013, only 55 percent of high school students reported they always wear seat belts when riding with someone else (CDC, 2014). Female drivers were more likely than male drivers to self-report that they always make their passengers wear a seat belt (76 percent vs. 63 percent) (Barr et al., 2015).

Low seat belt use combined with higher crash rates contribute to persistence of motor vehicle crashes as the leading cause of teenage death (Goldzweig et al., 2013). Nationally in 2009, 3,349 teen passenger vehicle occupants, aged 16–20, were killed in motor vehicle crashes, and 56 percent were unrestrained at the time of the fatal crash. In 2012, 71 percent of drivers aged 15 to 20 killed in motor vehicle crashes after drinking and driving were not wearing a seat belt, and more than half of all teen drivers killed in 2012 were not wearing a seat belt (CDC, 2014).

The protective effect of using a three-point seat belt (shoulder and lap) either as a driver or passenger reduces the risk of being killed or severely injured in a motor vehicle crash by almost 50 percent (Melnick et al., 2010; Goldzweig et al., 2013). Seat belts prevent ejection from the vehicle, spread forces from the crash over a wide area of the body, allow the body to slow down gradually, and protect the head and spinal cord from serious injury (Goldzweig et al., 2013). Not only are interventions to increase seat belt use by young people greatly needed, but also targeted strategies that take into consideration age, gender, race, urban/rural, and regional differences in seat belt use (Goldzweig et al., 2013).

Significantly more females (91 percent) compared to males (77 percent) reported always wearing their seat belts (Barr et al., 2015). Variations in teen seat belt use have not only been observed by gender, but by race/ethnicity. In recent data released by the CDC, the prevalence of rarely or never wearing a seat belt was higher among African American students (10.3 percent) and Hispanic students (9.3 percent) than White students (6.3 percent) (Goldzweig et al., 2013). These differences correspond with gender and racial/ethnic disparities in death, disability, and injury from motor vehicle crashes, with adolescent boys age 16 and racial/ethnic minorities bearing the highest burden (Reisner et al., 2013). Interestingly, correlations were also found with a teen's participation in organized sports. Risk-taking by not wearing a seat belt was found to be lower among athletes (as compared to non-athletes), including both moderately involved athletes (one or two team memberships in the past year) and highly involved athletes (three or more team memberships) (Melnick et al., 2010). Additional individual risk factors for safety belt nonuse in youths include overweight and obesity, alcohol (drinking as well as being a passenger with a drunk

driver), depression, and lower levels of academic achievement (Reisner et al., 2013).

Strong evidence indicates that seat belt laws are among the most important interventions in increasing safety belt use. Seat belt laws have been enacted by states since 1984 and vary in the nature of their provisions, with some allowing enforcement officers to make a traffic stop based only on the non-use of a seat belt (known as primary enforcement laws), while others only allow officers to note the violation of non-seat belt use if they have already pulled the driver over for a different infraction (such as failing to use a signal). These jurisdictions have what is known as secondary enforcement laws. Previous research has shown that primary safety belt laws are associated with higher safety belt use and lower crash-related injuries and mortality in the general population as compared with secondary laws (Adkins, 2014). Because some teenage populations have lower safety belt use, even with primary enforcement laws, combined approaches that include upgrades to laws with campaigns and increased enforcement might be warranted. In addition, evidence indicates that primary enforcement safety belt laws may play a key role in mitigating the disparity in safety belt use among certain teen groups. As of March 2012, only 17 US states still have secondary safety belt laws in effect, and New Hampshire still has no safety belt law at all (García-España, Winston & Durban, 2012).

In Alaska, as of May 2006, state law requires seat belts for all drivers and identifies this as a primary law, meaning that law enforcement officers can pull drivers over based solely on suspicion of non-compliant seat belt use (Insurance Institute for Highway Safety, 2015). According to the State of Alaska's Department of Public Safety website (2015), "A driver may be fined up to \$50 statewide and \$200 in the Municipality of Anchorage and may receive two points on their operator's license for failure to restrain passengers under age 16. Adult violations are subject to a \$15 fine statewide and a \$60 fine in the Municipality of Anchorage."

Drinking and driving

Impaired driving is a significant problem among teenagers in the United States. Despite concerted efforts to decrease the number of associated deaths and injuries, the statistics continue to rise nationwide. Drinking and driving greatly increases the risk for motor vehicle accidents among teenagers and is a relatively common occurrence despite that all states now have 21-year-old minimum drinking age laws (CDC, 2014). Data found that Christmas vacation, spring vacation, and prom nights/ weekends were the periods during which incidence of teenage alcohol-related crashes increased (Powers-Jarvis, 2014).

At all levels of blood alcohol concentration (BAC), the risk of involvement in a motor vehicle crash is greater for teens than for older drivers (CDC, 2014). In 2008, nearly 25 percent of teenage drivers who died in motor vehicle accidents had a blood alcohol concentration (BAC) of 0.08 g/dl or higher (considered to be alcohol impaired) and 31 percent had detectable BAC (Cavazos-Rehg et al., 2012). In 2012, 71 percent of drivers aged 15 to 20 who were killed in motor vehicle crashes after drinking and driving were not wearing a seat belt (CDC, 2014).

Nationally, a total of 11.7 percent of students reported having 'driven after drinking any alcohol' and 28.2 percent reported riding in a car with a driver who had been 'drinking on one or more occasions in the past 30 days.' (State of Alaska, 2014) Alcohol use, particularly binge drinking (which is common among adolescents), has been associated with neurocognitive deficits and increased risk-taking behaviors, which may contribute to negative driving outcomes among adolescents even while sober. In previous large-scale surveys, researchers found that binge-drinking adolescents are more likely to drive after drinking (Marcotte et al., 2012).

In Alaska, 13.1 percent of high school students reported having ridden one or more times during the past 30 days in a car or other vehicle driven by someone who had been drinking alcohol (versus the national average of 21.9 percent) and 3.4 percent of students who drove a car or other vehicle during the past 30 days, drove when they had been drinking alcohol one or more times during the past 30 days (compared to national average of 10.0 percent) (State of Alaska, 2014).

The percentage of teens in high school that drink and drive has decreased by more than half since 1991, but more can be done. Nearly one million high school teens drank alcohol and got behind the wheel in 2011 (CDC, 2014). Teen drivers are 3 times more likely than more experienced drivers to be in a fatal crash. Drinking any alcohol greatly increases this risk for teens (CDC, 2014). Research has shown that factors that help to keep teens safe include parental involvement, minimum legal drinking age and zero tolerance laws, and graduated driver licensing systems. These proven steps can protect the lives of more young drivers and everyone who shares the road with them (CDC, 2014).

Healthy Alaskans 2020

Healthy Alaskans 2020 (also known as HA2020) brings together partners from many sectors across the state to improve health and ensure health equity for all Alaskans through shared understanding, united efforts, and collective accountability (State of Alaska, 2012).

Based on the latest scientific evidence around improving health, along with community input from more than 3,000 Alaskans, the HA2020 framework identifies 25 health priorities that are regularly monitored and available publicly.

Of the identified 25 health priorities that make up HA2020, the following two priority metrics have the potential to see a direct impact by the reduction of drinking and driving in teens, an increase in seat belt use and a decrease in distracted driving among Alaska high school students:

- **Priority: Reduce the number of Alaskans experiencing alcohol and other drug dependence and abuse**
 - Indicator: Alcohol induced mortality rate per 100,000 population
 - Baseline in 2010: 16.3 per 100,000
 - Goal by the year 2020: 15.3 per 100,000
 - Indicator: percentage of adolescents who report binge drinking in the past 30 days based on the following criteria: 5 or more alcoholic drinks in a row within a couple of hours, at least once in the past 30 days
 - Baseline in 2010: 21.7 percent
 - Goal by the year 2020: 17 percent
- **Priority: Reduce Alaskan deaths from unintentional injury**
 - Indicator: Unintentional injury mortality rate per 100,000 population
 - Baseline in 2010: 58.3 per 100,000 HA2020
 - Goal by the year 2020: 54.8 per 100,000

CHAPTER THREE: PROJECT GOAL AND OBJECTIVES

This practicum project specifically sought to better understand the public health area of safer teen driving, with specific emphasis on safe driving interventions aimed at reducing distracted driving, increasing seat belt use and decreasing the rate of drinking and driving among Alaska high school students.

At present, while there is some research being conducted regarding this topic at a national level, little to none is available with specific regard to Alaska high school students.

Using a combination of Strategic Highway Safety Plan driver behavior aims, and additional consultation with practicum site Alaska Injury Prevention Center (AIPC), the following goal, and ensuing objectives were developed.

Goal:

Improve quality and accountability for youth safe driving programs in the state of Alaska, with an emphasis on implementation of interventions and measurements that adhere to established best practices and are appropriate to Alaska youth.

Objectives:

- Identify a minimum of ten interventions that target youth driving behaviors of distracted driving, seat belt use, or drinking and driving, that are aligned with current promising practices and relevant to Alaska high school students. *To be completed no later than September 30, 2015.*
- Create a resource guide for the state of Alaska that outlines interventions and potential success indicators related to best practices in targeting youth driving behaviors of distracted driving, seat belt use, and drinking and driving, relevant to Alaska high school students. *To be completed no later than September 30, 2015.*

CHAPTER FOUR: METHODS

The goal of this project was to improve quality and accountability for youth safe driving programs in the state of Alaska, with an emphasis on implementation of interventions and measurements that adhere to established promising practices and are appropriate to Alaska youth.

This section describes the methods utilized to reach answers to the original research questions and aims of this project (listed below).

Research questions:

- What interventions are currently available to prevent distracted driving, encourage seat belt use and prevent drinking and driving among high school students in Alaska?
- Of the available interventions, which are based on promising practice? Of these, which are most appropriate to the unique needs of Alaska high school students?
- What standardized measures should be used to evaluate the collective impact of interventions selected to prevent distracted driving, encourage seat belt use and prevent drinking and driving, among Alaska high school students?

Project aims:

- Upon identification of finalist interventions, compile a summary of each to be developed into a resource guide for promising practices, related to behaviors of distracted driving, seat belt use and drinking and driving, especially for young Alaska drivers.
- Determine any standardized measures used to better evaluate collective impact of youth safe driving and underage drinking prevention interventions, to be included in resource guide.

Methodological approach

In seeking to develop a final list of interventions for safe teen driving that are considered best practice, there was a challenge in determining the criteria to establish best practice. Swinburn, Gill and Kumanyika (2004) point out that 'evidence-based' public health practice is often inhibited by the mismatch between a significant spread and importance of a problem, compared to very little available evidence on the specific efficacy of potential interventions to address it.

They go on to distinguish the importance of becoming comfortable with using 'best available' evidence, versus 'best possible' and also make a strong case for the importance of expanding the body of admissible evidence to include considerations of contextual and policy relevance,

implementation capabilities and sustainability.

With the medical world setting a standard for best practice that relies upon such rigor as is associated with randomized control trials (RCT), and direct results after a defined intervention, there is a pervasive perception among researchers that an intervention cannot be viably classified as a promising or best practice, unless subjected to the same stringent evaluations (McNeil & Flynn, 2006).

The challenge is that in public health practice, many intervention approaches may have limited or diffused visibility at their outset, with impacts that are very gradual (e.g. population perceptions and behaviors that adjust slowly over time), and as a result, without the medically standardized phenomenon of visible uptake and effect, these interventions are not considered assessable by normalized standards of quality determination (Swinburn, Gill & Kumanyika, 2004.).

In setting an approach for this project, there was an opportunity to adopt an evaluation system that took into account the unique and meaningful variables in public health practice implementation that are often overlooked as valid indications of promising practice. One particularly important component to guide the evaluation process was the use of a strong conceptual framework, based in known public health recommended practices (McNeil & Flynn, 2006).

Conceptual framework

In 1988, Bruce Simons-Morton, in collaboration with colleagues Parcel and Bunker, developed an adaptation of Bronfenbrenner's original levels of *Ecology of Human Development*. This updated model, which became known as the Social Ecological model, quickly became a standard framework by which to evaluate the various social levels impacted by any one intervention (Simons-Morton, McLeroy & Wendel, 2012).

The Social Ecological Model (SEM) presents a natural choice as a conceptual framework for projects seeking to synthesize a wide variety of intervention strategies, all aimed at a specific population. The model (pictured in figure 4.1) contains five levels of impact at which an intervention can occur: Intrapersonal, Interpersonal, Organizational, Community and Public Policy. Each of these levels is associated with particular health behaviors. For some interventions, there may be more than one level targeted by the proposed strategy. By using the Social Ecological model as a framework, one is able to easily see how one intervention is impacted by another— even if a single intervention is operating at a different levels (also referred to as a 'nested' intervention). Additionally, use of SEM enables quick evaluation of patterns of success associated with the

targeting of specific levels (Simons-Morton, McLeroy & Wendel, 2012).

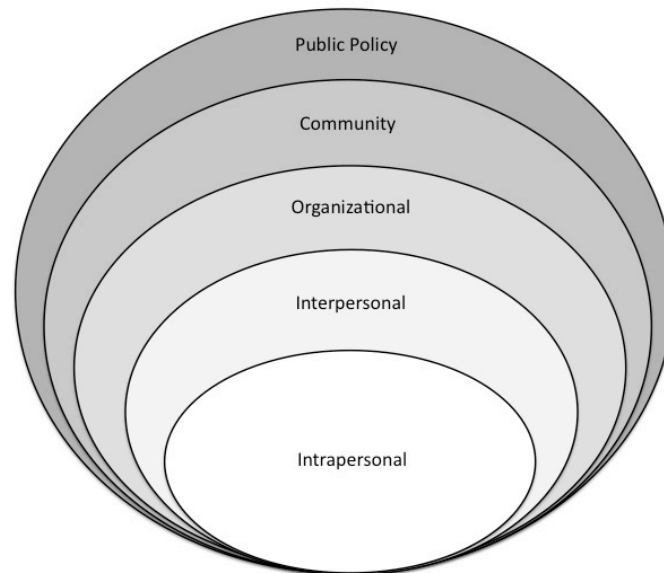


Figure 4.1 The Social Ecological Model (Simons-Morton, et al., 1988)

Project design

The approach for this project's data collection and review was based upon the approach used by McNeil and Flynn in their 2006 research on obesity prevention interventions.

Based on the flow process adapted by McNeil and Flynn from previous models (Swinburn, Gill & Kumanyika, 2004; Flynn et al., 2005), the design worked toward the creation of a portfolio of interventions aligned with promising practices in the field. This portfolio resulted after a multi-step filtering process that distilled available program literature down to a final collection of strategies based on best available evidence, while not excluding untried but promising interventions (McNeil & Flynn, 2006).

This project followed a six-step approach to refine a very large body of available interventions into a final portfolio of those considered leaders in promising practices.

Data collection and analysis

In its first phase, the project centered around a comprehensive search of all available resources (e.g. online databases, Internet sites, reference lists) for records regarding interventions that apply to safe teen driving. Identified records outlining a teen driving intervention that addressed seat belt use, distracted driving, or drinking and driving in some capacity were subject to additional evaluation.

The steps below outline the adapted process used to take the large number of initial records, and systematically reduce those numbers down, based on a series of inclusion and exclusion criteria.

Once the quantity of records was reduced to a manageable number, remaining candidates were placed into a table outlining their relevant features, at which point they were classified into a taxonomy to enable a generalization of their particular approaches and interventional strategies for easy comparability. These taxonomic results were then each classified by degree of promising practice, and additional indicators of program success were noted.

Evaluation steps are outlined in greater detail below:

Step 0: Pre-evaluation criteria, including search parameters

Academic databases for this search were identified through use of the University of Alaska Anchorage's Consortium Library. The library's online portal has the ability to access and search through more than 250 databases of academic materials, with a number of powerful search engines that have the ability to review the content of multiple databases simultaneously. Of the available search resources on the library's database, eight search engines were selected based on a high level of fidelity with the subject matter, and were used to access materials in more than 120 databases.

In addition to the consortium library's search engines, an Internet search engine was selected to review World Wide Web content, with particular interest in seeking out gray literature records (such as government and community coalition program reports, press releases, promotional materials, etc.) that may not be contained in the academic databases previously searched, but held relevance to the proposed search.

Through analysis of initial search result materials and consultation with a reference librarian, the following search terms were identified as both inclusive and exclusive at appropriate levels to produce initial search results from which to filter records of relevance in following project review stages. While certain search engines possess technology to identify records with 'related' vocabulary/ synonyms for the search terms listed, the search terms in (parentheses) were added as alternative results to use for search engines that did not possess this capability.

Search terms used:

- Safe*
- AND Intervention
- AND Driver
- AND Program

- AND Teen (adolescent; high school; high school)
- AND [seat belt (seatbelt; safety belt)] OR [drunk (drinking; alcohol)] OR [distract* (texting; text message; text-message)]

Step 1: Broad inclusion criteria

Results from each academic search result were reviewed in whole, with records of potential significance (based on a review of title and abstract) set aside for more thorough review in following steps.

Approximately 14,000 records were reviewed in this phase. Significant duplication of results (across databases) was controlled for with use of an online record storage tool, accessible from all engines used. Internet search results were reviewed only to the point of identifying saturation of resulting record types and themes. This occurred within the first 400 Internet records reviewed (when sorted by 'most relevant' results first).

To continue past step one of record filtration, each report met the following criteria:

- Identified by the search engine filter as published in English
- Identified by the search engine filter as published in past 10 years (2005-2015)
- Identified by the search engine as peer reviewed (academic databases only- Internet search did not include this criterion)
- Appeared pertinent to an intervention that targeted one or more of the desired outcomes (drunk driving/ seat belt use/distracted driving)

Step 2: Critical appraisal

After being controlled for duplication of results, approximately 700 unique records were thoroughly reviewed to determine their appropriateness to this project.

Remaining reports needed to address at a minimum each of the following, in order to be considered viable for the remainder of the review process:

- Had at least one identified outcome or process indicator
- Identified program development and potential for program evaluation
- Relevancy to population health principles as outlined in the social ecological model
- Potential relevancy to target population of high school students

Records that were pertinent from a contextual or background perspective, but that did not meet the above criteria were cultivated for use in background, discussion and strengths/limitations portions of this report, but were not included in the remaining filtration steps.

Step 3: Synthesis of findings

Of the initial records identified as potentially significant, a total of 162 met the criteria to continue on to step three. These remaining records were diagramed to outline pertinent intervention characteristics for comparison.

Important data points identified and evaluated for each report were:

- Program name(s) and geographic location
- Program type, setting (e.g. school, home, etc.) and populations addressed
- Key program intervention features and identified outcomes
- Timing of most recent information regarding this intervention
- Resources needed for implementation
- Gaps (in populations studied or in program foci)
- Summary of best practices in program development and program effectiveness (only if specific data available)

Upon completion of synthesis and evaluation of the gathered body of records, certain trends emerged, making it possible to categorize records into one of three types, based on patterns of content.

Materials were sorted into one of three types of record:

- Single intervention evaluation, with limited best practice implication identified;
- Multiple interventions or programs evaluated, with some best practice implications identified;
- Large syntheses of programming, with significant implications for best practice identified.

Of the 162 records, 14 were considered large syntheses, 39 were considered midsize (multiple intervention) evaluations, and 113 were limited in their scope of review to focus on only one intervention.

Step 4: Creation of taxonomic structure to classify intervention types

Utilizing comparison of information from the large-scale syntheses, more explicit findings were identified. By evaluating for consistencies in synthesis results, a core set of intervention types used to address teen driving behaviors of distracted driving, seat belt use and drinking and driving

became clear. These main intervention types were classified into a taxonomy, which was then tested against the mid-size and limited-scope records to ensure appropriateness of fit with all identified intervention records.

Step 5: Population of Promise Table

McNeil and Flynn (2006) used a sorting tool known as a “Promise Table” (see Table 4.1) in order to categorize interventions into various states of likely success (i.e. levels of promise).

Table 4.1 Promise Table for categorizing potential interventions (Swinburn et al., 2005)

Certainty of effectiveness*	Potential population impact†		
	Low	Moderate	High
Quite high	Promising	Very promising	Most promising
Medium	Less promising	Promising	Very promising
Quite low	Least promising	Less promising	Promising

*The certainty of effectiveness is judged by the quality of the evidence, the strength of the programme logic, and the sensitivity and uncertainty parameters in the modelling of the population impact.
 †Potential population impact takes into account efficacy (impact under ideal conditions), reach, and uptake and it can be measured in a number of ways such as effectiveness, cost-effectiveness, or cost-utility.

Using this approach, intervention types as defined by the taxonomic structure were assessed independently on both *certainty of effectiveness*, and *potential for population impact*, using available information contained in all three record types (large, mid-range and limited).

Certainty of effectiveness determinants:

- Potential ranking for each intervention is:
quite high; medium; quite low
- Ranking should be determined by the intervention’s level of internal validity and final program outcomes

Potential for population impact determinants:

- Potential ranking for each intervention is:
high; moderate; low
- Ranking should be determined by the intervention's program logic, reach and uptake

Based on the two rankings of certainty of effectiveness, and potential for population impact, each intervention was categorized into one of five categories of "promise" potential (see Table 4.1).

Potential levels of promise include:

- Most Promising
- Very promising
- Promising
- Less Promising
- Least Promising

Step 6: Evaluation of findings

Upon classification into various levels of promising practice, intervention types were evaluated for other trends and synergistic values, as identified by program literature. To provide additional structure, interventions were also evaluated according to alignment with the Social Ecological Model (SEM). This evaluation allowed for a single intervention type to be regarded as related to more than one level of the SEM.

In the process of reviewing records, additional significant results outside of the taxonomy were noted, such as individual program/intervention qualities of significance, synergistic qualities of more than one taxonomic feature applied within a single intervention effort, and general program design implications.

Upon completion and passage through filtration, classification and evaluation, all resulting intervention types were compiled into a portfolio discussing promising practices to increase safe driving for Alaska high school students.

These details are to be distributed in a resource guide, titled *Strategies to support safe teen driving in Alaska*, circulated through the Alaska Injury Prevention Center to various Alaska stakeholder organizations who have a vested interest in program execution to address these issues.

Protecting human subjects

This research presented minimal implications in the area of protection of research subjects. All data reviewed existed in publicly available databases, and while a small set of key informants was involved in project planning, they were not considered human subjects for this project, and their comments were not explicitly analyzed or reported.

An application to the University of Alaska Anchorage Institutional Review Board (IRB) was submitted April 23, 2015, seeking exempt review. It was approved and finalized May 11, 2015.

CHAPTER FIVE: RESULTS

After filtration and review of the large body of records regarding interventional approaches for the teen driving behaviors of distracted driving, seat belt use, and drunk driving, a general taxonomy of intervention types resulted.

This taxonomic structure (located in Appendix A) identifies main types of interventions in use presently to address and positively impact outcomes for the targeted behaviors. There are six main categories of intervention types, with additional sub classifications:

- **Public Policies**
 - *Minimum legal drinking age (MLDA) at 21*
 - *Cell phone use laws*
 - *Seat belt laws*
 - *Graduated driver's license (GDL) restrictions*
- **Policy Enforcement**
 - *Strength of enforcement*
 - *Enforcement culture and knowledge base*
 - *Resource allocation*
- **Community Roles**
 - *Cultural engagement*
 - *Community norms and awareness*
 - *Restriction of alcohol access and availability*
 - *Partnerships*
- **Parental Roles**
 - *Instruction and role-modeling*
 - *Communication and engagement*
 - *Knowledge of policies*
 - *Boundary setting and monitoring*
- **Youth Programs**
 - *School campaigns*
 - *Community connections*
 - *Formal driving instruction*

- **Technology Solutions**
 - *Vehicle-equipped technology*
 - *After-market technology*
 - *Phone-based applications*
 - *Relevant communication channels*

A review of findings affiliated with each of the six types follows.

1. Public Policies

While public policy regarding teen driving behaviors can often take a high degree of effort to implement or modify, research has shown that it makes a significant impact (Goodwin et al, 2013). While the effectiveness of certain policies on reducing negative teen driving outcomes are impacted by issues of enforcement and awareness, there are consistent results to indicate that the mere existence of a policy is a significant step in creating positive community norms. This leads to approval of road rules and enforcement and perceived advantage to complying with them, which are critical elements impacting behavior change programming.

From the perspective of the Social Ecological Model, public policy (while an SEM level all its own) is considered a highly ‘nested’ strategy, impacting outcomes at all other levels (community, organizational, interpersonal and intrapersonal).

Examples include a policy’s ability to influence community normative behaviors, leading to peer pressure at an interpersonal level, and affecting beliefs at an intrapersonal level. Research has proven that policies are significantly enhanced in their effectiveness when paired with other initiatives such as policy publicity, enhanced enforcement, and campaigns to support social perceptions of the policy-supported behavior as ‘normal’ for community members (Wilson, 2013).

Interventions that encourage behavior not supported by an existing policy (e.g. encouragement not to text and drive, when there is no law against it) are found to be significantly less effective than the same intervention deployed in a location that has policy support in place (Adkins, 2014).

Minimum legal drinking age (MLDA) at 21

The establishment of a minimum legal drinking age (MLDA) has long been a legislative tool used to approach and reduce a number of risky youth behaviors connected with alcohol consumption (Wilson, 2013). There has been more research on effectiveness of this approach than any other intervention directed at underage alcohol consequences, and it has been proven

consistently most successful in decreasing risks when established at 21 (Goodwin, 2013). There have been a number of significant lobbying efforts to reduce the MLDA to ages ranging from 18 to 20; thus far none have been successful. Many experts cite that maintaining minimum drinking age at 21, not lowering it, should be considered a significant priority in the work of preventing underage drinking and driving (Goodwin, 2013).

An additional implication of minimum legal drinking age laws is the impact on legislation around “zero tolerance” policies. Zero tolerance refers to legislation that regulates what level of blood alcohol (BAC) is considered legal while operating a vehicle. While adult drivers have a BAC limit between 0.10 and 0.08 in most states, the presence of a zero tolerance policy maintains that a reduced level of blood alcohol in a young driver (under MLDA) is considered a violation of law, and subject to all penalties of a DUI (Driving under intoxication) conviction. Not all states currently support zero tolerance; those who do maintain limits of anywhere from 0.02 to 0.00 as the threshold for their policies (varies by state). Success of these policies in impacting underage drinking and driving varies with the levels of enforcement and publicity around the regulations (Wilson, 2013). Studies have shown that extensive publicity of zero tolerance laws can dramatically reduce crash and injury rates (Goodwin, 2013).

There are additional laws associated with a minimum legal drinking age, such as restrictions on providing someone with alcohol when they are not of legal age, and requirements for alcohol retailers to restrict service to young people. While these vary by locale, they are consistent with their intent, which is to restrict access to those who do not meet the MLDA.

Cell phone use laws

Data supports teen drivers as higher users of cell phones than adult driver counterparts. As of 2014, legislation in more than 80 percent of US states prohibits cell use among novice teen drivers. While data shows very little impact on usage levels or accidents with implementation of a teen-only law, a community-wide cell phone ban has been shown to significantly impact teen crash rates (Buckley, Chapman & Sheehan, 2014). Additional research has maintained that cell phone bans prohibiting all phone use (excluding hands-free) are of significantly higher impact than those that focus only on banning texting (Fischer, 2014).

Seat belt laws

Every state and territory in the United States has some variety of law governing the use of seat belts in vehicles, however these restrictions vary significantly. Certain laws only apply to the driver,

to passengers, or to minors in the car. In addition, not all laws allow for enforcement officers to cite a violator for non-seat belt use unless they are identified as committing an accompanying traffic offense at the same time—these refer to secondary enforcement versus primary enforcement policies. Teen drivers and passengers consistently demonstrate lower belt usage rates than adults, and as a result some states have an explicit inclusion of belt use as part of their graduated driver's licensing (GDL) requirements. This is most significant for states that do not have primary enforcement capabilities with belt usage. Primary enforcement laws have been shown to increase teen compliance with safety restraints (both as drivers and passengers) by up to 15 percent (Goodwin, 2013).

Graduated driver's license (GDL) restrictions

A Graduated Driver's Licensing (GDL) program requires that new teen drivers work through a series of stages in order to transition from being a novice driver, to a fully licensed driver without any restrictions. While all states in the U.S. have some type of GDL in place, not all maintain the same levels of restriction. It is worth noting that while teen driving incidents in the U.S. are still disproportionate to the size of the population, there was a significant decline in teen-related traffic injuries and crashes between 1996 and 2010. While the specific reason is unknown, it is suspected by many researchers that the implementation of multi-phase driver licensing programs in a number of localities during this time period had a strong relationship to this impact (Goodwin, 2013).

The Insurance Institute for Highway Safety (IIHS) rated a GDL law as good if it had five or more of the following seven components: (1) minimum age for a learner's permit; (2) mandatory waiting period before applying for intermediate license; (3) minimum hours of supervised driving; (4) minimum age for intermediate license; (5) nighttime restriction; (6) passenger limitation; and (7) minimum age for full licensing (Fell & Romano, 2013). Research validates that that this phased approach significantly decreases negative teen driving outcomes by addressing both inexperience and immaturity in teen drivers (Goodwin, 2013). Interestingly, data also shows that even when a well-designed GDL is not well enforced, its presence still has a significant impact on teen driving safety. The assumption among parents and teens that the GDL is well enforced is more valuable than actual enforcement efforts (Goodwin, 2013).

With regard to learner's permit length and minimum age, there were positive correlations with an increased length needed to hold a learner's permit (6 mos. minimum, with improvements noted for 9-12 month periods), as well as with minimum ages for learners of no less than 14 years of age, with increasingly positive outcomes as the minimum age increased. Supervised driving hours (able

to be proctored by parents or other responsible adult licensed drivers) ranged in state requirements from none, to 70 hours of requirement, with an average between 30 and 50 needed before transition from a learner's permit to an intermediate license.

The minimum age for intermediate license achievement in any state is age 14 (in South Dakota), although most states do not offer the ability to achieve this phase until a minimum of age 16 (IIHS, 2015). During this intermediate licensing phase, nighttime driving and passenger restrictions are common. Nighttime restrictions for drivers in an intermediate stage of licensure exist in almost every state, but hours of 'night' vary from 6 p.m. to 6 a.m. as the most restrictive definition, and 1 a.m. to 5 a.m. as the least. The most common hours are from between 11 and 12, until either 5 or 6, but data supports that many teen crashes actually happen before 12 a.m., supporting an expansion of night hours to begin earlier. Data indicates a direct correlation between increased prevention and a wider definition of night hours (Preusser & Tison, 2007). For GDL most passenger restriction includes restriction by quantity, age or both. Some states allow for exception for family/household members. Strong evidence supports a reduction in injury and crash amongst teens with this restriction in place, as long as there is significant enforcement (Goodwin, 2013).

Minimum age for full licensing in teens has a direct relationship to prevention of teen driver fatalities, with positive relationships in reduction of risk associated with an increased age of full (unrestricted) driver licensure. States' regulations vary between age 16 (with a minimum waiting period of intermediate licensing) to age 18, with most programs utilizing ages 17 and 18 (IIHS, 2015).

2. Policy Enforcement

Enforcement culture surrounding public policy is a critical issue, considering that when surveyed as to their likelihood to comply with a stated law or regulation, both teens and parents displayed a significantly stronger likelihood to prioritize a law that they felt was highly enforced (Fischer, 2014).

Of particular note is the GDL restriction on number of passengers permitted in an intermediately licensed teen driver's vehicle. While many teens admitted to violating the stated passenger limit without their parents' consent or knowledge, a significant number surveyed indicated that their parents were aware of their violation and did not object to it, due to a perceived lack of local enforcement. When considering that statistically teen passengers are the number one predictor of a teen driver's likelihood to be in a distracted-driving-related incident, this finding is significant.

From the perspective of the Social Ecological Model, policy enforcement contributes to the same span of SEM levels as the public policies it supports. As another highly 'nested' strategy, enforcement impacts outcomes at every level (community, organizational, interpersonal and intrapersonal) and contributes substantially to the prediction of a policy's success or failure to significantly reduce risky behaviors and negative outcomes.

Of importance is the substantial relationship between the successes of enforcement initiatives when paired with pre-publicity of their scheduled occurrence (Solomon, Tison, & Cosgrove, 2013). While the enforcement of a public policy will impact an individual who is immediately being penalized (at inter and intrapersonal levels), successful ability to publicize the occurrence of this enforcement allows the impact to permeate at a community level.

Strength of enforcement

Many policies surrounding teen driving are subject to a classification of either 'primary' enforcement or 'secondary' enforcement enabled. This refers to the fact that an officer is able to issue a citation for an observed violation of a primary enforcement issue without any other cause needed, while in a scenario with secondary enforcement capability only, an officer can only issue a citation if and when the behavior occurs in tandem with some other offense that is supported by primary enforcement. Examples of this exist in seat belt legislation and GDL legislation, wherein a driver may not be wearing their seat belt or may have a passenger in their car when not allowed by law, but in a secondary enforcement scenario they could only be ticketed for these violations in the event they were pulled over for speeding (or some other driving offense).

Additional issues around strength of enforcement exist with the application of policies to certain population members, and not to others. An example is the scenario of a state that allows fully licensed drivers (who could be as young as 16) to use their cell phone while driving, but prohibits drivers who are in a graduated phase of licensure (learner or intermediate stage) to use their phone. When surveyed, law enforcement officers in multiple communities have indicated that the difficulty of identifying a clear violation of a limited or secondary enforcement policy has made them less likely to issue citations, even when in observation of a behavior that could be in violation (Fischer, 2014). The state of New Jersey has taken a unique approach assisting officers in easily identifying teen drivers who are subject to the restrictions associated with GDL. The state requires that all teen drivers have a reflective sticker affixed to the license plate of their vehicle. Review of this process showed that while citation levels went up, teens' self-reported violations did not

decrease, and multiple parents and teens identified avoided compliance with sticker use (Goodwin et al, 2013).

Penalties (and consistent application of them) are also considered a factor in the perceived 'strength' of enforcement. In communities where penalties are well known and cases of violation are consistently adjudicated to apply these penalties, teens indicate a higher likelihood to adhere to established regulations. A study regarding the enforced punishment with violation of certain states' GDL programs (delay of continuation in the licensing process) revealed certain challenges (Shaffer et al., 2008). The research didn't support that a more strict enforcement of GDL equals lower crash/incident rate. The general conclusion by researchers is that the penalties for violating GDL requirements are not well known, as well as not well enforced, and that the proposed punishment of licensing delays is infrequently applied—even in the case of violation (Shaffer et al., 2008).

Enforcement culture and knowledge base

While officers identify a reluctance to maintain some policies due to difficulty in certain policy enforcement components (i.e. only part of a population is held accountable, etc.), other surveys amongst law enforcement officers have identified that this can also be a challenge of culture within the law enforcement team (Fischer, 2014). An officer's likelihood to attempt enforcement can increase in the event of focused training and increased knowledge of issues surrounding enforcement of teen driving policies.

There are a number of programs that provide specific training to officers in order to educate them on the potential negative consequences that can come from unsafe teen driving behaviors, as well as the overall impact that their enforcement efforts can have on the health and well-being of their communities (Adkins, 2014).

Resource allocation

HVE- also known as high visibility enforcement activity, or STEP- selective traffic enforcement programs- are two approaches for enforcement that operate on the premise of increasing the presence of patrols in a concentrated period of time, with either a particular population focus, particular geographic focus, or particular behavior target. By providing the resources to support overtime funding to allow this increased presence, states have seen significant results accompany their investment. A well-known example of this approach is the nationwide "Click-it or Ticket" campaign that spends a two-week period in the spring with a national increase in law enforcement patrols scanning for violators of seat belt requirements. The data show that while an increase in the

presence of law enforcement officers will always result in an upswing in the number of citations for a particular infraction, the real goal (decreased crashes and injuries) is best achieved when this proposed increase in enforcement is promoted publicly ahead of the proposed time of increased enforcement (Solomon, Tison, & Cosgrove, 2013).

In a Wisconsin-based enforcement campaign targeting teens attempting to purchase alcohol underage, officers were paid overtime to visit local liquor stores and intercept youth purchasing from the stores against legal restrictions. A noteworthy result from this campaign was the importance of applying increased enforcement efforts to a wide target of establishments, as the finding was that rumor and reputation of increased enforcement efforts were only effective if there was a legitimate perception that the perceived threat of increased enforcement would actually be fulfilled (Goodwin, 2013).

3. Community Roles

Cultural norms around risky teen driving behaviors play a significant role in the disruption or continuation of these actions. As (another) specifically identified level within the Social Ecological Model framework, 'community' is without question an important area of exploration within available intervention strategies to address culture issues.

Community-based interventions have the unique ability of impacting levels both above and below them in the Social Ecological framework, with the prevailing norms and needs of a community dictating and supporting public policy formation, as well as these same community influences impacting the decisions and behaviors at organizational, interpersonal and intrapersonal stages of influence.

As mentioned for both policy and enforcement, community interventions also rely heavily upon publicity and broadcasted information to support the various initiatives executed at this level (Buckley, Chapman & Sheehan, 2014).

Cultural engagement

A strategy employed in other areas of the United States with a high percentage of a particular ethnic minority population, is to create a linkage between cultural standards of the population, and their role in influencing teen behaviors. Whether under the umbrella of cultural responsibility in tending to the safety of teen community members, or identifying cultural norms that can be taught to teens regarding safe behaviors, this approach can have interesting effects within target communities. This has particular applicability to Alaska Native teen populations.

These messages can be promoted through local tribal associations, mass media campaigns, Indian Health Services locations, and many other cultural gathering places.

Community norms and awareness

Another approach is through mass media campaigns that target the community as a whole, influencing perception of normative behaviors, as well as targeting community members in their ability to act to influence their peers in behaviors that support the decrease of risky teen driving.

It has been identified as critical for these campaigns to involve significant research ahead of implementation, in order to ensure that the media channels used are appropriate, as well as the specific messaging selected for the campaign being appropriately aligned with the target population. Common targets for community-wide media campaigns intended to impact safe teen driving issues include: influence of specific elements of local culture; information regarding enforcement and laws; coordination with national safe teen driving observances; avoiding consequences; and social responsibility.

Of additional note is the importance of evaluating local diversity needs, and identifying the appropriateness of developing auxiliary promotional or communication strategies in order to fully connect with diverse sectors of a community (Adkins, 2014).

Other strategies utilized in influencing community culture include signage prohibiting risky driving behaviors (located on major roadways, or in community centers such as malls, hospitals or government buildings), as well as promotion of a citizen's responsibility to be aware and act to influence dangerous teen driving behaviors. Some recommended actions include creation of a community tip line for knowledge surrounding behaviors such as underage drinking or drinking and driving, and training for community members to feel empowered to verbally and demonstratively support the notion that safe behaviors are a community norm and expectation (Goodwin, 2013). Additional issues include community members' awareness (and support) of laws as well as pressure for local advertising/marketing efforts to support and reinforce safe behavior messaging in their efforts to promote alcohol and other merchandise that could be connected with unsafe teen driving behaviors (e.g. no tolerance for advertisements showing a teen driving without wearing a seat belt, etc.).

Restriction of alcohol access and availability

While *alcohol access and availability* as a targeted sub-category appears inappropriately narrow for a taxonomy intended to broadly address multiple safe driving interventions among

teens, research indicates a strong correlation between underage use of alcohol, and resulting risky driving behaviors, including all three of the targeted behaviors specific to this project (Wilson, 2013).

Underage alcohol access in both retail and social environments can be effectively addressed with a combination of strategies directed at youth, adults and sellers of alcohol (including hosted establishments, as well as retailers) (Goodwin, 2013).

For youth, the continued enforcement and recognition of zero-tolerance and MLDA regulations remains critical. Examples of aides include reminder stickers on alcoholic products, warning of their age restrictions, as well as undercover enforcement efforts in which officers have the ability to cite youth for attempting to purchase alcohol when under the MLDA. Underage-party identification strategies by law enforcement, as well as appropriate disbursement strategies and enforced penalties for provision of false identification are some additional youth-targeted efforts that have been utilized with positive outcomes (Goodwin, 2013).

For initiatives targeting adults, undercover ‘shoulder tap’ operations (i.e. a minor asking an adult to purchase alcohol on their behalf) have been used to positive effect, as well as awareness and enforcement of social host liability (responsibility of the ‘host’ of a party for any negative consequences resulting from individuals who obtained alcohol from the event); and keg registration (kegs have ID numbers to identify who purchased it for a party).

Operational realities make it difficult to actually enforce social host liability, and research has shown that the existence of the law is most effective when promoted heavily through a fear-motivated media campaign that explains and reinforces laws that prohibit adult purchasing for minors—putting responsibility on the adult for subsequent crimes. When implemented, this showed significant impact on the number of surveyed teens who reported knowing parents who will host parties/purchase alcohol in their community (Goodwin, 2013).

For efforts involving vendors, the best line of defense is a robust alcohol checks program. The most frequent practice is (through undercover work) to observe and cite the vendor in the event they sell alcohol to a minor. Important qualities of checks include significant publicizing of their occurrence; occurrence with all vendors (not a sample); frequency of every few months; unscheduled; and a program that is sustained over time (Wilson, 2013).

In addition, penalties for violation must be perceived as significant- such as the suspension of a liquor license if a business is caught selling alcohol to minors (with no option to decrease time of suspension in lieu of cash penalty). Other approaches, such as the Cops in Shops program (that cites minors attempting to purchase alcohol, instead of the vendor) has had success with apprehending

minors before they are able to obtain the alcohol, and the ability to report to the vendors regarding problem-clerks who do not appear to be enforcing MLDA restrictions. Additional vendor-based intervention strategies include substantial signage in their establishment emphasizing the MLDA and its enforcement (Goodwin, 2013).

Partnerships

Community partnerships are a highly adaptable strategy to take advantage of resources present in a community, to best maximize unique local strengths in working toward safer teen driving behaviors.

A primary strategy for success is the formation of a community task force or community coalition focused specifically on addressing risky teen driving behaviors. When successful, these groups intentionally involve representation from schools; health; law enforcement; retailers; parents; youth; and citizen organizations. Additionally, strong and consistent leadership is needed, as well as significant cooperation and coordination between all parties (Goodwin, 2013). A common challenge occurs when the scope of a group is not well defined, to the point where there are conflicting priorities. It is important to acknowledge work that complementary committees are doing, and to potentially partner on specific projects, without necessarily combining the groups' efforts on a permanent basis, to the detriment of each group's primary purpose. For example, if there is a taskforce to reduce underage drinking, their work is corresponding, but not the same as the work of a task force devoted to safe teen driving.

In this vein, it is also important to fully assess the presence of community groups that potentially have the ability to impact safe teen driving, and to intentionally establish a clear and organized understanding of how a safe teen driving taskforce would engage with those groups (Goodwin, 2013).

In addition to coordinating community-wide initiatives aimed at safe teen driving behaviors, community groups have other potential functions. One significant area of importance is accurate and meaningful data, in order to advise needs for proposed interventions. Groups can work to conduct needs assessment and data collection (including participation in natural observations) in order to serve this end.

Additional community partnerships include opportunities for local groups, trades, and/or professional organizations to cultivate opportunities for their natural skills to contribute toward safer teen driving. One example is out of Pennsylvania, where local trial lawyers participate as presenters in school presentations to discourage distracted driving. As naturally gifted speakers,

with high attention to detail in preserving program fidelity, these volunteers have been tremendously successful in their presentation of this program. Their local bar association was involved in the initial recruitment effort, with a resulting volunteer-base of more than 800 lawyers statewide (Fischer, 2014).

4. Parental Roles

As a strategy in the reduction of risky teen driving behaviors, parental roles can be one of the more complex (but critical) approaches. Multiple tasks are important as parents of a driving teen: enforcer/supporter of GDL and other legal restrictions; role model of driving behaviors; creating additional restrictions outside of stated laws; supervising driving hours; and teaching driving skills. Parents are asked to act as an expert instructor, a motivator, a law-enforcing authoritarian and as a trusted advisor and confidant. While multiple programs exist for support of parents of teen drivers, there is significant variation in program evaluation and quality (Goodwin, 2013).

From the perspective of Social Ecological framing of parental interventions, there is a two-fold viewpoint. While actual influence from parents to their teens typically falls entirely within the level of interpersonal influence, additional consideration should be made for the multiple safe teen driving interventions that specifically *target parents*, encompassing broader SEM influences, including intrapersonal, organizational and community (Goodwin, 2013).

Instruction and role-modeling

Research has shown that parents are pivotal in modeling and shaping the driving behavior of their teen driver. This includes demonstrating safe driving behaviors and attitudes during early driving phases (Simons-Morton, Ouimet, & Catalano, 2008), as well as providing most of the driving supervision and instruction during the learner and intermediate licensure periods.

Consistently, data supports that parents who engage in behaviors such as distracted driving are more likely to see their children mimic these same behaviors (Buckley, Chapman & Sheehan, 2014). There is a collection of support materials to teach parents to be driving teachers (such as Ford and GHSA's *Driving Skills for Life: Road Ready Teens*).

Research shows that while parents regard these materials as 'helpful' or 'informative' in their efforts to teach their novice driver, they rarely use them specifically as prescribed. Consequently, data supports no specific reduction in crash rate outcomes related to parental use of instructional aides. Researchers hypothesize that these educational campaigns alone are incapable of producing

outcomes, but that when they are paired with other initiatives, can be complementary (Goodwin, 2013).

Communication and engagement

It has been found that parents who initiate conversations with their teens around risky driving scenarios have an easier time establishing and enforcing expectations for safe driving behavioral norms. There are a number of campaigns to encourage parents to have these conversations (including the well-known program 'Steering Teens Safe' (Ramirez et al., 2013)).

Further research in the area of parental involvement and engagement in teen education around safe driving issues demonstrates a positive correlation between parental engagement and reported risk reduction. Inclusion of parents in school health campaigns regarding drinking and driving showed higher positive outcomes (Buckley, Chapman & Sheehan, 2014). Additionally, jointly attended driver's education for teens and parents, such as Israel's *Green Light for Life* (Toledo et al., 2012) is shown to be effective in increasing parent and teen reports of compliance with driving restrictions, although this has not necessarily been shown to decrease accidents. There is a hypothesis among researchers that this lacking correlation may be based in sample bias, as it is more commonplace for safety conscious families to jointly attend driver education programs, and therefore surveyed participants may not be broadly representative of a general population (Goodwin, 2013).

Knowledge of policies

A known impediment to success of parental support of local laws regarding the GDL system and other driving-related legal and policy restrictions is lack of correct knowledge among parents regarding these policies. When surveyed regarding the quantity of hours needed for their novice teen driver to successfully transition from a learner's permit to an intermediate driver's license, less than half of parents were able to identify the number of hours correctly (Simons-Morton, & Ouimet, 2006).

Researchers have compared this with the fact that evidence supports no statistical correlation between number of required hours during the learner phase, and crash/injury reduction. It is now suspected that this is because few parents actually know the correct number of hours needed, and may not necessarily comply with the provision as it is laid out in law when teaching their novice drivers (Goodwin, 2013).

Boundary setting and monitoring

Parental boundary setting and conversations regarding safe teen driving are directly correlated to teen safety outcomes, but data show that parents need help to be most effective.

Many parents report having specific and implicit rules or expectations regarding their teenager's independent driving behavior. However, studies show that these "clear" expectations may be considered unclear or ambiguous to their teen driver. This is particularly true when parents are inconsistent in regulating and enforcing these rules (Simons-Morton et al., 2005).

Thus, results suggest that there is often considerable dissonance between parents and their novice driver regarding the specifics of these rules and expectations. This has been found to be a predictor for self-reported risky driving behaviors among teen drivers (Hartos, Leaf, Preusser, & Simons-Morton, 2006).

Available evidence suggests that 'safe driving agreements' can be used as a tool to educate parents and teen drivers regarding the risks associated with driving, as well as motivate them to set greater limits. The specifics of impact on offense rates and crash involvement are still uncertain, with more research needed (Soole et al., 2013). Formats for these parent-teen driving agreements are available, and examples such as the Checkpoints program include support materials for parents to use in order to communicate the variety of risks that should be addressed in the agreement (Simons-Morton et al., 2006).

The most opportunity for positive results comes from a combination of stated restrictions, paired with the use of technology monitoring devices (options for devices discussed in detail later in results) to validate teens' compliance with the agreed-upon expectations. These monitoring devices, utilizing a weekly report card format for parents support parents in communication regarding norms and expectations with their young novice drivers (Buckley, Chapman & Sheehan, 2014).

Overall, research supports affirmative parent-teen relationships and an authoritative parenting style as the keys to success of safer driving agreements. The implementation of safer driving agreements with partners other than a parent is limited and as a result still largely unevaluated (Soole et al., 2013).

5. Youth Programs

With potential to take advantage of Social Ecological model levels of intrapersonal, interpersonal and organizational influences, youth programs that target teen driving behaviors of drunk driving, distracted driving and seat belt use are the intervention type most commonly

developed and invested in by public and community health efforts. Problematically, this intervention type is also the one with the least consistent behavioral outcomes. Studies have shown that while teens view these programs as having impacted their knowledge and attitudes, the programming does not consistently impact their actual behavior (Goodwin, 2013).

Youth programs come in a variety of manifestations, with both passive and active promotional materials and program curricula available in abundance. There are a number of theories posed for the inconsistent outcomes of success associated with this variety of intervention, including the large number of interventions executed by a highly variegated population, resulting in lack of fidelity to original (evidence-based) program design. In addition to issues of fidelity in program execution, theories explore the general challenge of teens as a primary target for intervention strategies, due to a highly dynamic set of attention and intention issues around cognitive development stages in teenage years (addressed in greater detail in discussion section). Other challenges in youth programming outcomes are also related to the measurement criteria used in program implementation, which are sometimes not able to accurately capture program successes because they aren't using appropriate metrics in evaluation.

Examples of youth interventional program foci include: scare tactics; promotion of positive norms that don't involve the targeted risk behavior (i.e. identifying alternative 'fun' activities, instead of underage drinking); social norms (i.e. not as many people drink and drive as you think); peer-to-peer influences and many others (Goodwin, 2013). Programs with some level of success can be spearheaded and led by either youth or adults, although currently prevailing trends in program execution are exploring the significance in peer-to-peer program delivery as the more impactful deployment mechanism (Fischer, 2014).

Findings show that peers are a substantial influence on a teen, not necessarily just by peer pressure (direct), but just by being present (indirect). When it comes to risky driving behaviors, teens are more likely to engage in distractions and risks for the purposes of interacting more with peers, building relationships, and impressing peers (more so even than when playing a driving video game)(Buckley, Chapman & Sheehan, 2014). Using this same theoretical approach, a youth-led campaign is important because this same research suggests that youth have more influence among their peers in promoting positive driving behaviors.

School campaigns

The most popular deployment environment for youth-focused risk-reduction driving campaigns is within the context of schools. This isn't limited to the formal educational format and

structure of students' typical day-to-day school life, and can include a variety of approaches. As identified previously, programming within the school context currently employs an equal mixture of youth-led initiatives and education/programming provided by adult resources (Goodwin, 2013). Programs take a variety of approaches, including integration into existing curriculum, awareness campaigns through various media, visual reminders and interactive campaigns.

Integration into curriculum typically takes the form of lesson plans used within health and wellness educational settings, and is becoming less utilized in favor of newer innovations in behavior change theory and youth engagement.

Awareness campaigns through a variety of media outputs within a school environment have included use of posters, banners, floor decals, signs in school parking lots, school-radio or television broadcasts, announcements at school sporting events, slide-show presentations at school-wide assemblies and many other examples. While this consistently appears as a popular component in many interventions directed at teens, these efforts are highly passive in nature and are most successful in having potential to impact risk outcomes if combined with a more diverse campaign effort involving interactive engagement with the target population (Buckley, Chapman & Sheehan, 2014).

The notion of visual reminders as a prevention approach encompasses well-known manifestations such as memorial plaques or monuments dedicated to students who were killed in crashes, as well as example 'crash cars' delivered to school campuses to act as deterrent for students to engage in risky driving behaviors. While these visual cues have been long-used as part of fear-based deterrent systems, their efficacy is relatively low unless paired with a more diversified interventional strategy (Baird, 2011).

Interactive campaigns present the most significant area for exploration among the variety of program types currently targeted within a school environment. As behavioral science continues to better understand the teenage brain, the themes portrayed in this area of development continue to fluctuate, but the basic premise of engaging students' participation remains consistent. Iterations of interactive programs include: role plays/reenactments; monitoring and collection of data; competitions; incentives; and a variety of hands-on exhibits and demonstrations (Goodwin, 2013).

As in most behavior change campaigns, an important component is the ability to monitor the actual behavior being targeted for change. Programs have found a unique ability to serve this need, while engaging and educating youth. By encouraging youth representatives within various school communities to conduct observational measurement campaigns (e.g. observed seat belt use by students leaving the parking lot after school), studies have found that the students conducting the

observations are significantly impacted by a specific awareness of the problem's prevalence, and at the same time are collecting highly valuable program evaluation data that can be used in a pre-and-post-intervention comparison (Adkins, 2014).

Youth drivers have been noted as having a high sense of self-efficacy for certain driving tasks, which are often unrealistic. Examples include the assumption of an ability to successfully multi-task while operating a vehicle, drive appropriately when intoxicated, avoid injury when in a collision, even without seat belt use, etc. Interactive programs demonstrating the challenges associated with these behaviors provide dissonance between a teen's assumptions/beliefs and the demonstrated reality (Aguilar & Shoji, 2013).

Uses of competitive campaigns and incentive-earning opportunities have also been an up-and-coming trend in the past decade of teen driving interventional strategies. Examples of some of these campaigns include student pledge card 'drives' that incent students to sign a pledge to abstain from a variety of negative driving behaviors, surprise observations measuring positive driving behaviors (with results compared between schools), creative contests to design music, art, video or written compositions, and many other inventive approaches to engage with students who thrive off of competition. Incentives range dramatically, with some examples as eligibility for a gift-card raffle, a school-based grant for further safe-driving programming, an endowment for a student's club of choice, all the way up to the opportunity to win a new car. While these competitive efforts are highly successful at engaging student participation, and typically yield changes in stated attitudes and perceptions, the resulting behavior changes are inconsistent and vary substantially by program (Adkins, 2014; Fischer, 2014).

Noteworthy is the element of role-play and reenactment campaigns within an interactive school program strategy. A well-known reenactment campaign known as "Every 15 minutes" capitalizes on the idea that 'every fifteen minutes' a student is lost to a drunk driving accident. Reenactment participants stage a two-day campaign in their school to mimic a variety of scenarios to demonstrate to students what the impact of such a loss can feel like, including a crash scene recreation. While broadly used, and known for having a high emotional impact on participants, this program has been identified as utilizing a fear-based impact strategy, and significant concerns have been raised as to its efficacy at a behavior change level. A primary lesson to be learned from the limited success of these types of programs is the importance of emphasis on positive norms, and utilization of self-efficacy strategies to encourage adoption of new behaviors instead of a singular focus on 'scaring teens straight' by only advocating for abstention from negative behaviors (Baird, 2011).

Community connections

Not to be confused with larger community-based interventional strategies, community-connection based youth programming takes advantage of existing community structures that youth are engaged in and provides opportunities to infuse targeted youth campaigns into these contexts.

Many opportunities to utilize this approach are fairly recently conceptualized, and as such have very limited evaluation data to predict potential successful outcomes. The primary motivation for these types of interventions is the idea of utilizing and increasing protective factors that have been linked to reduction in teen driving injuries and deaths. Some protective factors of note include having a positive relationship with adults in a school or social club setting, as well as finding success in other health behaviors (such as healthy eating or physical activity). With this in mind, interventions have been developed for deployment by pediatricians (for use in the context of regular medical exams), school counselors and teachers, club and church group leaders and sports team coaches (Buckley, Chapman & Sheehan, 2014).

An additional approach that has been tested at the adult population level (with success) is the concept of targeting employers as another opportunity for interventional deployment (NHTSA, 2008). While this has been proposed as a potential strategy for youth populations as well (targeting employers who have a high percentage of teens in their workforce), no significant evaluation has yet been conducted to determine the efficacy of this approach. This is theorized as an alternative strategy for teens that may not be in the traditional school environment (home schooled, alternative charter school attendees, etc.) that may miss out on the many school programs typically used to target teen safe driving behaviors (Wilson, 2013).

Formal driving instruction

Although stakeholder groups committed to deployment and improvement of driver's education for novice drivers (e.g., educators, researchers, parents of novice drivers and young drivers themselves) often disagree about what the primary objective for driving education is (or should be), the most significant debate in the education of young drivers continues to be around appropriate measures for assessing success (Pezoldt, Womack & Morris, 2007).

The two most frequently cited goals for driver education are: To impart knowledge of the rules of the road, the basic skills involved in vehicle operation, and instill and reinforce attitudes consistent with safe driving; And to produce safe drivers, e.g., drivers with measurably lower crash rates (Pezoldt, Womack & Morris, 2007). There is a national initiative underway to identify and

standardize the most important components of driver education requirements and curriculum specifications (in both public and private instructional environments) known as the National Driver Education Standards Project (NHTSA, 2015).

When engaged with a formalized driver's education program (not to be confused with parent-provided education), youth have a variety of options, including both pre-licensing education as well as post-licensing education to reinforce and cultivate continuation of learned behaviors.

Pre-licensing driver's education was historically offered as part of a publicly available curriculum through schools, but disappeared over time (markedly in the middle 1990s) with funding availability decreases. Established studies show minimal crash reduction with driver's education (although there is question as to whether crash statistics are the right success/failure indicator) (Pezoldt, Womack & Morris, 2007).

Many states have attempted some form of incentive system for young drivers who take driver's education, including a younger age to get a full license or a provisional license; a decrease in number of required supervised hours; or waiver of a portion(s) of a driver's test. All of these have shown an increase in negative driving outcomes (likely due to the fact that they put inexperienced drivers on the road faster) (Goodwin, 2013).

Many states currently necessitate driver's education in some form before a teen has the ability to get their license (if subject is under 18), with most states offering a combination of commercial and high school driver education courses (although not all communities offer publically available instruction) (Goodwin, 2013).

Post-licensing driver's education operates off of the idea that instruction is helpful after a teen has had some initial experience with their learner phase, and engages in some type of instruction once they've achieved their provisional (intermediate) license. There is no current research to determine the effectiveness of this approach, but it is currently being evaluated in a number of trials (Goodwin, 2013).

In addition, some considerations for computer-based training have shown potential positive outcomes, especially for instruction targeting avoidance of distraction-based driving habits.

6. Technology Solutions

Social norming of technology to prevent and prohibit risky behaviors while teens are driving is suggested as a significant area for improvement/exploration (Buckley, Chapman & Sheehan, 2014). While legislative efforts to restrict use of distracting devices during vehicle operation are important, they are hard to enforce, and when used as a solitary intervention have less potential

than when paired with barriers in the form of technology that inhibit the teen's ability to ignore policy requirements.

In a Social Ecological context, technology operates mainly at an interpersonal and intrapersonal level. With the existence of monitoring, inhibiting and reminding components of tech available, teens are more likely to make decisions at a personal level that the inconvenience of working against the technology is not worth the hassle of risky behaviors. At the interpersonal level, many safe driving technologies have reporting functions that allow parents to receive regular report cards of their teen's driving habits. This additional accountability allows parents to regularly engage with their teen on behaviors and potential areas for improvement.

A significant challenge to the effectiveness of technology solutions comes with the current trend of teens as more technologically savvy than their adult counterparts. While this can present challenges in terms of teens potentially disabling technological interventions installed, or with adults not being sufficiently aware of the potential for use of technology as a countermeasure to their teen's risky driving behaviors, the potential for impact of technological solutions is still well-worth consideration.

Studies are still very new regarding the use of a variety of electronic monitoring technologies to provide parents insight into unsupervised teen driving behaviors. In a recent study, more than thirty teen-parent combinations used both in-vehicle video monitoring as well as GPS tracking solutions to evaluate their impact on teens' safe driving tendencies. The findings were encouraging. Not only did teens refrain from disabling the technology, but parents found the reports produced by the technology to be highly effective in providing opportunities to discuss teen behaviors and enforce established expectations and restrictions (Goodwin, 2013).

Vehicle-equipped technology

As automakers become engaged in efforts to create safer conditions for teen drivers, significantly higher levels of in-vehicle enhancements are becoming available with newer models. One example of enhancement is Ford's MyKey technology, which allows parents to set certain limitations by programming a key through the vehicle's message center to choose preferred driving modes. Upon insertion of the programmed key into the ignition, the system reads its MyKey code, activating the selected settings. Options include enhanced seat belt warning systems, top speed settings, limitations on audio settings and earlier warnings for low fuel (Ford Motor Company, 2015).

After-market technology

As many parents do not have the ability to purchase a new model vehicle for their teen driver, in order to access the latest and greatest options, a feasible alternative comes in the form of after-market installation options. These measures include solutions such as in-vehicle video-monitoring that detects significant G-force events (sudden braking, swerving, etc.) and records the driver's actions immediately preceding and during these events. Additional tech options include GPS systems that monitor driver speed, seat belt usage and geographical location, providing alerts if and when the driver ranges outside of any established boundaries (including specific location restrictions, speed restrictions or non-use of safety restraints). In addition to the ability to target distracted driving behaviors and seat belt use, in-vehicle technological options also exist to prevent teens from driving after drinking, with the ability to require use of ignition interlock devices (breathalyzer technology) in order to successfully start a vehicle's ignition.

There are a number of potential promotion and distribution mechanisms for these approaches, although the efficacy of them has not been evaluated. Some concepts being explored to make parents aware of this technology include promotional efforts by car insurance providers when contacted about adding a new teen driver to an existing policy; and utilizing car sales facilities as a point of sale for after-market technology (to offer for integration with newly purchased vehicles (both new and used) that may not have installed technology to support safe teen driving) (Swanson, 2013).

Phone-based applications

In addition to the use of technology that is dependent upon installation in a specific vehicle, there is also significant potential in the variety of phone-based applications currently on the market to inhibit phone interference in a teen driver's concentration. With cell phones identified as a primary contributor to distracted driving injury and death in teens, this technological intervention is significant (Fischer, 2014).

Apps have the ability to detect a vehicle's rate of acceleration and disable all functionality with the exception of emergency service (911) calls. Additional features available include 'personal assistant' technology to manage incoming text messages and voice calls to indicate that the driver is engaged in driving at the time. A factor in current cell phone applications is cost. Some apps can cost a subscription fee of up to \$25 per month, while others are available for a one-time purchase cost. The state of Iowa has worked with a software application developer to create a no-cost app for Iowa state residents that provides services such as phone disabling, tracking of certain driving

behaviors, such as speeding, reporting to parents, and the ability to compile these results in a statewide database (de-identified) in order to advise continuing public health interventions regarding young drivers in the state (Fischer, 2014).

Relevant communication channels

In addition to tech solutions that inhibit certain behaviors, up-and-coming communication technologies should be regarded as an opportunity to potentially impact and increase positive behavioral outcomes. While many traditional public health communication efforts have invested significant efforts into distribution channels such as television advertising, newspaper and other print promotion, radio spots or public signage, research indicates that these mechanisms may not be as successful in reaching today's teen populations (Adkins, 2014).

Relevant channels that have been identified include promotional messages on media-access web services, such as Hulu or Pandora, as well as social media sites, including Facebook, Twitter and others. One example of a current effort to utilize relevant technology in communication efforts is the Centers for Disease Control's Pinterest board dedicated to safe driving images.

Promise Table findings

A "Promise Table" was used, in order to categorize interventions into various states of likely success (i.e. levels of promise). Using this approach, intervention types as defined by the taxonomic structure were assessed independently on both *certainty of effectiveness*, and *potential for population impact*, using available information.

Based on the two rankings of certainty of effectiveness, and potential for population impact, each intervention was categorized into one of five categories of "promise" potential (see table 4.1). Potential levels of promise include:

- Most Promising
- Very promising
- Promising
- Less Promising
- Least promising

When input into a Promise Table (full table found in Appendix B), in order to evaluate likelihood of promising practice application, the intervention types were ranked as follows:

Most promising practices:

- All public policy efforts surrounding GDL, MLDA of 21, cell phone restrictions and seat belt requirements
- The community role of partnerships
- The parental role of boundary setting and monitoring

Very promising practices:

- Policy enforcement strength, culture and knowledge base
- Community role in norms and awareness
- Community role in restricting alcohol access and availability
- Parental instruction and role-modeling
- Vehicle equipped and after-market technology

Promising practices:

- Resource allocation for policy enforcement
- Community role of cultural engagement
- Parental roles of communication, engagement and knowledge of relevant policies
- Youth programs run through school campaigns
- Technology utilized through phone-based applications and relevant communication channels

Less promising practices:

- Youth programs through community connections
- Formal driving instruction for youth

Least promising practices:

- No interventions qualified as “Least Promising”

It is worth note that many practices defined in this taxonomy are evaluated within the construct of the Promise Table as an independent intervention. It is possible (and highly likely) that if evaluated from the standpoint of synergistic impact (if paired with complementary interventions) the results would be different.

Identified evaluation techniques

A variety of measures were utilized in order to evaluate the success or lack of success in a programmed intervention. Measures utilized included pre and post-intervention counts of single vehicle and/or multi-vehicle accidents, with additional criteria of timing, police themes and co-occurring convictions (such as DUI) to add clarity to their relationship to the intervention. Other measures included pre and post intervention surveys, conducted in a variety of settings with populations such as parents of teens, law enforcement officers, and teens themselves. Collection mechanisms included telephonic, online, via mail and in-person. These surveys measured variables such as self-reported behaviors, intentions, beliefs and opinions.

Some additional types of metrics used were evaluation and discussion with focus groups, review of injury and death records and reports, pre-and-post-intervention naturalistic (unscheduled and covert) observations of target population's behaviors (e.g. seat belt use, distraction while driving, etc.), and use of a simulator to observe driving behaviors in a controlled environment (Buckley, Chapman & Sheehan, 2014).

While some evaluation criteria were considered more reliable, and others less so, very few program evaluation processes had fully effective and generalizable measures for assured success in replication.

Additional findings of significance

Certain findings became apparent through the review process, with implications for practice and implementation in all intervention types noted. Specifically, findings around characteristics of teen participants, as well as general programming indicators for best practice were worth mention.

1. Characteristics of teen drivers

Young driver characteristics have been validated through extensive research and findings show that a combination of basic personality elements, as well as issues of experience, consistently present in the context of safe driving interventions for this population.

In terms of experience, teens as novice drivers require a high level of attention to concentrate on and complete basic driving tasks. This is in contrast with a more experienced driving counterpart who has had the benefit of developing instincts and familiarity with tasks in order to more effectively manage the level of attention needed for basic vehicle operations. Between this high percentage of attention needed for basic driving operations, and a low level of experienced

judgment and intuition, teens often regard driving safety as a secondary consideration, and do not prioritize it (Buckley, Chapman & Sheehan, 2014; Goodwin, 2013).

In addition to compromised stores of attention and experience, teens are also prone to a number of mental and emotional personality states that are directly related to their stage in neuro-cognitive development. Teen brains are still growing and developing into their mid-20s, and in high-school aged years present higher levels of cognitive immaturity, associated with unnecessary risk taking, lack of resistance to peer pressure, inability to think ahead to consequences for behaviors, decreased belief in personal susceptibility to harm, and compromised judgment and decision-making skills (Buckley, Chapman & Sheehan, 2014; Aguilar & Shoji, 2013).

General teen driver personality profiles display high levels of sensation seeking and perceived self-efficacy, which are both considered even more predictive than peer pressure for the generation of negative driving behaviors. Particularly in current cultural contexts where multi-tasking is considered commonplace, teens are particularly at risk for optimistic bias in evaluation of their own ability to safely drive while engaging in distractions. Research has established a link between a teen's sense of self-efficacy, and likelihood that they will engage in risky driving behaviors (Aguilar & Shoji, 2013).

2. Elements that generally contribute to effective programming

Research results have articulated a number of generalizable intervention elements that are important— regardless of intervention type(s)— in order to achieve desired outcomes. Characteristics for successful interventions include an important balance of using conceptually-sound approaches and implementation strategies, drawing on a varied set of influences, selecting the right targets, and choosing smart metrics for outcome evaluation (NHTSA, 2008; Buckley, Chapman & Sheehan, 2014).

CHAPTER SIX: DISCUSSION, STRENGTHS AND LIMITATIONS

After review and synthesis of this sizeable body of information, a number of discussion points, as well as identified strengths and limitations, are worth note. Examinations into interventions of any public health challenge are complex, and this is especially true in a circumstance where the primary target audience is known for fast adoption of new technologies, a limited attention span, and an unpredictable adherence to their own stated intentions.

Implications of results

In addition to providing an overview of intervention types, additional implications of these results include important knowledge about working with teens, as well as balancing programming against local culture and needs.

The challenge of teen drivers

As stated above, teen drivers are a complex population to work with, due to a number of variables around their stages of cognitive development, limited driving experience and a general willingness to adopt new technologies very soon after their release. In attempts to theorize, create and evaluate contemporary interventions that align with the ‘latest and greatest’ teen trends, researchers will always be at a disadvantage in terms of manifesting timely and applicable data, while still maintaining evaluative rigor.

In addition to challenges of remaining relevant, practitioners designing interventions face an additional challenge; data indicates that while teens’ beliefs and attitudes can be impacted with the right combination of programs, their actual behavior doesn’t always follow their stated intentions. This aligns with multiple factors in the growth and development of teen brains, which predispose them to impulsivity, sensation seeking and a heightened perception of their own abilities. As such, it becomes critical for implementations to contain a healthy balance of influences that rely on the decision-making and behaviors of non-teen populations, such as parents, law enforcement professionals and others, who are able to act in ways that benefit and support safe teen actions.

By understanding that teens are not always capable of making the right decision on their own, it becomes possible to enable a series of interventions that install barriers and checkpoints to regulate teen behavior, with the help of a variety of influences within the Social Ecological Model. It is worth note that programs that target teens and build upon their stated intentions to modify their behavior are still of value. It’s just important that they are combined with other strategies, in order to achieve maximum impact.

Balancing data-driven programming against realistic execution

There is currently a significant challenge in evaluating the ideal complement of teen driving interventions against operational and resource-based realities. This includes enforcement issues, matters of public convenience, and challenges in access.

While many indicators demonstrate the importance of increased enforcement efforts to support legislation regarding safe teen driving regulations, the operational reality is that there are too many violators of laws, and not enough law enforcement resources to consistently police them all. With law enforcement officers identifying certain teen driving issues as a low priority, there becomes a significant question as to alternatives in order to take full advantage of the known benefits to perception of enforcement of teen driving laws.

With regard to issues of public convenience, there is a significant divide between best practice for legislation regarding teen driving regulation, versus public support for implementation of these best practices. With many teens committed to a substantial number of extracurricular engagements, parents often consider their teen's ability to drive themselves a welcome relief. The notion of legislation that would increase the minimum age for learner permitting, provisional licensure and full licensure impacts that convenience, and not all parents are in support of it. Of note are a number of studies conducted in rural communities where surveyed parents specifically identified a lack of enforcement at a familial level of GDL requirements, in favor of the convenience of their teens being able to transport themselves (and neighbors) to important work and school functions (Gill et al., 2013). An additional example comes from New Jersey, where a reflective sticker is mandated on the license plate of all vehicles being operated by a driver within the GDL process. New Jersey parents and teens both acknowledged non-compliance with this program (Adkins, 2014).

Another issue is the challenge of making current assistive technologies fully available to those who would most benefit from them. While certain vehicles are now being outfitted with safety devices that have significant potential to contribute to decreased risky behaviors in teen drivers, these technologies are mostly available only in very new model vehicles, even then as a 'buy-up' option—not as a standard offering in all vehicles. The same can be said of interventions available through cell phones—there are a number of apps and GPS-based programs that have the ability to protect teen drivers, but they come at a price. The reality is that safety features to deter teen driving risks are not yet considered a cultural necessity, and are instead a luxury item.

Strengths

Significant strengths for this project included both the use of a highly-relevant conceptual framework, as well as a diverse set of informational inputs.

Social Ecological Model as evaluation tool

The use of the Social Ecological Model as the theoretical framework for this project yielded a strong linkage between the framework, and the material being applied to it. With a clear mechanism for displaying and understanding the interrelationships of multi-level interventional efforts, the use of SEM as a framework provided more meaningful analysis and outcomes, and understanding of their potential impact and significance.

Use of diverse inputs

This project was significantly strengthened by the use of alternative 'gray literature' sources in addition to more traditional academic pieces. The term 'gray literature' refers to literature that is not formally published in sources such as books and journals and can include an exhaustive compendium of resource types. Some examples of gray literature include (but are not limited to) conference abstracts, governmental or private sector research, ongoing or unpublished clinical trials, technical reports, video or music selections, press releases and white papers (Breitenbach, 2009). Of note, many highly valuable resources for this project were found through gray literature searches. With this expansive definition of acceptable inputs for this project's examination of current approaches to teen driving interventions, a much broader variety of solutions were able to be evaluated and used to contribute to the formation of understanding current best practices.

Limitations

There are a number of challenges currently limiting the quality and outcomes of execution and evaluation of safe teen driving interventions.

Issues of measurement

Additional research is needed to determine a best-practice strategy for the measurements used in evaluation of teen driving programs. While the current metric considered 'most critical' is around the outcome of teen injuries and deaths connected to unsafe driving behaviors, this has been shown to be a limited evaluation tool when determining a program's viability in making positive impacts to teen driving on a broader level.

There is currently no specified best practice strategy around standard success metrics for teen driving initiatives, and as a result programs use a wide span of metrics to evaluate progress, and often can even employ widely different strategies to interpret the same basic data elements. In this current state of measurement variability, programs are very difficult to compare to one another in determining which ones are more effective, and in what ways they stand to be improved upon, or replicated.

Ability to remain current while maintaining evaluation rigor

As discussed, implementing the right measures to determine program success can be difficult. In addition to the challenge in understanding quality of results, it can also be hard to easily identify what sources of information are most timely and relevant, when so many stakeholders are contributing to the significant quantity of literature (both peer-reviewed and gray literature) on safe teen driving interventions.

While academia and government entities have historically held a large corner of the teen driving knowledgebase with evidence-driven programming publications, many other groups are now also working to learn more about the challenges that teen drivers face, and to field-test solutions for those challenges. Among them are auto insurance carriers, telecommunications companies, auto manufacturers, local community task forces and statewide coalitions.

With the ability to share information quickly via the Internet, these groups have the benefit of nimbly publicizing results, frequently outpacing the publication timing of peer-reviewed research, even when the original investigations were conducted in a comparable window of time. There is frequently no clear answer as to what data is more valid, with publication date (and site) being an inconsistent indicator of reliability.

Many current peer-reviewed publications, dated in 2014 and 2015 are actually reviewing interventions that were applied to a target population of teens in the middle and late 2000s—often five to seven years old at best. This appears to be partially attributable to the necessary administrative efforts associated with entry into a peer reviewed publication process, as well as with a desire on the part of the research teams to see the programmed intervention reach full maturity before evaluating measures to determine success.

Data access and organization

In tandem with difficulty in identifying which reports and data sets are most relevant, there can also be difficulty in locating the most current versions of data and the most relevant information for a specific safe teen driving focal area.

Most noteworthy in the process of the data collection and evaluation of this project was the immense undertaking needed in order to find clear and concise summarizations of information connected to teen driving. The initial project design was predicated upon a thorough search of mostly academic resources, with use of gray literature only to validate the scope identified through peer-reviewed literature sources. In executing this strategy, the resulting experience illuminated a significant challenge around the bottleneck of unclear information related to this subject.

Many of the more valuable data sources for this project were syntheses produced by governmental partnerships and organizations, such as the Governor's Highway Safety Association and the National Highway Traffic Safety Administration, which were neither peer-reviewed nor easily available through traditional academic search approaches. The value in these syntheses were in their innovative approaches to data collection, including a significant level of peer-to-peer sourcing of information to identify current practices occurring in real-life scenarios that weren't being examined from a formal academic standpoint.

However valuable these syntheses were, it was highly difficult to find them, due to the significant amount of published information available in the 'gray literature' sphere— much of which has very little consistency with regard to the partnerships and unrelated parties producing data and evaluations simultaneously. In addition to the number of highly valuable sources of information, there were also an enormous number of online pseudo-information resources that were not only of very low value in the quality of their content, but were difficult to distinguish from credible resources, making the search and review process substantially more difficult and time consuming.

Some examples of these faux resources include personal injury or defense attorney groups who use the front of an 'informational' site (well optimized within search engine results through advertising dollars) in order to funnel potential clients through to their business website. Another manifestation of this same principle comes in the form of well-intentioned memorial efforts to honor loved ones lost to teen driving incidents. While the websites contain information intended to be helpful to teens and parents looking for information on safe driving, they are frequently very out of date, and are not maintained, due to the volunteer nature of their origin. In this same vein, a large number of smaller auto insurance providers also provide resource pages for safe teen driving that

are not well maintained, containing out-of-date resources, expired links and references to statistics that are inaccurate and obsolete. Simply stated, there is an excess of un-validated gray literature that is inconsistently publicized and often ineffectively search engine optimized, while infrequently replaced on websites when it becomes outdated.

The current oversaturation of data, with too many private vs. public initiatives occurring without coordination makes it very hard to find information that is most helpful. Even when attempting to examine or evaluate a specific safe-driving program, there are massive levels of variation on the same program name or theme, but implemented with slight differences. Even though all intervention efforts were rooted in the exact same original program, significant variability in program execution and fidelity to evidence-based practices can vary at the individual school or municipality level, sometimes even by a portion of a state, sometimes by an entire region, leaving dozens of evaluations for the same program, with dramatically different outcomes.

Overall, there is a significant need for a central clearinghouse or system of organization and coordination at a national level that sets consistent guidelines for measurement, surveys up-to-date trends and acts as a conduit to connect the efforts of the large number of disparate operators attempting to solve the challenge of teen driving-related injuries and deaths.

Risk of topical bias due to limited number of major research entities

That which is measured drives best practice. With only a few major groups doing the bulk of research around the topic of teen safe driving (GHSA and NHTSA as two of the more dominant) there is notable risk of topical bias within the available research. With a dependency upon data in order to determine best practices, if a topic is not researched, then there is little ability to identify whether or not it has merit, or the ability to affect positive outcomes and risk reduction. With the majority of large research entities being government run, the risk of politics impacting research topic selection and resulting promising practice outcomes is something that needs additional attention and exploration.

Additional investigation needed

While this project evaluated a large amount of data, it is worth note that there were many important opportunities for further investigation that were considered out of scope during the review process. As these issues are still of significant relevance to future successes in safe driving interventions, they have been identified below, with the recommendation that they are added to an agenda for future exploration.

Potential negative consequences of GDL programs

Most states' GDL programs limit their program's stages of driver graduation only until a driver turns 18. Some data has indicated that by targeting high-school-only populations, and ignoring novice drivers post high school, there is an increase in accidents among the 18-19-aged bracket (Fell & Romano, 2013).

Other teen driving behaviors and modalities

While this program had a specific focus on drunk driving, distracted driving and seat belt use among teen drivers, some broad-scale safe driving interventions were still evaluated as part of the project due to their noted impact on the targeted behaviors. While investigating these broad-scale 'safe teen driving' strategies, it became apparent that there are additional teen driving behaviors that were not addressed within this project's scope. These behaviors include: drowsy driving, drug use and driving (not covered under drinking and driving) and reckless and emotional driving behaviors, such as speeding and road rage.

In addition, this project did not address alternative driving modalities, which are of significance in Alaska, as there are a high number of users of these alternative modes of transportation (motorcycles, all-terrain vehicles, snow machines, etc.).

Significance of other age groups

There are a number of safe driving studies that target age groups outside of the teen demographic. This project did not evaluate the potential effectiveness of those strategies in relation to teens. Other ages with specific driving/vehicle safety programs are the elderly, youth who are not yet old enough to drive, young adults in their late teens and twenties, and general adult populations. It is worth exploring the characteristics that are common amongst these approaches, and those that need to be specifically targeted by age.

Teen drinking vs. teen drunk driving

The investigation of interventions targeting teen drinking and driving have a direct connection to programs that target underage drinking, as it is impossible for a teen to drive drunk without having any alcohol. Of note is the significant difference in general population programs that target drunk drivers, which focus not only on abstinence from alcohol, but also have a heavy component of cultivating positive decision-making by encouraging responsible alcohol use. There is a need for

exploration into the matter of using this varied approach with teens; if abstinence from alcohol doesn't resonate with the targeted teen, would programming to support responsible avoidance of driving drunk have any impact on teen driving fatalities?

Medical diagnoses that impact driving

There has been a significant upswing in teen distracted driving research that explores the implications of certain attention disorders among teen drivers (such as Attention Deficit Disorder (ADD), or Attention Deficit/Hyperactivity Disorder (ADHD)), and the impact of these medical diagnoses on the likelihood of these teens driving distracted. In addition, there is also a substantial body of work surrounding teen alcoholism and other substance addictions, which could have implications for targeting these teens with a different strategy when attempting to reduce drunk driving. More exploration is needed to clarify the role of medical conditions in efforts to encourage safer teen driving behaviors.

Recidivism deterrence efforts

This project specifically focused on general 'all teen' population health strategies for safe driving behaviors. As a result, there was not specific investigation into interventions for teens that have already engaged with the identified behaviors and are at risk of recidivism. There is a body of work that specifically addresses programming that targets teens during the adjudication process for their violations. As this project did not address successful strategies to discourage multiple offenses, this is an area that could benefit from more significant examination.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS

As evidenced by the overwhelming data to support continued needs in safe teen driving initiatives, the work in program development and evaluation in this area is far from complete. As research gains further insight into the minds of teenage drivers, the landscape of environmental factors, developing technology and evolving culture continues to change and grow.

Unique considerations for teen driving

The continued identification in behavioral science evaluations of teen drivers is clear; teens are not inherently equipped to be good drivers. Major cognitive developments continue throughout the first years of a typical teenage driver's licensure, and with those developments come such handicaps as impaired judgment, diminished capacity for decision-making, weakened anticipation of risk and a lack of concern with consequences.

In addition to these known developmental barriers, teens as new drivers must contend with high demands on their attention to complete basic driving tasks, without the benefit of years of experience to assist in easier multi-tasking and navigation of foundational driving concepts.

While these various challenges are important considerations when developing interventional strategies, an equally important consideration is the development of evaluative strategies to determine success or failure of a program. Results have shown that while many programs base predictions of successful outcomes off of pre- and post-surveys with teens, there can be dissonance between teen respondents' stated opinions, and ultimate actions (Goodwin, 2013).

While many high school students self-identify that their beliefs and attitudes have been impacted by a program, the data indicates that their actual behaviors are not as likely to change (Goodwin, 2013). Program measures need to strike a balance between self-reported and verified data sets, in order to create a comprehensive and more valid snapshot of outcomes.

In attempting to develop targeted interventional strategies to serve this highly complex group, variety of inputs is key. Use of the Social Ecological Model (SEM) as a theoretical framework with which to classify proposed interventional strategies has been met with significant success in public health practice (Buckley, Chapman & Sheehan, 2014). By using the SEM to identify various elements of an intervention by their level of impact, practitioners can easily make out the relationships between the various interventions, and can also discern the balance of inputs being directed at teens.

Studies continue to show that successful interventions sample from a collection of inputs that connect at different levels of the SEM, many times in a 'nested' capacity—having synergistic impacts

that would not be possible if each were executed in isolation (Fischer, 2014). As with so many things in the natural world, interventions should be rooted not only in theory and evidence, but also in diversity.

Priority areas

Identification of priority areas can be extremely challenging with the large number of considerations in tackling teen drinking and driving, teen seat belt use and teen distracted driving. Fortunately, a host of interventional areas serve to satisfy the needs of multiple subjects, while other best practice constructs can be easily adapted.

Some particular priority initiatives that stand to potentially have the greatest role in impacting teen driving outcomes are: continued development and enforcement of protective public policies and supportive engagement with parents and other key adult mentors (Goodwin, 2013). The current analysis came to similar conclusions with a few other priorities and promising practices identified.

Public policy issues are challenged from two perspectives; the actual creation and/or refinement of a specific law or statute, as well as the necessary resources to effectively enforce the policies once in place. With public perceptions that regard violation of teen driving laws as unlikely to be punished, enforcement plays a significant role in the success of implemented policies, regardless of their quality or adherence to best practices and evidence.

For parents and other significant adult mentors to teens, the intent to provide encouragement for safe driving behaviors can sometimes be impaired by the lack of knowledge in how to do so effectively. Many parents believe that they have established clear guidelines to their teen drivers in what is expected of their performance on the road, while many teens report a lack of clear understanding of these expectations (Simons-Morton et al., 2005). In addition to a need for enhanced communication, many parents simply lack the necessary knowledge to act as a professional driving instructor, enforcer of punitive measures for unsafe driving, and navigator to the variety of challenges inherent to a teen's first years of driving. There is a substantial need for parent-supportive strategies that can attempt to mitigate some of these challenges.

While most interventions aimed at increasing the quality of teen driving will yield a certain level of public benefit, those that take into consideration these priorities should see an enhanced level of successful outcomes.

Recommendations for practice in Alaska

Alaska has been successful in implementing a number of protective strategies at the public policy level that are in line with national best practices in safe teen driving. Among the most noteworthy are anti-texting laws, primary seat belt enforcement laws, zero tolerance alcohol laws, and a robust graduated driver's licensing process. Even with these successes, there is still room for improvement and enhancement of safe teen driving strategies in the state.

Public policy improvements are possible at a number of levels, some directed toward teens specifically, while others made at a general public level are still believed to have significant impact on teens, even without specifically targeting them. Based on review of available literature and application of current best practices, the following are public policy enhancement recommendations with the potential to impact safe teen driving outcomes in Alaska:

- **GDL modifications:** While Alaska has implemented a GDL program with many best-practice features, including passenger restrictions, nighttime driving restrictions, minimum ages for both learner's permits and provisional driver's licenses, and requirements for supervised driving hours, there are certain elements of Alaska's GDL that could be strengthened. Recommendations include:
 - Increase the minimum entry age to enter into a learner's permit from age 14, to age 16 (minimum of 6 months holding period before ability to graduate to a provisional license).
 - Increase the minimum age to graduate from a provisional driver's license to an unrestricted license from age 16½ to age 18.
 - Expand nighttime hours from current timing of 1 a.m. through 5 a.m. to include broader hours (e.g. 10 p.m. through 6 a.m.).
 - Include restricted cell phone use as an included component of GDL.
- **Enhancement of zero-tolerance policy**
 - Current zero-tolerance prohibitions state that any Alaska driver under the age of 21 is considered driving under the influence of alcohol regardless of their BAC (any level above 0.000 is considered a violation) (Wilson, 2013). Many states have enhanced their policies by including a non-driving component to this zero-tolerance, meaning that anyone under the age of 21 found to be drinking alcohol could potentially risk suspension of their driver's license as a consequence.
- **Restrictions of driver cell-phone use:**

- Current Alaska statutes prohibit texting, and texting-like behaviors while driving a vehicle (for adults and teens alike), but do not have any broader restrictions on cellular phone use, particularly clarification on the ability to talk and drive simultaneously (Fischer, 2014).
- Studies have shown that when restricted cell phone use is part of a state's GDL program, but not in place for all drivers, regardless of age, there is a high level of difficulty in enforcement, and a low level of compliance by newly licensed drivers. Instead, evidence supports states implementing a no-talk or a hands-free-only policy for all cell phone use for licensed drivers operating a motor vehicle.

In addition to these initial recommendations, there are a significant number of other approaches that have been compiled for consideration by the Alaska Committee to Prevent Underage Drinking (ACPUD) with a more narrowed focus of decreasing the level of alcohol consumption by minors in Alaska. Alcohol use among teens has been linked to increased levels of drunk driving, distracted driving and lower levels of safety belt use (Adkins 2014; Fischer 2014; Wilson, 2013). Underage drinking reduction strategies are believed to have significant impacts on success measures in all three areas (teen seat belt use, drinking and driving and driver distraction) being explored in this report.

ACPUD's community action recommendations to decrease underage alcohol use in Alaska can be found in their guide, *Alaska's Strategies to Prevent Underage Drinking* (2013) on the State of Alaska's Division of Behavioral Health main website (State of Alaska, 2015).

Future practice

In order to achieve success in decreasing crash and injury rates for teen drivers, there are a number of barriers to be navigated, but with persistence and continued attention to best practices there is a great deal of progress possible.

There is a high level of importance to continuing to work toward use of meaningful metrics to identify success in interventions and programs, with transparent and timely publication of results. By creating a more coordinated and industry- standardized pool of evidence to draw from, practitioners gain an enhanced ability to move from theoretical success, to full permeation of best-practice.

Also important is the ability to consolidate and strengthen partnerships amongst entities working toward interventional successes in overlapping areas (Goodwin, 2013). Community task forces and coalitions make an excellent centralization point to coordinate efforts that address the

broader community, and allow for inclusion of a variety of stakeholders and subject-matter experts that may not always historically have been included if an intervention was launched from a single organization.

A final critical reminder is the importance of patience. There are a number of factors that will make progress in this area slower than many would like, and this progress will often be difficult to detect. With the emotionally-charged nature of teen injuries and traffic accidents this can be difficult to wait through, from both the perspectives of those working in the field, and the observing public.

Evidence indicates that a minimum of three years of intervention maturation are needed in order to identify the full breadth of impact possible (NHTSA, 2008). In addition, data show that the closer a problem comes to full resolution (such as increased levels of compliance with seat belt usage), the more difficult it is to achieve the final increments of success. There is often a diminishing return on investments, requiring greater resources and more time, to achieve less progress than historical efforts. While future solutions may surface to this challenge of additional time and resource demands, the current prevailing knowledge dictates a need for patience and persistence as the field continues to develop and grow (Solomon, Tison, and Cosgrove, 2013).

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APPENDIX A
TAXONOMY* OF INTERVENTIONS

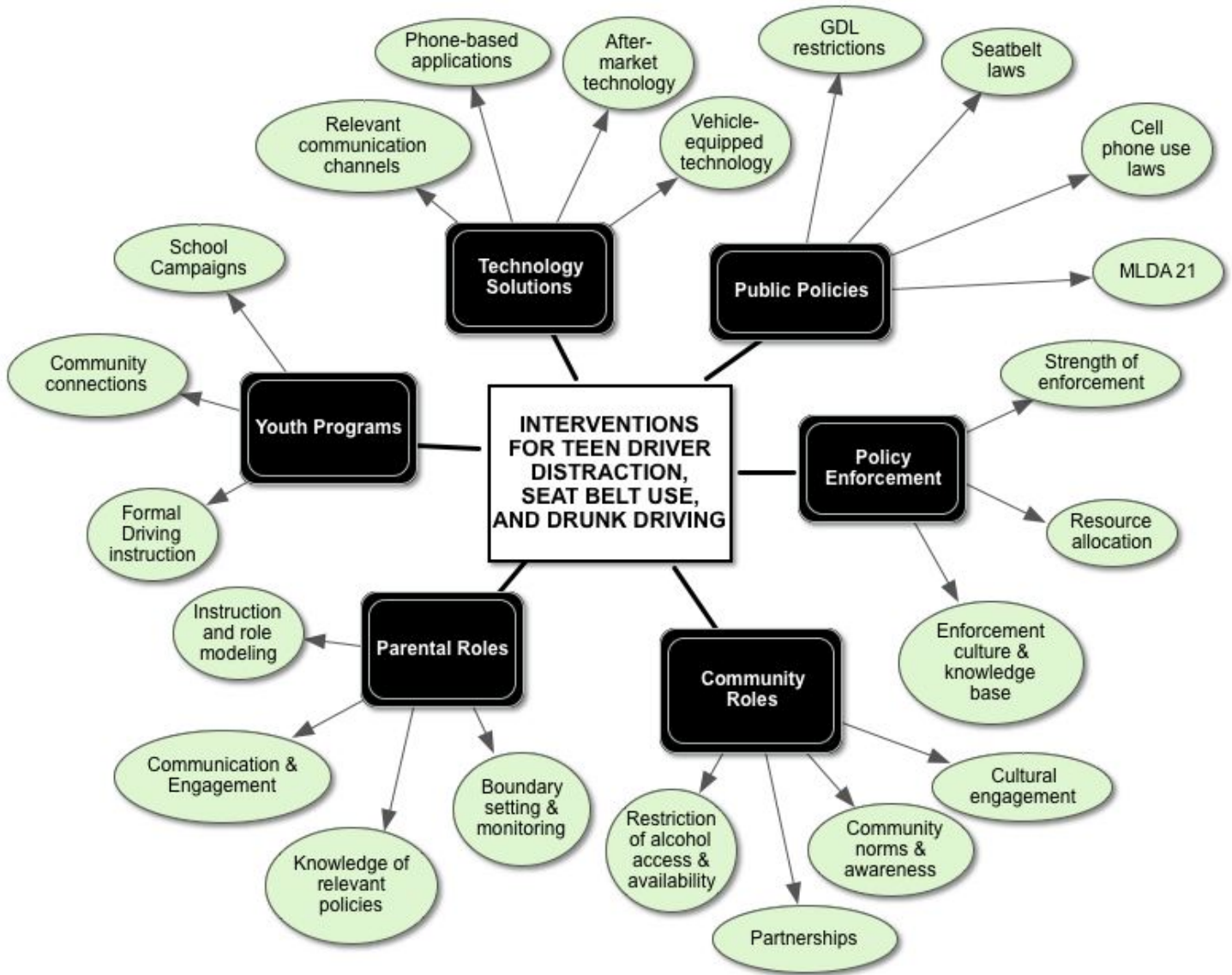


Figure A-1 Taxonomy* of interventions for teen driver distraction, seat belt use and drunk driving

**Developed as an original product of this practicum project*

APPENDIX B

INTERVENTION TYPES AND IMPACT FOR TEEN DRIVING

Table B-1 Promise Table findings for teen driving interventions

Intervention type	Certainty of Effectiveness	Potential Population Impact	Potential for Promise
Public Policies			
MLDA 21	High	High	Most Promising
Cell phone use laws	High	High	Most Promising
Seat belt laws	High	High	Most Promising
GDL restrictions	High	High	Most Promising
Policy Enforcement			
Strength of enforcement	High	Medium	Very Promising
Enforcement culture and knowledge base	Medium	High	Very Promising
Resource allocation	Medium	Medium	Promising
Community Roles			
Cultural engagement	Medium	Medium	Promising
Community norms and awareness	High	Medium	Very Promising
Restriction of alcohol access and availability	High	Medium	Very Promising
Partnerships	High	High	Most Promising
Parental Roles			
Instruction and role-modeling	Medium	High	Very Promising
Communication and engagement	Medium	Medium	Promising
Knowledge of relevant policies	Medium	Medium	Promising
Boundary setting and monitoring	High	High	Most Promising
Youth Programs			
School campaigns	Medium	Medium	Promising
Community connections	Low	Medium	Less Promising
Formal driving instruction	Low	Medium	Less Promising
Technology			
Vehicle-equipped technology	Medium	High	Very Promising
After-market technology	Medium	High	Very Promising
Phone-based applications	Medium	Medium	Promising
Relevant communication channels	Medium	Medium	Promising

APPENDIX C
STRATEGIES TO SUPPORT SAFE TEEN DRIVING IN ALASKA,
RESOURCE GUIDE



Strategies to Support Safe Teen Driving in Alaska

*Targeting distracted
driving, seat belt use
& drunk driving*



AIPC
Alaska Injury Prevention Center.org

AIPC efforts to support safer teen driving

The Alaska Injury Prevention Center (AIPC) is a nonprofit organization governed by a board of directors. AIPC has a mission to prevent injuries across Alaska, and has taken on the challenge of working to increase safe teen driving conditions throughout the state.

AIPC believes in approaching public health interventions with thorough consideration of available data, including analyzing the epidemiology of a type of injury or cause of death, and considering potential interventions relevant to both the mechanical causes as well as the human elements. The Center seeks to implement interventions that address the specific elements of causation and to design interventions relevant and appropriate to their targeted populations.

This guide was created in collaboration with the Safe Streets initiative and is intended to be a tool for community partners to access information about available interventions for distracted driving, seat belt use and drinking and driving for Alaskan teens. Note, this guide is intended to be most relevant to high school students in Alaska who are or will be driving licensed vehicles on the state's road systems. In keeping with the center's approach, all recommendations in the guide were evaluated for alignment with best practice.

The guide is also specifically targeted toward three major factors that contribute to teen driving safety: reducing distracted driving, increasing seat belt use and decreasing drunk driving.



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SAFE TEEN DRIVING CASE STUDIES ARE AVAILABLE THROUGHOUT THIS GUIDE



INTRODUCTION

The statistics are definitive; United States teenagers have the highest crash rate of any group in the nation. In 2013 (most recent available data), 963,000 drivers aged 16-19 were involved in police-reported crashes, resulting in 383,000 injuries and 2,865 deaths (AAA Foundation, 2015).

Based on these numbers, it is no surprise that motor vehicle collisions are the leading cause of death for U.S. teens. Seven teenagers aged 16 to 19 die every day from motor vehicle injuries and for every mile driven, teen drivers are nearly three times more likely than drivers aged 20 and older to experience a fatal crash (CDC, 2014).

Many of these high crash rates for young drivers are partially attributed to immaturity and inexperience in operating a vehicle. This combination of factors can lead to engagement in high-risk driving behaviors, such as speeding, tailgating, driving under the influence of alcohol or drugs, underestimating hazardous driving situations, and driver distractions (Goldzweig et al., 2013). The data tell us that there are eight identified leading risk factors of teen crashes: (1) driver inexperience; (2) driving with teen passengers; (3) nighttime driving; (4) not using seat belts; (5) distracted driving; (6) drowsy driving; (7) reckless driving; and (8) impaired driving (CDC, 2014). This guide provides information and guidance in addressing three of these issues in greater detail: teen driver distraction, seat belt use and drinking and driving, as these three areas of emphasis were identified as priorities by the Safe Streets project team.

DISTRACTED DRIVING

Distracted driving is an increasing problem in the United States and is defined as any activity that could divert a person's attention away from the primary task of driving, endangering drivers, as well as passenger and bystander safety. Types of distractions include: texting; using a cell phone or smart phone; eating and drinking; talking to passengers; grooming; reading, including maps; using a navigation system; watching a video; or adjusting a radio, CD player, or MP3 player (U.S. Department of Transportation, 2014). A distracted driver may experience slow reaction time, degraded awareness of exterior objects, roadway signs or traffic signals, and reduced vehicle control, such as drifting into other lanes or into the shoulder of the road (Adeola & Gibbons, 2013).

Teens make up the largest group of distracted drivers, and 11 percent of teen drivers in fatal auto accidents were reported as distracted at the time of the crash (Bratsis, 2013). In a recently completed study by AAA that analyzed video footage of more than 1,700 accidents, video analysis found that distraction was a factor in nearly 6 out of 10 moderate-to-severe teen crashes, which is four times as many as official estimates based on police reports (AAA Foundation, 2015). Results showed that distraction was a factor in 58 percent of all crashes studied, including 89 percent of road-departure crashes and 76 percent of rear-end crashes.

There are three main types of distraction—visual, manual, and cognitive. A visual distraction is any distraction that takes the driver's eyes off the road; manual distractions are distractions that take the driver's hands off the steering wheel; and a cognitive distraction is any distraction that takes the driver's mind off the task of driving (Adeola & Gibbons, 2013).

Because text messaging requires visual, manual, and cognitive attention from the driver, it is by far the most alarming distraction (Distraction.Gov, 2014). The concentration needed for safe driving makes texting safely at the same time impossible, research shows (Bratsis, 2013). A driver's reaction time doubles when sending or reading a text. Sending or reading a text takes a driver's eyes off the road for an average of 4.6 seconds. At 55 mph, that's like driving the length of a football field blindfolded (Bratsis, 2013). Crash risk estimates based on observation studies of driver behavior suggest that driving while texting is at least five to six times as bad as drunk driving (Atchley, Hadlock & Lane, 2012).

In Alaska, 34.2 percent of high school students who drove a car or other vehicle during the past 30 days, texted or emailed while driving on one or more of the past 30 days. This is lower than the National average of 41.4 percent (State of Alaska, 2014), but still a substantial figure. Alaska state law currently prohibits all drivers from texting while driving. Drivers who are identified as operating a vehicle while texting are subject to the following punishments:

- Texting and driving (only) is a Class A Misdemeanor with up to a \$10,000 fine and one year in prison.
- Texting and driving that results in an injury is a Class C Felony with up to a \$50,000 fine and five years in prison.
- Texting and driving that results in a serious injury is a Class B Felony with up to a \$100,000 fine and ten years in prison.
- Texting and driving that results in a fatality is a Class A Felony with up to a \$250,000 fine and twenty years in prison (State of Alaska Department of Public Safety, 2015)

Case study New Jersey: Leveraging school parking privileges



In September 2009, the New Jersey Attorney General and the Department of Education Commissioner distributed model language that may be added to the current Uniform State Memorandum of Agreement Between Education and Law Enforcement Officials. The paragraph, which addresses sharing student traffic offense information, states: "The Chief of Police or Station Commander agrees to notify the chief school administrator or his or her designee of any GDL law or traffic violation, committed within the school district, by a student enrolled in the school district."

As a result, several New Jersey schools have adopted this model and are temporarily rescinding students' parking privileges based on traffic violation information received from local police. In addition, the School Administrators Association and the New Jersey School Boards Association are alerting their members about this initiative.

Other New Jersey high schools are tying the privilege of high school parking to mandatory parental attendance at a teen driver orientation program such as the National Safety Council's "Alive at 25." To assist with these programs, the New Jersey Division of Highway Traffic Safety developed and posted a "how to" guide to implementing teen-parent safe driving community programs on its website.

Contact information: Violet Marrero, NJ Division of Highway Traffic Safety violet.marrero@lps.state.nj.us 609-633-9161. *Excerpt taken from Protecting Teen Drivers, Governor's Highway Safety Association 2010*

SEAT BELT USE

Evidence-based recommendations from the US Task Force on Community Preventive Services state, “Safety belts are the single most effective means for vehicle occupants to reduce the risk of death and serious injury” (Reisner et al., 2013). Each year, safety belts prevent an estimated 15,700 fatalities, 350,000 serious injuries, and \$67 billion in costs associated with traffic injuries and deaths (Melnick et al., 2010).

Although seat belts are one of the most important safety inventions in automotive history, many teens simply do not use them. While important that people of any age wear seat belts, it is especially important for teenagers, because their crash rate is much higher than other age groups in the United States (Goldzweig et al., 2013). In combination with this high crash rate, when compared with other age groups, teens also have the lowest rate of seat belt use. Despite substantial efforts aimed at increasing belt use among teens, observed seat belt use among teens and young adults (16–24 years old) was 81 percent in 2009 and dropped to 79 percent in 2010, representing the lowest for any age group (Goldzweig et al., 2013). Statistics show that nonuse of safety belts is even more common for adolescent passengers than drivers (Reisner et al., 2013). In 2013, only 55 percent of high school students reported they always wear seat belts when riding with someone else (CDC, 2014).

Low seat belt use combined with higher crash rates contribute to persistence of motor vehicle crashes as the leading cause of teenage death (Goldzweig et al., 2013). Nationally in 2009, 3,349 teen passenger vehicle occupants, aged 16–20, were killed in motor vehicle crashes, and 56 percent were unrestrained at the time of the fatal crash. In 2012, 71 percent of drivers aged 15 to 20 killed in motor vehicle crashes after drinking and driving were not wearing a seat belt, and more than half of all teen drivers killed in 2012 were not wearing a seat belt (CDC, 2014). Results of a survey indicated that in Alaska, 10.1 percent of high school students reported that they rarely or never wore a seat belt when riding in a car driven by someone else (compared with 7.6 percent as the national average) (State of Alaska, 2014).

Strong evidence indicates that seat belt laws are among the most important interventions in increasing safety belt use. Seat belt laws have been enacted by states since 1984 and vary in the nature of their

provisions, with some allowing enforcement officers to make a traffic stop based only on the non-use of a seat belt (known as primary enforcement laws), while others only allow officers to note the violation of non-seat belt use if they have already pulled the driver over for a different infraction (such as failing to use a signal). These jurisdictions have what is known as secondary enforcement laws. Previous research has shown that primary safety belt laws are associated with higher safety belt use and lower crash-related injuries and mortality in the general population as compared with secondary laws (Adkins, 2014). Because some teenage populations have lower safety belt use, even with primary enforcement laws, combined approaches that include upgrades to laws with campaigns and increased enforcement might be warranted. In addition, evidence indicates that primary enforcement safety belt laws may play a key role in mitigating the disparity in safety belt use among certain teen groups. As of March 2012, only 17 US states still have secondary safety belt laws in effect, and New Hampshire still has no safety belt law at all (García-España, Winston & Durban, 2012).

In Alaska, as of May 2006, state law requires seat belts for all drivers and identifies this as a primary law, meaning that law enforcement officers can pull drivers over based solely on suspicion of non-compliant seat belt use (Insurance Institute for Highway Safety, 2015). According to the State of Alaska’s Department of Public Safety website (2015), “A driver may be fined up to \$50 statewide and \$200 in the Municipality of Anchorage and may receive two points on their operator’s license for failure to restrain passengers under age 16. Adult violations are subject to a \$15 fine statewide and a \$60 fine in the Municipality of Anchorage.”



DRINKING AND DRIVING

Impaired driving is a significant problem among teenagers in the United States. Despite concerted efforts to decrease the number of associated deaths and injuries, the statistics continue to rise nationwide. Drinking and driving greatly increases the risk for motor vehicle accidents among teenagers and is a relatively common occurrence despite that all states now have 21-year-old minimum drinking age laws (CDC, 2014). Data found that Christmas vacation, spring vacation, and prom nights/ weekends were the periods during which incidence of teenage alcohol-related crashes increased (Powers-Jarvis, 2014).

At all levels of blood alcohol concentration (BAC), the risk of involvement in a motor vehicle crash is greater for teens than for older drivers (CDC, 2014). In 2008, nearly 25 percent of teenage drivers who died in motor vehicle accidents had a blood alcohol concentration (BAC) of 0.08 g/dl or higher (considered to be alcohol impaired) and 31 percent had detectable BAC (Cavazos-Rehg et al., 2012). In 2012, 71 percent of drivers aged 15 to 20 who were killed in motor vehicle crashes after drinking and driving were not wearing a seat belt (CDC, 2014).

Nationally, a total of 11.7 percent of students reported having 'driven after drinking any alcohol' and 28.2 percent reported riding in a car with a driver who had been 'drinking on one or more occasions in the past 30

days.' (State of Alaska, 2014) Alcohol use, particularly binge drinking (which is common among adolescents), has been associated with neurocognitive deficits and increased risk-taking behaviors, which may contribute to negative driving outcomes among adolescents even while sober. In previous large-scale surveys, researchers found that binge-drinking adolescents are more likely to drive after drinking (Marcotte et al., 2012).

In Alaska, 13.1 percent of high school students reported having ridden one or more times during the past 30 days in a car or other vehicle driven by someone who had been drinking alcohol (versus the national average of 21.9 percent) and 3.4 percent of students who drove a car or other vehicle during the past 30 days, drove when they had been drinking alcohol one or more times during the past 30 days (compared to national average of 10.0 percent)(State of Alaska, 2014).

The percentage of teens in high school that drink and drive has decreased by more than half since 1991, but more can be done. Nearly one million high school teens drank alcohol and got behind the wheel in 2011 (CDC, 2014). Teen drivers are 3 times more likely than more experienced drivers to be in a fatal crash. Drinking any alcohol greatly increases this risk for teens (CDC, 2014). Research has shown that factors that help to keep teens safe include parental involvement, minimum legal drinking age and zero tolerance laws, and graduated driver licensing systems. These proven steps can protect the lives of more young drivers and everyone who shares the road with them (CDC, 2014).

Case study Montana: SOAR program (Safe on All Roads)

American Indians comprise 6.2 percent of the population in Montana, but represent about 17 percent of the motor vehicle crash deaths in the state; the majority of fatalities in these crashes are unbuckled. In response, the Montana Department of Transportation initiated the SOAR (Safe On All Roads) program to reduce highway fatalities through education and community outreach on Montana reservations. The goal of the program is to provide messaging that is culturally relevant and that resonates with target audiences in the seven reservations in Montana. Each of the reservations hired a part-time SOAR coordinator familiar with the particular tribal culture who partners with law enforcement, tribal health departments, injury prevention and other entities to ensure consistent message is being delivered. Coordinators focus on educational messaging that emphasizes keeping traditions going and culture alive through safe driving practices.

While the focus of the SOAR program is community-wide traffic safety, SOAR coordinators have participated in a media outreach campaign on their respective reservations that focuses on a peer-to-peer approach for encouraging teens to use seat belts. Several outstanding students from each tribe were selected to promote the seat belt use message within their community and posters were created using those students and the reasons why they buckle up. The posters have been widely distributed on the reservations and are highly visible in schools, health centers, jails and other public places. The images and messages carried by the posters have been used in radio, Facebook and newspaper outreach to carry the seat belt compliance message.

Contact information: Janet Kenny, State Highway Traffic Safety Section, MT DOT, jakenny@mt.gov, 406-444-7417 & Sheila Cozzie, Cultural Liaison, MT DOT, scozzie@mt.gov, 406-444-7301

Excerpt taken from Getting it to Click, Governor's Highway Safety Association 2014

DISCUSSION OF POTENTIAL SOLUTIONS

After filtration and review of the large body of records regarding approaches for the teen driving behaviors of distracted driving, seat belt use, and drunk driving, results fell into six main categories of intervention types:

Public Policies

- Minimum legal drinking age (MLDA) at 21
- Cell phone use laws
- Seat belt laws
- Graduated driver's license (GDL) restrictions

Policy Enforcement

- Strength of enforcement
- Enforcement culture & knowledge base
- Resource allocation

Community Roles

- Cultural engagement
- Community norms and awareness
- Restriction of alcohol access & availability
- Partnerships

Parental Roles

- Instruction & role-modeling
- Communication & engagement
- Knowledge of policies
- Boundary setting & monitoring

Youth Programs

- School campaigns
- Community connections
- Formal driving instruction

Technology Solutions

- Vehicle-equipped technology
- After-market technology
- Phone-based applications
- Relevant communication channels

Of these identified intervention types, some were found to be more promising than others when executed as a single intervention. All intervention types were found to be far more successful though when they were part of a larger strategy, employing multiple approaches simultaneously.

Most promising practices:

- All public policy efforts surrounding GDL, MLDA of 21, cell phone restrictions and seat belt requirements
- The community role of partnerships
- The parental role of boundary setting and monitoring

Very promising practices:

- Policy enforcement strength, culture & knowledge base
- Community role in norms & awareness
- Community role in restricting alcohol access & availability
- Parental instruction & role-modeling
- Vehicle equipped & after-market technology

Promising practices:

- Resource allocation for policy enforcement
- Community role of cultural engagement
- Parental roles of communication, engagement and knowledge of relevant policies
- Youth programs run through school campaigns
- Technology utilized through phone-based applications and relevant communication channels

Less promising practices:

- Youth programs through community connections
- Formal driving instruction for youth

Case study Alaska: Raise Your Voice

Description: The goal of the Raise Your Voice (RYV) program is to address teen driving safety issues through student created media. Issues include underage drinking, seatbelt use, distracted driving. The theory-based initiative recognizes that young people often listen to their friends and other teens more than they listen to adults. Student-to-student messages can be more powerful than adult-to-student messages. By creating media with a prevention message, school-based organizations can have a positive impact on the peer culture at their school.

We live in a culture saturated by the media. Cell phones, TV, music, movies, and the Internet are part of our daily, even hourly, lives. Raise Your Voice projects use the media to give a powerful message about teen safety issues. High school organizations and sports team have students that are talented at making movies, developing graphics, creating music, delivering presentations, writing articles and drawing cartoons. The Youth Grants are a way to use their media talents and skills to promote positive change.

Raise Your Voice has been shown to improve young driver knowledge, attitudes, and behavioral intentions regarding inattentive driving, unsafe speed and safe driving principles, seat belt use and impaired driving. Evaluations over the years have shown that RYV is an effective strategy to increase safe teen driving attitudes and awareness of laws and enforcement.

How it works: High school student groups submit an application to participate. Applicants who are chosen to participate are provided with the information and data they need to create an effective and powerful safe driving campaign for their school. Information includes state of the art social marketing strategies, video taping guidance from a professional videographer, and teen driving data to help them determine the most important issue to address. Student groups are mentored along the way to ensure their final products are powerful as well as appropriate. Each group then shares their campaign with their peers and collect feedback on their completed project. AIPC staff assist students with designing, collecting and analyzing evaluation data to measure the impact of their efforts.

Evaluation: Before and after watching Raise Your Voice media, students were asked to participate in a pre and post survey. One survey question measuring change in social norms, asked, "What percentage of Alaska high school students had at least one drink of alcohol on one or more of the past 30 days?" Prior to viewing the media, 114 students correctly identified that 23% of Alaska high school students had at least one drink of alcohol in the past 30 days; after viewing the media, 266 students chose the correct answer. This shows a 133% increase in knowledge. Other evaluation components include the likelihood youth will tell someone about the media they saw. Eighty-one percent responded that they would tell someone about the media that they saw. This finding indicates that peer-to-peer messaging is an excellent way to kick off a safe driving word of mouth campaign among teens. In a pre survey, 48% of students felt that responding to a text message immediately was never worth the risks of texting while driving. After viewing TRYC's video 97% felt that it was never worth the risks. In another example, after watching Raise Your Voice media, 80% of students felt that it is important for teens to help prevent their peers from drinking and driving.

Contact information: Marcia Howell, Executive Director Alaska Injury Prevention Center. Office 907-929-3939 marcia.howell@alaska-ipc.org Beth Schuerman, Projects Director, Beth.Schuerman@alaska-ipc.org



"I think that this program is very important and impacts many students and people in the community, and changes their thoughts and decisions on very real topics that most people face daily."

-student comment

Be in the know...

Public Policies

While public policy regarding teen driving behaviors can often take a high degree of effort to implement or modify, research has shown that it makes a significant impact (Goodwin et al, 2013). While policies are impacted by issues of enforcement and awareness, there are consistent results to indicate that the mere existence of a policy is a significant step in creating positive community norms. This leads to approval of road rules and enforcement and perceived advantage to complying with them, which are critical elements impacting behavior change programming.

Interventions that encourage behavior not supported by an existing policy (e.g. encouragement not to text and drive, when there is no law against it) are found to be significantly less effective than the same intervention deployed in a location that has policy support in place (Adkins, 2014).

Minimum legal drinking age (MLDA) at 21

The establishment of a minimum legal drinking age (MLDA) has long been a legislative tool used to approach and reduce a number of risky youth behaviors

connected with alcohol consumption (Wilson, 2013). There has been more research on effectiveness of this approach than any other intervention directed at underage alcohol consequences, and it has been proven consistently most successful in decreasing risks when established at age 21 (Goodwin, 2013).

An additional implication of minimum legal drinking age laws is the impact on legislation around “zero tolerance” policies. While adult drivers can drive if below a BAC limit between 0.10 and 0.08 (in most states), the presence of a zero tolerance policy maintains that a reduced level of blood alcohol in a young driver (under the MLDA) is considered a violation of law. Studies have shown that extensive publicity of zero tolerance laws can dramatically reduce crash and injury rates (Goodwin, 2013).

Cell phone use laws

Data supports teen drivers as higher users of cell phones than adult driver counterparts. As of 2014, legislation in more than 80 percent of US states prohibits cell use among novice teen drivers. While data shows very little impact on usage levels or accidents with implementation of a teen-only law, a community-wide cell phone ban has been shown to significantly impact teen crash rates (Buckley, Chapman & Sheehan, 2014). Additional research has maintained that cell phone bans prohibiting all phone use (excluding hands-free) are of significantly higher impact than those that focus only on banning texting (Fischer, 2014).

Seat belt laws

Every state and territory in the United States has some variety of law governing the use of seat belts in vehicles, however these restrictions vary significantly. Certain laws only apply to the driver, to passengers, or to minors in the car. In addition, not all laws allow for enforcement officers to cite a violator for non-seat belt use unless they are identified as committing an accompanying traffic offense at the same time—these refer to secondary enforcement versus primary enforcement policies. Teen drivers and passengers consistently demonstrate lower belt usage rates than adults, and as a result some states have an explicit inclusion of belt use as part of their graduated driver’s licensing (GDL) requirements. This is most significant for states that do not have primary enforcement capabilities with belt usage. Primary enforcement laws have been shown to increase teen compliance with safety restraints (both as drivers and passengers) by up to 15 percent (Goodwin, 2013).



Be in the know...

Public Policies contd.

Graduated driver's license (GDL) restrictions

A Graduated Driver's Licensing (GDL) program requires that new teen drivers work through a series of stages in order to transition from being a novice driver, to a fully licensed driver without any restrictions. While all states in the U.S. have some type of GDL in place, not all maintain the same levels of restriction.

The Insurance Institute for Highway Safety (IIHS) rated a GDL law as good if it had five or more of the following seven components: (1) minimum age for a learner's permit; (2) mandatory waiting period before applying for intermediate license; (3) minimum hours of supervised driving; (4) minimum age for intermediate license; (5) nighttime restriction; (6) passenger limitation; and (7) minimum age for full licensing (Fell & Romano, 2013). Research validates that this phased approach significantly decreases negative teen driving outcomes by addressing both inexperience and immaturity in teen drivers (Goodwin, 2013). Interestingly, data also shows that even when a well-designed GDL is not well enforced, its presence still has a significant impact on teen driving safety, since the assumption of enforcement among parents and teens is more valuable than actual enforcement efforts (Goodwin, 2013).

There were positive correlations with an increased length needed to hold a learner's permit (6 mos. minimum, with improvements noted for 9-12 month periods), as well as with minimum ages for learners of no less than 14 years of age, with increasingly positive outcomes as the minimum age increased. Supervised driving hours (able to be proctored by parents or other responsible adult licensed drivers) range in state requirements from none, to 70 hours of requirement, with an average between 30 and 50 needed before transition from a learner's permit to an intermediate license.

The minimum age for intermediate license achievement in any state is age 14 (in South Dakota), although most states do not offer the ability to achieve this phase until a minimum of age 16 (IIHS, 2015). During this intermediate licensing phase, nighttime driving and passenger restrictions are common. Nighttime restrictions for drivers in an intermediate stage of licensure exist in almost every state, but hours of 'night' vary from 6 p.m. to 6 a.m. as the most restrictive definition, and 1 a.m. to 5 a.m. as the least. The most common hours are from between 11 and 12, until either 5 or 6, but data supports that many teen crashes actually happen before 12 a.m., supporting an expansion of night hours to begin earlier. For GDL most passenger restriction includes restriction by quantity, age or both, with some states allow for

exception for family/household members.

Finally, the minimum age for full licensing in teens has a direct relationship to prevention of teen driver fatalities, with positive relationships in reduction of risk associated with an increased age of full (unrestricted) driver licensure. States' regulations vary between age 16 (with a minimum waiting period of intermediate licensing) to age 18, with most programs utilizing ages 17 and 18 (IIHS, 2015).



Be in the know...

Policy Enforcement

Enforcement culture surrounding public policy is a critical issue, considering that when surveyed as to their likelihood to comply with a stated law or regulation, both teens and parents displayed a significantly stronger likelihood to prioritize a law that they felt was highly enforced (Fischer, 2014).

Of importance is the substantial relationship between the successes of enforcement initiatives when paired with pre-publicity of their scheduled occurrence (Solomon, Tison, & Cosgrove, 2013). While the enforcement of a public policy will impact an individual who is immediately being penalized (at inter and intrapersonal levels), successful ability to publicize the occurrence of this enforcement allows the impact to permeate at a community level.

Strength of enforcement

Many policies surrounding teen driving are subject to a classification of either 'primary' enforcement or 'secondary' enforcement enabled. This refers to the fact that an officer is able to issue a citation for an observed violation of a primary enforcement issue without any other cause needed, while in a scenario with secondary enforcement capability only, an officer can only issue a citation if and when the behavior occurs in tandem with some other offense that is supported by primary enforcement.

Additional issues around strength of enforcement exist with law enforcement officers' ability to clearly identify

whether or not someone is breaking the law. In states that have GDL restrictions on teen drivers that are not enforceable once a teen is fully licensed (such as seat belt or cell phone restrictions), it can be hard for officers to act.

When surveyed, law enforcement officers in multiple communities have indicated that the difficulty of identifying a clear violation of a limited or secondary enforcement policy has made them less likely to issue citations, even when in observation of a behavior that could be in violation (Fischer, 2014). The state of New Jersey has taken a unique approach assisting officers in easily identifying teen drivers who are subject to the restrictions associated with GDL. The state requires that all teen drivers have a reflective sticker affixed to the license plate of their vehicle in order to provide easy identification for officers.

Penalties (and consistent application of them) are also considered a factor in the perceived 'strength' of enforcement. In communities where penalties are well known and cases of violation are consistently adjudicated to apply these penalties, teens indicate a higher likelihood to adhere to established regulations.

Enforcement culture & knowledge base

While officers identify a reluctance to maintain some policies due to difficulty in certain policy enforcement components (i.e. only part of a population is held accountable, etc.), other surveys amongst law enforcement officers have identified that this can also be a challenge of culture within the law enforcement team (Fischer, 2014). An officer's likelihood to attempt enforcement can increase in the event of focused training and increased knowledge of issues surrounding enforcement of teen driving policies.

There are a number of programs that provide specific training to officers in order to educate them on the potential negative consequences that can come from unsafe teen driving behaviors, as well as the overall impact that their enforcement efforts can have on the health and well-being of their communities (Adkins, 2014).

Resource allocation

HVE- also known as high visibility enforcement activity, or STEP- selective traffic enforcement programs- are two ap-

proaches for enforcement that operate on the premise of increasing the presence of patrols in a concentrated period of time, with either a particular population focus, particular geographic focus, or particular behavior target. By providing the resources to support overtime funding to allow this increased presence, states have seen significant results accompany their investment.

A well-known example of this approach is the nationwide "Click-it or Ticket" campaign that spends a two-week period in the spring with a national increase in law enforcement patrols scanning for violators of seat belt requirements. The data show that while an increase in the presence of law enforcement officers will always result in an upswing in the number of citations for a particular infraction, the real goal (decreased crashes and injuries) is best achieved when this proposed increase in enforcement is promoted publicly ahead of the proposed time of increased enforcement (Solomon, Tison, & Cosgrove, 2013).



Be in the know...

Community Roles

Cultural norms around risky teen driving behaviors play a significant role in the disruption or continuation of these actions.

As mentioned for both policy and enforcement, community interventions also rely heavily upon publicity and broadcasted information to support the various initiatives executed at this level (Buckley, Chapman & Sheehan, 2014).

Cultural engagement

A strategy employed in other areas of the United States with a high percentage of a particular ethnic minority population, is to create a linkage between cultural standards of the population, and their role in influencing teen behaviors. Whether under the umbrella of cultural responsibility in tending to the safety of teen community members, or identifying cultural norms that can be taught to teens regarding safe behaviors, this approach can have interesting effects within target communities. This has particular applicability to Alaska Native teen populations. These messages can be promoted through local tribal associations, mass media campaigns, Indian Health Services locations, and many other cultural gathering places.



Community norms and awareness

A primary strategy employed under the umbrella of community engagement and awareness is a variety of mass media campaigns targeting the community as a whole in their influence on perception of normative behaviors, as well as targeting community members in their ability to act to influence their peers in behaviors that support the decrease of risky teen driving.

It has been identified as critical for these campaigns to involve significant research ahead of implementation, in order to ensure that the media channels used are appropriate, as well as the specific messaging selected for the campaign being appropriately aligned with the target population. Common targets for community-wide media campaigns intended to impact safe teen driving issues include: influence of specific elements of local culture; information regarding enforcement & laws; coordination with national safe teen driving observances; avoiding consequences; and social responsibility.

Of additional note is the importance of evaluating local diversity needs, and identifying the appropriateness of developing auxiliary promotional or communication strategies in order to fully connect with diverse sectors of a community (Adkins, 2014).

Other strategies utilized in influencing community culture include signage prohibiting risky driving behaviors (located on major roadways, or in community centers such as malls, hospitals or government buildings), as well as promotion of a citizen's responsibility to be aware and act to influence dangerous teen driving behaviors. One solution is the creation of a community tip line to report behaviors such as underage drinking or drinking and driving (Goodwin, 2013).

Restriction of alcohol access & availability

While alcohol access and availability as a targeted sub-category can seem like a very narrow focus for a guide intended to broadly address multiple safe driving interventions among teens, research indicates a strong correlation between underage use of alcohol, and resulting risky driving behaviors, including all three of the targeted behaviors specific to this guide (Wilson, 2013).

Underage alcohol access in both retail & social environments can be effectively addressed with a combination of strategies directed at youth, adults and sellers of alcohol (including hosted establishments, as well as retailers) (Goodwin, 2013).

For youth, the continued enforcement and recognition of zero-tolerance & MLDA regulations remains critical. Examples of aides include reminder stickers on alcoholic products, warning of their age restric-

tions, as well as undercover enforcement efforts in which officers have the ability to cite youth for attempting to purchase alcohol when under the MLDA. Underage-party identification strategies by law enforcement, as well as appropriate disbursement approaches and enforced penalties for provision of false identification are some additional youth-targeted efforts that have been utilized with positive outcomes (Goodwin, 2013).

For initiatives targeting adults, undercover 'shoulder tap' operations (i.e. a minor asking an adult to purchase alcohol on their behalf) have been used to positive effect, as well as awareness and enforcement of social host liability (responsibility of the 'host' of a party for any negative consequences resulting from individuals who obtained alcohol from the event); and keg registration (kegs have ID numbers to identify who purchased it for a party).

For efforts involving vendors, the best line of defense is a robust alcohol checks program. The most frequent practice is (through undercover work) to observe and cite the vendor in the event they sell alcohol to a minor. Important qualities of checks include significant publicizing of their occurrence; occurrence with all vendors (not a sample); frequency of every few months; unscheduled; and a program that is sustained over time (Wilson, 2013).

In addition, penalties for violation must be perceived as significant- such as the suspension of a liquor license if a business is caught selling alcohol to minors (with no option to decrease time of suspension in lieu of cash penalty). Other approaches, such as the Cops in Shops program (that cites minors attempting to purchase alcohol, instead of the vendor) has had success with apprehending minors before they are able to obtain the alcohol, and the ability to report to the vendors regarding problem-clerks who do not appear to be enforcing MLDA restrictions (Goodwin, 2013).

Partnerships

A primary strategy for success is the formation of a community task

force or community coalition focused specifically on addressing risky teen driving behaviors. When successful, these groups intentionally involve representation from schools; health; law enforcement; retailers; parents; youth; and citizen organizations. Additionally, strong and consistent leadership is needed, as well as significant cooperation and coordination between all parties (Goodwin, 2013). It is important to acknowledge work that complementary committees are doing, and to potentially partner on specific projects, without necessarily combining the groups' efforts on a permanent basis, to the detriment of each group's primary purpose. For example, if there is a taskforce to reduce underage drinking, their work is corresponding, but not the same as the work of a task force devoted to safe teen driving.

In this vein, it is also important to fully assess the presence of community groups that potentially have the ability to impact safe teen driving, and to intentionally establish a clear and organized understanding of how a safe teen driving taskforce would engage with those groups (Goodwin, 2013).

In addition to coordinating community-wide initiatives aimed at safe teen driving behaviors, community groups have other potential functions. One significant area of importance is accurate and meaningful data, in order to advise needs for proposed interventions. Groups can work to conduct needs assessment and data collection (including participation in natural observations) in order to serve this end.



Be in the know...

Parental Roles

As a strategy in the reduction of risky teen driving behaviors, parental roles can be one of the more complex (but critical) approaches. Multiple tasks are important as parents of a driving teen: enforcer/supporter of GDL and other legal restrictions; role model of driving behaviors; creating additional restrictions outside of stated laws; supervising driving hours; and teaching driving skills. Parents are asked to act as an expert instructor, a motivator, a law-enforcing authoritarian and as a trusted advisor and confidant. While multiple programs exist for support of parents of teen drivers, there is significant variation in program evaluation and quality (Goodwin, 2013).

Instruction & role-modeling

Research has shown that parents are pivotal in modeling and shaping the driving behavior of their teen driver. This includes demonstrating safe driving behaviors and attitudes during early driving phases (Simons-Morton, Ouimet, & Catalano, 2008), as well as providing most of the driving supervision and instruction during the learner and intermediate licensure periods.

Consistently, data supports that parents who engage in behaviors such as distracted driving are more likely to see their children mimic these same behaviors (Buckley, Chapman & Sheehan, 2014). There is a collection of support materials to teach parents to be driving teachers (such as Ford & GHSA's Driving Skills for Life: Road Ready Teens).

Research shows that while parents regard these materials as 'helpful' or 'informative' in their efforts to teach their novice driver, they rarely use them specifically as prescribed. Data supports no specific reduction in crash rate outcomes related to parental use of instructional aides, but that when they are paired with other initiatives, finds them potentially complementary (Goodwin, 2013).

Communication & engagement

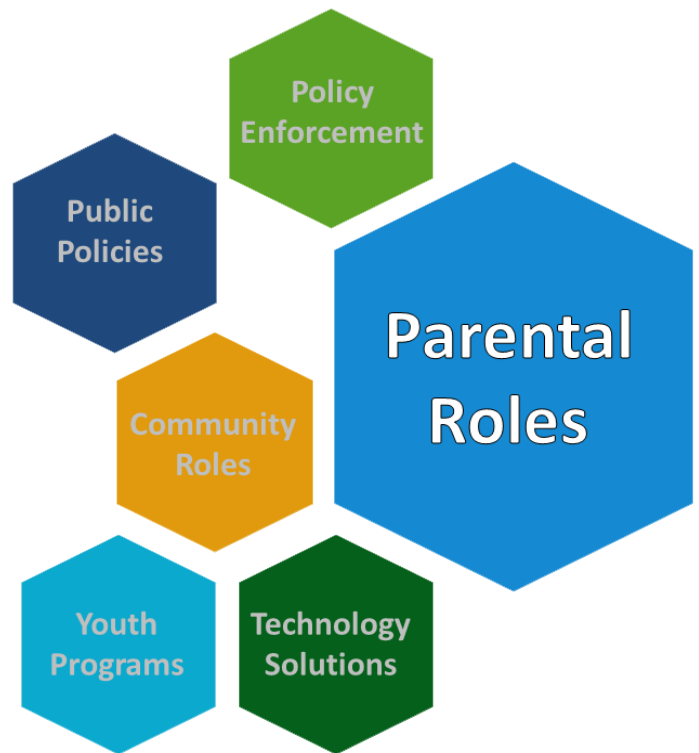
It has been found that parents who initiate conversations with their teens around risky driving scenarios have an easier time establishing and enforcing expectations for safe driving behavioral norms. There are a number of campaigns to encourage parents to have these conversations (including the well-known program 'Steering Teens Safe').

Further research in the area of parental involvement and engagement in teen education around safe driving issues demonstrates a positive correlation between parental engagement and reported risk reduction. Inclusion of parents in school health campaigns regarding drinking and driving showed higher positive outcomes (Buckley, Chapman & Sheehan, 2014). Additionally, jointly attended driver's education for teens and parents, such as Israel's Green Light for Life (Toledo et al., 2012) is shown to be effective in increasing parent and teen reports of compliance with driving restrictions.

Knowledge of policies

A known impediment to success of parental support of local laws regarding the GDL system and other driving-related legal and policy restrictions is lack of correct knowledge among parents regarding these policies. When surveyed regarding the quantity of hours needed for their novice teen driver to successfully transition from a learner's permit to a intermediate driver's license, less than half of parents were able to identify the number of hours correctly (Simons-Morton, & Ouimet, 2006).

Researchers have compared this with the fact that evidence supports no statistical correlation between number of required hours during the learner phase, and crash/injury reduction. It is now suspected that this is because



few parents actually know the correct number of hours needed, and may not necessarily comply with the provision as it is laid out in law when teaching their novice drivers (Goodwin, 2013).

Boundary setting & monitoring

Parental boundary setting and conversations regarding safe teen driving are directly correlated to teen safety outcomes, but data show that parents need help to be most effective.

Many parents report having specific and implicit rules or expectations regarding their teenager's independent driving behavior. However, studies show that these "clear" expectations may be considered unclear or ambiguous to their teen driver. This is particularly true when parents are inconsistent in regulating and enforcing these rules (Simons-Morton et al., 2005). This has been found to be a predictor for self-reported risky driving behaviors among teen drivers (Hartos, Leaf, Preusser, & Simons-Morton, 2006).

Available evidence suggests that 'safe driving agreements' can be used as a tool to educate parents and teen

drivers regarding the risks associated with driving, as well as motivate them to set greater limits. Formats for these parent-teen driving agreements are available, and examples such as the Checkpoints program include support materials for parents to use in order to communicate the variety of risks that should be addressed in the agreement (Simons-Morton et al., 2006).

The most opportunity for positive results comes from a combination of stated restrictions, paired with the use of technology monitoring devices (options for devices discussed in detail later in guide) to validate teens' compliance with the agreed-upon expectations. These monitoring devices, utilizing a weekly report card format for parents support parents in communication regarding norms and expectations with their young novice drivers (Buckley, Chapman & Sheehan, 2014).

Overall, research supports affirmative parent-teen relationships and an authoritative parenting style as the keys to success of safer driving agreements. The implementation of safer driving agreements with partners other than parents is limited and as a result still largely unevaluated (Soole et al., 2013).

Case study New York: Battle of the Belt

Using research from the Institute for Traffic Safety Management and Research at the University of Albany, the New York Governor's Traffic Safety Committee (GTSC) approached the five high schools in Orleans County, New York, to bring attention to the high level of unbuckled teen crashes in their county. Working with New York State Police Troop A and local law enforcement, the GTSC met with high school principals to create an educational experience that would raise the awareness about the importance of using seat belts among students and the community.

During the month of October, students in grades 10-12 at the five high schools had assemblies that featured the victim of a cell phone-involved crash and took part in other activities that highlighted the consequences of distracted driving and the need for seat belt use. Each high school held "Battle of the Belt" competitions where four-person teams put on seat belts as quickly as possible in a parked car, with team members rotating through the car's four seats and buckling up in each seat. The winning team from each school and law enforcement leaders from each agency in the area came together at halftime of the homecoming game, squar[ing] off in a countywide "Battle of the Belts" competition.

Several groups supported the teens in this awareness-raising event. New York State Police had a rollover simulator at the event, and licensed drivers were encouraged to take a "No Texting and Driving" pledge for a free hot dog and a soda. Other incentives, including \$10 iTunes gift cards and t-shirts, encouraged the participation of students throughout the effort. Local businesses supported the initiative by placing "Buckle Up Orleans County" stickers on takeout containers to spread the word in the community, and local law enforcement agencies stepped up traffic enforcement of seat belt and texting laws.

Local media covered the halftime event at the Albion homecoming game and featured pictures of the "Battle of the Belt" participants. The initiative was funded by a "Driving Skills for Life" grant underwritten by Ford Motor Company Fund.

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Excerpt taken from Getting it to Click, Governor's Highway Safety Association 2014



Youth Programs

Youth programs that target teen driving behaviors of drunk driving, distracted driving and seat belt use are the intervention type most commonly developed and invested in by public and community health efforts. Problematically, this intervention type is also the one with the least consistent behavioral outcomes. Studies have shown that while teens view these programs as having impacted their knowledge and attitudes, the programming does not consistently impact their actual behavior (Goodwin, 2013).

Youth programs come in a variety of manifestations, with both passive and active promotional materials and program curricula available in abundance. While the inconsistent results are partially attributed to inconsistent delivery of programs (by different presenters, etc.) there is also a great deal of evidence to support the general challenge of teens as a primary target for intervention strategies, due to a issues around cognitive development stages in teenage years (addressed in greater detail later in guide). Other challenges in youth programming outcomes are also related to the measurement criteria used in program implementation, which are sometimes not able to accurately capture program successes because they aren't using appropriate metrics in evaluation.

Examples of youth interventional program foci include: scare tactics; promotion of positive norms that don't involve the targeted risk behavior (i.e. identifying alternative 'fun' activities, instead of underage drinking); social norms (i.e. not as many people drink and drive as you think); peer-to-peer influences and many others (Goodwin, 2013). Programs with some level of success can be spearheaded and led by either youth or adults, although currently prevailing trends in program execution are exploring the significance in peer-to-peer program delivery as the more impactful deployment mechanism (Fischer, 2014).

Findings show that peers are a substantial influence on a teen, not necessarily just by peer pressure (direct), but just by being present (indirect). When it comes to risky driving behaviors, teens are more likely to engage in distractions and risks for the purposes of interacting more with peers, building relationships, and impressing peers (more so even than when playing a driving video game)(Buckley, Chapman & Sheehan, 2014). Using this same theoretical approach, a youth-led campaign is important because this same research suggests that youth have more influence among their peers in promoting positive driving behaviors.

School campaigns

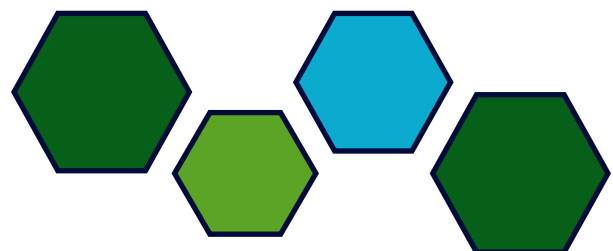
The most popular deployment environment for youth-focused risk-reduction driving campaigns is within the context of schools. This isn't limited to the formal educational format and structure of students' typical day-to-day school life, and can include a variety of approaches. As identified previously, programming within the school context currently employs an equal mixture of youth-led initiatives and education/programming provided by adult resources (Goodwin, 2013). Programs take a variety of approaches, including integration into existing curriculum, awareness campaigns through various media, visual reminders and interactive campaigns.

Integration into curriculum typically takes the form of lesson plans used within health and wellness educational settings, and is becoming less utilized in favor of newer innovations in behavior change theory and youth engagement.

Awareness campaigns through a variety of media outputs within a school environment have included use of posters, banners, floor decals, signs in school parking lots, school-radio or television broadcasts, announcements at school sporting events, slide-show presentations at school-wide assemblies and many other examples. While this consistently appears as a popular component in many interventions directed at teens, these efforts are highly passive in nature and are most successful in having potential to impact risk outcomes if combined with a more diverse campaign effort involving interactive engagement with the target population (Buckley, Chapman & Sheehan, 2014).

The notion of visual reminders as a prevention approach encompasses well-known manifestations such as memorial plaques or monuments dedicated to students who were killed in crashes, as well as example 'crash cars' delivered to school campuses to act as deterrent for students to engage in risky driving behaviors. While these visual cues have been long-used as part of fear-based deterrent systems, their efficacy is relatively low unless paired with a more diversified interventional strategy (Baird, 2011).

Interactive campaigns present the most significant area for exploration among the variety of program types



currently targeted within a school environment. As behavioral science continues to better understand the teenage brain, the themes portrayed in this area of development continue to fluctuate, but the basic premise of engaging students' participation remains consistent. Iterations of interactive programs include: role plays/reenactments; monitoring and collection of data; competitions; incentives; and a variety of hands-on exhibits and demonstrations (Goodwin, 2013).

As in most behavior change campaigns, an important component is the ability to monitor the actual behavior being targeted for change. Programs have found a unique ability to serve this need, while engaging and educating youth. By encouraging youth representatives within various school communities to conduct observational measurement campaigns (e.g. observed seat belt use by students leaving the parking lot after school), studies have found that the students conducting the observations are significantly impacted by a specific awareness of the problem's prevalence, and at the same time are collecting highly valuable program evaluation data that can be used in a pre-and-post-intervention comparison (Adkins, 2014).

Uses of competitive campaigns and incentive-earning opportunities have also been an up-and-coming trend in the past decade of teen driving interventional strategies. Examples of some of these campaigns include student pledge card 'drives' that incent students to sign a pledge to abstain from a variety of negative driving behaviors, surprise observations measuring positive driving behaviors (with results compared between schools), creative contests to design music, art, video or written compositions, and many other inventive approaches to engage with

students who thrive off of competition. Incentives range dramatically, with some examples as eligibility for a gift-card raffle, a school-based grant for further safe-driving programming, an endowment for a student's club of choice, all the way up to the opportunity to win a new car. While these competitive efforts are highly successful at engaging student participation, and typically yield changes in stated attitudes and perceptions, the resulting behavior changes are inconsistent and vary substantially by program (Adkins, 2014; Fischer, 2014).

Community connections

Not to be confused with larger community-based interventional strategies, community-connection

based youth programming takes advantage of existing community structures that youth are engaged in and provides opportunities to infuse targeted youth campaigns into these contexts.

Many opportunities to utilize this approach are fairly recently conceptualized, and as such have very limited evaluation data to predict potential successful outcomes. The primary motivation for these types of interventions is the idea of utilizing and increasing protective factors that have been linked to reduction in teen driving injuries and deaths. Some protective factors of note include having a positive relationship with adults in a school or social club setting, as well as finding success in other health behaviors



Be in the know...

Youth Programs contd.

Community Connections contd...

(such as healthy eating or physical activity). With this in mind, interventions have been developed for deployment by pediatricians (for use in the context of regular medical exams), school counselors and teachers, club and church group leaders and sports team coaches (Buckley, Chapman & Sheehan, 2014).

An additional approach that has been tested at the adult population level (with success) is the concept of targeting employers as another opportunity for interventional deployment (NHTSA, 2008). While this has been proposed as a potential strategy for youth populations as well (targeting employers who have a high percentage of teens in their workforce), no significant evaluation has yet been conducted to determine the efficacy of this approach. This is theorized as an alternative strategy for teens that may not be in the traditional school environment (home schooled, alternative charter school attendees, etc.) that may miss out on the many school programs typically used to target teen safe driving behaviors (Wilson, 2013).

Formal driving instruction

The two most frequently cited goals for driver education are: To impart knowledge of the rules of the road, the basic skills involved in vehicle operation, and instill and reinforce attitudes consistent with safe driving; And to produce safe drivers, e.g., drivers with measurably lower crash rates (Pezoldt, Womack & Morris, 2007). There is a national initiative underway to identify and standardize the most important components of driver education requirements and curriculum specifications (in both public and private instructional environments)

known as the National Driver Education Standards Project (NHTSA, 2015).

When engaged with a formalized driver's education program (not to be confused with parent-provided education), youth have a variety of options, including both pre-licensing education as well as post-licensing education to reinforce and cultivate continuation of learned behaviors.

Pre-licensing driver's education was historically offered as part of a publicly available curriculum through schools, but disappeared over time (markedly in the middle 1990s) with funding availability decreases. Established studies show minimal crash reduction with driver's education (although there is question as to whether crash statistics are the right success/failure indicator) (Pezoldt, Womack & Morris, 2007).

Many states have attempted some form of incentive system for young drivers who take driver's education, including a younger age to get a full license or a provisional license; a decrease in number of required supervised hours; or waiver of a portion(s) of a driver's test. All of these have shown an increase in negative driving outcomes (likely due to the fact that they put inexperienced drivers on the road faster) (Goodwin, 2013).

Post-licensing driver's education operates off of the idea that instruction is helpful after a teen has had some initial experience with their learner phase, and engages in some type of instruction once they've achieved their provisional (intermediate) license. There is no current research to determine the effectiveness of this approach, but it is currently being evaluated in a number of trials (Goodwin, 2013).

In addition, some considerations for computer-based training have shown potential positive outcomes, especially for instruction targeting avoidance of distraction-based driving habits.

Case Study: Buckle Up and Cell Phone Down

Description: Anchorage High Schools have participated in an annual teen seatbelt promotion project since 2006. In the past several years, the message has expanded to include avoiding distracted driving. The goal of this campaign

is to empower and engage youth to lead projects addressing youth traffic safety during the times of increased risk; including prom, graduation, and summer driving. With funding from the Alaska Highway Safety Office and State Farm Insurance, AIPC has coordinated this peer-to-peer campaign in all ASD high schools over the last ten years (2006-2015). The main focus of the campaign is to increase seat belt use amongst teen drivers and their passengers but there is also an emphasis on preventing distracted driving. Cell phones, texting, and other teen passengers are examples of major distractions to drivers, which contribute to a high percentage of crashes.

How it works: As participants in the campaign, high schools conduct peer-to-peer safety messaging and have been successful in increasing seat belt use.



Be in the know...

Technology Solutions

Social norming of technology to prevent and prohibit risky behaviors while teens are driving is suggested as a significant area for improvement/exploration (Buckley, Chapman & Sheehan, 2014). While legislative efforts to restrict use of distracting devices during vehicle operation are important, they are hard to enforce, and when used as a solitary intervention have less potential than when paired with barriers in the form of technology that inhibit the teen's ability to ignore policy requirements.

Studies are still very new regarding the use of a variety of electronic monitoring technologies to provide parents insight into unsupervised teen driving behaviors. In a recent study, more than thirty teen-parent combinations used both in-vehicle video monitoring as well as GPS tracking solutions to evaluate their impact on teens' safe driving tendencies. The findings were encouraging. Not only did teens refrain from disabling the technology, but parents found the reports produced by the technology to be highly effective in providing opportunities to discuss teen behaviors and enforce established expectations and restrictions (Goodwin, 2013).



Vehicle-equipped technology

As automakers become engaged in efforts to create safer conditions for teen drivers, significantly higher levels of in-vehicle enhancements are becoming available with newer models. One example of enhancement is Ford's MyKey technology, which allows parents to set certain limitations by programming a key through the vehicle's message center to choose preferred driving modes. Upon insertion of the programmed key into the ignition, the system reads its MyKey code, activating the selected settings. Options include enhanced seat belt warning systems, top speed settings, limitations on audio settings and earlier warnings for low fuel (Ford Motor Company, 2015).

Case Study: Buckle Up and Cell Phone Down contd...

Efforts include; parking lot incentives to those "caught" wearing seat belts, pledges for safe driving, roll-over-simulator demonstrations, school announcements, assembly skits, safe driving jingles, videos, banners, signs, and locker flyers.

Prior to the initiation of the project, AIPC staff conduct a pre-implementation observation of seatbelt use at each high school. The protocol is repeated post implementation, by the same observer. The methodology has remained the same for ten years to allow for trend analysis. Each observer is expected to be at their school to observe student arrival from 7 to 7:30am. It is important for the observer to find a parking spot early, and for better visibility to park to the right of the driver's side and under a light source. Observers only record the seat belt use of students and their front seat passenger. Adult use is not recorded.

Evaluation: Over the years, there has been an average 8% increase in seatbelt use after the annual campaign. With the typical number of observations being around 800, this means about 65 students started wearing their seatbelt after the campaign. In 2006, the pre-observation use rate was 73%. That number has steadily increased to 85% in 2015. In 2015, post observation usage was 91% greater than the observed statewide seatbelt use rate of 89%.

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Be in the know...

Technology Solutions contd...

After-market technology

As many parents do not have the ability to purchase a new model vehicle for their teen driver, in order to access the latest and greatest options, a feasible alternative comes in the form of after-market installation options. These measures include solutions such as in-vehicle video-monitoring that detects significant G-force events (sudden braking, swerving, etc.) and records the driver's actions immediately preceding and during these events. Additional tech options include GPS systems that monitor driver speed, seat belt usage and geographical location, providing alerts if and when the driver ranges outside of any established boundaries (including specific location restrictions, speed restrictions or non-use of safety restraints). In addition to the ability to target distracted driving behaviors and seat belt use, in-vehicle technological options also exist to prevent teens from driving after drinking, with the ability to require use of ignition interlock devices (breathalyzer technology) in order to successfully start a vehicle's ignition.

There are a number of potential promotion and distribution mechanisms for these approaches, although the efficacy of them has not been evaluated. Some concepts being explored to make parents aware of this technology include promotional efforts by car insurance providers when contacted about adding a new teen driver to an existing policy; and utilizing car sales facilities as a point of sale for after-market technology (to offer for integration with newly purchased vehicles (both new and used) that may not have installed technology to support safe teen driving) (Swanson, 2013).

Phone-based applications

In addition to the use of technology that is dependent upon installation in a specific vehicle, there is also significant potential in the variety of phone-based applications currently on the market to inhibit phone interfer-

ence in a teen driver's concentration. With cell phones identified as a primary contributor to distracted driving injury and death in teens, this technological intervention is significant (Fischer, 2014).

Apps have the ability to detect a vehicle's rate of acceleration and disable all functionality with the exception of emergency service (911) calls. Additional features available include 'personal assistant' technology to manage incoming text messages and voice calls to indicate that the driver is engaged in driving at the time. A factor in current cell phone applications is cost. Some apps can cost a subscription fee of up to \$25 per month, while others are available for a one-time purchase cost. The state of Iowa has worked with a software application developer to create a no-cost app for Iowa state residents that provides services such as phone disabling, tracking of certain driving behaviors, such as speeding, reporting to parents, and the ability to compile these results in a statewide database (de-identified) in order to advise continuing public health interventions regarding young drivers in the state (Fischer, 2014).

Relevant communication channels

In addition to tech solutions that inhibit certain behaviors, up-and-coming communication technologies should be regarded as an opportunity to potentially impact and increase positive behavioral outcomes. While many traditional public health communication efforts have invested significant efforts into distribution channels such as television advertising, newspaper and other print promotion, radio spots or public signage, research indicates that these mechanisms may not be as successful in reaching today's teen populations (Adkins, 2014).

Relevant channels that have been identified include promotional messages on media-access web services, such as Hulu or Pandora, as well as social media sites, including Facebook, Twitter and others. One example of a current effort to utilize relevant technology in communication efforts is the Centers for Disease Control's Pinterest board dedicated to safe driving images.

Case study Kentucky & Iowa: There's an app for that

Kentucky and Iowa are harnessing the power of mobile apps with the hope that teens and, in particular, their parents will leverage the technology to help keep young drivers safe. The Kentucky Highway Safety Office (KHSO) is working with Mobile Life Solutions to make its smartphone app Text Limit available to all residents free of charge for the first year. The app, which costs \$24.99 annually (KHSO is using a grant from State Farm and federal funds to cover the cost), works with the phone's GPS. It allows an administrator, such as a parent, to set a speed limit where texting, calling and surfing the web is prohibited, but does not disable 911 or emergency service calling.

"We selected this app because it works on all phones including Apple devices," explained a KHSO official. "With so many teens and adults owning iPhones, this is critical for keeping Kentucky's 3 million motorists safe on the road."



TRENDS WORTH NOTE

The challenge of teen drivers

Teen drivers are a complex population to work with, due to a number of variables around their stages of cognitive development, limited driving experience and a general willingness to adopt new technologies very soon after their release.

In terms of experience, teens as novice drivers require a high level of attention to concentrate on and complete basic driving tasks. Between this high percentage of attention needed for basic driving operations, and a low level of experienced judgment and intuition, teens often regard driving safety as a secondary consideration, and do not prioritize it (Buckley, Chapman & Sheehan, 2014; Goodwin, 2013). In addition to compromised stores of attention and experience, teens are also prone to higher levels of cognitive immaturity, associated with unnecessary risk taking, lack of resistance to peer pressure, inability to think ahead to consequences for behaviors, decreased belief in personal susceptibility to harm, and compromised judgment and decision-making skills—all directly related to their stage of neurocognitive development (Buckley, Chapman & Sheehan, 2014; Aguilar & Shoji, 2013).

In attempts to theorize, create and evaluate contemporary interventions that align with the 'latest and greatest' teen trends, researchers will always be at a disadvantage in terms of manifesting timely and applicable data, while still maintaining evaluative rigor. In addition to challenges of remaining relevant, practitioners designing interven

Case Study: There's an app for that contd...

This isn't KHSO's first foray with Mobile Life Solutions; the agency also makes the Drive Sober app available to Kentuckians in conjunction with the Drive Sober or Get Pulled Over campaign.

Currently, there are 1,600 new users (2,000 phones) of the Text Limit app. Mobile Life Solutions plans to work with insurance carriers to encourage agents to let policy holders, particularly those with novice drivers, know about the KHSO offer. There's also a plan to partner with the Kentucky Auto Dealers Association to place point-of-sale materials in showrooms.

The Iowa Department of Transportation, meanwhile, has contracted with Aegis Mobility to provide a mobile app, TEXTLR, to reduce distracted driving and fatalities. Iowa is the first state to develop its own app and plans to market it to the parents of teens 14 to 17 years of age at no cost. Iowa teens may obtain a permit at 14; approximately 18,000 did in 2013.

"Parents hold the purse strings when it comes to driving," said an Iowa DOT official. "But we also want them to think not only about the costs associated with driving, but also the risks. The TEXTLR app is a way to help reduce distractions for drivers and [promote] conversations between parents and...young drivers who are most at risk."

The app, which is being developed for both iOS and Android platforms, will disable text and phone capabilities when driving (except emergency calls) on the Android platform. The app, which is scheduled to launch November 2014 includes other planned features such as:

- The ability to monitor and receive reports on driver behavior including drive time, speeding, fast acceleration, and hard braking.

- A secure, password-protected parent portal providing reports on driving behaviors, including route-specific events displayed on maps.
- Parent notifications sent via e-mail when a teen exceeds configurable thresholds.

Iowa DOT officials indicated that they'll use several touch points to market the app to parents including when a teen applies for a permit and when he obtains an intermediate license. In both instances, a parent must be present and provide permission. Iowa also allows teens to obtain a minor school license at age 14-and-a-half, with the permission of a parent and the school superintendent, principal or school board chair.

Information about the app and the risks for teen drivers will be made available to school officials to share with parents. The price tag to develop the app is \$100,000 and the cost to make it available to teens will depend on the adoption rate (estimated cost is \$3.99 per month). Iowa DOT officials hope to sign-up 5,000 teens during the first 12 months of rollout.

While the evaluation parameters have not been identified, the state plans to conduct research to gauge teen and parent reaction to the app. Additionally, Aegis Mobility has agreed to share with the Iowa DOT all data it collects from teens that are using the app (data will be scrubbed of personally identifiable information prior to sharing) to assist them in analyzing teen driver behavior.

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Excerpt taken from Distracted & Dangerous, Governor's Highway Safety Association 2014

TRENDS WORTH NOTE: *The challenge of teen drivers contd...*

-tions face an additional challenge; data indicates that while teens' beliefs and attitudes can be impacted with the right combination of programs, their actual behavior doesn't always follow their stated intentions. This aligns with multiple factors in the growth and development of teen brains, which predispose them to impulsivity, sensation seeking and a heightened perception of their own abilities. As such, it becomes critical for implementations to contain a healthy balance of influences that rely on the decision-making and behaviors of non-teen populations, such as parents, law enforcement professionals and others, who are able to act in ways that benefit and support safe teen actions.

By understanding that teens are not always capable of making the right decision on their own, it becomes possible to enable a series of interventions that install barriers and checkpoints to regulate teen behavior, with the help of a variety of influences. It is worth note that programs that target teens and build upon their stated intentions to modify their behavior are still of value. It's just important that they are combined with other strategies, in order to achieve maximum impact.

Balancing data-driven programming against realistic execution

There is currently a significant challenge in evaluating the ideal complement of teen driving interventions against operational and resource-based realities. This includes enforcement issues, matters of public convenience, and challenges in access.

While many indicators demonstrate the importance of increased enforcement efforts to support legislation regarding safe teen driving regulations, the operational reality is that there are too many violators of laws, and not enough law enforcement resources to consistently police them all. Additionally, there is a significant divide between best practice for legislation regarding teen driving regulation, versus public support for implementation of these best practices. With many teens committed to a substantial number of extracurricular engagements, parents often consider their teen's ability to drive themselves a welcome relief. The notion of legislation that would increase the minimum age for learner permitting, provisional licensure and full licensure impacts that convenience, and not all parents are in support of it. Of note are a number of studies conducted in rural communities where surveyed parents specifically identified a lack of enforcement at a familial level of GDL requirements, in favor of the convenience of their teens being able to transport themselves (and neighbors) to important work and school functions (Gill et al., 2013).

Another issue is the challenge of making current assistive technologies fully available to those who would most benefit from them. While certain vehicles are now being outfitted with safety devices that have significant potential to contribute to decreased risky behaviors in teen drivers, these technologies are mostly available only in very new model vehicles, even then as a 'buy-up' option—not as a standard offering in all vehicles. The same can be said of interventions available through cell phones—there are a number of apps and GPS-based programs that have the ability to protect teen drivers, but they come at a price. The reality is that safety features to deter teen driving risks are not yet considered a cultural necessity, and are instead a luxury item.

APPROACHES TO MEASUREMENT

A variety of measures have been utilized in order to evaluate the success or lack of success in a programmed intervention. Measures utilized included pre and post-intervention counts of single vehicle and/or multi-vehicle accidents, with additional criteria of timing, police themes and co-occurring convictions (such as DUI) to add clarity to their relationship to the intervention. Other measures included pre and post intervention surveys, conducted in a variety of settings with populations such as parents of teens, law enforcement officers, and teens themselves. Collection mechanisms included telephonic, online, via mail and in-person. These surveys measured variables such as self-reported behaviors, intentions, beliefs and opinions.

Some additional types of metrics used were evaluation and discussion with focus groups, review of injury and death records and reports, pre-and-post-intervention naturalistic (unscheduled and covert) observations of target population's behaviors (e.g. seat belt use, distraction while driving, etc.), and use of a simulator to observe driving behaviors in a controlled environment (Buckley, Chapman & Sheehan, 2014).

While some evaluation criteria were considered more and less reliable, very few program evaluation processes had fully effective and generalizable measures for assured success in replication.

A metric of value for Alaskans is the Healthy Alaskans 2020 (also known as HA2020) criteria. Based on the latest scientific evidence around improving health, along with community input from more than 3,000 Alaskans, the HA2020 framework identifies 25 health priorities that are regularly monitored and available publicly.

Of the identified 25 health priorities that make up HA2020, the following two priority metrics have the potential to see a direct impact by the reduction of drinking and driving in teens, an increase in seat belt

Case study California: Impact Teen Drivers



Established in 2007 through a partnership between the California Association of Highway Patrolmen, California Teachers Association and California Casualty, Impact Teen Drivers (ITD) is an evidence-based program that uses teen-targeted videos, interactive materials (such as a probability wheel that reveals your chances of being involved in a crash based on various forms of distraction), presentations, posters, lesson plans, activity outlines, PSAs, social media, and more to empower teens to take control of protecting themselves and their friends when they're on the road. All of the materials are available free to schools nationwide through ITD's web portals: www.impactteendrivers.org and www.whatslethal.com.

The program is designed to start a dialogue among teens so they take ownership of what they learn about the risks and severity of distracted driving and leverage positive peer pressure to make good decisions. The focus, according to the ITD team, isn't on scaring teens, but appealing to them on a "visceral level" by using stories of real teens and their families. The program uses emotion, humor and facts that are taken from the latest research and conveys this information in terms and words that resonate with teens.

ITD's bedrock program is What Do You Consider Lethal? (WDYCL). The 60-minute presentation, designed for use by teachers, safety educators, first responders, health professionals, parents, students, and community members, focuses on generating dialogue and encouraging teens to take the lead in peer-to-peer messaging. A 90-minute Parent-teen Workshop combines the WDYCL presentation with strategies for parents, including information on graduated driver licensing laws, and open discussion.

Training is key to ITD's outreach and success in reaching teens. The ITD team annually trains the California Highway Patrol (CHP) Public Information Officers on current teen safe driving research focusing on distracted driving and GDL, the importance of understanding teen culture and trends, how to use the WDYCL program, as well as other community and school-based resources including social norming media campaigns.

CHP receives over a million dollars in grant funds through the California Office of Traffic Safety to facilitate the program in high schools and communities across the state including a high visibility teen-centric media campaign. In addition to working with CHP officials, ITD also offers a two-and-a-half hour Lead the Leaders training program to help students fine tune their peer-to-peer traffic safety messaging, and a 5-hour, Train the Trainers session for adults who are seeking to enhance their knowledge of distracted driving, bolster their presentation skills and train others to deliver the WDYCL program.

ITD also invites teens to tell them how they talk to their friends, parents and siblings about the dangers of reckless and distracted driving, through Create Real Impact. Launched in 2011 and conducted twice a year, the contest gives 14- to 22-year-olds the opportunity to showcase through art, music, video, and creative writing what they're doing to solve the problem of reckless and distracted driving. All qualified entries are judged via an online voting process that's designed to drive teens to the website and facilitate learning, and by a panel of judges who score each based on creativity, idea execution and message effectiveness. A \$500 cash prize is awarded to the top vote-getter and \$1,500 to the judges' pick in each of the four categories.

To date, ITD has reached more than 2 million high school students in California and nationwide. The ITD team has provided training to educators, police officers, SADD and 4-H chapters, injury prevention and traffic safety program representatives, universities, statewide coalitions, and SHSO officials in 21 states.

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Excerpt taken from Distracted & Dangerous, Governor's Highway Safety Association 2014

APPROACHES TO MEASUREMENT contd...

use and a decrease in distracted driving among Alaska high school students:

Priority: Reduce the number of Alaskans experiencing alcohol and other drug dependence and abuse

- **Indicator:** Alcohol induced mortality rate per 100,000 population
 - Baseline in 2010: 16.3 per 100,000
 - Goal by the year 2020: 15.3 per 100,000
- **Indicator:** percentage of adolescents who report binge drinking in the past 30 days based on the following criteria: 5 or more alcoholic drinks in a row within a couple of hours, at least once in the past 30 days
 - Baseline in 2010: 21.7 percent
 - Goal by the year 2020: 17 percent

Priority: Reduce Alaskan deaths from unintentional injury

- **Indicator:** Unintentional injury mortality rate per 100,000 population
 - Baseline in 2010: 58.3 per 100,000 HA2020
 - Goal by the year 2020: 54.8 per 100,000

Additional research is needed to determine a best-practice strategy for the measurements used in evaluation of teen driving programs. While the current metric considered 'most critical' is around the outcome of teen injuries and deaths connected to unsafe driving behaviors, this has been shown to be a limited evaluation tool when determining a program's viability in making positive impacts to teen driving more broadly.

There is currently no specified best practice strategy around standard success metrics for teen driving initiatives, and as a result programs use a wide span of metrics to evaluate progress, and often can even employ widely different strategies to interpret the same basic data elements. In this current state of measurement variability, programs are very difficult to compare to one another in determining which ones are more effective, and in what ways they stand to be improved upon, or replicated.

CONCLUSION & RECOMMENDATIONS

As evidenced by the overwhelming data to support continued needs in safe teen driving initiatives, the work in program development and evaluation in this area is far from complete. As research gains further insight into the minds of teenage drivers, the landscape of environmental factors, developing technology and evolving culture continues to change and grow.

Keeping in perspective unique considerations for teen driving

The continued identification in behavioral science evaluations of teen drivers is clear; teens are not inherently equipped to be good drivers. Major cognitive developments continue throughout the first years of a typical teenage driver's licensure, and with those developments come such handicaps as impaired judgment, diminished capacity for decision-making, weakened anticipation of risk and a lack of concern with consequences.

Case study Kansas: SAFE (seat belts are for everyone)

What started out as a response to a horrific tragedy during the 2008-2009 school year has turned into one of the nation's most comprehensive programs to address teens and seat belt use. After attending the funerals for four teens killed in a crash in Ulysses, Kansas where no seat belts were used, Law Enforcement Liaison David Corp took action and formed S.A.F.E. (Seatbelts Are For Everyone). Safety professionals in Kansas believe that S.A.F.E. has played a major role in increasing the observed seat belt rate for teens ages 13-17 from 61 percent in 2009 to 80 percent in 2013.

State S.A.F.E. coordinators work through local law enforcement agencies to reach schools interested in participating in the S.A.F.E. program. If local chiefs and sheriffs do not participate, the Kansas Highway Patrol will step in to serve as the enforcement agency that works with schools to start their program. Students are trained to conduct unannounced baseline seatbelt surveys in the fall and, following a program kick off shortly after the baseline surveys, undertake monthly educational activities to increase their peers' compliance with the state's primary seat belt law.

PSA and poster contests, art projects, seat belt convincers and other activities of the students' choosing help them raise awareness among their peers about the need for occupant protection. An important element of the seat belt awareness activities is the monthly signing of pledge cards. Students pledge to wear seat belts and in so doing, are



In addition to these known developmental barriers, teens as new drivers must contend with high demands on their attention to complete basic driving tasks, without the benefit of years of experience to assist in easier multi-tasking and navigation of foundational driving concepts.

While these various challenges are important considerations when developing interventional strategies, an equally important consideration is the development of evaluative strategies to determine success or failure of a program. Results have shown that while many programs base predictions of successful outcomes off of pre- and post surveys with teens, there can be dissonance between teen respondents' stated opinions, and ultimate actions (Goodwin, 2013).

While many high school students self-identify that their beliefs and attitudes have been impacted by a program, the data indicates that their actual behaviors are not as likely to change (Goodwin, 2013). Program measures need to strike a balance between self-reported and verified data sets, in order to create a comprehensive and more valid snapshot of outcomes.

In attempting to develop targeted interventional strategies to serve this highly complex group, variety of inputs is key. Use of the Social Ecological Model (SEM) as a theoretical framework with which to classify proposed interventional strategies has been met with significant success in public health practice (Buckley, Chapman & Sheehan, 2014). By using the SEM to identify various elements of an intervention by their level of impact, practitioners can easily make out the relationships between the various interventions, and can also discern

the balance of inputs being directed at teens.

Studies continue to show that successful interventions sample from a collection of inputs that connect at different levels of the SEM, many times in a 'nested' capacity—having synergistic impacts that would not be possible if each were executed in isolation (Fischer, 2014). As with so many things in the natural world, interventions should be rooted not only in theory and evidence, but also in diversity.

Priority areas

Identification of priority areas can be extremely challenging with the large number of considerations in tackling teen drinking and driving, teen seat belt use and teen distracted driving. Fortunately, a host of interventional areas serve to satisfy the needs of multiple subjects, while other best practice constructs can be easily adapted.

Some particular priority initiatives that stand to potentially have the greatest role in impacting teen driving outcomes are: continued development and enforcement of protective public policies and supportive engagement with parents and other key adult mentors (Goodwin, 2013). The current analysis came to similar conclusions with a few other priorities and promising practices identified.

Public policy issues are challenged from two perspectives; the actual creation and/or refinement of a specific law or statute, as well as the necessary resources to effectively enforce the policies once in place. With public perceptions that regard violation of teen driving laws as

Case Study: SAFE contd...

eligible for monthly drawings for \$25 VISA gift cards. The S.A.F.E. program, through funders such as Kansas DOT, AAA, State Farm, and local courts, fund one \$25 gift card per month for every 100 students who sign the pledge.

Schools are also encouraged to fundraise within their local communities for additional prizes and to stage competitions with other S.A.F.E. schools in their areas for even larger prizes. The final component to the S.A.F.E. program is the actual enforcement of Kansas traffic law that program leaders feel is the key to behavior change. A two-week period of extra teen seat belt enforcement occurs in early spring and is followed up by a final observational seat belt survey by students in April.

In 2013, 86 percent of the participating schools experienced an improvement in seat belt use over their initial seat belt usage surveys, with an average gain of 6 percentage points (from average 79 percent baseline use to average 85 percent post-enforcement use). In the 2013 participating S.A.F.E. counties, 99.3 percent of teenage crash victims were reported as having used their seat belts and were able to walk away from their crashes. In 2014, 36 percent of Kansas high schools (129 of 350) participate in the S.A.F.E. program, with 59 out of 105 counties represented, including the majority of high population counties in the state. According to the Kansas Occupant Protection Observational Survey, for the second consecutive year, "seat belt use among ages 15-17 is increasing at a faster rate than any other youth age group."

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Excerpt taken from Getting it to Click, Governor's Highway Safety Association 2014

unlikely to be punished, enforcement plays a significant role in the success of implemented policies, regardless of their quality or adherence to best practices and evidence.

For parents and other significant adult mentors to teens, the intent to provide encouragement for safe driving behaviors can sometimes be impaired by the lack of knowledge in how to do so effectively. Many parents believe that they have established clear guidelines to their teen drivers in what is expected of their performance on the road, while many teens report a lack of clear understanding of these expectations (Simons-Morton et al., 2005). In addition to a need for enhanced communication, many parents simply lack the necessary knowledge to act as a professional driving instructor, enforcer of punitive measures for unsafe driving, and navigator to the variety of challenges inherent to a teen's first years of driving. There is a substantial need for parent-supportive strategies that can attempt to mitigate some of these challenges.

While most interventions aimed at increasing the quality of teen driving will yield a certain level of public benefit, those that take into consideration these priorities should see an enhanced level of successful outcomes.

Recommendations for practice in Alaska

Alaska has been successful in implementing a number of protective strategies at the public policy level that are in line with national best practices in safe teen driving. Among the most noteworthy are anti-texting laws, primary seat belt enforcement laws, zero tolerance alcohol laws, and a robust graduated driver's licensing process. Even with these successes, there is still room for improvement and enhancement of safe teen driving strategies in the state.

Public policy improvements are possible at a number of levels, some directed toward teens specifically, while others made at a general public level are still believed to have significant impact on teens, even without specifically targeting them. Following are some public policy enhancement recommendations believed to have significant potential to impact safe teen driving outcomes in Alaska:

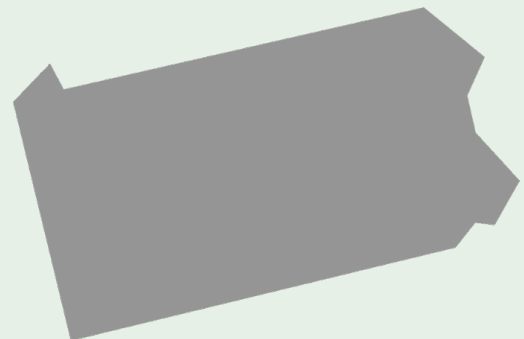
GDL modifications: While Alaska has implemented a GDL program with many best-practice features, including passenger restrictions, nighttime driving restrictions, minimum ages for both learner's permits and provisional driver's licenses, and requirements for supervised driving hours, there are certain elements of Alaska's GDL that could be strengthened.

Case study Pennsylvania: EndDD (End Distracted Driving)

When Joel Feldman's 21-year old daughter, was struck and killed by a distracted driver in July 2009, he never imagined he would parlay what he describes as "telling a sad story," into an interactive, fun and impactful presentation that is changing teens' attitudes and behaviors about distracted driving. What's more the End Distracted Driving Student Awareness Initiative (EndDD), sponsored by the Casey Feldman Foundation, is delivered by a network of more than 900 volunteer speakers, 800 of whom are trial lawyers who have volunteered thousands of hours to this cause.

Feldman, a trial lawyer who earned a masters degree in counseling after Casey's death, readily admits he drove distracted before his daughter's was tragically killed. (Casey was in the crosswalk at a four-way stop intersection during daylight hours and was struck when the driver reached across the center console for a drink). He worked with researchers at the Center for Injury Research & Prevention at The Children's Hospital of Philadelphia (CHOP), psychologists and teen safe driving experts, to develop the 55 to 75-minute program.

EndDD integrates "health communications, behavioral science and behavior change theory, and teen-targeted persuasion principles specifically designed to avoid an unanticipated boomerang effect" (Jacobsohn & Winston, 2012). This means that instead of an individual adopting the suggested positive behavior or attitude (i.e., not texting and driving), the information presented is received as an attempt to restrict personal freedom, which may prompt the individual to actually engage in the negative behavior (Gulliver, 2014).



Case Study: EndDD contd...

Like Impact Teen Drivers, EndDD employs research, facts, emotion, and humor to educate teens. Facilitators use a PowerPoint presentation and script, both downloadable at no cost from EndDD.org, to help teens understand what distraction is as well as engage in a discussion about its various forms, not all of which are illegal. The presentation is designed not to be confrontational. Teens are surprised when facilitators admit they had often driven distracted themselves and won't lecture or tell them what to do, but rather ask for their help in solving what is not just a teen problem.

Humorous and tragic videos discussing real people whose lives have been affected by distracted driving are woven into the presentation to help teens explore how the choices they make can have life-long consequences. EndDD.org created a number of videos that are used in the program, including one that is part of the USDOT Faces of Distracted Driving series. Throughout the presentation teens are asked to commit to taking specific steps to drive safer and to formulate a plan for distraction-free driving using the EndDD.org Family Safe Driving Agreement.

In addition to asking teens to reflect on their own driving behaviors, they're taught that they can effectively intervene when others drive distracted. Teens participate in role play exercises to help them try out and gain confidence in using bystander intervention strategies. The goal of EndDD.org is to have teens become safety advocates for their peers, parents and communities and to change the driving culture so that distraction-free driving will not only be socially acceptable but expected. Teens also participate in a simple interactive exercise – writing backwards from 100 to zero while engaged in a cell phone conversation – to demonstrate how easily their skills are diminished when they attempt to multi-task. The program is grounded in the belief that when teens learn first-hand the facts and consequences of distracted driving, they're more likely to make positive choices that are long-lasting.

Although facilitators do not need to be lawyers, the majority of EndDD.org presentations are given by trial lawyers. "While the public perception about trial lawyers may be mixed, trial lawyers have enthusiastically endorsed the campaign and are reaching out in communities across the country and Canada to speak with teens," noted Feldman. "When I shared my story with them and asked for their help, 500 signed up in the first two weeks. They're sympathetic to the cause, good communicators, tend to stick to the script, and their volunteer efforts have been praised by educators, law enforcement, safety advocates, and employers across the country." Driver education instructors, healthcare professionals, injury prevention coordinators, and safety professionals also regularly facilitate presentations and EndDD.org works with youth organizations supporting their safety programs and efforts.

Since 2012 approximately 200,000 teens and 25,000 adults have participated in the program through schools, colleges and businesses. An online presentation for parents, prompted by many teens commenting that they wished their parents were attending the program with them, is in the works, as well as a distracted walking segment. Presentation videos and a distracted driving brochure can be downloaded from EndDD.org. The program can be tailored to incorporate stories and information specific to a state or community and EndDD.org regularly partners with local safety organizations.

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Excerpt taken from Distracted & Dangerous, Governor's Highway Safety Association 2014

Recommendations include:

- Increase the minimum entry age to enter into a learner's permit from age 14, to age 16 (minimum of 6 months holding period before ability to graduate to a provisional license).
- Increase the minimum age to graduate from a provisional driver's license to an unrestricted license from age 16½ to age 18.
- Expand nighttime hours from current timing of 1 a.m. through 5 a.m. to include broader hours (e.g. 10 p.m. through 6 a.m.).
- Include restricted cell phone use as an included component of GDL.

Enhancement of zero-tolerance policy: Current zero-tolerance prohibitions state that any Alaskan driver under the age of 21 is considered driving under the influence of alcohol regardless of their BAC (any level above 0.000 is considered a violation) (Wilson, 2013). Many states have enhanced their policies by including a non-driving component to this zero-tolerance, meaning that anyone under the age of 21 found to be drinking alcohol could potentially risk suspension of their driver's license as a consequence.



Case study Washington: High school distracted driving grant project

The Washington traffic safety commission (WTSC) is giving teens the opportunity to tackle the problem of distracted driving and obtain a \$500 grant for the school group of their choice – no strings attached. The program, which is funded through a grant from State Farm, has prompted teen educational projects in more than 230 high schools.

Working with a school advisor or teacher, a group of teens must complete five action steps from a list of 15 provided by WTSC. These range from developing and distributing a brochure or flyer describing the dangers of distracted driving, to surveying students, creating a video or writing an article for the school or community newspaper. Once students identify their five action steps, they're required to write a letter to WTSC explaining what they'll do. Upon receiving notification that their plan is approved, the group completes their five action steps and takes photos documenting their work. To complete the project, the group submits a follow-up letter to WTSC from their advisor stating what activities they did that includes photos and samples of their work. Sample action steps and follow-up letters are included in the promotional materials, making it easy for schools to participate.

The Commission receives new grant applications daily, and the program has grown significantly since it was first launched in 2012 (at that time it focused solely on distracted driving, impaired driving was added in 2013). WTSC officials indicate that "once students get going with the project, they always do much more than asked of them under the grant rules." Program accomplishments as of April 2014 include:

- Teens have designed, printed and distributed 11,321 distracted and impaired driving brochures.
- At 94 high schools, teens developed news articles and submitted them to their local newspapers for publication.
- Teens held up large banners reading Don't Text and Drive alongside 288 busy Washington roadways, each for at least one hour.
- Teens have constructed 42 Memory Walls honoring those who died or were severely injured in crashes that have been seen by 2,200 students.
- Forty-one teen groups developed educational videos and posted them on YouTube.

The program has also prompted other new and creative ideas including a flash mob, an intersection and a legislative rally, writing traffic safety messages on high school windows using washable markers, and developing table tents with distracted driving messages for a high school cafeteria. Teens have also organized 35 all-school assemblies, brought in speakers and, in one case, placed a crashed car in front of a school to drive home the message about teen driver safety.

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Excerpt taken from Distracted & Dangerous, Governor's Highway Safety Association 2014

Restrictions of driver cell-phone use: Current Alaska statutes prohibit texting, and texting-like behaviors while driving a vehicle (for adults and teens alike), but do not have any broader restrictions on cellular phone use, particularly clarification on the ability to talk and drive simultaneously (Fischer, 2014).

Studies have shown that when restricted cell phone use is part of a state's GDL program, but not in place for all drivers, regardless of age, there is a high level of difficulty in enforcement, and a low level of compliance by newly licensed drivers. Instead, evidence supports states implementing a no-talk or a hands-free-only policy for all cell phone use for licensed drivers operating a motor vehicle.

In addition to these initial recommendations, there are a significant number of other approaches that have been compiled for consideration by the Alaska Committee to Prevent Underage Drinking (ACPUD) with a more narrowed focus of decreasing the level of alcohol consumption by minors in Alaska. Alcohol use among teens has been linked to increased levels of drunk driving, distracted driving and lower levels of safety belt use (Adkins 2014; Fischer 2014; Wilson, 2013). Underage drinking reduction strategies are believed to have significant impacts on success measures in all three areas (teen seat belt use, drinking and driving and driver distraction) being explored in this report.

ACPUD's community action recommendations to decrease underage alcohol use in Alaska can be found in their guide, *Alaska's Strategies to Prevent Underage Drinking (2013)* on the State of Alaska's Division of Behavioral Health main website (State of Alaska, 2015).

Future practice

In order to achieve success in decreasing crash and injury rates for teen drivers, there are a number of barriers to be navigated, but with persistence and continued attention to best practices there is a great deal of progress possible.

There is a high level of importance to continuing to work toward use of meaningful metrics to identify success in interventions and programs, with transparent and timely publication of results. By creating a more coordinated and industry- standardized pool of evidence to draw from, practitioners gain an enhanced ability to move from theoretical success, to full permeation of best-practice.

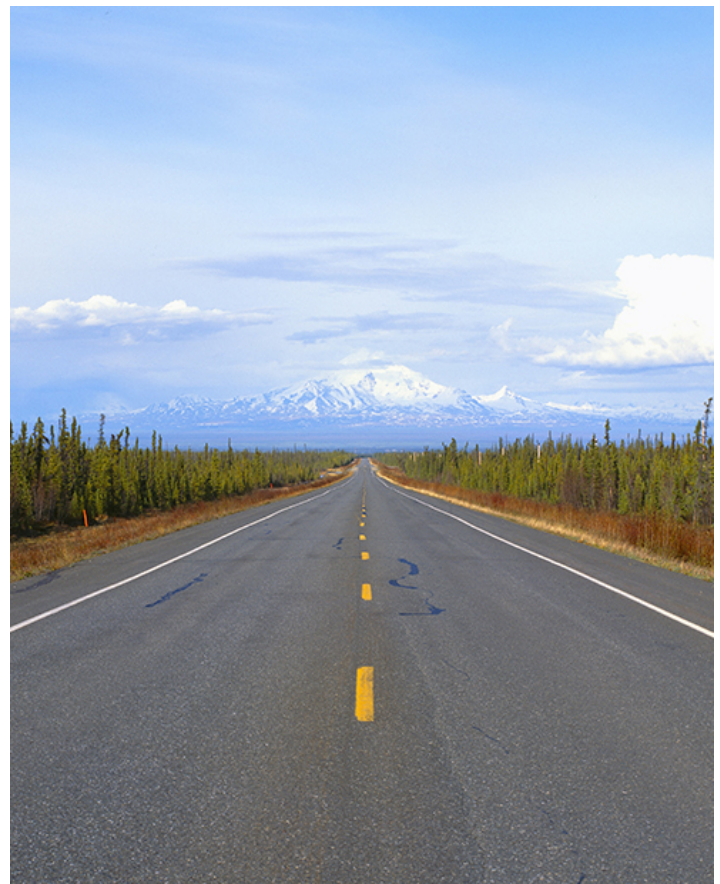
Also important is the ability to consolidate and strengthen partnerships amongst entities working toward interventional successes in overlapping areas (Goodwin, 2013). Community task forces and coalitions make an excellent centralization point to coordinate ef-

forts that address the broader community, and allow for inclusion of a variety of stakeholders and subject-matter experts that may not always historically have been included if an intervention was launched from a single organization.

A final critical reminder is the importance of patience. There are a number of factors that will make progress in this area slower than many would like, and this progress will often be difficult to detect. With the emotionally-charged nature of teen injuries and traffic accidents this can be difficult to wait through, from both the perspectives of those working in the field, and the observing public.

Evidence indicates that a minimum of three years of intervention maturation are needed in order to identify the full breadth of impact possible (NHTSA, 2008). In addition, data show that the closer a problem comes to full resolution (such as increased levels of compliance with seat belt usage), the more difficult it is to achieve the final increments of success.

There is often a diminishing return on investments, requiring greater resources and more time, to achieve less progress than historical efforts. While future solutions may surface to this challenge of additional time and resource demands, the current prevailing knowledge dictates a need for patience and persistence as the field continues to develop and grow (Solomon, Tison, and Cosgrove, 2013).



ONLINE RESOURCES TO SUPPORT SAFE TEEN DRIVING

From facts and figures, to ideas to try, explore these noteworthy online resources:

AAA Foundation for Traffic Safety

<https://www.aaafoundation.org/>

Alaska Department of Transportation & Public Facilities, Highway Safety Office: Teen driving

<http://www.dot.state.ak.us/highwaysafety/teens.shtml>

Alaska Injury Prevention Center [AIPC]

<http://alaskainjurypreventioncenter.org/about/>

Allstate: Corporate Social Responsibility Report: Social Impact, Teen Safe Driving

<https://www.allstate.com/corporate-responsibility/social-impact/teen-safe-driving.aspx>

AT&T: It Can Wait

<http://www.itcanwait.com/all>

Centers for Disease Control and Prevention, Motor Vehicle Safety: Teen Drivers

http://www.cdc.gov/Motorvehiclesafety/Teen_Drivers/

CSN: Children's Safety Network: Teen driving safety

<http://www.childrensafetynetwork.org/injury-topics/motor-vehicle/teen-driving-safety>

Florida highway safety and motor vehicles official site: Teen driver monitoring services

<http://www.flhsmv.gov/ddl/youthservices/>

Ford Motor Company, Ford Driving Skills for Life

<https://www.drivingskillsforlife.com/>

Foundation for Advancing Alcohol Responsibility: Start a conversation: Responsibility & Teens

<http://responsibility.org/start-a-conversation/responsibility-teens/>

Governors Highway Safety Association: Issues Teen Drivers

<http://ghsa.org/html/issues/teens/index.html>

Impact Teen Drivers: Our efforts

<http://impactteendrivers.org/about/our-efforts/createrealimpact>



online resources for support, contd...

Insurance Information Institute: Topics: Teen Drivers

<http://www.iii.org/issue-update/teen-drivers>

Insurance Institute for Highway Safety: Teenagers

<http://www.iihs.org/iihs/topics/t/teenagers/topicoverview>.

Kansas Traffic Safety Resource Council: Seatbelts are for everyone (SAFE)

<https://www.ktsro.org/safe>

Minnesota Department of Public Safety: Office of Traffic Safety: Teen Driving

<https://dps.mn.gov/divisions/ots/teen-driving/Pages/default.aspx>

National Motorists Association

<http://www.motorists.org/>

National Safety Council: Teen Driving

<http://www.nsc.org/learn/NSC-Initiatives/Pages/teen-driving.aspx>

Network of Employers for Traffic Safety

<http://www.trafficsafety.org>

NHTSA [National Highway Traffic Safety Administration]: Teen Drivers

<http://www.nhtsa.gov/Driving+Safety/Teen+Drivers>

SADD: Students Against Destructive Decisions: Campaigns and activities

<http://www.sadd.org/campaign.htm>

State of Alaska, Department of Health and Social Services, Prevention and early intervention

<http://dhss.alaska.gov/dbh/Pages/Prevention/default.aspx>

Teen driving alliance: Colorado's teen driving safety news and information site

<http://www.teendrivingallianceco.com/>

Distraction.Gov: Official US Government Website for Distracted Driving, Facts and Statistics

http://www.cdc.gov/Motorvehiclesafety/Teen_Drivers/

Youth.gov. Youth topics: Driver safety, ways to promote safe driving for youth

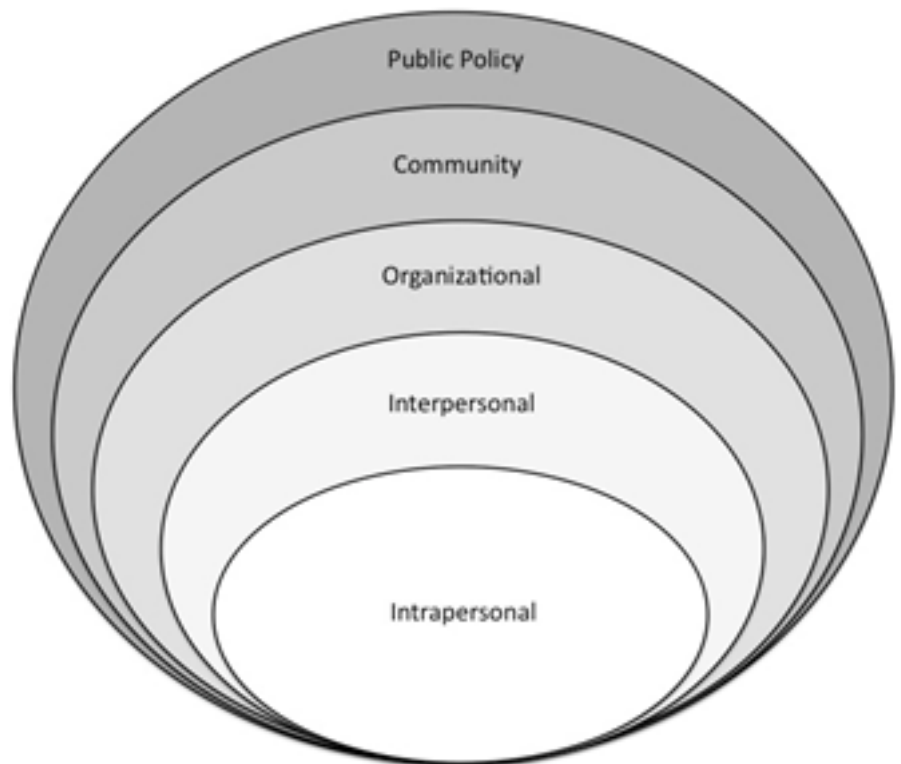
<http://youth.gov/youth-topics/teen-driver-safety/ways-promote-safe-driving-youth>



METHODOLOGY

The content of this guide was developed through a methodical analysis of current available materials regarding safe teen driving, with a primary focus on distraction, seat belt use and drinking and driving. Collection and subsequent analysis of materials utilized substantial influence of the Social Ecological Model as a conceptual framework.

Developed In 1988 by Bruce Simons-Morton, in collaboration with colleagues Parcel and Bunker, the Social Ecological model, quickly became a standard framework by which to evaluate the various social levels impacted by any one intervention (Simons-Morton, McLeroy & Wendel, 2012). The model's five levels of impact make it possible to easily see how one intervention type is related to another, and enables quick evaluation of patterns of success associated with the targeting of specific levels (Simons-Morton, McLeroy & Wendel, 2012).



The Social Ecological Model
(Simons-Morton, created 1988)

Project design

The approach for this project's data collection and review was based upon previous research (McNeil and Flynn, 2006) on obesity prevention interventions and worked toward the creation of a portfolio of interventions aligned with promising practices in the field. This portfolio resulted after a multi-step filtering process that distilled available program literature down to a final collection of strategies based on best available evidence, and followed a six-step approach to refine a very large body of available interventions into a final portfolio of those considered leaders in promising practices.

In its first phase, the project centered around a comprehensive search of all available resources (e.g. online databases, Internet sites, reference lists) for records regarding interventions that apply to safe teen driving. Identified records outlining a teen driving intervention that addressed seat belt use, distracted driving, or drinking and driving in some capacity were subject to additional evaluation.

Following this collection, a systematic reduction of records occurred through the use of inclusion and exclusion criteria. Once the quantity of records was reduced to a manageable number, remaining candidates were compared and classified into a taxonomy to enable a generalization of their particular approaches and interventional strategies for easy comparability.

These taxonomic results were then each classified by degree of promising practice, and additional indicators of program success were noted.

Additional research details are available through the Alaska Injury Prevention Center.

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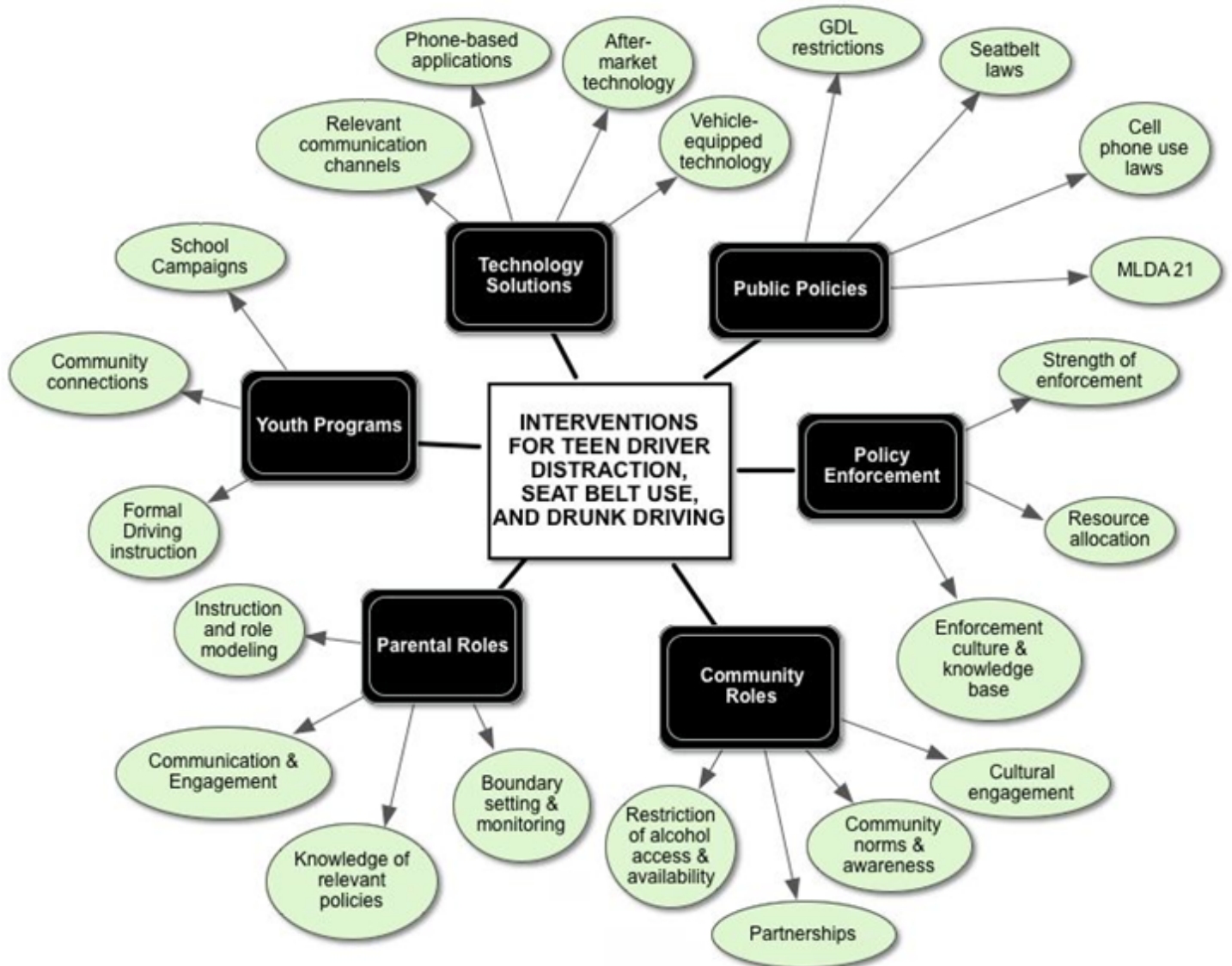
The views and recommendations in this publication do not necessarily reflect those of The Alaska Injury Prevention Center nor the individuals or organizations represented on the expert panel.

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APPENDIX A

Taxonomy of interventions for teen driver distraction, seat belt use and drunk driving



APPENDIX B

Promise table findings for teen driving interventions

Intervention type	Certainty of Effectiveness	Potential Population Impact	Potential for Promise
Public Policies			
MLDA 21	High	High	Most Promising
Cell phone use laws	High	High	Most Promising
Seat belt laws	High	High	Most Promising
GDL restrictions	High	High	Most Promising
Policy Enforcement			
Strength of enforcement	High	Medium	Very Promising
Enforcement culture and knowledge base	Medium	High	Very Promising
Resource allocation	Medium	Medium	Promising
Community Roles			
Cultural engagement	Medium	Medium	Promising
Community norms and awareness	High	Medium	Very Promising
Restriction of alcohol access and availability	High	Medium	Very Promising
Partnerships	High	High	Most Promising
Parental Roles			
Instruction and role-modeling	Medium	High	Very Promising
Communication and engagement	Medium	Medium	Promising
Knowledge of relevant policies	Medium	Medium	Promising
Boundary setting and monitoring	High	High	Most Promising
Youth Programs			
School campaigns	Medium	Medium	Promising
Community connections	Low	Medium	Less Promising
Formal driving instruction	Low	Medium	Less Promising
Technology			
Vehicle-equipped technology	Medium	High	Very Promising
After-market technology	Medium	High	Very Promising
Phone-based applications	Medium	Medium	Promising
Relevant communication channels	Medium	Medium	Promising