Executive Summary: Health Impact Review of SSB 5289

Modifying the Infraction of and Penalties for Distracted Driving
(2017-2018 Legislative Session)

Evidence indicates that SSB 5289 has the potential to decrease distracted driving, improve health outcomes by reducing injuries and fatalities caused by distracted driving accidents, and decrease health disparities experienced by young drivers.

BILL INFORMATION

Sponsors: Senators Rivers, Liias, Miloscia, Carlyle, Kuderer

Companion Bill: HB 1371

Summary of Bill:

- Establishes that a person is guilty of a traffic infraction if they use a personal electronic device while driving a motor vehicle on a public highway.
- Establishes the base penalty for a first infraction of $48 and a total penalty of $136. A second violation and any violation thereafter carries a base penalty of $96 and a total penalty of $235.
- Defines a personal electronic device as any device that is capable of wireless communication or electronic data retrieval and includes, but is not limited to, cell phones, tablets, laptops, electronic gaming devices, and two-way messaging devices.
- Defines "use" of a personal electronic device as holding a device in either one or both hands; watching a video; or using a hand or finger to compose, send, read, view, access, browse, transmit, save, or retrieve email, text messages, instant messages, or photographs.
- Allows for the minimal use of a single finger to activate, deactivate, or initiate a function on a personal electronic device.
- Establishes a number of exemptions including summoning emergency services, and exemptions for drivers operating an emergency vehicle, transit system employees, and commercial motor vehicle drivers.
- Repeals existing statutes that relate to cell phone use and texting while driving.
- Creates a new secondary traffic infraction for driving dangerously distracted, which is defined as engaging in an activity not related to the actual operation of a motor vehicle in a manner that interferes with the safe operation of such motor vehicle on any highway.
- Establishes that the $30 base penalty from a driving dangerously distracted infraction must be deposited into a Distracted Driving Prevention account to be used for programing dedicated to reducing distracted driving.

HEALTH IMPACT REVIEW

Summary of Findings:

This Health Impact Review found the following evidence regarding the provisions in SSB 5289:

- A fair amount of evidence that strengthening the distracted driving laws in Washington would likely decrease distracted driving.
- Strong evidence that decreasing distracted driving would likely improve health outcomes.
- A fair amount of evidence that improving health outcomes would likely decrease health disparities experienced by young drivers.

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Health Impact Review of SSB 5289

Modifying the Infraction of and Penalties for Distracted Driving
(2017-2018 Legislative Session)

March 9th, 2017

Staff Contact: Alexandra Montaño

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Introduction and Methods

A Health Impact Review is an analysis of how a proposed legislative or budgetary change will likely impact health and health disparities in Washington state (RCW 43.20.285). For the purpose of this review 'health disparities' have been defined as the differences in disease, death, and other adverse health conditions that exist between populations (RCW 43.20.270). This document provides summaries of the evidence analyzed by State Board of Health staff during the Health Impact Review of Substitute Senate Bill 5289 (SSB 5289) from the 2017-2018 legislative session.

Staff analyzed the content of SSB 5289 and created a logic model depicting possible pathways leading from the provisions of the bill to health outcomes. We consulted with experts and stakeholders to better understand the potential impact of this bill. State Board of Health staff can be contacted for more information on which stakeholders were consulted on this review. We conducted objective reviews of the literature for each pathway using databases including PubMed and Google Scholar.

The following pages provide a detailed analysis of the bill including the logic model, summaries of evidence, and annotated references. The logic model is presented both in text and through a flowchart (Figure 1). The logic model includes information on the strength of the evidence for each relationship. The strength-of-evidence has been defined using the following criteria:

- **Not well researched:** the literature review yielded few if any studies or only yielded studies that were poorly designed or executed or had high risk of bias.
- **A fair amount of evidence:** the literature review yielded several studies supporting the association, but a large body of evidence was not established; or the review yielded a large body of evidence but findings were inconsistent with only a slightly larger percent of the studies supporting the association; or the research did not incorporate the most robust study designs or execution or had a higher than average risk of bias.
- **Strong evidence:** the literature review yielded a large body of evidence on the relationship (a vast majority of which supported the association) but the body of evidence did contain some contradictory findings or studies that did not incorporate the most robust study designs or execution or had a higher than average risk of bias; or there were too few studies to reach the rigor of 'very strong evidence'; or some combination of these.
- **Very strong evidence:** the literature review yielded a very large body of robust evidence supporting the association with few if any contradictory findings. The evidence indicates that the scientific community largely accepts the existence of the association.

This review was subject to time constraints, which influenced the scope of work for this review. The annotated references are only a representation of the evidence and provide examples of current research. In some cases only a few review articles or meta-analyses are referenced. One article may cite or provide analysis of dozens of other articles. Therefore the number of references included in the bibliography does not necessarily reflect the strength-of-evidence. In addition, some articles provide evidence for more than one research question so they may be referenced multiple times.

Analysis of SSB 5289 and the Scientific Evidence

Summary of SSB 5289

- Establishes that a person is guilty of a traffic infraction if they use a personal electronic device while driving a motor vehicle on a public highway.
- Establishes the base penalty for a first infraction of $48 and a total penalty of $136. A second violation and any violation thereafter carries a base penalty of $96 and a total penalty of $235.
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- Defines "use" of a personal electronic device as holding a device in either one or both hands; watching a video; or using a hand or finger to compose, send, read, view, access, browse, transmit, save, or retrieve email, text messages, instant messages, or photographs.
- Allows for the minimal use of a single finger to activate, deactivate, or initiate a function on a personal electronic device.
- Establishes a number of exemptions including summoning emergency services, and exemptions for drivers operating an emergency vehicle, transit system employees, and commercial motor vehicle drivers.
- Repeals existing statutes that relate to cell phone use and texting while driving.
- Creates a new secondary traffic infraction for driving dangerously distracted, which is defined as engaging in an activity not related to the actual operation of a motor vehicle in a manner that interferes with the safe operation of such motor vehicle on any highway.
- Establishes that the $30 base penalty from a driving dangerously distracted infraction must be deposited into a Distracted Driving Prevention account to be used for programing dedicated to reducing distracted driving.

Health impact of SSB 5289

Evidence indicates that SSB 5289 has the potential to decrease distracted driving, improve health outcomes by reducing injuries and fatalities caused by distracted driving accidents, and decrease health disparities experienced by young drivers.

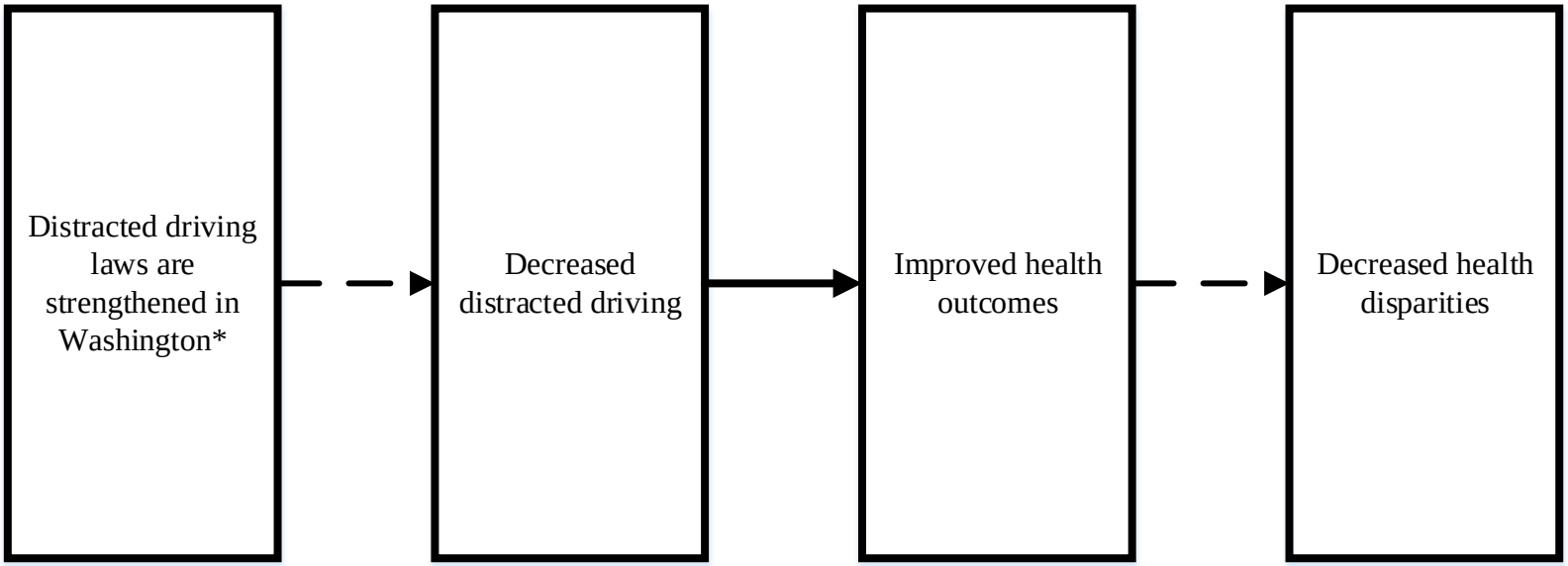
Pathways to health impacts

The potential pathways leading from the provisions of SSB 5289 to decreased health disparities are depicted in Figure 1. There is a fair amount of evidence that strengthening the distracted driving laws in Washington would likely decrease distracted driving.[1-3] There is strong evidence that decreased distracted driving would likely improve health outcomes by reducing injuries and fatalities caused by distracted driving accidents such as injuries and fatalities.[4-12] There is a fair amount of evidence that improving health outcomes associated with distracted driving would likely decrease health disparities experienced by young drivers.[5,12,13]

Magnitude of impact

Data from the 2015 Annual Collision Summary in Washington show that there were 12,399 collisions that were due to distracted drivers and of these, 895 were from a driver operating some form of electronic device. Together, these collisions where a personal electronic device was a distraction account for 5 fatal collisions, 13 serious injury collisions, 309 minor injury collisions, 562 property damage collisions, and 6 collisions with an unknown injury.[4] It is likely that these numbers are an underestimate of the actual impact that distracted driving has on injuries and fatalities because there is not always a standard way to report distraction on police collision reports and many drivers are reluctant to disclose that information.[2] However, it can be estimated that some proportion of these distracted driving accident and the resulting injuries and fatalities may be prevented by this legislation, although the actual numbers are unknown.

Logic Model



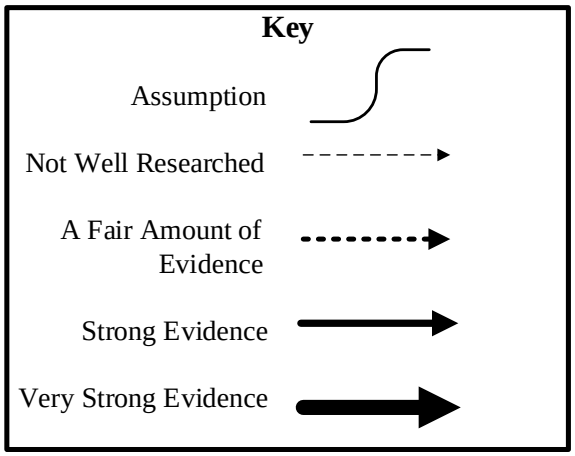


Figure 1
Modifying the Infraction of and Penalties for Distracted Driving

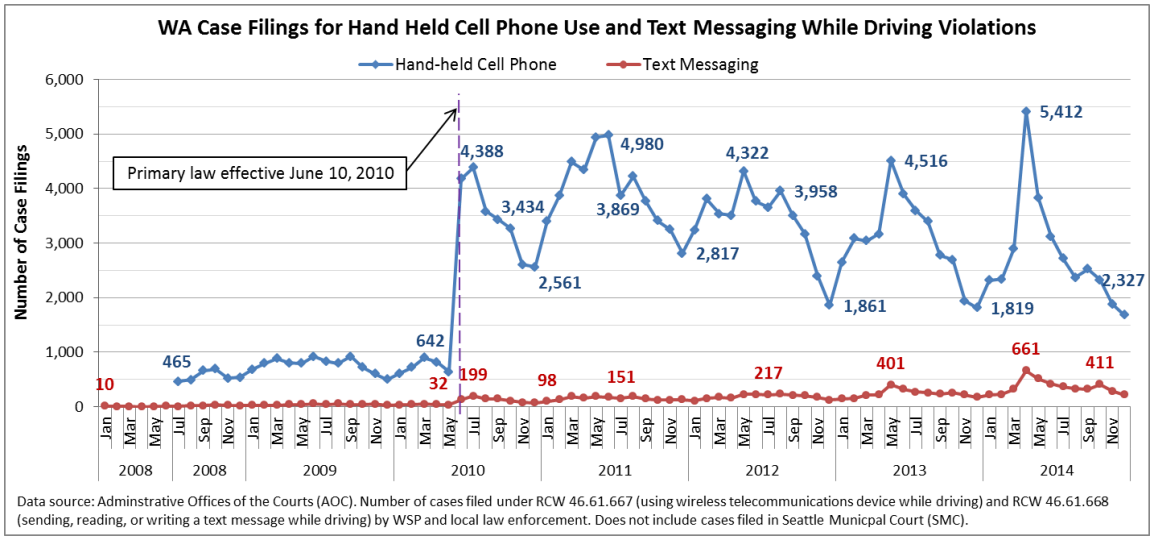
SSB 5289

*For details on the specific provisions of SSB 5289, see the bill summary on page 3 of this review

Summaries of Findings

Will strengthening the distracted driving laws in Washington decrease distracted driving? There is a fair amount of evidence that strengthening the distracted driving laws in Washington would likely decrease distracted driving. It is unclear if other states have implemented distracted driving laws that have similar provisions to those outlined in SSB 5289; therefore, literature and data on the effectiveness of this kind of distracted driving law is limited. Shelly Baldwin, Legislative and Media Relations Manager with the Washington Traffic Safety Commission (WTSC) indicated that one of the biggest challenges with the current distracted driving laws is that they are very hard to enforce. A qualitative study of Washington law enforcement officers in 2016 highlights a number of these enforcement concerns. Specifically related to Washington laws, officers reported that the texting and driving law is narrowly defined and challenging to enforce, particularly because other activities people engage in on their phones besides texting, such as emailing or taking pictures, is not expressly prohibited so it's difficult to differentiate.[2] These frustrations were also true for the use of a handheld mobile phone given that the law prohibits holding the phone to your ear but not necessarily holding it up to your face on speaker mode, for example.[2] A number of officers also discussed resistance to citations during traffic stops, particularly when somebody was stopped for texting as opposed to talking on a cell phone.[2] Data from the Administrative Offices of the Courts reveals that this kind of ambiguity in the current laws makes enforcement a challenge for officers.[2] Figure 1 below shows the number of case filings for violations of hand held cell phone use and text messaging while driving in Washington from January 2008 through December 2014. In 2010, Washington implemented a primary enforcement law for texting and holding a cell phone to your ear while driving. Figure 1 shows that after this primary enforcement law went into place, the number of violations given for hand-held cell phone use while driving increased while the enforcement for the texting while driving law has remained relatively low. While the primary enforcement law allowed law enforcement to write tickets to drivers who were clearly holding their cell phone to their ear, the ability to enforce a still vague texting law has prevented the same kind of enforcement (Shelly Baldwin, personal communication, February 2017).

Figure 1: WA Case Filings for Hand Held Cell Phone Use and Text Messaging While Driving Violations (provided by Shelly Baldwin, WTSC)



Data source: Adminstrative Offices of the Courts (AOC). Number of cases filed under RCW 46.61.667 (using wireless telecommunications device while driving) and RCW 46.61.668 (sending, reading, or writing a text message while driving) by WSP and local law enforcement. Does not include cases filed in Seattle Municpal Court (SMC).

An additional body of evidence looking into the effectiveness of stricter seat belt laws indicates that higher fines and primary enforcement laws are associated with an increase in seat belt use.[1,14] While research on seat belt laws are not fully generalizable to distracted driving laws, these studies do provide additional insight into the likely effects that increasing the penalties and enforcement for distracted driving will have on compliance.

In addition to difficulty with enforcing the current law due to the number of exceptions and vagueness in the language, there has also been discussion about the importance of dedicated traffic enforcement as an effective strategy for reducing distracted driving[3] and many officers in the qualitative study noted that this strategy has worked for seat belt and impaired driving enforcement.[2] In one systematic review of the effectiveness of seat belt laws, the authors looked at the strategy of enhanced enforcement, which includes activities such as increased citations for seatbelt violations, increasing the number of officers on patrol, implementing seatbelt checkpoints, or a combination of a number of interventions.[1] There were 15 articles that met the inclusion criteria and results indicate that enhanced enforcement efforts result in an increase in seatbelt use (median increase of 16%) and a decrease in injuries.[1] Further, the peaks in the number of cell phone violations that can be seen in Figure 1 reflect times when extra funding was implemented to increase enforcement patrols for distracted driving (Shelly Baldwin, personal communication, February 2017). SSB 5289 would create a Distracted Driving Prevention Account to be used exclusively for programming to reduce distracted driving. It is unclear which programs the account would support; but if funds were used for increased enforcement, evidence from seat belt laws indicate a potential to decrease distracted driving and subsequent injuries.

Therefore, given the challenges with the current distracted driving laws, the provisions provided in SSB 5289, which would make it easier for officers to enforce, increase the fines for subsequent violations, and create a Distracted Driving Prevention Account to fund programs to decrease distracted driving would likely decrease distracted driving in Washington.

Will decreasing distracted driving in Washington improve health outcomes?

There is strong evidence that decreasing distracted driving in Washington would likely improve health outcomes by decreasing injuries and fatalities from distracted driving accidents. A number of studies have examined the association between performing secondary tasks, including talking on the phone, texting, checking emails, etc. and driving performance. For example, one study found that typing text messages while driving adversely affected nearly all aspects of safe driving performance including visual attention and eye movements, reaction time, collisions, lane positioning, speed, stimulus detection, and headway.[6] More broadly, evidence indicates that distracted driving is a major contributor to car accidents that result in injuries and fatalities[4-9,11] and that cell phone use while driving causes significant driver distraction.[7,10,12] For example, data from the National Highway Traffic Safety Commission's Fatality Analysis Reporting System show that there were 29,989 fatal crashes in the United States in 2014 and of those, 2,955 included some kind of distraction (10%).[5] Further, 18% of injury crashes and 16% of all police-reported motor vehicle traffic crashes were reported as distraction-affected crashes. As a result of these 2,955 distracted driving crashes, 3,179 fatalities occurred. It is estimated that another 431,000 people were injured in a crash that involved a distracted driver and 502 people killed in a fatal crash that involved a distracted driver were non-occupants (pedestrians, bicyclists, etc.).[5] Results from one study indicate that pedestrians and bicyclists account for about one out of ten fatalities caused by distracted driving and that drivers who were distracted at the time of a fatal accident were 1.6 times as likely as drivers who were not distracted to fatally hit a pedestrian at a

marked crosswalk and close to 3 times as likely to hit a pedestrian on a road shoulder.[9] In one study of motor vehicle collisions related to distracted driving, the greatest risk for getting in an accident was found to be for those individuals who made a phone call within 5 minutes of the time of the collision.[8] Even the use of hands-free devices while driving has found to be a risk factor for car accidents as it still causes impairment in safe driving performance due to the brain's inability to multitask. Studies indicate that talking on cell phones, either handheld or hands-free, can increase the risk of crashing by four times.[11]

Will improving health outcomes decrease health disparities?

There is a fair amount of evidence that improving health outcomes by decreasing injuries and fatalities from distracted driving accidents would likely decrease health disparities experienced by young drivers. Evidence indicates that young drivers, generally defined as those between 16 and 29 years of age, are more likely to drive distracted and get in a car accident due to these distractions.[5,12,13] The Washington State Strategic Highway Safety Plan for 2013 named distracted driving and young driver involved accidents as a first tier priority for the state. Moreover, the report indicates that vehicle crashes are the leading cause of death in people aged 16-25 in Washington and between the years 2009 to 2011, 35% of all traffic fatalities and 38% of serious injury collisions in Washington involved a young driver.[13] Currently, RCW 46.20.075 restricts the use of a personal electronic device for any reason other than to report illegal activity, summon medical or emergency help, or prevent injury to a person or property for individuals that hold an intermediate license, which is typically from age 16-18. Although this stricter law already exists for teen drivers, determining the age of a driver before pulling them over is difficult and therefore enforcement is low (Shelly Baldwin, personal communication, March 2017). SSB 5289 would hold all drivers to the same standard and would assist officers with enforcing distracted driving laws among teen drivers. As discussed previously, addressing challenges associated with enforcement of distracted driving laws would likely decrease distracted driving and in turn, improve health outcomes by decreasing injuries and fatalities from distracted driving accidents. Reducing injuries and fatalities from distracted driving, specifically by young drivers, has potential to reduce the disparities in traffic fatalities and serious injury collisions that currently exists for young drivers.

Annotated References

1. **Dihn-Zarr Tho Bella, Sleet David A., Shults Ruth A., et al. Reviews of evidence regarding interventions to increase the use of safety belts.** ***American Journal of Preventative Medicine.*** **2001;21(4):48-65.**

Dihn-Zarr et al. conducted a systematic review of the literature published between January 1, 1980 and June 30, 2000 that had to do with interventions aimed at increasing seatbelt use. Regarding primary enforcement laws around seatbelt use, the authors found 13 articles that met their inclusion criteria and concluded that there was strong evidence that primary laws are effective in increasing the use of seatbelts and decreasing fatalities. The median percentage point difference between places with a primary versus a secondary enforcement law was 14%. The next type of intervention the authors looked at was enhanced enforcement, which includes activities such as increased citations for seatbelt violations, increasing the number of officers on patrol, implementing seatbelt checkpoints, or a combination of a number of interventions. There were 15 articles that met the inclusion criteria and results indicate that enhanced enforcement efforts result in an increase in seatbelt use (median increase of 16%) and a decrease in injuries. The authors conclude that this review of the literature can serve as a basis for recommendations and policy change aimed to increase seatbelt use.

2. **Nevin P. E., Blanar L., Kirk A. P., et al. "I wasn't texting; I was just reading an email ...": a qualitative study of distracted driving enforcement in Washington State.** ***Injury prevention : journal of the International Society for Child and Adolescent Injury Prevention.*** **Sep 15 2016.**

Nevin et al. conducted semistructured focus groups with Washington State active duty law enforcement officers with the goal of understanding the factors that influence distracted driving enforcement. The study was done in 2013 with 26 active duty officers from three counties in Washington that represent both rural and urban locations. Participants filled out anonymous surveys about demographic data and personal driving habits and participated in a focus group that included a set of 28 general and probing questions. Among the participants, 58% reported that they talked either weekly or daily on their cell phone while driving and 27% reported regularly reading text messages while driving. A number of themes emerged from the qualitative interviews regarding challenges to enforcing distracted driving laws. A number of officers discussed resistance to citations during traffic stops, particularly when they were stopped for texting as opposed to talking on a cell phone. There was also a consistent discussion about enforcement for distracted driving being a lower priority compared to other duties. For example, one officer discussed that if he is on a call responding to a burglary and he sees a phone related violation on the way there, it's not enough of a priority to stop and respond to the phone violation so he will just continue on. In response to this theme, there was a general consensus that dedicated traffic enforcement officers is an effective strategy for distracted driving and many noted that this strategy has worked for seat belt and impaired driving enforcement. Other enforcement strategies discussed include the use of patrol on motorcycles and bicycles, unmarked patrol cars, and increased communication with prosecutors in an effort to improve coordination and education for officers. Many officers discussed that distracted driving is under-reported on collision reports because it is often not a habit to ask about it when taking a report and many drivers are reluctant to disclose that information. Specifically related to Washington laws, officers reported that the texting and driving law is narrowly defined and challenging to enforce, particularly because other activities people engage in on their phones besides texting is

not expressly prohibited so it's difficult to differentiate. These frustrations were also true for the use of a handheld mobile phone given that the law prohibits holding the phone to your ear but not necessarily holding it up to your face on speaker mode, for example.

3. **Rudisill T. M., Zhu M. The association between states' texting regulations and the prevalence of texting while driving among U.S. high school students. *Annals of epidemiology.* Dec 2015;25(12):888-893.**

Rudisill et al. used data from the 2013 Youth Risk Behavior Surveillance System (YRBSS) survey to examine the relationship between state's texting while driving regulations and the prevalence of texting while driving among high school students. YRBSS is a nationally representative sample of students in grades 9-12 in the United States that are enrolled in public and private schools. The authors compiled data about the distracted driving legislation in each state from January 1, 2013 to December 31, 2013. The study population (n=6,216) included students who were of age when cell phone and driving regulations were applied, indicated that they had driven in the past 30 days, and did not reside in one of the two states (Michigan and Florida) where laws were passed during the school year that the survey was given. There were only two statistically significant results from this study. The first shows that compared to students in states with universal texting bans and young driver all cell phone bans, students in states with young driver bans only had an adjusted prevalence ratio of 1.33 (95% confidence interval, 1.11-1.58). The second finding was that in states that had a provision about delaying full licensure of a driver with a learner's permit or intermediate license, self-report of texting while driving was 28% lower than in states without this provision. These estimates were adjusted for age, sex, race and/or ethnicity, and the length of time since the ban had been enacted. The results also indicate that African American students and Latino drivers were less likely to have sent a text while driving than non-Hispanic white students. The authors conclude that universal texting bans and young driver all cell phone bans, in addition to enforcement of such laws, may be a deterrent for distracted driving.

4. **2015 Annual Collision Summary. 2015.**

This annual summary of collisions in Washington is put together through a collaboration between the Washington State Department of Transportation, Washington Traffic Safety Commission, Department of Licensing, Office of Financial Management, Administrative Office of the Courts, and the Department of Health. The most relevant data for this review is related to collisions due to inattentive or distracted drivers. In 2015, there were 12,399 collisions that were due to distracted drivers and of these, 895 were from a driver operating some kind of electronic device. Together, these collisions where a personal electronic device was a distraction account for 5 fatal collisions, 13 serious injury collisions, 309 minor injury collisions, 562 property damage collisions, and 6 collisions with an unknown injury. It is important to note that about 56% of the total distracted driving collisions reported above are due to unknown driver distraction and therefore it is unclear if the fatalities and injuries due to personal electronic device use may actually be higher.

5. ***Traffic Safety Facts: Research Note.* Washington, D.C.: National Highway Traffic Safety Commission's National Center for Statistics and Analysis;2016.**

This research note from the National Highway Traffic Safety Administration (NHTSA) presents an overview of distracted driving statistics from 2014. The authors used data from NHTSA's Fatality Analysis Reporting System (FARS) and the National Automotive Sampling System

general Estimates System. Data from these sources shows that there were 29,989 fatal crashes in the United States in 2014 and of those, 2,955 included some kind of distraction (10%). Further, 18% of injury crashes and 16% of all police-reported motor vehicle traffic crashes were reported as distraction-affected crashes. As a result of these crashes, 3,179 fatalities occurred and it is estimated that another 431,000 people were injured in a crash that involved a distracted driver. 502 people killed in a fatal crash that involved distracted driving were nonoccupants (pedestrians, pedalcyclists, etc.). The largest proportion of drivers who were distracted at the time of a crash, among those where were involved in a fatal crash in 2014, were in the 15-19 year old age category.

6. **Caird J. K., Johnston K. A., Willness C. R., et al. A meta-analysis of the effects of texting on driving.** ***Accident; analysis and prevention.*** **Oct 2014;71:311-318.**

Caird, Johnston, Willness et al. conducted a meta-analysis of all peer-reviewed articles that measured the effects of texting while driving. After searching relevant databases, researchers found 1,476 publications with variants of the words "driving" and "text messaging". Through exclusion criteria, 28 publications were coded into the meta-analysis. Most studies used driving simulators (n=25); however, three used closed test tracks. A total sample size of 977 participants were compiled from these publications. In all studies, typing text messages while driving adversely affected nearly all aspects of safe driving performance. These performance indicators include visual attention and eye movements, reaction time, collisions, lane positioning, speed, stimulus detection, and headway. Large effect sizes were measured for eye movements during typing and reading text messages (rc=0.74) and typing alone (rc=0.88). Visual, physical, and cognitive distractions were all recorded when participants texted while driving. Researchers recommend targeted legislation and increased enforcement to reduce this public health threat.

7. **Klauer S. G., Guo F., Simons-Morton B. G., et al. Distracted driving and risk of road crashes among novice and experienced drivers.** ***New England Journal of Medicine.*** **Jan 02 2014;370(1):54-59.**

Klauer, Guo, Simons-Morton et al. collected data from both the 100-Car Naturalistic Driving Study (experienced drivers) and the Naturalistic Teenage Driving Study (novice drivers) to determine the risk of distracted driving on road crashes. Researchers equipped vehicles of 42 novice drivers and 109 experienced drivers with accelerometers, cameras, global positioning systems, and other sensors. Novice drivers (mean age 16.4 years)—those who had had their driver's license for three weeks or less—were measured for an 18-month period. Experienced drivers (mean age 36.2 years) were measured for a 12-month period in the Washington D.C. area. Several secondary tasks while driving were reported in this study, including: handheld cell phone use, hands-free cell phone use, reaching for an object, using the internet or email, adjusting the radio or other internal vehicle system controls, looking at a roadside object, eating with or without utensils, and drinking a beverage. Among novice drivers, all of the above listed secondary tasks except talking on the phone, adjusting internal vehicle control systems, and drinking a beverage were significantly associated with increased risk of crash or near-crash. For experienced drivers, only cell-phone dialing was significantly associated with increased risk of crash or near-crash. The authors recommend that more states pass graduated licensing requirements or other policy initiatives to prevent novice drivers from performing these secondary tasks while driving.

8. **Redelmeier Donald A., Tibshirani Robert J. Association between cellular-telephone calls and motor vehicle collisions.** ***The New England journal of medicine.*** **1997;336(7):453-458.**

Redelmeier and Tibshirani examined data from a sample of drivers who reported being involved in a motor vehicle collision and owned a cell phone in order to examine whether using a cell phone increases the risk of a motor vehicle collision. Data was collected from individuals who reported to the North York Collision Reporting Centre in Toronto between July 1, 1994 and August 31, 1995 (n=699). These individuals were involved in a collision that resulted in substantial property damage but no personal injury. In addition to police records, subject statements, and a questionnaire, researchers obtained information from telephone records in order to determine if phone calls were made within a hazard interval (defined as within 10 minutes before the time of the collision). The greatest risk was found to be for those individuals who made a phone call near the time of the collision. There was not a statistically significant risk for calls made more than 15 minutes before a collision however there was a relative risk of 4.8 for calls made within 5 minutes before the collision. Further, the authors found that there was no protective advantage of using a hands free device.

9. **Stimpson Jim P., Wilson Fernando A., Muelleman Robert L. Fatalities of pedestrians, bicycle riders, and motorists due to distracted driving motor vehicle crashes in the U.S., 2005-2010.** ***Public Health Reports.*** **2013;128:436-442.**

In this study by Stimpson et al. the authors used data on traffic fatalities from the Fatality Analysis Reporting System (FARS) from 2005 through 2010 to describe trends in pedestrian, bicycle rider, and other victim's deaths that were caused by distracted drivers in the United States. The authors used the National Highway Traffic Safety Commission definition of distracted driving meaning that the police investigation determined that a driver was been using a device or had been engaged in inattentive or careless activities. Results indicate that while fatalities from distracted driving crashes are declining for motorists, the fatality rates from distracted driving crashes are increasing for pedestrians and bicyclists. Pedestrians and bicyclists account for about one out of ten fatalities caused by distracted driving and victims of these crashes are disproportionately male, middle-aged, and non-Hispanic white. Further, the data indicates that drivers who were distracted were 1.6 times as likely as drivers who were not distracted to fatally hit a pedestrian at a marked crosswalk and close to 3 times as likely to hit a pedestrian on a road shoulder.

10. **Strayer David L., Cooper Joel M., Turrill Jonna, et al.** ***Measuring Cognitive Distraction in the Automobile.*** **Washington, D.C.: AAA Foundation for Traffic Safety;2013.**

Together with the AAA Foundation for Traffic Safety, researchers from the University of Utah—Cooper, Turrill, Coleman et al.—conducted three experiments to systematically measure cognitive distraction. Each experiment measured eight tasks: 1. No secondary task, 2. Listening to a radio, 3. Listening to a book on tape, 4. Conversation with a passenger, 5. Conversation on hand-held cell phone, 6. Conservation on hands-free cell phone, 7. Interaction with speech-to-text email system, and 8. Concurrent performance with an auditory Operation Span (OSPAN) task, which are tasks that use math and memorization. For each experiment, researchers had participants rate the difficultly of each task. Researchers used NeuroScan 4.5 software to measure cognitive distraction by having participants wear a continuous EEG during the experiments. Experiment 1 measured baseline data for the above-listed eight tasks, without driving, for thirty-eight participants. Experiment 2 measured cognitive distraction for thirty-two

participants by requiring that they complete the above-listed eight tasks while using a fixed-base high fidelity driving simulator. Experiment 3 measured cognitive distraction for thirty-two participants on the above-listed eight tasks while the participant drove an instrumented car on a defined route. After analysis, researchers determined that the eight tasks gradually increased in workload rating throughout all experiments, with speech-to-text being the most cognitively distracting out of all of the common in-vehicle activities. Through these experiments, researchers were able to establish a systematic instrument for measuring and understanding cognitive distraction in the vehicle.

11. ***Understanding the Distracted Brain: Why Driving While Using Hangs-Free Cell Phones is Risky Behavior.*** **National Safety Council;2012.**

The National Safety Council authored a white paper on the topic of hands-free cell phone risk. The authors state that there is an informed consensus among researchers and policy makers that using a handheld phone while driving or that texting while driving can lead to increased fatal and non-fatal crashes. However, a summary of state policies indicate that all states and many employers allow hands-free cell phone use. The authors warns that hands-free cell phone use, while it allows for drivers to keep their eyes on the road, still causes impairment in safe driving performance due to the brain's inability to multitask. Studies indicate that talking on cell phones—either handheld or hands-free—can increase the risk of crashing by four times. Advances in technology, such as those that will block all calls and messages while driving, offer the best method for minimizing the use of cell phones of any kind on the road.

12. **Llerena L. E., Aronow K. V., Macleod J., et al. An evidence-based review: distracted driver.** ***The journal of trauma and acute care surgery.*** **Jan 2015;78(1):147-152.**

Llerena, Aronow, Macleod et al. conducted a systematic review of international data during the years 2000 to 2013 to determine the effects of cell-phone use on driving performance. Variations on the key words "texting" and/or "distracted driving" were used to find citations in the PubMed database. The authors initially found 39 such articles; however, after exclusion criteria, 19 were coded into the systematic review. Three main trends were summarized: 1. Driver distractions significantly contribute to motor vehicle crashes in all age groups, 2. All cell phone use while driving causes significant driver distraction, and 3. Novice and teen drivers are at increased risk of crashes due to distracted driving.

13. ***Washington State Strategic Highway Safety Plan.*** **Washington State Department of Transportation;2013.**

The Washington State Strategic Safety Plan identifies priorities and potential solutions with the goal of reducing traffic fatalities and serious injuries in Washington. Looking first at the priority surrounding young drivers aged 16-25, the report indicates that vehicle crashes are the leading cause of death in people aged 16-25 in Washington State. Between the years 2009 to 2011, 35% of all traffic fatalities and 38% of serious injury collisions in Washington State involved a young driver. The authors listed several reasons for this, including inexperience, immaturity, and increased risk taking. If a driver attains their license before the age of 18, they are required to adhere to restricted driving privileges that allow them to focus on driving without distraction. However, a challenge in Washington State is that if a novice driver obtains their license after they turn 18, they do not have the same limitations. Between 2009-2011, young drivers were about twice as likely to be speeding, three times more likely to be passing improperly, and 20% more likely to be impaired than drivers over the age of 26. While young male drivers contribute

to a greater proportion of fatalities due to the above listed habits, young female drivers were twice as likely to be involved in a fatal car crash due to distracted driving. Washington participates in several mass media campaigns and outreach programs to inform young drivers of the hazards of risky driving. Moving to the other pertinent priority about distracted driving, the authors begin by stating that distracted driving is defined as any secondary task that takes the driver's attention away from driving. Between 2009 and 2011, 30% of fatalities and nearly 12% of serious injuries involved distracted driving. This data is likely underestimated because it reflects only collisions where police were certain that the driver was distracted. For all ages, female drivers were more likely to be distracted than males, 23% and 21% respectively. In June 2010, using a handheld device or texting while driving because a primary offense in Washington State. Since then, there has been a significant increase in handheld cell phone citations, but nearly no change in texting citations; the reason for this being that texting enforcement is nuanced. Washington State participates in campaigns to reduce distracted driving and plans to identify areas to improve implementation, enforcement, and prosecution of distracted driving legislation.

14. **Houston D. J., Richardson L. E., Jr. Getting Americans to buckle up: the efficacy of state seat belt laws.** ***Accident; analysis and prevention.*** **Nov 2005;37(6):1114-1120.**

In this study by Houston and Richardson, the authors aimed to examine the impact of enforcement and statutory fines on seat belt use rates from 1991-2001. The discussion begins with an overview of the current literature regarding the effectiveness of seatbelt laws including findings that indicate primary enforcement statues are more effective at increasing seat belt use than secondary enforcement laws. For this study, the authors use time-series cross-sectional data about observed annual state seat belt use rate from 47 states in the United States(reported by the National Highway Traffic Safety Administration). The average state seat belt use in 2001 was 71.9%, which was an increase from the 54.0% average reported in 1991. The main finding from this data was that states that have a primarily enforced seat belt law have a seat belt use rate that is, on average, 9.1% higher than states with a secondary law. Further, the average fine for a seat belt infraction was $25 and in states with this level of fine, the seat belt use rate was 3.8% higher than states with no fine. The authors hypothesize that increasing the fine to at least $50 would result in a further increase in the rate of seat belt use.