Distracted Driving:
Review of Current Needs, Efforts and Recommended Strategies

OVERVIEW

In recent years, drivers have been faced with a range of different challenges due to a variety of societal changes. The roadways have become more crowded, time appears to have become more precious, life stressors seem to be heightened, and frustration among drivers is increasing. These general factors are compounded with a range of technological advances, including those directly related to the automobile, those related to the driving setting, and those that otherwise affect driving. Specifically, equipment for automobiles has been advanced, roadways have more technological elements, and other technology now available can be used in the automobile.

This confluence of factors brings with it the challenge of gaining greater understanding about the resulting multitasking by drivers. Specifically, it will be helpful for improved traffic safety to identify the range of safety implications of these components. Further, the preparation of a range of recommendations appropriate for consideration by leadership in Virginia will be helpful. With this background, Virginia Senate Joint Resolution 336, which passed in the 2001 General Assembly, called for a study of the "dangers imposed by distracted drivers." Further, one aim of this study was "to specifically examine the use of telecommunications devices by motor vehicle operators."

To meet this directive, Virginia's Department of Motor Vehicles (DMV) asked George Mason University's Center for the Advancement of Public Health (GMU) to prepare a detailed study. The overall aim of this study was to examine the nature and scope of the problem associated with distracted driving, and to provide a clear set of findings and recommendations. Based on the previous experience of GMU with studies on mature drivers and young drivers, this study was outlined with much of the same type of methodology. Just as with the previous studies, the primary concern with this process, and the associated recommendations, is upon maintaining a safe driving environment for the driver, passengers, and others on the roadways.

The multi-phase initiative was designed and implemented to address areas in which current approaches might be enhanced. The ultimate purpose of this review was to examine current data, practices, standards, attitudes, and related issues in Virginia as well as nationwide regarding distracted driving. A primary focus was upon the use of cellular telephones while driving; however, this was done in the context of other issues associated with distracted driving, including the presence of other passengers (particularly among young drivers), eating, drinking, smoking, reading, writing, use of car computer devices and GPS systems, map reading, and related factors. The ultimate focus of this study was to identify specific strategies and sound recommendations for highway safety in Virginia.

METHODOLOGY

The methodology used to gather the necessary information for this study relied upon a multi-pronged approach. Similar to the studies conducted with mature drivers and young drivers, this approach included a range of approaches, from a literature review and key informant interviews to focus groups and a national survey. In addition, some applied approaches to help monitor individuals' behaviors were incorporated to gain additional insights about distracted driving. This range of approaches, described below, helps in providing a broad understanding about the situation facing traffic safety professionals as well as drivers throughout the Commonwealth.

The initial phase of this project was the preparation of a **literature review**. A comprehensive search was conducted to identify key studies, reports and research initiatives addressing distracted and inattentive driving issues. Documents, studies and reports reviewed came from a wealth of sources, including the National Highway Traffic Safety Administration (NHTSA), the American Automobile Association (AAA), the Insurance Institute for Highway Safety (IIHS), the University of Michigan Transportation Institute (UMTRI), and a Transportation-Communications listserv. In addition, libraries and individual researchers were used as primary sources. Any national data and statistics regarding the nature and scope of the problem with distracted driving are included in this segment. A summary of this document is included in this report; the complete literature review and citations can be found in the Appendix.

The review of literature resulted in an extensive and concerted **curriculum and product review**. Through this extensive review process, the aim was to identify products, curricula, or educational materials designed to address distracted and inattentive driving issues. Several driver education curricula were examined for content relevant to distracted driving, including the new content in the 2001 Virginia Driver Education Curriculum. The search for materials extended to industry-produced products, on-line interactive programs and materials, and consumer-targeted education/awareness campaigns.

State leader interviews were conducted through telephone interviews with high-level administrators in the state departments of highway safety and/or transportation to determine how each state views and addresses distracted driving. Representatives were asked about their definition of distracted driving, what they viewed as contributing factors, agency efforts and the efforts of other organizations, crash and citation data being gathered, and what they would like to see done in the nation to address the problem. The questions, found in the Appendix, were designed by GMU faculty in consultation with DMV staff. As a result of several follow-up calls a 100% response rate was achieved from all 50 states and the District of Columbia.

Additionally, calls were made to state legislators and legislative assistants from the 50 states and the District of Columbia. The legislators (or legislative aides) interviewed from around the nation were typically those who had introduced legislation regarding some aspect of distracted driving. The legislative assistants either worked in these particular Congressional offices or in offices responsible for looking up bills and sharing that information with the general public. Sixteen legislative interviews were conducted with those who responded to GMU's queries about distracted driving. In eleven of the 50 states, state leaders were not aware of any legislation that was introduced regarding distracted driving, thus negating the need for pursuing these contacts

further.   Thus, the total contact rate was 40% of the states and D.C. where legislation had been introduced on distracted driving.   The questions centered around the content of the bills being introduced to address distracted driving.   The survey questions are found in the Appendix of the report.

A helpful component of the methodology was the identification of several **key informants** who have expertise and experience with distracted driving issues. Only six individuals were identified for this purpose; unfortunately, only three individuals were available to be interviewed. Nonetheless, their experience provided rich insights about distracted driving, and is incorporated in this report.

A **national survey** of each state regarding their efforts to address distracted driving was conducted between July and September 2001. The survey was mailed to traffic safety professionals in all 50 states and the District of Columbia. It included questions on issues such as their definition of distracted driving, their perception of the problem, data collection, current legislative efforts, current preventive efforts, proposed attention to the issue through various approaches, and recommendations for the future.   The design of the survey engaged GMU faculty and also DMV staff. Two mailings of the survey were sent out, and phone calls were made to every non-respondent to encourage them to complete the survey. By the time of writing this report responses were received from 28 states. This return rate of 55% is lower than the return rate for surveys conducted with previous studies, possibly because several states had not conducted sufficient research on the subject, or had no specific policies to deal with it.   The surveys were coded and analyzed using SPSS computations, and for collating open-ended responses. The results of the survey are summarized in the section on the National Survey; a copy of the survey is attached in the Appendix, and the survey results are summarized in the Attachments to this report.

Virginia leaders were contacted to provide their insights about distracted driving. This group included judges, police officers, and driver education instructors. General district court judges who hear traffic cases were contacted from each of the six DMV districts; fourteen district court judges, at least two from each district, completed the interviews. Judges were asked questions concerning cases they see in the courtroom regarding distracted driving; contributing factors; any policies, laws, education or enforcement currently in place; and what they would like to see done in the future to address the problem.   For the police interviews, calls were placed to three to five police departments and sheriff's offices in each of the six DMV districts. Interviews were completed with 11 officers, with representation from all districts; questions concerned what behaviors law enforcement observes on the roads, contributing factors behind these behaviors, strategies or approaches they are using to address distracted driving in their localities, and suggestions for approaches at both the local and state levels.   Finally, driver education instructors from across the state were contacted; the aim was to contact four driver education instructors from each of the six DMV districts; a total of 25 interviews were completed, each of these from the private sector**.** Again, these interviews asked driver education instructors to identify the problems and behaviors associated with distracted driving in the students they teach, contributing factors, ways they are addressing distracted driving issues with their students, and suggestions for appropriate local and state-wide strategies. Each set of questions is included in the Appendix.

Intercept interviews were used to gather information from the average vehicle driver whose job requires the use of telecommunication devices frequently (such as sales personnel, couriers, repair personnel, school bus drivers, taxis, and drivers for hire). In order to accomplish this, the plan was to reach such drivers "wherever they are" with a short interview. The purpose of the interview was to assess the frequency of using distracting devices, and their perception of how much such devices distract them from driving tasks. Since the initial plan of reaching individuals through their intermediaries (i.e., taxi dispatchers) was difficult to implement, a revised plan was adopted; this focused on members of certain jobs who were accessible directly by phone (real estate agents) throughout the state, and random groups of drivers as specified in the initial design from the Shenandoah area. A total of 31 intercept interviews were completed either in person or by phone. The responses to these interviews were collated, and are included in the section on Intercept Interviews, and also within the appropriate themes and findings. A copy of the interview form is attached in the Appendix.

Virginia data and approaches includes the specific nature and scope of distracted driving in the Commonwealth. This segment includes quantitative information from traffic safety records and convictions. In addition, strategies currently used, both from a law enforcement as well as an educational perspective, are identified.

Self-assessment and behavioral monitoring includes the design and implementation of a personalized assessment using a wide range of volunteers throughout the state. This includes two components: a self-report of a sampling of individuals who monitor their driving and distracted driving behaviors over a one-week period of time, and a report on monitoring others' behaviors over the same period of time. The assessment form included self-reflections about participants' driving behavior, any guidelines they use for the specified distraction behaviors, and consequences encountered (incident, legal citation, or other). This assessment form also incorporated their comments and suggestions about what they believe are appropriate to implement regarding distracted driving. The assessment form was designed to capture information on participants' specific use of devices or involvement with various activities while driving for each day of the week (i.e., using a cell phone; changing vehicle climate; steering without hands; fighting with passenger(s), etc.). In addition, the form allowed for anecdotal information to reflect on their driving experience for each day of the week. Finally, the form also included sections to capture information on participants' impressions about others' driving. Participants were asked to record their observations about themselves at the end of the day, and were clearly instructed to do this when they were not driving. They were also asked to provide their observations about others at the end of their week of tracking this behavior. Seventeen individuals from around the state completed the self-assessment and behavioral monitoring form. Despite the small number of responses, the data gathered proved to be useful in highlighting certain issues with distracted driving, and also proved to be an effective research tool that may be used for further research on the subject, as described later in the Recommendations section. A copy of the form is attached in the Appendix.

Helping with the qualitative focus of the methodology was the implementation of four **focus groups** with targeted audiences statewide. These include driving instructors, representatives of the Virginia Department of Transportation, members of the Virginia Chamber of Commerce and members of AARP in Northern Virginia. The questions for each focus group addressed how each

group, from its own interest or experience, views the issue of distracted driving. Each group was also asked about what practices seemed to be effective in addressing distracted driving issues, and what could be done to improve the safety of drivers and others.

The final component was a **Stakeholder Discussion,** which helped debrief key individuals on the initial results of the research, and to gather information on possible actions to address issues that emerge from the research. The range of individuals, representing various interest groups and experience, helped provide additional reactions and insights in the formulation of the comprehensive recommendations included in this report. Representatives of various government agencies, businesses, police, DMV, community groups, and insurance companies were debriefed on the major highlights of the research process and findings. They were then asked to participate in a discussion of the major issues and their recommendations in relationship to three areas: enforcement, legislation and education. GMU faculty members facilitated the discussion, and recorded the points raised and recommendations. The forms used are included in the Appendix.

This Report of Findings begins with a broad look at background information on the issue of distracted driving in the form of a literature review. The next two components (National Survey and State Leader Interviews) provide a picture of what is occurring nationally in regards to distracted driving. This report then examines what is happening statewide in the Virginia Data and Virginia Leader Interviews sections. The issue of distracted driving is then approached by individuals with a vested interest in the issue in the form of Key Informant Interviews, Focus Groups, a Self-Assessment Survey, Intercept Interviews and a Stakeholder Discussion. Finally, the report concludes with Themes and Findings and resulting Recommendations.

LITERATURE REVIEW

Introduction

The task of driving involves a complicated interaction of psychological, physical, cognitive, psychomotor, and sensory skills, placing high attentional demands on drivers. However, despite the complexity of the driving task, it is not uncommon to see drivers engaging in other tasks while operating a motor vehicle. For example, some drivers will plan and make notes for a meeting they are about to enter, read the newspaper or a book in heavy traffic, or finish getting ready for work by shaving or putting on make-up, all while behind the wheel. While these may seem to be trivial tasks, they divert a driver's attention away from the tasks of driving, thereby increasing the risk of a crash and creating a potential risk of injury to themselves and others. Recent technological advancements in wireless communications, such as cellular phones and hand-held computers, have brought a new level of attention and concern to the issue of distracted driving.

Describing the nature and scope of the distracted driving issue is difficult. Rigorous empirical research into the issue is greatly lacking, and in the research that is available, the language is often different ("inattentive driving" versus "distracted driving"), and the operative definitions of key terms vary from one study to the next. Not surprisingly, statistics on the frequency and magnitude of the distracted driving issue vary nearly as widely as the definitions. To further complicate matters, research into crash causation, the role of particular casual or contributing factors, and prediction of crash incidence as a function of particular factors is a complex and nearly impossible task, thereby limiting the scope of research and its practicality. Despite a lack of consensus from the research, and likely mitigated by the role of media, American society has seemingly translated "distracted driving" to "talking on a cell phone while driving," and legislatures across the country are feeling the pressure to take action in the name of public safety.

This review of the literature addresses the range of behaviors and driver conditions that comprise "distracted driving" and "driver inattention," attempts to quantify the scope of the problem, and examine research into the safety risks caused by driver distraction. It will also review strategies and countermeasures against distracted driving, including current and recently proposed legislation, technological countermeasures, and products and curricula that address the issue of distracted driving and traffic safety.

Defining and Describing the Problem of "Distracted Driving"

Extensive studies have been conducted into the causes of traffic crashes in Monroe County, Indiana. Study results identified "human factors" as causing traffic crashes more frequently than either environmental or vehicular factors. Human factors were identified as "definite causes" of crashes in 71% of crashes by the in-depth examination team, and 64% of crashes by the on-site investigators. At the "probable causes" level, human factors were calculated at 93% by the in-depth team, and 90% by the on-site team. The researchers "conservatively" concluded that human errors and deficiencies were a causal factor in at least 64% of crashes, and were likely causes in approximately 90-93% of all crashes investigated (Treat, et al., 1979). Treat et al. then looked at more specific human behaviors or direct causes contributing to crashes, among which three of the five most frequently cited causal factors were "recognition failures," including: "improper lookout" (flawed visual surveillance, or "looked but didn't see"), "inattention" (preoccupation with competing thoughts), and "internal distraction" (attention to events, activities,

persons or objects inside the vehicle), "Improper lookout" was most commonly cited as a causal factor, cited in 18-23% of all crashes by the in-depth team, and 13-20% by the on-site team. Driver "inattention" was reported as a causal factor in 10-15% of crashes by the in-depth team, and 8-14% by the on-site team. "Internal distraction" was identified as a causal factor in 6-9% of all crashes by the in-depth team, and 4-6% of crashes by the on-site team (Treat, et al., 1979). In addition to these three types of "recognition failure," a fourth type was identified in the study: external distraction (attention to events, activities, persons or objects outside the vehicle). The Indiana Tri-Level Study of the Causes of Traffic Accidents, revered as one of the most rigorous and comprehensive studies in the field, found that these four principal forms of "recognition failure" were involved in 56% of the in-depth crashes reviewed.

Sussman, Bishop, Madnick and Walter (1985) completed a review of research on driver attentional processes and summary of safety implications of inattention, psychological and physiological indices of inattention (including drowsiness; physical fatigue; excess mental workload; intoxication due to alcohol, drugs, or other chemicals; and simple inattention), and available in-vehicle technology to detect inattention. Among seven driver factors identified, the researchers included driver inattention, defined as "the attentional state where the driver fails to respond to a critical situation." Of 11,868 crashes in which the vehicles were under way and a driver response "conceivably" may have either avoided the crash or lessened the severity of the crash, the investigators discovered that 8% of cases were specifically related to driver inattention and 37% of drivers involved in the crashes did not take any action to avoid the collision. Sussman et al. attributed this to "attentional lapses" and concluded that they play a major causal role in motor vehicle crashes.

An examination and analysis of nine major target vehicular crashes, including an examination of the type of crash and causal factors, identified the role of driver inattention (Naim et al., 1995). Results of the review revealed driver inattention as a disproportionately contributing or causal factor in rear-end collisions, lane change/merge crashes, single-vehicle roadway departures, and opposite directions crashes. Synthesis of the data analysis led the researchers to conclude that driver recognition error (including inattention, "looked but did not see," and obstructed vision) was the primary cause of approximately 44% of the 1,183 crashes they investigated.

In 1995, a new data variable named *Driver Distraction / Inattention to Driving* (DD/ID) was added to the NASS Crashworthiness Data System (CDS). Comparison of data from the CDS (the DD/ID variable) was made to other crash variables, including crash type, crash severity, hour of day, atmospheric (weather), and roadway speed limits. The researchers identified three major forms of driver inattention involved in motor vehicle crashes: distraction, looked but did not see, and sleepy/fell asleep (Wang, Knipling, & Goodman, 1996). Combining all driver inattention categories suggests that 15% of driver involvements in 1995 passenger vehicle towaway crashes and 26% of the crashes involved driver inattention as a causal factor. These researchers then aggregated this information into five categories of distraction: sleepy/fell asleep, distracted, looked but did not see, unknown/no driver present, and attentive/not distracted. (Only seven of the crashes included in the analysis involved multiple drivers with distractions.) Of these categories, 3% of crashes involved sleepy/fell asleep as a contributing factor; 13% were related to distraction; and "looked but did not see" accounted for 10% of crashes.

In 1999, Response Insurance conducted 1,016 telephone interviews with adults across the country, asking respondents to self-report distractions they had encountered or engaged in while driving, and whether each distraction led to a crash or a near crash situation. The research indicated that 76% of all drivers self-reported having been distracted by at least one of the following activities while driving (e.g. tuning the radio, reading, eating/drinking or spilling, other passengers, using a cellular phone, etc.), and in many cases caused an "accident" or a "near accident."

Driver inattention was established as one of several "unsafe driving acts", being defined as "a lack of focus on the required field of view (typically forward)" (Hendricks et al, 2001). This definition was intentionally chosen so as to encompass both of the driver inattention and driver distraction categories as defined in the Indiana Tri-Level Study. Over 13 months in 1996-97, a sample of 723 crashes involving 1283 drivers was investigated from four different sites in the country. Results of the study identified driver behavioral error as causing or contributing to the crash in 99% of crashes, and 57% of the 1284 drivers as contributing to the cause of their crashes. Overall, the study identified six causal factors associated with driver behaviors that occurred at relatively high frequencies for these drivers and accounted for most of the problem behaviors. Driver inattention was found to contribute in 23% of cases, more than any of the other five behaviors (Hendricks, et. al., 2001).

In 2001, the AAA Foundation for Traffic Safety (AAAFTS) released Phase I of a major research project on distracted driving. The researchers chose to focus specifically on driver distraction "rather than the broader category of driver inattention," defining distraction as "when a driver is delayed in the recognition of information needed to safely accomplish the driving task because some event, activity, object, or person within or outside the vehicle compelled or tended to induce the driver's shifting attention away from the driving task." They further differentiated between a "distracted driver" and one who is "simply inattentive or 'lost in thought'" based on the occurrence of a triggering event (Stutts, et al., 2001). From the overall 1995-1999 CDS data, 8% of drivers were identified as distracted, 5% as "looked but did not see," and 2% as sleepy or asleep. The AAAFTS study also identified some variability in distraction relative to driver age, suggesting that some types of distraction may be more prevalent among certain ages of drivers.

Definitions or methods of categorically describing the behaviors that comprise distracted driving have also emerged from sources other than research. Several reports have suggested different perspectives for categorizing driver distraction, including Streff and Spradlin, 2000; Parkes and Hooijmeijer; NHTSA, 2000; Ranney, Mazzae, Garrott, & Goodman, 2000; and Tijerina. There exists a lack of consistency in terminology, approach, and data in the literature.

Understanding Human Limits
The infiltration of technology into most aspects of life has not missed the automobile industry, forging a new technology field known as telematics. Telematics is essentially "wireless voice and data communication between a car and somewhere else" (Buderi, 2001). The field has evolved as a result of both consumer and economic needs in the 1990's. During this time, wireless communications became very popular and computer hardware became more economical. In order to make profits and maintain customer loyalty, automobile companies have expanded their services to include technology-based systems in cars. Development of the telematics field has expanded beyond emergency systems to include new In-Vehicle Information Systems (IVIS), such as

telefax, mobile PC, route guidance, and entertainment systems. These new technological systems are already in development and in some cases are currently being installed in vehicles. However, they raise an important and as yet unanswered question: "how are these new systems going to affect driver safety?"

The emergence and nearly exponential growth of the telematics and IVIS field has demanded that researchers begin studying the implications of IVIS systems on traffic safety. According to Hankey, Dingus, Hanowski, and Wierwille (2001), the goal of IVIS technologies is "…to increase the mobility, improve the efficiency, and increase the safety and/or convenience of the motoring public." However, in order to create IVIS systems that are safe to use while driving, development must take into consideration the human factors involved in both driving and using such technology, and assess the demands of IVIS on the driver's attentional resources for the primary task of driving.

In order to perceive, assimilate, interpret, predict, and respond to the driving environment, a driver must have his/her full range of attentional resources to draw upon. A growing body of research indicates that engaging in other tasks not only competes with the driving task for a driver's attentional resources, but also degrades driver performance. A recent study (Recarte & Nunes, 2000) examined the effects of "mental activity" on driving and road safety, approaching the issue in terms of divided attention limitations. Operating on hypotheses soundly founded in earlier research, this investigation was conducted in real-time traffic, exposing drivers to three conditions in four different driving environments; for each condition (driving with no mental task, driving with a verbal task, driving with a spatial-imagery task), pupil size and fixation parameters were analyzed for mean fixation duration, horizontal and vertical coordinates on the visual scene, and their respective variability across fixations. Each participant completed two verbal and two spatial-imagery tasks. Significant results from this study included:

- Eye fixation duration increased when participants performed a spatial-imagery task;
- Performing a mental spatial-imagery task produced longer fixations than a verbal task or than ordinary driving;
- Decreases in both horizontal and vertical gaze variability were detected when a mental task was performed. Considering both vertical and horizontal axes, during the verbal task the "visual inspection window" (driver gaze variability) decreased by 25% horizontally and 40% vertically. During the spatial-imagery task, the visual inspection window decreased by 40% horizontally and 60% vertically.
- When mental tasks were performed, the percentage of glances at the interior and side mirrors and speedometer decreased sharply.

A groundbreaking study on cortical (brain) tissue activation and concurrent cognitive tasks (Just, et al., 2001) used functional magnetic resonance imaging (fMRI) to measure cortical activation during the concurrent performance of two high-level cognitive tasks, one an auditory comprehension task, and the other the mental rotation of visually depicted 3-D objects. The most significant result of the study came from the fMRI finding that the amount of cortical activation in the most involved areas of the brain was substantially less in the dual task performance condition than in the sum of the two single tasks. In fact, the cortical activation produced by the dual tasks was only 56% as much as in the single task conditions. The researchers suggest three similar and related interpretations of the test, all of which have serious implications for driving:

- There may be biological mechanisms that impose an upper limit on the amount of cortical tissue that can be activated at one time.
- There may be a biological mechanism that limits how much attention an individual has available to distribute over multiple or competing tasks. This interpretation suggests that attention is a "limited cognitive commodity that can be distributed over tasks, such as divided attention."
- There is a biological limit on how well it is possible to perform concurrent tasks. This relates to the increased response times and decreased accuracy in the behavioral measures; although both tasks were performed at a high absolute level of accuracy, behavioral performance was reliably poorer under dual task conditions.

A study by McCarley, et al. examined the effects of "naturalistic" conversation on observers' scanning and consequent representation of visual scenes. The premise for the study came from research that suggested visual scanning may be disrupted by the workload imposed by conversation, thereby impairing change detection. Participants observed a repeating cycle of four displays: an image, a gray screen, an altered image, and a gray screen, and were charged with the task of detecting and reporting differences between the two traffic images. Significant results included: conversation led participants to miss changes more frequently, but did not affect reaction time when change was detected; visual search was less efficient during conversation, with fewer fixations and short fixation durations under dual-task conditions. These results indicate that simple conversation can disrupt attentive scanning.

Cell Phones

The issue of cellular phones and distracted driving deserves special attention, as the cellular phone industry is the current leader in wireless communications (CTIA reports 122,898,789 current wireless subscribers as of October 5, 2001), and has been the focal point of media attention to the distracted driving issue. Recent debate has arisen as to whether using a cell phone while driving increases the risk of a crash. While cell phone usage while driving is undoubtedly classified as a distraction, the empirical research concerning cell phone usage while driving is inconclusive.Several studies illustrate the difficulty in drawing clear conclusions, as they examine different factors. For example, a North Dakota client survey reports that 44% of people talk on a cell phone while driving (Blue Cross Blue Shield, 2001). On the other hand, a recent AAA Foundation study reports that motor vehicle crashes caused by cell phones account for only 1.5 percent of crashes (Stutts et. al., 2001). Further, a Response Insurance survey reports that 29 percent of people talk on cell phones while driving (in contrast to the 44% in the North Dakota survey), and that 13 percent of those drivers have either had "an accident or a near accident" as a result of talking on a cell phone while driving (Response Insurance, 1999). Despite recent media attention to cellular phones, research regarding driver distraction and the use of cellular phones is dominated by the wireless communications industry, and a body of strong empirical research and a consensus as to the role and magnitude of cellular phones and distraction seems to be

missing.   While these studies are not necessarily inconsistent with one another, they do examine different aspects of the potential role played by cellular phones in automobile crashes.

Numerous studies exploring the relationship between cellular phones and driver distraction can be found with varying methodologies and results; among these studies, some of the more widely known include McKnight and McKnight, 1991; Violanti and Marshall, 1996; Redelmeier and Tibshirani, 1997; ICBC Transportation Safety Research, 2000. However, the Harvard Center for Risk Analysis conducted an extensive study, commissioned by AT&T Wireless Services, to clearly identify what is known about the risks and benefits of using a cellular phone while driving, and the policy implications based on that analysis. In order to generate these risks, benefits, and recommendations, they reviewed the body of research available at that time, including those studies listed above.

According to the Harvard Center for Risk Analysis study, four primary methods of study have been used to study the relationship or association between cellular phone use and motor vehicle crashes. These include measures of driver performance, studies of case reports where cellular phone use appears to have been involved, statistical comparisons of trends in motor vehicle crashes and cellular phone usage, and epidemiological studies (like the ones described above). As a whole, this body of research suggests that using a cellular phone while driving can increase the risk of a motor vehicle crash. However, there is little research to identify or suggest the magnitude of this in real-world, real-time driving environments. A second task of this study was to elucidate the benefits associated with cellular phone use, defined for this study as "any positive consequences – whether tangible or intangible – of using a cellular phone while driving that may accrue to the user of the phone, the user's family or household, the user's social network of friends and acquaintances, the user's business, or the community as a whole." Benefits were identified primarily through a series of focus groups. A summary of benefits identified includes preventing unnecessary trips; diminishing the tendency to speed; contributing to peace of mind; improving mental alertness; facilitating privacy in communication; expanding productivity and efficiency; increased responsiveness; more efficient execution of household responsibilities and social connectedness; and more time at home.

In conclusion, Lissy, Cohen, Park and Graham put forth a series of recommendations as appropriate "next step" actions, to facilitate more informed decision making about the use of cellular phones while driving and disseminating information about risks and benefits among the driving public and policymakers. Their recommendations fell into two categories: scientific research and risk management.   Research recommendations including greater use of case-crossover study design and modified cohort studies; examination of international policies and strategies and their impact; concerted, wide-spread efforts for data collection; quantification of the benefits of using cellular phones while driving; development of safer in-vehicle technologies; and the development and implementation of a broad-based (as opposed to cellular phones only) driver distraction program. The overarching theme in risk management recommendations is to develop "a comprehensive educational effort aimed at drivers to promote the responsible use of cellular phones while driving" (Lissy, Cohen, Park & Graham, 2000).

A study by Parkes and Hooijmeijer (2001), already cited, examined drivers' situational awareness while using a hands-free cellular phone as compared to no phone use at all. Fifteen volunteer

participants were asked to keep a computer-simulated vehicle in the middle lane and closely follow the mandatory speed limit (indicated by regular roadside speed limit signs) while navigating through varied weather conditions and curves in the road, and answering questions using the hands-free cellular phone. Participants were measured on their ability to stay in their lane, maintain their speed, and respond to traffic signs. Participants were also measured for situational awareness at two points in the simulation. Not surprisingly, the results identified significant differences in reaction time, especially in the beginning stages of the telephone conversation. The most important result of the study, however, was the significant degradation of situational awareness between the "phone" and "no-phone" conditions. During "no phone" situations, participants gave significantly more *correct* answers to questions of situational awareness than in the "phone" situations. Many "phone" participants had very little idea about what was going on around them when the simulation was stopped to assess situational awareness, and were not able to report on the presence of actions of traffic around them.

Strayer and Johnston conducted dual-task studies on the effects of cellular phone conversations and driver performance of a simulated driving task. The first study in the report examined the effects of handheld and hands-free cell phone conversations on the simulated driving task, while the second study, similar to the first, assessed two aspects of the dual-task condition. Results of the two studies showed: that the probability of a missed signal more than doubled when subjects were engaged in cellular phone conversation, and that response to detected signals was significantly impaired during conversation; these deficits were equivalent for hands-held and hands-free cellular phones; and tracking error increased when participants were asked to perform an active, attention-demanding task of word generation, but not when they performed the word shadowing task. Strayer and Johnston concluded that cellular phone conversation – hand held or hands free – leads to significant degradation of simulated driving performance.

In-Vehicle Information Systems (IVIS)
Clear distinctions cannot necessarily be drawn between research related to cellular phone use while driving a motor vehicle, and research examining wireless telecommunications or in-vehicle information systems (IVIS) technology in vehicles. They are, respectively, simpler and more complex pieces of one issue. This section addresses primarily studies looking at IVIS technologies *other* than cellular phones, but it is important to understand that these are an outgrowth of the foundation laid by cellular phones.

Lee, Caven, Haake, and Brown conducted a simulated car-following task to evaluate the effect of speech-based e-mail systems on driver response to a braking lead vehicle. Study results revealed slower reaction times by 30% during interaction with the e-mail systems, but with no statistically significant difference associated with e-mail system complexity. Participants reported greater subjective workload when the e-mail system was available, and greater subjective workload for the complex system. These results suggest that voice-activated systems place a cognitive workload on drivers that can impair driving performance, and may not be a panacea alternative to manual-interface IVIS.

NHTSA funded a large-scale research project published in 2000 that studied driver workload, cellular telephones, crash avoidance, and IVIS technologies. The project was charged with three objectives: characterize the impact of route guidance system destination entry use on vehicle

control and driver eye glance behavior; assess the influence of individual differences on the susceptibility to distraction as indicated by disruption in vehicle control and driver eye glance behavior during destination entry and cellular telephone use while driving; and examine the validity of a proposed SAE recommended practice, the 15-second rule (discussed under *Countermeasures*). Study results suggested that voice-recognition technology might be a viable alternative to visual-manual destination entry while driving. The second study suggested some individual variability or susceptibility to distraction, but correlation between test scores and test track performance measures were low. The final test completed under this project involved testing the feasibility of the 15-second rule, or the "design concept" that in-vehicle technology should be designed so as not to require more than 15-seconds of interaction per use when the vehicle is in a static state. Subjects completed 15 different tasks, first in a stationary vehicle to establish "static use" time, then while driving. All route navigation system destination entry tasks that required visual-manual methods and manually dialing an unfamiliar 10-digit phone number on a cellular phone both failed the 15-second rule *and* were associated with disrupted lanekeeping. The HVAC adjustment task was the only task to be completed in less than 15 seconds and to have no significant effect on lanekeeping. Results of this assessment suggest that, when applied to a variety of in-vehicle tasks, there is little or no scientific diagnostic sensitivity in the 15-second rule.

Countermeasure Approaches to Distracted Driving
Measuring driver distraction or inattention to the driving task is a complex and highly difficult charge. Drivers may *appear* attentive but may be cognitively removed from the situation without any clear physical indication that there are multiple objections, actions, events, or persons competing for the driver's attention. As discussed by Tijerina, regardless of how driver distraction and inattention is categorized, be it by specific behavior or in terms of how driver performance is affected, different categories of driver distraction warrant different types of measures and scenarios for evaluation. Safety associated with device use or driver distractions (as with other issues) cannot be measured directly, so researchers use indirect measures to assess safety-related distraction effects. Commonly used measures include driver eye glance behavior (glance duration, glance frequency, scanning patterns), driver-vehicle performance (lane keeping or exceedences, speed maintenance, driver reaction times), driver control actions (steering wheel inputs, gear shifting, hands-off wheel time), and task completion time (as an index of the distraction potential of a device).

Several weaknesses and limitations exist in much of the evaluation research conducted to date in assessing safety or distraction potential. A great deal – if not the majority – uses only crash data to approximate the frequency and types of distraction drivers face. However, the majority of crashes are not due to a single cause, but rather have interacting causal or contributory factors that work *together* to bring about a crash situation. Therefore, there are numerous potential weaknesses in using crash data, including: some relevant factors may be (intentionally or inadvertently) omitted from reports or consideration; contributing factors may be known, but the degree or extent of involvement or contribution may not be known; values for those factors that are identified and relevant to crash causation may be estimates of uncertain reliability; the interactions among causal and/or contributing factors may be poorly understood; the probabilities of occurrence and co-occurrence of any causal or contributing factor is unknown and may be impossible to determine or predict. Tijerina also discusses two issues relevant to study design: first, in controlled field test

studies, crash occurrence is most often estimated "from conditions where the safety-relevant intervention which could not have had an effect and for whom the population of drivers may be fundamentally different that those in the formal study." Second, in the research that has been conducted there exists a lack of attention to the *incidence* of task execution, focusing instead on the task demands placed on drivers engaged in additional behaviors or using technological devices. This combination of problems presents significant barriers not only in quantifying the magnitude of the driver distraction issue, but in predicting crash causation or incidence based on driver workload measures.

Dr. Thomas A. Dingus, Director of the Virginia Tech Transportation Institute testified in 2001 before the House of Representatives Committee on Transportation and Infrastructure Subcommittee on Highways and Transit and asserted that driver distraction today is markedly different from distraction issues faced in the past; "many of the electronic devices now used, and planned for use, in automobiles require greater visual and cognitive attention from the driver than do conventional tasks." He discriminated between those electronic devices designed to be used in-vehicle, and those that are portable and carried into vehicles by drivers, and put forth five considerations with regard to design and implementation of safer in-vehicle electronic devices: development and design should follow human factors principles (i.e. limiting visual complexity); device functionality should be appropriate to the driving context, including possibly limiting access to functions in some cases; manufacturers should work together to develop a consistent driver interface for selected functions, thereby reducing driver task load and distraction; properly designed "hands-free" devices should be used whenever possible and effective; design of hands-free devices should attempt to minimize cognitive distraction potential.

The Society of Automotive Engineers (SAE) put forward Recommended Practice J2364 in 2000, known as the "15-Second Rule for Total Task Time" or the "15-Second Rule" for using navigational systems in vehicles. The rule reads: "This Recommended Practice applies to both Original Equipment Manufacturer and aftermarket route-guidance and navigation system functions for passenger vehicles. It establishes a design limit for the total task time for the presentation of visual information and the manual control inputs associated with navigation functions accessible by the driver while the vehicle is in motion. The Recommended Practice does not apply to voice-activated controls or passenger operation." Section 4 (function accessibility criterion) states, "Any navigation function that is accessible by the driver while a vehicle is in motion shall have a static total task time of less than 15 seconds." As discussed by Green (2000), the rule was developed out of concern that driver interaction with manual controls and visual displays would impose visual demands in competition with the visual demands placed on drivers as part of the driving task. The language of the 15-Second Rule is specific in addressing navigation and route-guidance systems, but the concept may be expanded to other in-vehicle technologies, such as those that are highly manual or rely predominantly on voice input, once a reasonable body of research supports appropriate task time estimates. (A preliminary assessment of the appropriateness and applicability of this rule is discussed under *In-Vehicle Information Systems*.)

Similar measures to ensure driver safety when interacting with In-Vehicle Information Systems have been taken in Europe. In the early 1990s the United Kingdom Department of Transportation (DoT) recognized a need to develop internationally applicable tests to ensure driver safety and limit the amount of distraction that occurs with the use of IVIS technology. The UK DoT therefore

began development of recommendations that could be applied to IVIS technology development in that interim. The DoT began in 1992 by commissioning the development of a Code of Practice and Design Guidelines for in-vehicle information systems, a set of principles that would highlight the main safety-related factors that needed to be accounted for in design, installation, and use of in-vehicle equipment. A series of similar discussions arose among other agencies and organizations, and this Code was reviewed and used as a model for other similar recommendations. By 1998, a European Community task force was established and the following year put forth a formal "Commission Recommendation of 21 December 1999 on safe and efficient in-vehicle information and communication systems: A European statement of principles on human machine interface." The Recommendation applies to providers of original equipment, after-sales system providers, and importers that provide, fit, and/or design IVIS technologies. The "statement of principles" established key issues to be considered for IVIS to be used safety and effectively, and demands that Member States report to the Commission within 12 months on steps taken by them and their industries, and within 24 months to provide evaluation results. The 35 principles outlined cover six areas relevant to driver information and communication systems (Stevens and Rai, 2001; Burns and Lansdown, 2001). The U.S. Federal Highway Administration (FHWA) recently allocated funds to the Virginia Tech Transportation Institute with two objectives: to develop tools and criteria for In-Vehicle Information Systems (IVIS) engineers to use in evaluating the attentional resources IVIS demands of drivers, and to provide highway planners and engineers with the means to evaluate proposed IVIS requirements. The resultant behavioral prototype software, "In –Vehicle Information System Design, Evaluation, and Model of Attention Demand (IVIS DEMAnD)," enables the user to compare two or more potential IVIS designs, evaluate an upgrade for a current IVIS design, evaluate a given design or task against benchmark criteria, or compare the effects of driver demand of different tasks and different systems.

In 1995 Ford Motor Co. and General Motors Corp. created the Crash Avoidance Metrics Partnership to conduct joint (pre-competitive) projects to accelerate the deployment of future crash avoidance measures. A 1999 research proposal builds on this relationship to unite Ford Motor Company, General Motors Corporation, Nissan Technical Center North American, Inc., and Toyota Technical Center Inc. USA to propose a driver workload metrics project to develop practical (the metric or method is compatible with various phases in the OEM product development process), repeatable (the metric is consistent in measured results from one test to another), and meaningful (the metric is correlated with other safety-relevant, 'ground-truth' measures of driver distraction, such as eyes-off-road time) driver workload metrics and procedures for both visual and cognitive demand that can realistically assess which types of human-machine interface tasks are appropriate to perform or have available to drivers while a vehicle is in motion.

A recent study from Germany examined the prospect of developing driver assistance systems that detect and react to changes in driving performance or an on-going communication as a means to counteract changes in driver behavior due to interaction with IVIS. Study results indicated that manual operation of IVIS systems degrades driver ability to maintain lateral and longitudinal control of the vehicle; visual information processing degrades lateral and longitudinal control primarily on curvy roads; and acoustic information-processing increases speed-variability. The researchers concluded that acoustic presentation of information is preferable to visual output, and assert that driver assistance systems may be appropriate methods for countering the degraded

driver performances observed when interacting with visual and manual information processing systems (Vollrath & Totzke, 2001).

Other technological approaches to understanding crash avoidance and driver distraction involve actual simulation machines. Ford Motor Company has developed VIRTTEX, the Virtual Test Track Experiment, which employs hydraulic pistons to generate realistic sensations of swerving, stopping, and accelerating and duplicating forces experienced when driving. Every movement of the driver, including eye position, glance duration, hand and foot movement will be tracked, recorded, and added to a database of knowledge about driver focus to examine not only the physical aspects of driver distraction, but cognitive as well. Cumulative data and simulations from the VIRTTEX simulator will help Ford Motor Co. determine how best to provide electronic devices and features that consumers want, without compromising safety. Similarly, the National Advanced Driving Simulator (NADS) is being developed for NHTSA by TRW. According to NHTSA, NADS will assist them, other federal agencies, and commercial organizations in "enhancing human factors and crash avoidance research related to driver-vehicle-road interactions like driver impairment research, human factors research concerning driver workload and adaptation to emerging Intelligent Transportation System (ITS) equipment and technology, and to support regulations regarding automotive safety." NADS will allow NHTSA to test the distraction levels of drivers interfacing with IVIS technologies such as computers, navigation systems, and cellular phones.

Legislative Approaches to Driver Distraction:
Cell Phone Legislation
Recent media attention to the issue of cellular phone use while driving has generated pressure for state legislators to create laws to protect drivers and other users of roadways from motor vehicle crashes associated with cellular phone use, yet a consistent body of research evidence to support restrictive legislation does not exist. L. Robert Shelton the Executive Director of NHTSA states, "it would be "premature" to ban drivers' use of cell phones because of what he called a "lack of data on impact of such a distraction"" (Chary and Mariano, 2001). Despite NHTSA's recommendations, state legislators are examining international laws regarding cell phone use as potential models for legislation in the United States (Nobel, 2001), and in some cases has not prevented the enactment of legislation at local- or state-levels.

As of August 2001, at least 24 countries have restricted or prohibited cellular phones and other wireless technologies in motor vehicles, including Israel, Japan, Portugal, Singapore, Australia, Brazil, Chile, Denmark, Germany, Greece, Hungary, Italy, Poland, the Philippines, Romania, Slovenia, South Africa, Spain, Switzerland, Turkey, New Delhi, India, Hong Kong, the Czech Republic, France, the Netherlands, and the United Kingdom (Drivers.com, 2001; Sundeen, 2001). In the United States, the federal government has yet to pass any legislation that would regulate the use of mobile phones and other wireless technologies in motor vehicles, yet lawmakers proposed in 2001 the first federal legislation to regulate cellular phone use in cars (Senate Bill 927) (Sundeen, 2001).

Pressures to regulate cellular phone use have generated much more legislative activity at the state and local levels in the United States. At least 13 local governments have mandated that drivers use hands-free devices while operating a motor vehicle. However, by the end of 2001, five of

these municipalities will not enforce their cellular phone laws, and the new law in New York state will overrule those in the three New York counties (Sundeen, 2001).

The majority of legislative discussion has taken place at the state level, where 2001 saw 44 states and the District of Columbia propose a collective 134 pieces of legislation related to technology and driver focus. This is a dramatic increase from the prior two years, in which 15 states considered cellular phone bills in 1999, and 27 in 2000. In 1999, none of the bills passed, and in 2000 only a joint study resolution passed in Pennsylvania (Sundeen, 2001). A chart identifying and describing the bills proposed in 2001 is included at the end of this report, but is summarized here, based on information from October, 2001, from the National Conference of State Legislatures' *Driver Focus and Technology State Legislature Database*.

Of 134 bills from 44 states and the District of Columbia:	
Scope of bill:	*Number of bills:*
• Prohibit hand held phones while driving	53
• Improve data collection about cell phone involvement in motor vehicle crashes	28
• Increase penalties or responsibility of drivers who use hand-held phones, any cellular phones, and/or crash while using cell phones	21
• Prohibit school bus drivers from using a cell phone while operating a school bus	9
• Restrict or prohibit cell phone use by young or teenage drivers, novice drivers, or drivers with permits or intermediate stage licenses	11
• Places time limits on cell phone calls by drivers, or protects calls that do not exceed a certain time limit	4
• Prohibit all use of cell phones in cars (with emergency exceptions)	9
• Prohibit local governments from regulating use of mobile/ cellular phones in vehicles; state regulations superceded local regulations	4
• Prohibits other types of technology use in vehicles	4
• Addresses, defines, or specifically includes the language "distracted driving"	9
• Other	17

Of those same 134 bills, 117 of them addressed "mobile telephones only", while only 17 bills addressed "all" technology. Seventy-seven of these bills remain active, 48 are inactive, and only 8 were enacted (one unknown). A complete record of proposed legislation, organized by state, can be found in the Appendix.

Distracted Driver Legislation
A potential alternative to legislating the use of cellular phones or other wireless technologies in automobiles is to expand the scope of existing legislation to include certain distracting actions (e.g. eating, reading, or grooming) while driving. Indeed, more general distracted driver and driver inattention issues are garnering attention and concern. According to Burriesci (2001), all states in the U.S. make reckless driving illegal, laws that generally address aggressive driving or violations with a criminal intent, but 14 states also provide a lesser offense of negligent, careless, or

inattentive driving. Inclusive in these laws are restrictions for – but not prohibitions of – cellular phone use while driving (Burriesci, 2001).

Products and Curricula to Address Distracted Driving

In spite of the recent media attention to issues of driver distraction and inattention, there are surprisingly few products, instruments, materials, or curricula available that address driver distraction. Those that are available have only recently been produced and released, and have not been evaluated.

"Teaching Your Teen to Drive" (MetLife Auto & Home) is a guide for parents to use during practice driving sessions. In the sixteen-page booklet, the only reference to driver inattention is found in the first lesson under "Common Problems & Solutions": "Drifting in the lane is another sign that [your inexperienced driver] may not be paying attention." The American Automobile Association also offers a product to help parents teach their new young drivers how to drive. This resource, "Teaching Your Teens to Drive: A Partnership for Survival," includes a Parent/Teen Handbook divided into six parts, with a total of thirteen driving lessons. The introduction to the booklet talks to parents about how they can help their teens become safe drivers, and provides fifteen tips or rules on how to make the most of each practice session. Item three on the list specifies "…Do not eat, read, or listen to music when you are coaching a new driver," three behaviors commonly cited in research on driver distraction and inattention. The only other reference to any aspect of driver distraction or inattention occurs in "Lesson 13 – Adverse Driving Conditions," as a part of the first session on Night Driving and Coping With Fatigue. Fatigue is not directly identified as a form of distracted driving, but the booklet provides five tips to avoid fatigue. At no point does the booklet address how to help teach a young driver how to multitask or cope with distraction and inattention.

The Cellular Telecommunications & Internet Association (CTIA) launched a "Responsible Driver" media effort in 1999 and has continued with annual efforts to increased awareness about distracted driving issues among the driving public. CTIA targets the driving public while in their cars to deliver safe driving messages comprised of three components: support from the wireless industry of strict enforcement of laws against irresponsible drivers; responsible drivers should ask themselves questions about their use of the phone while driving, including the temporal appropriateness of calls in the car, and whether or not a call will be a distraction from his/her "first responsibility to drive safely." According to the CTIA web-site, industry-wide efforts to deliver this safety message have included mailers, brochures, a toll-free consumer information number and responsible driver web-site, and requiring all CTIA certified wireless phones to be hands-free capable and have the ability to "wake up" with a safety message when activated.

In October 2000, General Motors (GM) launched its 3-year, $10-million "SenseAble Driving" campaign to educate consumers about the dangers of driver distraction through a combination of research, education, and technology. It began in Michigan, with plans to go nationwide in 2001 and includes distribution of educational materials (posters and brochures, included in the Appendix), public service announcements, and a web site. GM sponsored a new 8.5-minute video about distracted driving, and in April 2001 launched an Internet-based interactive computer demonstration designed to demonstrate to drivers the risks associated with too much multitasking behind the wheel. The six segments of the GM video (viewable at http://gm.com/company/gmability/safety/senseable/releases/distracted_032901.html) and

some of the Internet-based Driver Distraction Demonstration (D3) (available at http://gm.com/company/gmability/safety/senseable/driver_distraction/index.html) use cartoons, and while they are aimed at drivers of all ages, a particular emphasis exists on young drivers.

In 2000, the National Driver Development Program "Traffic Safety Education Life Long Learning Process" was prepared and released by the American Driver and Traffic Safety Education Association (ADTSEA), Highway Safety Center, Indiana University of Pennsylvania. Examination of a Draft Version dated 3/27/2001, available from the ADTSEA web site, identified only a few pieces of the model curriculum that addressed driver attention and distraction. These include item 25.1 of Classroom Segment I, "Driver Fitness. The student is expected to understand and maintain attention to task by avoiding (25.1.a) outside vehicle distractions (limitations to vehicle path of travel; signs, signals, and markings; and other users) and (25.1.b) inside vehicle distractions (passengers, electronics including cell phone, and dashboard controls). Item 25.5 also addresses the role of fatigue and sleep deprivation, and 26 addressed chemical use/abuse. In Classroom Segment II, Item 2 focuses on Driver Fitness Tasks, but emphasis is on fatigue, emotions, and substance abuse. Substance abuse issues comprise the majority of Section V (five).

The Network of Employers for Traffic Safety (NETS) has taken a lead in developing a driver instruction curriculum specifically focused on distracted driving. They have produced a Distracted Driver Tool Kit, "Who's Driving? The Distracted Driver: A Lesson in Road Sense," designed such that employers, highway safety professionals, law enforcement, safety community coordinators, driver training instructors and others can provide training to employees, parents and others concerned with highway safety. The training kit provides techniques to minimize driver distraction to keep employees – or anyone – focused on the task of driving. The workshop addresses distraction associated with cell phones, attending to children in the vehicle, and reading a map, among others. It is the only product or curriculum identified with a focus on distracted and inattentive driving.

Shell Oil Company launched a campaign focusing on driver distraction; "Deadly Distractions" includes print publications, television commercials, a web site, and safe driving booklets available at Shell stations nationwide. The "Deadly Distractions" 8-page booklet (included in the Appendix) addresses the broader issue, including identification of the most common driver distractions, suggestions for safe cell phone use "if you absolutely have to use your phone while traveling," and other tips to help drivers avoid allowing food, stereo and climate controls, children, pets, passengers, and events outside the car be a distraction from driving.

In 2001, Virginia began implementing new Standards of Learning and a new curriculum for Driver Education. Standard DE 11 specifically addresses driver distraction and inattention; this section within the curriculum directs driver education instructors to discuss distracted driving with their students. The entire section, (Module 4, Topic 1: Risk Assessment), can be found under the *Virginia Data and Approaches* section.

Looking Ahead

While some driver behaviors – such as eating, drinking, or changing CDs in the car – may have become almost second-nature to the driving task, new advances in in-vehicle technologies and

increasing availability to consumers have brought distracted driving to the forefront of traffic safety issues, and warrants serious consideration in order to ensure the safety of all users of shared roadways. Despite the work that has been accomplished so far, the literature review suggests that only a foundation has been laid.

NATIONAL SURVEY

State traffic safety officials in 28 states completed the survey. Their responses showed that the issue of distracted driving was not clearly defined officially. Respondents mainly suggested their own definitions of distracted driving which related to any activity that results in diverting the driver's attention from the operation of the vehicle, or failure to give full time and attention, or a shift of attention away from stimuli critical to safe driving toward stimuli that are not related to safe driving.

Most respondents found that the major issues with distracted driving were crashes. For Virginia, the major issues have to do with the lack of a legal definition, the effect on highway safety, and how to educate the driving public. Respondents nationwide seemed to emphasize the use of cell phones as a contributing factor in these crashes, and also referred to other distracting factors such as drowsiness and distracted driving in work zones.

Overall, respondents rated distractions because of personal activities inside the car (e.g., using cell phones, eating, drinking, putting on make-up) to be of the most concern, followed by distractions because of driver specific conditions (e.g., tiredness, medication, alcohol, "lost in thought"). Distractions because of equipment inside the car (e.g., radio, CD, navigational system) was of lesser concern nationally; for Virginia, this was a relatively high concern. Distractions because of conditions outside the car seemed to be of lesser concern; in Virginia, this was of modest concern. Virginia noted a distinction regarding distractions because of other passengers inside the care; this was very much a concern with respect to juveniles, and a much less concern for adults.

The focus of efforts addressing distracted driving was mainly on automobile drivers and subsequently on tractor-trailer drivers and commercial drivers transporting goods. For Virginia, the greatest focus was with school bus drivers and motorcyclists, although these were moderate in rating.

In terms of educational efforts, very few respondents (9) indicated that their states' driver education includes information on distracted driving (Virginia was one of the states which does include this). Most of these nine reported that their driver education program included such information, but only five of them stated that their education program included skills on dealing with distracted driving; again, Virginia addresses both information and skills to deal with distracted driving. The number of hours allocated to addressing distracted driving issues was minimal, usually not exceeding one hour of the total hours allocated for driver education. The focus of driver's education programs has been mainly on changing attitudes towards making behavior less risky, possible safety risks as a result of driver specific conditions (e.g., tiredness, medication, alcohol, "lost in thought"), defensive driving, possible safety risks as a result of weather conditions, and psychology of driving courtesy; Virginia rated each of these as being included to a high level. Distracted driving education was reported to be standardized across the state by two respondents (includingVirginia); others indicated that it was either determined by local jurisdictions or was a blend of state and local standards. Only five states had questions on their driver-licensing exam that addressed distracted driving (Virginia does not have these included on the exam).

Nine respondents indicated that their states conducted public awareness campaigns; Virginia is not one of these states. These campaigns were conducted mainly through radio, TV, posters, billboards and mailers. These awareness campaigns covered a variety of driving distractions such as cell phones, eating, drowsiness, alcohol use, and reading while driving.

The use of certain equipment while driving was not usually dependent on a driver's age or experience; only one respondent indicated that such use was dependent on age or experience.   Virginia responded with the majority of respondents to this question.

In terms of enforcement, most respondents (62%) indicated that distracted driving was recorded in police crash reports. These distractions included general inattention, reckless driving, using cell phones, drowsiness, and using alcohol; Virginia reports that this is included in the police crash report, citing "inattention" as the type of distraction. However, recording these distractions in traffic citations or as part of the court conviction was reported by only 28% and 14% respectively; Virginia also reports that distracted driving is not recorded in the traffic citation, nor is it part of the court conviction. Most respondents suggested that police reports need to be modified in order to allow for recording more specific information about distracted driving.   Currently, the Virginia crash report is being reviewed to include distractions. However, they also warned against making such reports so lengthy that police officers would not fill them out.

When asked about how emerging technologies will affect traffic safety most responses suggested that they would have no effect or just a little positive effect. In this respect, voice activated devices and guidance systems received the most favorable scores, while Internet and email capabilities received less favorable scores.

When asked about their suggestions on how to prevent distracted driving, respondents suggested a combination of approaches employing further research, education and awareness campaigns, legislation, and safety oriented technology. When asked about what the awareness campaigns should be about and how they should be conducted, they suggested that awareness publications be given to drivers at car dealers, to constantly promote the message, media exposure of causation of crashes involving a distracted driver and to provide driver improvement programs. Others emphasized the need to collect more data in order to determine the magnitude and scope of the problem.

Proposed bills to address distracted driving have been submitted in at least 13 of the 28 states, including Virginia.   However, most of these bills either did not pass or are still pending. Almost all of the bills addressed cell phone use while driving. Only three respondents indicated that there have been efforts to assess the effectiveness of passed bills.

Finally, responses to the National Survey showed that the involvement of state offices dealing primarily with issues of law enforcement and traffic safety was most prominent in addressing distracted driving issues. The involvement of other groups and agencies, on the other hand, seemed to be lower; this included youth and parents groups, health agencies, commercial industry and state departments of education.   With a few exceptions, Virginia's pattern of involvement was quite similar to that found nationally.

STATE LEADER INTERVIEWS

The state leader interviews were conducted with two groups: traffic safety officials, and transportation legislative aides. Interviews were conducted with traffic safety officials from the 50 states, plus the District of Columbia. Sixteen state Senators, Representatives and Legislative Assistants from the fifty states and the District of Columbia responded to GMU's queries about distracted driving. The discussion focused on the content of the bills. Typically, legislative assistants stated that they were not permitted to express their opinions, and the state legislators themselves had not given much thought to topics such as how to address emerging technology. They were willing, however, to discuss procedures, curriculum and education they would like to see instituted. This summary includes responses of traffic safety officials followed by responses of legislators or their aides.

Traffic Safety Officials
There was universal agreement from traffic safety officials in all 50 states and the District of Columbia that distracted driving is defined as, "Any behavior that takes one's attention away from the driving task…that results in operating a motor vehicle is a manner that is not reasonable or proper." Although the majority of traffic safety officials mentioned distractions inside the vehicle, 36% of those interviewed mentioned distractions outside of the vehicle. About 97% of the participants mentioned cell phones, including their view that cell phone use is a higher risk behavior than eating or drinking because, since one's mind is engaged in the phone conversation, their concentration is no longer fully on the road.

When asked about the nature of concern of distracted driving in their states, about 17% of the 51 traffic safety officials said that distracted driving was not being discussed in their state; safety restraints, aggressive driving and DUI were still the key issues. However, cell phones were the focus of concern in 38% of the states interviewed. Several traffic safety officials mentioned the "concentration factor" in the use of cell phones, recognizing that not all distractions are equally distracting.

Forty-eight percent of those surveyed stated that very little or nothing was being done to address the issue of distracted driving in their agency and that the focus remains on aggressive driving and safety restraints. A few states are working with businesses to conduct NETS (Network of Employers for Traffic Safety) training for their employees. Also instituted are training programs for senior citizens, trucking companies, business leaders, and law enforcement officers. Other states have developed effective billboard and television campaigns that address the issue of distractions in both direct and humorous ways.

Regarding bills to address the distracted driving issue, the few bills that have passed have been within the past year. Seventy-eight percent (78%) of the states responding had introduced some type of legislation related to distracted driving. For most of the bills introduced, the emphasis was on banning the use of hand held cell phones. Some will be amended and reintroduced in the next legislative session. With the exception of the state of New York, bills proposing the banning of hand held cell phones rarely made it out of committee. States where localities have passed cell phone bans report an increased chance of passing a statewide ban.   Also, removing the word "cell

phone" and addressing penalties for distracted driving crashes also seem to increase the chances of passage of the bills.

About 25% of those interviewed stated that they did not collect crash data about distracted driving. Forty-eight percent (48%) have the category of "driver inattention", "reckless" or "contributing circumstances" on police report forms. However, 11% do collect data specifically on distracted driving, and approximately 17% are in the process of revising forms to include a data collection field (or column) for distracted driving. Another factor is training law enforcement officers to use the field, if there is one, or make detailed comments regarding distracted driving if no field currently exists. This is important so that accurate statistics can be used as the basis for determining the extent to which distracted driving is implicated in traffic safety and motor vehicle incidents .

It was acknowledged by several respondents that when one is engaged in conversation on the cell phone or using other technology like hand-held electronic calendars, one's mind detaches from paying attention to the driving tasks. It was recommended that a multi-agency effort with a steering committee be commissioned to address the problem of emerging technologies, and that this should be introduced at the National Association of Governors' Highway Safety Representatives (NAGHSR) Conference.

Regarding data collection and educational efforts, it was felt that not enough data was being collected on the problem. More research needs to be done and statistics collected. It was also stated that officers need to give tickets more often for distracted driving where the law permits. New technologies such as "On Star" can also become a distraction to one's driving. In summary, enforcement, education, legislation and partnering with others are necessary to mobilize the effort to address distracted driving. Some respondents were aware of education programs and public relations campaigns being conducted by AAA, NETS, the National Safety Council and the cell phone industry. For example, both the National Safety Council and AAA appear to include distracted driving as part of larger public relations campaigns that center around seat belts and aggressive driving. Research is also being conducted by the Governor's Highway Traffic Safety Commission to determine what types of distractions cause crashes.

The extent to which distracted driving is addressed in states curricula for novice drivers and in driving improvement courses varied. Thirty percent (30%) of those responding stated that distracted driving was taught in the curriculum and two states specifically mentioned that cell phones are included in this curriculum. One state offered an elective course for 9th through 12th graders called "Safe Talk"; this program included simulations and videotapes. In another state, distracted driving is addressed in the new school curriculum resources guide under "driver impairments." This state also has videos, CDs, handout materials and 15 computer-generated examples dealing with distracted driving. Since driver education is reported to not be standardized in many states, it is difficult to determine the extent to which distracted driving is discussed in the overall curriculum.

When asked about what needs to be done nationally to address the issue of distracted driving, 13% of those surveyed believed that more legislation was needed, 37% felt the problem should be

addressed with further education, 15% thought additional research was necessary and 1% stated that a national public relations campaign should be designed to address the problem.

Those who thought the problem should be addressed via *legislation* recommended that more bills be introduced related to cell phone use, VCR's and televisions in vehicles. Those advocating *education* believe that public education and awareness are necessary for changing thinking and habits. Respondents who think the problem is a lack of *research* feel a need to look at the prevalence and degree of the problem from a national perspective. More studies are needed to define, validate and determine the extent of the problem before implementing solutions. At the national level, it was suggested that NHTSA and NAGHSR provide guidelines for passing legislation as well as develop a "best practices" paper regarding distracted driving. One respondent summarized it well by stating that what is needed are realistic enforcement options, packaged media efforts, and workable educational programs.

Legislators and Legislative Aides
The responses from legislators and their aides showed limited and inconsistent attention to the issue of distracted driving; in fact, only three of the sixteen legislative individuals interviewed responded to this question. One state did not have a formal definition for distracted driving, and only had one for reckless driving. In another state, proposals had been introduced over the last 10 years to define distracted driving more clearly, but these have not passed because the highway patrol viewed them as too subjective. Another state commented that it was difficult to legislate common sense and even more difficult to prove cell phone use. Regarding changes in distracted driving, one legislative respondent mentioned cell phone use being included on the crash/citation forms, and more attention being drawn to distracted driving legislatively, particularly in urban areas.

Commenting on bills addressing distracted driving, it was observed that bills which address penalties for the negligent operation of the vehicle due to distractions are likely to have a hearing on the floor. However, most of the initial bills introduced simply proposed banning the use of hand-held cell phones. With the exception of the state of New York, banning hand-held cell phones rarely made it out of committee. States where localities have passed cell phone bans have increased the chances of passing a statewide ban. Taking out the word "cell phone" and addressing penalties for distracted driving crashes also seem to further the chances of the bills' passage. It is difficult to assess the impact, as the penalties have only recently gone into effect. One possible outcome of the bills is that the wireless industry purchased full-page newspaper ads encouraging the safe use of cell phones.

Regarding the question of how to address emerging technologies, one legislator mentioned that plans were not clear for addressing emerging technology, as national research was just getting underway. Another stated that if a bill was to be reintroduced to require the collection of data at crashes, it would encompass emerging technology. Another legislator mentioned that emerging technologies were addressed by a bill recently introduced in that state's legislature. Finally, similar to the responses of the traffic safety officials, it was recommended that emerging technologies be on the agenda at the NAGHSR Conference, and that multiple agencies, with a steering committee for oversight purposes, be commissioned to tackle the problem.

Regarding laws and procedures, distracted driving was reported to be difficult to enforce even where laws prohibit negligent driving. A couple of respondents felt that speeding, aggressive driving, DUI and seat belts are more important issues. Others saw the need for additional research and public education especially on the topic of drowsy driving. In some states there are laws to prohibit inattentive driving on the state and local roads but none on the state highways.

Regarding education, it was recommended that new technology, such as text messaging while driving, be addressed in the curriculum. Driver's education should be re-instituted as a requirement, and a youth operator's bill is needed to educate new drivers. One respondent thought that distracted driving should be part of a mandatory driver's re-education curriculum in lieu of paying a fine. Parents also need to be role models. The more the problem grows, stated one legislator, the more awareness there is of the problem. Thus, enforcement, education, legislation and partnering with other people are necessary for this effort.

VIRGINIA DATA AND APPROACHES

 The Commonwealth of Virginia has several elements relevant to the understanding of distracted driving. First, there are several laws and related approaches that already exist that have relevance to this issue.   Second, Virginia data has been reviewed to determine what insights can be gained to help inform the findings and recommendations for the state.

Regarding existing laws, two have been identified as relevant for this issue.   One law addresses the installation of televisions; titled "Motor vehicles not to be equipped with television within view of driver" (46.2-11077), this law prohibits the placement of a television screen that is visible to the driver of a vehicle.   This law specifically excludes vehicle navigation systems, dedicated video cameras used in rear-view systems on trucks and motor homes, and those used in an official capacity by law enforcement officers and VDOT employees.

The second law addresses the use of earphones when operating a motor vehicle, including bicycles and mopeds.   Specifically, individuals are prohibited from using earphones "on or in both ears" while operating a vehicle, bicycle, electric power-assisted bicycle, or moped.   This exempts prosthetic devices for the hearing impaired and helmet-installed earphones for motorcyclists. It also exempts "noise-cancellation devices" used for those in high-noise environments with vehicles above a certain weight, as well as drivers of specified emergency vehicles.

Strategies used by Virginia include the Virginia Driver's Manual, *Juvenile Driver Licensing Ceremony*, the Handbook for Parents, and the new Virginia Standards of Learning for Driver Education and Driver Education Curriculum.   The 2001-2002 Virginia Driver's Manual addresses cellular phone use in section three, *Safe Driving Techniques*. The section reads:

> "A cellular telephone is a very helpful tool for drivers to call for help, report dangerous road conditions or to summon police. However, driving while talking on the telephone can be dangerous to you and other motorists. Cell phones can be a serious source of driver inattention because a phone conversation can impair your ability to perceive gaps in traffic or changing conditions. To use a cell phone more safely, get to know your type of phone and its features, keep it within easy reach, and suspend calls when in hazardous or heavy traffic or in bad weather. Place calls when you are not moving or before pulling into traffic."

The Virginia procedure for issuing a driver's license to new young drivers is through a *Juvenile Driver Licensing Ceremony* through the Virginia Juvenile and Domestic Relations Courts, as required by *Virginia Code* §46.2-336.   The "Driver Licensing Ceremony Resource Guide," prepared by the Virginia Department of Motor Vehicles for judges performing the licensing ceremony, includes a section on Presentation Ideas and Topics to Cover. Identified as a topic to cover is major causes of violations, which reads: "Inattention (especially due to teenage passengers or adjusting the radio); Following too closely; Speeding; Aggressive driving; Alcohol use; Thrill seeking and risky driving; Fatigue."

Finally, another Virginia resource is "Teaching Your Teen to Drive: A Handbook for Parents," developed by Radford University through a Highway Safety Project grant from the Virginia

Department of Motor Vehicles. The first section, "How to be a Good Coach," includes a discussion of important topics parents should talk about with their young drivers; included in this is the topic *controlling emotions and avoiding aggressive driving.* Part of that discussion touches on driver distraction:

> "It is also important to take steps to reduce stress before driving because driving under stress can lead to aggressive driving behaviors. Advanced planning reduces stress. Remind your teen to always allow enough time to reach the destination and to avoid driving when upset or depressed. Discuss the importance of reducing distractions that may take attention away from driving and increase risk. Talk to your child about the dangers of loud music, cellular phones and driving with passengers in the car."

New Virginia Standards of Learning and a corresponding Driver Education curriculum were released and implemented in Fall, 2001. While standard DE 11 states that "the student will identify distractions that contribute to driver error," including key concepts about "passengers and pets, vehicle accessories, and cell phones and other portable technology devices," there exists only a single three-paragraph section within the curriculum directing driver education instructors to discuss distracted driving with their students. The entire section (Module 4, Topic 1: Risk Assessment) reads:

> "***Disregarding traffic sign or signal*** – This is the fourth leading cause of crashes in Virginia. This could be from inattention or from trying to "beat" a light or "roll" through a stop sign. Actions such as this can lead to crashes because other drivers expect you to stop.
>
> *Distracted Driving* – Distractions while driving can be deadly. At 55 mph, taking your eyes off the road for three to four second, the car has traveled the length of a football field.
>
> Typical driving distractions include: changing the radio, CD or tape; dialing or talking on the phone; passengers; pets; eating (especially when food falls in your lap) or drinking; smoking; reading a road map, directions, etc.; searching for an item in a purse, glove compartment, back pack, etc.; having books slide off the front seat or carrying other unstable items in your car; engaging in intense or emotional conversation; putting on make-up or looking at yourself in the mirror; and driving an unfamiliar vehicle without first adjusting the mirrors and seats, selecting entertainment options, locating the light, windshield wipers or other vehicle controls."

Looking at the Virginia crash data, in the last 6 years, the numbers of total crashes in Virginia have increased along with the total number of licensed drivers in the state. A preliminary review of Driver Actions in crash situations reveals that that *the most frequently identified driver action in all driver crashes between 1995 and 2000 was inattention.* The only other driver action cited *almost* as often was "failure to yield." Of Virginia drivers engaged in motor vehicle crashes during these 6 years, the percentage of drivers identified as being inattentive has hovered at or just below 13% each year. A table of all driver actions, from Virginia Crash Facts, is found below; a more detailed table with percentages is found in the Appendix.

	1995	1996	1997	1998	1999	2000
Total Crashes	**127,126**	**131,088**	**129,980**	**136,138**	**139,573**	**141,650**
Driver Action	*Number of Drivers*					
Ran Traffic Control	7,678	7,889	8,136	7,888	8,145	7,889
Improper Passing	1,954	1,951	1,776	1,815	1,767	1,720
Left of Center – Not Passing	2,768	2,879	2,718	2,685	2,630	2,517
Failure to Yield	24,236	23,909	23,974	23,68	23,288	23,109
Inattention	29,284	29,558	29,576	30,867	31,841	32,131
Speed too Fast	13,252	15,366	13,811	14,369	14,106	14,666
Improper Turn	4,094	4,135	4,171	4,065	4,188	4,229
Improper Lane Change	2,190	2,058	2,204	2,153	2,264	2,421
Following too Close	16,079	16,275	17,469	18,498	19,523	19,503
Improper Backing	1,257	1,459	1,463	1,433	1,582	1,614
Illegal or Improper Parking	418	453	401	365	378	355
Lights Not On	167	153	148	146	136	115
Hit and Run	5,331	5,337	5,221	5,843	6,025	6,014
Avoiding Pedestrian	187	217	216	203	176	162
Avoiding Other Vehicle	3,922	4,264	4,048	3,869	3,988	3,875
No Violation	98,996	102,035	100,897	106,593	110,151	110,875
Other	15,218	15,303	15,062	16,065	16,000	16,241
Total	227,031	233,214	231,293	240,546	246,188	247,436
Not Stated	7,596	7,966	8,700	8,123	8,673	9,558
Grand Total	234,627	241,207	239,993	248,669	246,861	256,994

VIRGINIA LEADER INTERVIEWS

Virginia Leader Interviews were completed with General District Court Judges who hear traffic cases, County and City Police Officers, and Driver Education Instructors from across the state to generate a more complete picture of distracted driving behaviors and trends across Virginia. A total of 14 general district court judges who hear traffic cases, 11 police officers, and 25 driver education instructors (from private agencies) were interviewed from throughout the state. When asked to define the nature and scope of the distracted driving problem, responses varied widely among groups.

The judges interviewed estimated that between 10-50% of all crashes are caused by distraction, approximately 3-4% of which involves drivers using a cell phone. Among types of distractions identified, judges addressed young drivers cruising and looking for friends, and increased complexity of in-vehicle technologies (such as tape players).

All of the police officers interviewed immediately defined distracted driving as cell phone use. Twenty-seven percent of the officers talked about general inattentive behaviors, with drivers "just not paying attention" to the situation and driving environment, thereby engaging in driver behaviors which officers described as amounting to "reckless driving," resulting in crashes and close calls. However, the majority of the police officers interviewed emphasized that cell phones are the worst type of distraction.

Driver education instructors cited the use of cell phones and distractions inside the vehicle (e.g. tuning the radio, adjusting temperature) as the two biggest factors in distracted driving. Several driver education instructors stated that distracted driving cannot be broken down into one or two specific behaviors. Distraction, according to them, depends on a multitude of factors including time of day, stress level, number of passengers in the car, and what is going on in the life of the driver at the time (i.e. what is on his/her mind).

Judges and driver education instructors also focused on changes in technology – complexity and availability, respectively – as the most prominent changes in the distracted driving problem over the last several years, but police officers talked about more fundamental changes at the social level that have led to increased numbers of multitasking drivers and assert that distracted driving is really a time management issue. Forty-five percent of the responding officers mentioned that people are generally in a hurry all the time - "everyone is always in rush rush mode." Similarly, 36% of officers suggested that people are busier and engaged in more activities now than they have ever been before. One officer captured all of this in his response, "People are trying to do more than what they have time to get done – everyone is in such a hurry to get somewhere and get something done." Another interesting response came from a driver education instructor who stated that the biggest contributing factor to distracted driving is an "insensitivity to danger." He explained that sitting in a car has become as comfortable as sitting in a living room, so behaviors are similar to those exhibited in peoples' homes: people eat, drink, read, and never realize the increase in danger when those behaviors are combined with the task of operating a motor vehicle.

Efforts to address distracted driving issues varied across the three groups interviewed, as would be expected given the different responsibilities and context of their work responsibilities. Judges talked about using the time an individual is in the courtroom as an opportunity to remind people of the importance of paying attention and to discuss ramifications. Police officers addressed education and public awareness programs in which they are involved in their localities, including PSAs, news spots on local television channels, community displays and signage changes, as well as speaking to community/civic groups and students in the schools. Several police officers also mentioned targeting aggressive driving in their localities, another behavior they believe to be related to distracted driving.

All interviewees across the three groups of Virginia Leaders identified the same pool of laws, statutes, and clauses of the state or local codes that apply to or encompass distracted driving. Judges, police officers and driver education instructors alike identified the "failure to maintain proper control" or "failure to pay fulltime attention" clauses of the reckless driving statute in Virginia as potentially inclusive of distracted driving, as well as the newly effective young driver passenger restriction. A few judges and police officers also identified local ordinances relating to noise pollution and prohibition of dual headphones. One judge however, said that the law deals only with the consequences, and that the actual behavior should be addressed, possibly through driver education and/or public awareness. This corresponds to a similar response from a driver education instructor, who said that the law deals with the "results of distraction and not distraction itself." Judges were generally not in favor of passing more legislation to address distracting driving, except where technology warrants it, whereas 27% of police officers suggested cell phone legislation and another 27% suggested that distracted driving, or the "failure to pay fulltime attention" element of Virginia's reckless driving statute should be a primary offense alone.

Finally, judges, police officers and driver education instructors were in consensus in their call for educational strategies for addressing distracted driving. As alternatives to legislative strategies, judges suggested that penalties should increase, and several advocated sending individuals to driver improvement school or requiring them to do volunteer work with a rescue squad in lieu of a fine or demerit points. Police officers overwhelmingly (81%) identified education and increased public awareness efforts as what they would like to see being done at both the local and state level, including grants to help fund community awareness efforts; DMV prepared PSAs for television and radio; news and media spots; an instructional/educational course or seminar; and demonstrations or activities that engage adults in hands-on learning experiences. Responses from driver education instructors complemented those of judges and police officers with suggestions for awareness campaigns, the construction of driving ranges, the inclusion of distracted driving questions on the drivers licensing exam, safety education at the elementary and middle school level, and mandatory participation in a safety course every ten years.

KEY INFORMANT INTERVIEWS

With the key informants contacted, a range of questions and issues were identified for their comment and expertise. The specific major concerns cited by them focuses on the need to get people to believe that they are driving distracted. They indicated that there hasn't been much focus on distracted driving until recently, and that the cell phone issue has been a primary focus of the current discussion. The range of distractions found with driving were noted as being quite

widespread, including eating, drinking, talking with passengers, use of telematics, reading, looking at maps, grooming, fatigue, problem-solving, and using car equipment.

Looking at the historical aspect of distracted driving, they noted that cell phones is the current distraction issue, primarily in the past couple of years. They noted that a variety of approaches have been used with other distractions (such as the implementation of standards for young drivers regarding the transport of other passengers, due to this being a distraction which puts them at greater risk for a crash or other risky behavior). The emphasis is that, with other distraction issues, there are ways that can be helpful and effective. Another aspect historically is that there appears to be greater multi-tasking among drivers currently, when compared with drivers of several decades ago. The emphasis of drivers is upon learning how to manage the driving environment safely, with the range of multi-tasking and distraction that surround the driver. The current emphasis upon the cell phone as a major component of distracted driving is viewed as a factor because of its visibility. Related to this is the significant amount of press coverage that monitors and relates to this issue.

There was a range of responses regarding these individuals' awareness of recent or relevant studies on distracted driving. Several helpful studies were cited and were included as part of the literature review. Most of these studies were recent, and emphasized attention to the role of cell phones with the driving tasks.

The respondents were then asked about efforts made by various organizations and agencies to address distracted driving. The general finding was that the efforts made have been quite preliminary in nature. Cited was work performed by the National Highway Traffic Safety Administration (NHTSA), the AAA Foundation, the National Safety Council, and the Network of Employers for Traffic Safety (NETS). Major efforts incorporate studies that have been performed, or are in the process of being conducted. Also cited were a limited number of resources, primarily by NETS.

The main efforts used by states to address distracted driving have been legislative approaches, primarily dealing with reckless and careless driving. States have also conducted efforts to provide legislation about the use of cell phones. There was also an option that legislation will not be sufficient to address distracted driving. In fact, some interviewees felt that legislation on cell phone use would be inappropriate, since other laws exist on the books and are currently not enforced. The basic thrust of remarks was that legislation should not be done until data exists that clearly documents the role that cell phones play in driving safety.

Specific suggestions about what should be done to address distracted driving focused on the role of education. This approach emphasizes working with individuals to help them identify when they are distracted, what is distracting them, and skills and strategies for managing these distractions. The key informants believed that a set of cues can be developed which will be helpful to address negative consequences associated with distracted driving. One of the biggest problems with the distracted driving issue is that many individuals are not aware that they engage in this behavior, and they can become more involved with their daily routines than with driving and are not cognizant of the safety risks associated with their driving.

Another major request from these individuals was the need for more research that helps to clearly identify the nature and scope of the problem. They observed that there has been a lot of discussion recently on data collection, and how to do this. However, there is not "good data" currently because many of the numbers are so low. Overall these individuals believe that society does not fully understand the nature and scope of distracted driving, what to do about it, and ways of specifying its importance within the schema of safe driving overall. Said differently, these interviews suggest that, while many elements and components of the problem and its solutions are identified, these remain fragmented and, for many people, not currently a high priority.

FOCUS GROUPS

Focus groups were conducted with Driver Education Instructors, members of Virginia Chamber of Commerce, representatives of the Virginia Department of Transportation (VDOT), and members of the American Association of Retired Persons (AARP) in Northern Virginia.

Definitions and examples of distracted driving were consistent across all the groups, including reading newspapers, putting on make-up, trying to conduct business in the car, and using cellular phones. Driver education instructors reported a separate set of distracted driving behaviors they notice during instructional time, including young drivers searching for friends, looking for various car controls (including the brake), and talking to the observers in the car. Interestingly, AARP members were in virtual agreement that younger drivers are more distracted than older drivers while driving.

VDOT employees offered an additional perspective, as the use of telecommunications devices (including cellular phones, two-way radios, pagers) is a part of their work. In fact, telecommunications devices are the only way workers are able to communicate with one another, which is vitally important when coordinating multiple work zone projects across the state. All members of the VDOT groups reported using some type of telecommunications device while driving, but most also stated that when using these devices they use hands-free devices to receive calls, and pull over to make calls or read their pagers.

Although the issue was raised or framed differently across the four groups, there emerged general consensus that distraction is not limited to observable behaviors, but includes a cognitive dimension where a driver is more or less "lost in thought." Driver education instructors discussed the emotional baggage young drivers bring into the vehicle, and how the driving performance is changed and degraded as a result. Chamber of Commerce participants raised the issue in the context of cellular phone use, suggesting that hands-free technology does not prevent a driver from being distracted. VDOT employee comments resonated with those of driver education instructors, saying they felt that the causal factor behind distracted driving is that people's minds are in other places or consumed by issues other than the road. Conversely, when asked about their own distracted driving behavior, a majority of AARP members stated that their distractions were situations outside of the vehicle (e.g., looking at the scenery, looking at a crash site on the road).

Educational strategies for addressing distracted driving were also mentioned in each group. Driver education instructors agreed that they all discuss distracted driving as part of their curriculum, yet expressed frustration in the fact that driver education and training is not allotted enough time in the academic schedule for teaching all of the information and skills with which they are charged, including teaching skills for safe and appropriate multitasking, and coping with distraction behind the wheel. Participants form the Virginia Chamber of Commerce group highlighted the effectiveness of educational campaigns and awareness programs that target children as an intermediary influence on parental behavior. They also discussed witnessing success in their companies as a result of implementing policies that address issues such as not allowing the use of cell phones while driving a company car. VDOT employees suggested increasing education efforts about distracted driving topics and behaviors, targeting the general public, including commercials, public service announcements, and educational programs. While many of the AARP

members mentioned the 55-Alive defensive driving course that their organization offers, most members were not sure if the course contained a distracted driving component.

All groups were also able to identify current legislative efforts related to distracted driving issues, including dual headphone prohibitions, noise pollution, and the passenger restrictions for young drivers that went into effect July 1, 2001. The possibility of new or behavior-specific legislation was raised in all groups, as well, but with different voices. Several driver education instructors, and a majority of AARP focus group members, indicated support for a statewide ban of hand-held cellular phone use in cars. Chamber of Commerce participants discussed a similar approach, but recognized that people vary in their ability to do more than one thing at a time, and therefore cautioned that legislative efforts – while they may be appropriate as a last resort, and only in some cases – must be careful to aim for risk management, not risk elimination. As mentioned above, they demonstrated greater support for introducing relevant policy within companies and organizations, rather than legislation. VDOT employees asserted that the problem of distracted driving was around long before cell phones, and therefore the solution is not to ban cell phone use while driving, but lies in multiple efforts of education, enforcement, and penalties. Other suggestions for addressing distracted driving that emerged from the VDOT group included education for new drivers, tests for individuals renewing their driver licenses, commercials, public service announcements, stiffer fines for distracted driving crashes, the use of cameras at work zones, and authorization of VDOT work zone employees to give out warnings. They collectively believed that the best way to address the problem of distracted driving is a multi-pronged approach to reach citizens "where they are in life."

SELF-ASSESSMENT & BEHAVIORAL MONITORING

Seventeen participants, who recorded observations about their behavior while driving over one week, completed the Self-Monitoring survey. The results of the Self-Monitoring survey showed that handling radio and vehicle climate controls occurred in about six of the seven days of the week. Drinking and reaching for objects occurred on average on three days; use of cell phones, eating and adjusting mirrors occurred on two days.

Several participants indicated that the long hours spent on the road led to much distraction of various types. Several participants indicated that they used their time in a vehicle to do other things such as eating, drinking (several had a daily routine or diet), or using cell phones. Participants indicated that their various distractions interfered at times with their ability to drive safely. Several also indicated that they used cell phones quite frequently when driving.

Participants made several observations on their Self-Monitoring surveys. First, several suggested that being part of this survey made them more aware of theirs and others' distracted driving behavior. They seemed to be divided on the issue of cell phones. The majority of respondents were in favor of either some type of restriction on the use of cell phones or banning its use all together while driving. Only a few respondents thought that it was not necessary to ban the use of cell phones while driving. One person also noted that different persons could be distracted at different levels.

Reflections about others' distracted driving behaviors
Overwhelmingly, the most commonly cited behavior observed among others was cell phone use. Several people also reported seeing drivers attend to small children in the backseat, children in the front seat or on a driver's lap, pets on the driver's lap, and attending to other passengers in the vehicle. Two drivers mentioned observing other drivers apply make-up, and two others mentioned reading newspapers or maps.

Comments, suggestions, and guidelines regarding distracted driving
Observers commented on cell phones more than any other issue related to distracted driving. Suggestions ranged from banning cell phones altogether, to restricting cell phone use to emergencies only or restricting cell phone use to hands-free only. A couple of the participants made reference to the fact that many behaviors behind the wheel are done routinely and out of habit. Other comments cited drowsy driving as a concern, inconsiderate drivers, and the tendency to become bored and distracted on long drives. Two people also raised issues identified in other parts of this study: different people can be distracted at different levels, and multitasking seems to have become part of the lifestyle of many citizens.

INTERCEPT INTERVIEWS

A total of 31 intercept interviews were conducted of individuals whose profession requires a large amount of driving. Respondents' professions ranged from real estate agents to couriers. A majority of interviews (11) were conducted with real estate agents, while truck drivers (5) and delivery drivers (3) made up the next largest groups.

The amount of time spent behind the wheel varied with almost half (11) spending 8 – 10 hours per day behind the wheel while slightly less than half spend only 1-3 hours per day behind the wheel. The average amount of time spent behind the wheel was 6.53 hours. Almost all respondents reported using some type of telecommunication device with all stating they use cellular phones. Other devices included radios, computers, two-way radios, CBs, voice recorders, cameras, pagers and personal digital assistants (i.e., Palm Pilots).

When asked how frequently these devices were used, many respondents used varying terms (e.g., hours per day, percentage of time in a car, number of times used), but the answers were often the same; respondents reported using telecommunication devices frequently, if not most of the time, while they were in their vehicles. The phrase "used while in the vehicle" did not, however, mean that the phones were used while the vehicle was in motion. Some of the respondents stated that they only used their cell phones when they were either parked or stopped on the roadway.

A large portion of respondents (11) stated that the use of telecommunication devices does not affect their driving. The reasons they believed their driving was not affected varied from the use of hands-free devices to the changing of behaviors (e.g., pulling off the road) while using the devices. While many believe that their driving is not affected, some (5) believe that it is affected while others (6) stated that it depended on the circumstances. For example, some respondents stated that their driving was affected more when they have to dial than if they hit one button to receive a call. The type and length of conversation were also believed to be factors in determining how much their ability to drive was affected.

Respondents who reported that the use of telecommunication devices had no effect on their driving supported this response reporting that they only received calls on a hands-free device while driving, and rarely made outgoing phone calls. Receiving calls while driving was quite frequently equated with having conversations with other passengers in the car since both instances only involved talking.

One respondent stated that the use of telecommunication devices did not affect his/her driving, but when other drivers used them, it profoundly affects their driving behavior. Another respondent stated that his/her attention to the road was greater while using these devices. It was interesting to note that two respondents worked for companies that installed phones that operated via satellite in the company vehicles and, therefore, will only work when the truck has pulled over and stopped.

When asked what should be done to improve driving safety while using telecommunication devices, the most frequent responses were " use hands-free devices," "ban cell phones while driving," and "pull over to use cell phone." Other suggestions for improving safety included using devices with voice-activated dialing capability, pay more attention to the road, increase police

citations, ban the use of cell phones in minivans, and do not allow the use of cell phones while in the passing lane.

It was interesting to note that while a large number of respondents reported using telecommunication devices and believed that their driving was not affected by use of these devices, a large number suggested banning cell phone use while driving to help improve safety.

Each interview question used the term "telecommunication devices" when asking about their involvement in distracted driving and many respondents reported using everything from radios to pagers and computers. However, when asked how driving is affected by these devices and what should be done to improve safety, all respondents described how cell phones affected their driving and what should be done about cell phone use to improve driving safety. No respondents mentioned any of the other devices. It was clear that when discussing distracted driving, most respondents equated that with cell phone use.

STAKEHOLDER DISCUSSION

The Stakeholder Discussion was attended by 18 individuals representing various groups and agencies such as commercial manufactures, police, insurance companies, highway safety, citizen groups and lobby groups. The discussion focused on three subjects related to distracted driving: educational and awareness efforts, legislation and enforcement.

In terms of education and awareness efforts, group participants agreed that there was a need for a definition of "distracted driving", and to broaden the scope and the definition beyond cell phones. In terms of educational efforts, they agreed that young people always have been distracted, but the problem extends beyond the young drivers, including commercial drivers, older drivers. For those groups, there was a general impression that people do not feel they have a problem with driving until they are brought into class where they become interested in and active in class. Generally, there is no public awareness of the importance of these issues. It is difficult to get someone to go to a class on distracted driving. Therefore, there is a need to find ways "to turn people's heads." They also suggested that one key player was the employer. They suggested a mandate for drivers to take driver improvement class, which would give them more awareness of distracted driving issues. They also suggested that insurance companies might implement such mandates for their clients. This may reach adults and then to younger drivers.

Participants in the meeting also noted a gap between what was included in the driver education curriculum versus what was actually taught. Several participants raised concerns that there was no education on distracted driving subjects to drivers who already had their license; the problem was not only a young driver's problem. In terms of awareness campaigns, they suggested that efforts must refrain from using complicated messages that people cannot easily understand. Some participants suggested that if the extent of risky behavior could be equated with certain distractions, a PSA demonstrating how safety decreases with specific distracted behaviors might be effective. Several participants cited the Shell PSA message as an example of an effective message because it depicted real situations.

In terms of legislation, several participants stated that legislators were looking for a visible solution around which legislation can be implemented. They agreed that there was a need to broaden the scope and the definition of distracted driving beyond cell phones. There was agreement that seeking to legislate about distracted driving behaviors demands data to justify the legislation. Most participants in the meeting suggested that legislative efforts at this time should focus on two issues: data collection and educational efforts, rather than on penalizing distracted driving behavior. Many participants pointed to the political perspective on how much or far society is willing to go to regulate or legislate personal activities. They also stated that legislating these issues gets into the individual liberties debate.

In terms of enforcement, some participants expressed concerns that pulling drivers over for distracted driving may be used as a cover to other social issues such as racial profiling. For others, it seemed difficult to think of pulling over drivers because of behaviors that were not in violation of the law. Others expressed concerns about how to draw the line between acceptable and unacceptable behavior.

Participants suggested training police officers to look for things as part of crash investigation. They also suggested that police officers need to have an additional report to capture distracted driving information if the violation is of a certain level. Others also suggested looking at what the other states are doing in terms of issues such as fines and laws. From a police perspective on enforcement, it was suggested that police officers look at violations of law, rather than specific behavior. As one participant stated, "some people multitask better than others. So do we penalize everyone regardless of their ability to multitask?"

Participants also suggested that judges were able to reduce a charge from reckless to "improper" at their discretion, based on the individual nature of each case. At the same time, judges dislike mandates that take away their discretionary authority. Finally, a judge may not care for a distraction reported in a police report if it were not a violation of law.

Other suggestions regarding enforcement included the need for support throughout the enforcement and judicial system. Others suggested training, reevaluation of the point system, and examining current laws for ways to make them stronger. Finally, another suggestion made regarding mandatory fines if individuals engaged in certain behaviors while driving.

THEMES AND FINDINGS

Theme 1 - RESEARCH

With the issue of distracted driving, research is relatively sparse but emerging. Research generally serves as a helpful foundation for proceeding with a range of topics. As realized with the findings below, the status of current research with distracted driving is emerging.

Finding 1a – Terminology regarding distracted driving is inconsistent.
Overall, a formal consistent definition of "distracted driving" is not found. There is general consensus from both research and traffic safety professionals that while behind the wheel, a driver's primary task is driving; secondary behaviors or actions may serve to distract drivers from the driving task. While the literature and research lacks consistent terminology and operational definitions of terms, generally speaking, there was universal agreement between the national survey respondents and other interviewed individuals and groups that distracted driving is defined as "any behavior or factor, inside or outside of the vehicle, that takes one's attention away from the driving task…that results in operating a motor vehicle in a manner that is not reasonable or proper." While terms such as "distraction" and "inattention" are defined differently for every time they are used interchangeably, other inconsistencies arise in attempting to break down and categorize types of driver distractions and inattention. The absence of consistent and widely accepted definitions of key terms carries into other aspects of the problem, including legislative and enforcement strategies. Thus far, new legislative initiatives have focused primarily on cellular phones and other technological aspects of driver distraction; a few states currently use careless driving, improper driving or reckless driving statutes to address distracted driving. Illustrating the lack of a consistent definition, most National Survey respondents indicated that there was not one operational definition in their states.

During the legislative interviews, one state's respondent mentioned that a clearer definition of distracted driving had been proposed over the past ten years, but it did not pass because the highway patrol viewed defining the behavior as too subjective. Citing the lack of a universal definition, participants in the Stakeholder Discussion agreed that there is a need for a broad definition of distracted driving that goes beyond cell phones.

Finding 1b - Research conducted regarding distracted driving lacks naturalistic research, rigorous experimental design and implementation.
With current research very few studies are conducted to get a detailed review and analysis of the extent and nature of distracted driving. According to the National Survey, only three states have conducted studies on distracted driving.

With the range of variables associated with distracted driving and differences in a professional opinion about what is encompassed within distracted driving, research designs are by necessity quite limited in nature and scope. Much of the research that has been done faces considerable and important limitations, among them difficulty in accurate and comprehensive data collection, sample population limitations, and study design. Due to differences across all the studies, and

propagated by the lack of consistent terminology discussed earlier, meaningful comparison and extrapolation is constrained, if not impossible. Many "experimental" studies have been conducted on test tracks and thereby do not have generalizability to the general driving population and real-time driving environments. One example is the simulation studies that have drivers completing complex math problems while driving. This would rarely happen in real driving situations and, therefore, the results of the study are not necessarily reflective of real driving behaviors.

During the legislative interviews, one respondent suggested that more realistic studies with graspable outcomes be developed. More studies are needed to help define, validate and determine the extent of the problem before discussing and implementing solutions.

Finding 1c - **Limited practicality or compilations of best practices are found.**
In the past, only limited attention has been given to distracted driving issues. It is only recently that distracted driving has been placed in the media spotlight, and therefore there are few resources and strategies for states and localities to share. Many research studies conducted on test-tracks with only small study samples lack generalizability and do not lend themselves to practical or immediate strategies for addressing the issue of distracted driving. A search for available products and curricula designed to address distracted driving issues identified only a couple efforts focused strictly on driver distraction issues, and only minimal pieces of driver education curricula. Consistent across multiple pieces of this project is a call for education and awareness efforts, yet interviews with judges, police officers, and driver education instructors throughout Virginia, and with other traffic safety leaders across the nation, the state demonstrates a lack of communication and resource sharing among professionals.

Forty-eight percent of legislators (or legislative aides) interviewed from around the nation agreed that very little was being done to address the issue of distracted driving in their agencies because the focus remains on combating the problems of aggressive driving and the use of safety restraints.

When asked what other organizations were doing about distracted driving, the participants in the Virginia Chamber of Commerce focus group stated that insurance companies have been conducting some research, but they could not think of other agencies or organizations that have made such efforts. Other efforts cited include NETS training for employees, a "Driver Friendly" campaign geared toward aggressive driving and a "Smooth Operator" campaign for inattentive driving.

Finding 1d - The extent of the distracted driving problem is not clearly defined, validated or determined.
Complementing the first finding regarding terminology, the precise extent to which distracted driving occurs is not well documented. Part of this results from a lack of consistent terms and definitions to use for data collection in quantifying the problem, and part of it stems from real and prevalent barriers to data collection. Virginia traffic crash data includes an "inattention" option as a description of driver action, but does not specify why the driver was inattentive. Summonses and FR-300 crash report forms offer police officers the option to identify driver "inattention" as a contributing or causal factor in crashes, but the language and law of the Virginia Code does not address "distracted driving" unless the outcome of such driver behavior results in driver

performance consistent with the definition of "reckless driving." Studies that have attempted to examine and quantify the pervasiveness of driver distraction and the safety implications (i.e. relative crash risk increase) associated with driver distraction rely on national data sources from agencies such as the National Highway Traffic Safety Administration, whose data is compiled from individual state data. To compound these difficulties, what data is available nationally may be incomplete due to incorrect or faulty collection procedures or holes and "half-truths" in self-reported crash data (as drivers do not want to admit liability in crash situations).

Distracted driving is not documented by police for a variety of reasons including the limitation of citation forms, as well as the failure of drivers to be forthcoming about their behavior prior to a crash. Further, many of the distracted driving incidents occur without resulting in a notable crash thereby making it unlikely that the behavior is documented. Finally, it is the actual driving behavior, not the precursor (i.e. distracted driving) that is typically observed and ultimately cited by law enforcement personnel.

Finding 1e - There appears to be an increase in attention to data collection (including task forces and studies); this seems to be coming from a legislative push.
In recent years, state legislators nationwide and law enforcement personnel, as well as the media, have identified cell phone use as a factor with distracted driving, due to the high visibility of cell phone usage by drivers. This has highlighted, particularly among state legislators nationally, the need for better data collection to document the nature and extent of distracted driving. Data from the National Conference of State Legislatures regarding "Driver Focus and Technology" identified more than 130 proposed pieces of legislation in 44 states and the District of Columbia between January 1 and October 19, 2001. Approximately 28 of those proposals addressed improved data collection about cell phone involvement in motor vehicle crashes. More than 115 proposals addressed "mobile telephones only," and approximately 17 others addressed "all technology."

One of the legislators interviewed nationally noted that cell phone use is being included on the crash/citation forms used by police, and that more attention is being drawn to distracted driving legislatively, particularly in urban areas. This could result in a clearer view of the scope of the problem.

Finding 1f- It is not clear how specific behaviors affect driving capacities differently in magnitude or effect.
With a range of potential distracted driving behaviors, the specific behavioral, perceptual, attitudinal and cognitive results emerging are not clear. The lack of rigorous research and evaluation standards are such that specific distracted driving behaviors are not clearly linked, whether at a global or an individual level, to specific driving capacities. New research from 2001 focuses heavily on the cognitive abilities of drivers (understanding that every individual varies in his/her cognitive capacities as compared with others). Part of this research suggests that every individual *may* have an "upper boundary" on how much cognitive complexity an individual can cope with and still perform all tasks in which he/she is engaged with a high degree of accuracy and precision. The implication for drivers is that some tasks (such as adjusting a radio or climate control) may be less cognitively complex, and therefore not significantly impair the driver's

performance, where as teleconferencing into a business meeting may overtax the driver's cognitive resources and result in degraded performances in both the driving tasks and the teleconference meeting tasks.

The literature also suggests that, aside from the task complexity and cognitive demand it places on a driver, whether or not it is actually related to the driving task may influence how much of a driver's attentional resources are diverted away from driving or refocused on the driving task. For example, adjusting mirrors or wiper speed is a secondary task directly related to the primary task of driving, and may therefore supplement a driver's attentional resources focused on driving, or at least not draw resources away. Reaching for a CD from the glove compartment or attending to a passenger in the back seat are secondary tasks indirectly related to the primary task of driving, and are likely to compete with the demands of driving for a driver's attentional resources.

Finding 1g – Research is inconclusive regarding the role of cell phones in automobile crashes, hand-held or hands-free devices.
Based on the few research studies that have been conducted to date, the role of cell phones in distracted driving behavior and automobile crashes is not conclusive. While there is some documentation regarding the extent to which the use of cell phones contributes to driver inattention, the specific role of cell phones is not clearly documented in crashes. This is due, in part, to individual non-reporting and to limited detail included on crash investigation report forms. At this point in time and based on the data that is available, cellular phone use, while it can be distracting to drivers, is not at the top of the list in terms of crash involvement. In situations where crash cellular phone use is identified as a contributing or causal factor in motor vehicle crashes, new research indicates that it is not the distraction of a driver's physical resources (i.e. hands) that is as concerning as the cognitive distraction associated with the intensity, complexity, or emotional content of the conversation in which the driver is engaged on the cell phone.

When state leaders were asked about driving distractions, 97% mentioned cell phones. The use of a cell phone is viewed as a riskier behavior than eating or drinking because the person is engaged in the phone conversation and is no longer concentrating on the road.

As cited above, specific research does not distinguish between hands-free and hand-held devices. Also, distinctions are not made between hand-held and hands-free devices in reporting the relatively low incidents of crashes that involve cell phones.

Despite legislative attention and numerous proposals that hands-free technology for cell phones be mandated for use in automobiles, research does not support the hypothesis that hands-free technology is a less risky behavior than hand-held cell phone use. As mentioned earlier, there is evidence to support the theory that it is the nature of the telephone conversation in which a driver is engaged that presents the greatest potential for distraction or diversion of additional resources. A brief call to a driver's destination to report that he/she will arrive 15 minutes late is dramatically different than an attempt to negotiate contract conditions via telephone while driving. The cognitive demands each conversation places on the driver are significantly different, and have equally different potential to impact driver attention and performance.

Theme 2 – EDUCATION/AWARENESS/TRAINING

In order to address the issue of distracted driving, there needs to be an increase in education, awareness and training efforts. The general public is not aware of the significant danger of distracted driving, although many have become aware of the issue due to an increase in media coverage on the subject of distracted driving and, more specifically, cell phones. Current driver education efforts do not adequately address distracted driving; little training exists on multitasking, and the few resources that do exist lack substance and direction.

Finding 2a – Driver education efforts are not attending well to distracted driving issues.
The driver education efforts discussed here focus primarily on the preparation of novice drivers receiving their driver's licenses for the first time.

Across the nation, current efforts with driver education do not incorporate, to a significant degree, distracted driving issues. In fact, only nine of the states that responded to the national survey indicated that their driving education efforts addressed distracted driving issues. Of those nine, only five include skills for dealing with distracted driving in their driver education efforts. Even in Virginia's new Driver Education Curriculum, only a single paragraph of the instructor's manual discusses distracted driving. Driver fatigue, driving under the influence, and aggressive driving are addressed separately in another module of the curriculum. However, as this is the first year the curriculum has been implemented and instructor training has not yet been completed, there is no telling how closely or accurately the curriculum will be followed or implemented in each and every classroom.

When asked about the inclusion of distracted driving issues in the classroom, most driver education instructors in Virginia stated that although they do not have a specific lesson plan related to distracted driving, they instruct their students to pay attention or to remain focused on their driving at all times. While those instructions address the importance of paying attention, they do not specifically address the types of behaviors, and related consequences, that students may or may not consider to be distracting. A focus group with driver education instructors revealed that there is concern about distracted driving on the part of driver education instructors, and they attempt to cover it in their curriculum, yet they are frustrated with the quantity and complexity of information and skills they are expected to teach, while at the same time facing budget and instructional time cutbacks.

A number of state leaders are not addressing distracted driving because they are not certain how to approach the topic. Also, as noted in an earlier finding, there is limited sharing of helpful strategies.

Participants in the Virginia Chamber of Commerce focus group highlighted the effectiveness of educational and awareness programs that target children. This is viewed as successful because children, as a result of these campaigns, start to influence their parents' and other adults' driving behavior. This same technique was successful in encouraging adults to put on their seatbelts. The participants suggested that using this same strategy to address distracted driving would be beneficial and effective.

Finding 2b - The general public is not aware of the magnitude of the impact of distractions with their driving, including actions and consequences, as well as proactive and reactive considerations.

Overall, the general driving public is not aware of the extent to which they drive distracted. While some of these behaviors are linked to the driving function (such as setting mirrors and adjusting seats), others have become so habitual that they are not noted as distractions (such as eating, tuning the radio, or inserting a CD). For example, during the Intercept Interviews, most respondents reported frequent use of telecommunication devices (such as cell phones, pagers, and two-way radios) but stated that the use of such devices had no effect on their driving. Many equated talking on a cell phone with talking to another passenger in the vehicle, which the respondents did not consider distracting.

There was a general impression from the Stakeholder Discussion that individuals do not realize they have a problem with distracted driving until they are brought into a driver improvement class where they begin discussing the issue. Since the general public does not seem to fully comprehend how telecommunication devices might divert their attention and also compromise their safety, it is difficult to get their attention on distracted driving issues. Participants in the Stakeholder Discussion stated how difficult it would be to get individuals to go to voluntary improvement classes on driver improvement and cited a need to find a way to "turn people's heads."

In contrast to the relative lack of awareness found among the general public, the general district court judges interviewed identified estimates that distracted driving caused up to 50% of all crashes because drivers were eating, smoking, changing CDs, using cell phones, getting lost in thought, or seeing someone they knew outside of the car. In most of these cases the judges did not believe the driver intended to cause a risk. However, the judges were adamant that flagrant and deliberate driver behaviors, such as reading a book or writing, should be considered reckless driving which carries a stiffer penalty. It was the judges' hope that stiffer penalties would make drivers more aware of their actions and consequences.

According to the legislative interviews, in addition to enforcement, more billboard campaigns are needed with anti-distracted driving messages. These were successfully displayed in one state with the result being fewer distracted driving citations. Another state successfully conducted a campaign featuring humorous television ads with the message of not driving while distracted. Some judges stated that the campaigns should have different messages for different segments of the population (e.g., truck drivers, families). The judges believed that more methods such as those listed above should be used since the issue of distracted driving, in their opinion, is a matter of using common sense.

Finding 2c - Relatively little skills training exists regarding safe multitasking.

Extremely limited incidences of skills training on how to multitask in a safe manner are found. While some training exists for state police officers, there are few examples of other settings where new drivers, experienced drivers or those in driver improvement programs gained skills training on multitasking. In fact, only five of the states that responded to the National Survey indicated that their driving education programs included skills on dealing with distracted driving. A review of a nationally proposed driver education curriculum from the American Driver

and Traffic Safety Education Association and Virginia's new Driver Education Curriculum found no item or module addressing skills training for how to multitask or use In-Vehicle Information Systems while driving. Interviews and focus groups with driver education instructors revealed no instructional efforts to teach multitasking skills to novice drivers.

The vast majority of judges interviewed emphasized the importance of driver's education, specifically mandatory driver's education for high risk groups who have the most difficulty multi-tasking (e.g., young drivers and mature drivers). Some judges also suggested that using new technology while driving (such as text messaging) should be addressed in the curriculum as unsafe. In order to address external distractions, it was recommended that engineers be trained to think about multi-messaging so that highway construction and signage are less distracting to drivers.

Finding 2d - Current education and awareness efforts lack substance and direction.
Current approaches to distracted driving lack substance. Very little exists on the topic of safe "multitasking" and designing strategies for specific audiences. In addition, there is limited information on how to incorporate appropriate content into current education and awareness efforts for new drivers, high-risk drivers, mature drivers and other subgroups. The only education effort specifically addressing distracted driving is a kit available from the Network of Employers for Traffic Safety (NETS), "Who's Driving? The Distracted Driver: A Lesson in Road Sense." This kit includes a Leader's Guide for facilitating a presentation on distracted driving, a corresponding video, worksheets, and more. Shell Oil Company also launched a new awareness campaign this year as part of its ongoing "Count on Shell" campaign, this time addressing distracted driving. They have published a booklet, "Deadly Distractions," and initiated a series of television commercials designed to increase public awareness about how to prevent distracted driving.

While legislators (or legislative aides) interviewed from around the nation recommended that a national driver education curriculum on distracted driving be developed and disseminated, participants in the Stakeholder Discussion stated that a gap exists between what is included in the curriculum versus what is actually taught. Several participants in the Stakeholder Discussion stated their belief that the problem was not only a young driver problem, but also a problem for experienced drivers. Participants raised concerns that there is no distracted driving education for drivers who already have their licenses.

Several judges advocated sending drivers who cause crashes to driver improvement school or have them volunteer with a rescue squad. They believe that this would be more effective in improving driving skills than giving a fine or points.

Finding 2e - Few resources (i.e., products and curricula) exist to assist with addressing distracted driving.
Few resources, whether electronic, curricula, informational campaigns, brochures, statistics or other print materials, exist to help drivers understand the critical role that distractions can play in compromising safety. While some research on developing resources is emerging, overall, this is quite limited. As discussed in the previous finding, only two educational or informational resources about distracted driving were identified, and a third series of brochures and television

PSAs about safe cell phone use has been produced and disseminated by the Cellular Telecommunications & Internet Association (CTIA).

Legislators (or legislative aides) interviewed from around the nation s acknowledge that although there are not many products that exist, a few states have designed programs to include materials and formats addressing distracted driving. A couple of states have a driver education course that is group discussion oriented and includes topics on high risk distractions such as cell phones. Another state requires instructors to mention distracted driving in the five-hour driver improvement course. A third state offers an elective course for 9th through 12th graders called "Safe Talk," which includes simulations and videotapes. Other states are addressing distracted driving in driver education by using CD ROMs and simulators, videos, handout materials, computer-generated examples of distracted driving, and including distracted driving in a school curriculum resources guide under "driver impairments."

While several states appear to be addressing the distracted driving topics in their driver education curricula, many driver education instructors in Virginia are not aware of other efforts being conducted to address the problem of distracted driving within the state.

Finding 2f - The role that cell phones play with distracted driving is the primary focus of media and other coverage of distracted driving.
Cell phones have promoted the attention of current efforts from a legislative as well as a public awareness standpoint. While distracted driving has existed for decades, this is currently coming to greater public and legislative awareness because of the high visibility and extensive use of cell phones. It was mentioned in the legislative interviews that cell phones were the primary focus of concern for legislators nationwide. When discussing cell phones, several legislators/legislative aides interviewed nationally mentioned the "concentration factor" as it relates to distracted driving.

When asked about changes in distracted driving in recent years, many of the driver education instructors cited various states that have passed or proposed laws banning the use of cell phones. The knowledge of these laws stems from the media attention on the use of cell phones and all related legislation. A review of popular media and news reports from the last year illustrates the media's role in focusing the public perception of driver distraction; though hundreds of articles and news bytes have included the term "driver distraction" in the title or body of the articles, the overwhelming majority of them have only discussed or addressed cellular phones and newly emerging In-Vehicle Information Systems technologies, rather than the true range of issues and behaviors that comprise "distraction."

Theme 3 – LEGISLATION AND POLICY

With the increase in media attention on cell phones and distracted driving, there is an increase in proposed legislation and policy approaches related to this issue. While research does not support any current, specific legislative initiatives, most proposed bills focus on cell phones. Despite the increase in proposed bills, most fail to pass.

Finding 3a - There appears to be a tendency to seek legislative approaches to address distracted driving.

With a growing awareness about the need to address distracted driving, the tendency has been to seek legislative approaches. The lack of public information in the form of awareness campaigns and other approaches to address distracted driving is complemented by the tendency to identify ways that state legislatures can address this issue. In fact, thirteen of the states that responded to the National Survey indicated that there have been bills introduced to their legislatures to address distracted driving issues. Specifically, over one hundred bills addressing distracted driving, with particular attention to cell phones were introduced in the 2000-2001 legislative year. Of those bills proposed by October 2001, 117 of them addressed "mobile telephones only", while only 17 bills addressed "all" technology. Only 9 of the 134 initiatives include the language or addressed the issue of "distracted driving." Of those bills proposed in 2001, 77 remain active, 48 are inactive, and 8 were enacted.

Participants in the Virginia Chamber of Commerce focus group agreed that legislation should be used as a last resort to address the issue of distracted driving. The participants seemed to be more in support of introducing policies to address these issues within companies and organizations. Some of the participants described the success they witnessed in their companies as a result of implementing policies that address various issues such as not allowing the use of cell phones while driving a company car.

According to judges, there have been some changes in laws in recent years. They stated that laws, as they relate to juvenile drivers, have become stricter. Judges believe this is the result of an increase in fatalities and more publicity about distracted driving. "Failure to pay full time and attention," covers most distracted driving situations except in instances where the distraction is flagrant, then it is considered to be reckless.

Interviews with police officers across the state indicate a desire for legislative action that would make it possible for officers to cite drivers engaged in distracting behaviors behind the wheel. The only legal recourse currently available to them is the reckless driving statute in Virginia, but that is difficult to enforce, and officers report that the charge is reduced in court at the discretion of a judge.

Finding 3b- Research does not support current specific legislative initiatives.

Based on the limited research and evaluation findings previously noted, the legislative initiatives appear to be grounded in increased public awareness and the desire to implement some non-specific strategies to address distracted driving. Unfortunately, the existing research is limited and thus does not provide appropriate support or grounding for the proposed legislation. This finding echoes some of the same research findings discussed earlier, in that the body of research available at this time does not support the hypothesis that cellular phone use significantly increases the risk of motor vehicle crashes, nor does hands-free technology provide a significantly safer alternative to hand-held cellular phones. Helpful within the legislation, however, are several initiatives calling for further study and task forces to address the issue.

During the legislative interviews, it was mentioned that an American Automobile Association study found that only 1.5% of crashes were caused by cell phones, 3.2% by moving objects, and

18% by alcohol. Thus, according to the study, the number of bills being introduced banning the use of hand-held cell phones is not proportional to the magnitude of the problem. There was agreement during the stakeholders meeting that any proposed legislation about distracted driving behaviors be justified by supporting data.

Finding 3c– Most proposed bills focus on cell phones and fail to pass.
Responses to the National Survey clearly show that cell phones are among the most important issues and concerns related to distracted driving. Many participants in the Stakeholder Discussion believe that legislators are looking for an easy target on which to pin the distracted driving issue cell phones, they believe, are an easy target. Interviews with police officers across the state indicate that in many minds the term "distracted driving" is synonymous with "driving while talking on a cell phone." Cellular phone use was overwhelmingly identified as "distracted driving" by police officers, driver education instructors, and citizens who participated in Intercept Interviews.

In general, legislative approaches to deal with distracted driving as a behavior of concern are not found. With over 130 bills being introduced in state legislatures, only 8 had been enacted by October 2001. Eighty-one bills remain active, and another 46 are inactive. With the exception of two bills that were general in their approach to distracted driving, all other bills mentioned by respondents to the National Survey focused on one aspect or another of using cell phones. In fact, 18 bills were introduced addressing mainly cell phones. Of these bills, six are still pending, three passed, and nine failed to pass.

The legislative efforts focused primarily on cell phones and restrictions on various aspects of cell phone use, as is illustrated above in that cellular phones were the focus of at least 117 legislative proposals in 2001 alone. These include the need for hands-free devices, punishment resulting from cell phone use, prohibition of hand-held cellular devices, exemption of certain groups (e.g., young drivers) from cell phone use, and traffic violations and crashes caused by cell phones. As mentioned earlier, legislative proposals over the last year have been almost exclusively oriented towards cell phones, with only a few broad enough to include "all technology" and fewer to include all components of driver distraction. Even the Virginia Senate Joint Resolution No. 336 that initiated this report includes an aim "to specifically examine the use of telecommunications devices by motor vehicle operators."

It was observed in the legislative interviews that most of the initial bills introduced proposed banning the use of hand-held cellular phones. These bills rarely made it out of committee with the exception of the bill that passed in the State of New York. Interviewees felt that the broader the legislation (e.g., addressing penalties for "distracted driving" crashes), the more likely the bill was to have a hearing on the floor.

Most participants in the Stakeholder Discussion suggested that legislative efforts at this time should focus on two issues: data collection and education. According to the legislative interviews, one state has introduced two bills to establish a task force on driver distraction. An assembly bill that was passed into law states that cell phone use is to be noted on all ticket and crash reports. This

bill will be significant in helping to determine the extent of the problem of cell phone use and its role, if any, in crashes.

Theme 4 – ENFORCEMENT

There are a multitude of factors that prohibit the accurate reporting of the role that distracted driving behaviors play in crashes. Since distracted driving is not a primary offense, police officers are limited in their ability to cite citizens for exhibiting such behavior. In addition, most reporting mechanisms (e.g., summons, citation forms) do not have a distracted driving component that would allow police officers to record the behavior. Other factors include law enforcement personnel's lack of knowledge on how to document distracted driving incidences, and the failure of citizens to willingly admit to engaging in distracted driving behaviors. Until the reporting methods and other barriers can be addressed, there appears to be a call for more enforcement of laws that are already on the books.

Finding 4a - Standards, reporting mechanisms, and training regarding crash investigation and reporting distracted driving (on summons and crash forms) do not meet emerging needs.
Approximately 25% of state legislators (or legislative aides) interviewed from around the nation s do not collect crash data about distracted driving. Complementing the lack of research and evaluation data is the limited attention in which law enforcement personnel can track and monitor the nature and extent of distracted driving. Currently, summons and crash forms are cited by traffic safety personnel throughout the nation as not having the appropriate accommodation, which makes data reporting processes simple and straightforward for law enforcement personnel. Responses to the National Survey showed that about half of respondents (15) indicated that distraction, use of cell phones, use of substance, or other types of distraction were included in police crash reports. However, fewer respondents indicated that these observations were included in either traffic citation or court conviction reports. Without this type of simple-to-use data collection process, the only data is in a written, open-ended form. In addition to reporting mechanisms not being as "user friendly" as they would need to be to facilitate more inclusive data collection, many officers are not properly trained to look for, observe, and record the desired data.

Some participants in the Stakeholder Discussion expressed concerns that pulling drivers over for distracted driving may be used as a cover for other social issues such as racial profiling. For others, it seemed difficult to think of pulling drivers over because of behaviors that were not in violation of the law. Still others expressed concerns about how to draw the line between acceptable and unacceptable behavior.

Finding 4b - Law enforcement personnel and highway safety personnel are not sure about how to document the issue of distracted driving.
Primarily due to the lack of a clear definition of distracted driving as casual factors to crashes and highway safety incidents, law enforcement highway safety personnel have limited guidance about appropriate documentation. Without a clear definition and clearly defined standards for data recording, the documentation remains inadequate.

Anecdotal responses to the National Survey showed that most respondents believe that existing police reports need to include spaces for describing any distraction that might have taken place. However, other respondents warned against overburdening police officers with the requirement of too many details in their reports. Police officers across the state report having the opportunity to cite driver inattention and explain details of a situation in the "Comments" or narrative section of the appropriate forms. There is no other item on the forms that would prompt an officer to cite behaviors such as eating, adjusting stereo settings or using CDs.

Finding 4c - The fact that distracted driving is not an offense restricts the ability to "cite."
Since distracted driving is generally not a primary and/or specific offense, the ability of law enforcement personnel to cite drivers for violations is limited. While individuals can be cited for other offenses, such as reckless driving, the precursor behavior is not cited. This precursor behavior (distracted driving) may be a causal or contributing factor and duly noted, but it is not a specific offense. Interviews with police officers indicate frustration at not being able to issue citations for lesser-distracted driving offenses, but rather instead having to use driver performance or more severe outcomes of a distracted behavior and cite reckless driving.

According to the legislative interviews, even when there are laws to prohibit negligent driving behaviors, they are difficult to enforce. An example was given where some states have laws to prohibit inattentive driving on state and local roads but not on state highways. For enforcement to be successful, consistency in all settings is needed.

Finding 4d - The fact that drivers are unwilling to admit their use of cell phones in crashes, and driving, impairs data collection and enforcement efforts.
For a variety of reasons, drivers are currently unwilling to admit that they have used cell phones when they are involved in a traffic incident or crash. One aspect of this is their concern about their insurance premiums. Another aspect is their general awareness that the use of a cell phone may lead to distraction and an inability to provide full attention to the driving task. Thus, they are reticent to acknowledge their potentially contributory behavior. Research suggests that distracted and inattentive driving behaviors increase the risk of rear-end and single-vehicle crashes disproportionately to other crash types. This is further compounded by the observation in Virginia that, if a driver strikes another vehicle from behind, the driver of the striking vehicle is typically found to be at fault. The net outcome for that driver is potential citations for traffic violations and an increase in insurance premiums. It is therefore not surprising that drivers involved in motor vehicle crashes in which distraction or inattention – in any of their many forms – is a causal or contributing factor is reluctant to admit such information to law enforcement officials.

Several respondents in the legislative interviews mentioned the importance of officers accurately describing in writing the cause of a crash so that statistics can be collected. In response to drivers' reluctance to admit any wrongdoing, one state referred to the power to subpoena telephone records if it is suspected that a cell phone was being used at the time of the crash.

Finding 4e - Current laws that encompass distracted driving need to be enforced.
Through this study, many individuals stated that no new laws are needed, but that existing laws that cover distracted driving should be enforced to their fullest extent. A review of legislation

across the nation reveals a reckless driving statute in every state, under which exists a clause that could be interpreted or expanded to encompass distracted driving. In addition, 14 other states have existing statutes regarding careless, negligent, or improper driving that are or can be used to address distracted driving from a legislative-enforcement position.

Finding 4f - The role of judges can have a great influence on distracted driving issues.
According to the Stakeholder Discussion, some judges would not be concerned about a distraction noted in a police report if it were not a violation of the law. Judges are able to drop a charge from "reckless" driving to "improper" at their discretion, based on the individual nature of each case. While there is an expressed desire for consistency when it comes to enforcement of distracted driving laws, judges are reported to dislike any mandates that propose to take away their discretionary authority.   One judge mentioned the value of having a "Smooth Operator"-type program where police are looking for distracted drivers and are prepared to enforce existing laws.

Theme 5 – CONFOUNDING SOCIAL FACTORS

Longer commutes, an increase in heavy traffic, more technology within the vehicle, and a blur between work and non-work time are all factors that result in driver distraction. Issues of individual liberties (i.e., the ability to do what one pleases while operating a vehicle) versus safety considerations for other motorists, passengers and pedestrians are at the center of the debate. Because operating a vehicle in an unsafe manner due to distractions could result in increased insurance costs, fines or points, drivers are hesitant to admit using cell phones or other technological devices while driving.

Finding 5a - Driving conditions have changed significantly in recent years, including greater traffic density and more time spent driving.
One of the considerations with distracted driving is that it revolves around the change in driving conditions in recent years. With more vehicles on the road, the density in traffic increases the time needed to travel a specific distance. Because the commute time is longer, individuals become more engaged in doing other tasks while driving.   More time on the road can result in less time available at home or in the office, thereby resulting in greater multitasking by drivers. Several participants from the self-monitoring assessments indicated that long hours spent on the road led to many distractions of various types, such as, eating, drinking and using cell phones. State leaders mentioned boredom and fatigue as major factors causing the driver to engage in other potentially distracting behaviors, especially in long distance travel.

Participants in the Virginia Chamber of Commerce focus group stated that, in the past, parents were concerned about the use of radios, however the visibility of phones has made the issue of distracted driving much more obvious. Now that there are more cars and traffic there is a need to pay better attention, but instead "we are getting more things to distract us." A large portion of respondents in the intercept interviews indicated spending most of their day behind the wheel. Many stated the need to use cell phones to keep in touch with their office, or be reached by clients or family members.   Police officers also addressed the changed context of driving in today's society, specifically commenting on the "rush, rush, rush" mode in which so many people seem to operate.

Finding 5b - Conditions surrounding drivers have changed, including greater time constraints (busier schedules) and unclear lines between work and non-work time.

Related to the previous finding is that drivers appear to have busier schedules. This may, in part, be based on the need to balance multiple jobs, resulting in the use of several telecommunication devices (cell phones, pagers and electronic communication) to handle work and non-work related responsibilities. Several participants in the self-monitoring study indicated that they used their time in a vehicle to do other things such as eating, drinking or make telephone calls. Police officers mentioned the infinite number of things people are trying to do with very finite time, including people to see, things to do, and places to go. Several officers reported feeling that people try to use time in the car as time to multitask, and that much of the distracted driving problem is a time management issue.

Finding 5c - Significantly more technology is available for drivers, both inherent in the automobile and available for use in the automobile.

A wide range of technology has been made available both within the automobile as well as for potential use in the automobile. For example, electronic seat mechanisms, side mirrors, GPS systems, CDs and other computer devices are "built in" for the use of drivers. Other devices can be transported into the automobile, including computers, fax machines, and Internet browsing technology. The availability of these resources provides temptations for drivers to be distracted from the primary task of driving safely. Respondents in the self-monitoring interviews stated that adjusting vehicle climate and changing radio stations were the two most frequent activities reported by participants. Using cell phones was the fifth most frequent activity reported.

Participants in the Virginia Chamber of Commerce focus groups agreed that there is a plethora of technology in vehicles, including navigation systems, TV, CDs, phones and other equipment. One participant expressed a particular concern about phones with e-mail retrieval capabilities that could then be read by drivers. State leader interview respondents were of the opinion that technology in vehicles has increased the level of distraction in recent years, and that discussions with the automotive industries around placing limits within the vehicle need to take place in the near future. The Virginia Department of Transportation focus group was of the opinion that automobile manufacturers have made driving too comfortable. With the addition of computer ports, cell phone ports, convenient cup holders, and one touch adjustment buttons for radio, temperature and seat adjustment, driving has become as comfortable as sitting in one's own living room.

While cellular phones have received the bulk of attention from the media – and seemingly therefore by the rest of society - the exponential growth rate in the number of cellular phone users in the United States is only an indicator of a rapidly growing field of telematics and In-Vehicle Information Systems. In addition to cellular phone technology, route guidance navigation systems (e.g. global positioning systems) and emergency systems (e.g. General Motors' OnStar) are increasingly available in consumer vehicles, either from the manufacturer or after market, and riding on their heels are Internet, e-mail, fax and many other technological capabilities. The innovation and availability of such technology, however, has outpaced the research side of the issue, with very little information as to how these technologies impact driver attention and performance.

Finding 5d - Tension exists between issues of individual liberty and safety issues.
As with motorcycle helmet laws, the issues surrounding distracted driving reveal a contrast between personal rights and responsibilities and the rights and responsibilities of the larger society. It appears that legislating these issues leads to the individual liberties debate. The question remains, " Should the driver be permitted to do whatever he/she wants to do within the vehicle or should overall safety of the vehicle's occupants and the surrounding environment (pedestrians, bicyclists, etc.) take precedence?" Many participants at the Stakeholders Meeting raised the question of how far efforts should go to regulate or legislate personal activities.

Finding 5e – Drivers do not want to acknowledge cell phone use and its role in automobile crashes, due to what they believe to be the politically correct and economically viable reasons.
As cited earlier, many drivers do not want to acknowledge the fact that they may have been using cell phones prior to an automobile crash or incident. Many of them are aware, due to public discussion and coverage in media presentation, that there are potential risks involved with the use of cell phones and other distracting behaviors while driving the automobile. However, when compared with anonymous self-report behaviors, such as the Response Insurance study, their knowledge of potential distracting or risk behaviors is in conflict with their behaviors. They are also aware of insurance considerations, thereby reducing their likelihood of acknowledging their use of distracting technological devices.

<u>Theme 6 – CULTURE LAG</u>

Technology installed in vehicles - as well as the use of portable technologies has developed more quickly than drivers' readiness to develop safety standards. Few discussions regarding emerging technology have occurred. Those that have surfaced focus more on blaming the manufacturers than working as a team to develop constructive solutions. Direction from national leaders and multiple agencies who have an interest in the issue are needed to resolve both immediate and long-term problems as they relate to emerging technology.

Finding 6a – Technology, innovation and availability are moving much faster than cultural and social "readiness" (with resulting limited etiquette and standards for making safe use of the equipment).
In recent years new technology has emerged very quickly. There are constantly new devices available as well as updated, more advanced versions of existing technological resources. As new equipment appears, whether in the automobile setting or elsewhere in the culture, often etiquette and "rules" of their use have not yet been established. For example, the introduction of telephone answering machines and the introduction of e-mail each generated their own protocols and standards. Similarly, with the use of technological equipment in the automobile, such devices warrant new standards for their use to ensure safety of drivers and other road users. Participants from the self-monitoring interviews indicated that various distractions interfered at times with their ability to drive safely. Several mentioned that they often used cell phones when driving. One respondent from the legislative interviews felt that plans are not clear for addressing emerging technology, as national research is just getting underway. Another mentioned that any new

legislation introduced that required the collection of data at crashes should include emerging technology such as General Motors' "On Star". The impact of the media attention on cellular phones and other In-Vehicle Information Systems technologies can be seen in the organizational, governmental, and international response to IVIS technologies. CTIA has published a brochure on safe cellular phone use in automobiles; the United States House of Representative Transportation Committee has heard testimony from NHTSA officials, the CEO of CTIA, Dr. Thomas Dingus, Director of the Virginia Tech Transportation Institute, and others; the European Commission has issued Recommendations and principles for Human Machine Interface to member states. All of these actions have been in response to the innovation and availability of technology, with very little anticipatory or preparatory research

Finding 6b - The discussions and dialog have not yet been framed appropriately.
Current discussions are focused primarily on blame. Problem solving and potential solutions for this issue have not as yet been found. There is a tendency to jump to a quick solution to address distracted driving rather than examine, in an appropriate and thorough way, the nature and breadth of the entire issue. Legislative respondents recommended that emerging technology be a part of program discussions at the NAGHSR Conference, and that multiple agencies appoint representatives to a steering committee to tackle the issue in a positive and productive way. There is overwhelming emphasis in the literature calling for education and awareness efforts for tackling distracted driving issues. Yet the products and curricula available for the purpose of discussing and addressing distracted driving are few and far between, and the primary theme of legislative initiatives has been technology in vehicles, cellular phones in particular.

Finding 6c - Current efforts are primarily reactive, rather than proactive, in nature.
Most efforts currently tend to be responding to existing problems rather than developing standards for the safe use of new technology in vehicles. Constructive efforts to prevent future difficulties from arising are needed. Consideration needs to be given to having a blend of both the immediate response with long term planning. As mentioned above, across the boards domestically and internationally, researchers, governments, traffic safety professionals, and the public have to respond to the almost overnight changes and innovations in available IVIS technologies. Legislative initiatives regarding technology in vehicles are a prime illustration, with the number of proposed bills in 1999 and 2000 almost non-existent, but over 130 proposals in 43 states and the District of Columbia in the first half of 2001.

Theme 7 - LACK OF CLARITY IN DEFINING THE ISSUE

It is difficult to determine how much distracted driving actually occurs. Judges interviewed estimated that distracted driving caused anywhere between 10% and 90% of the crashes. Greater discrepancies exist when considering the various groups and audiences involved in the issue. There are differing views, for example, as to whether technological devices are primarily responsible for the distractions, and if more legislation is needed or just better enforcement. When discussing technological devices, the emphasis on cell phones seems to take precedence over other

distractions. Regarding healthy dialogues among groups, there was a tendency instead to blame one another rather than take responsibility for crafting viable solutions.

Finding 7a - There is ambiguity about the nature and extent of distracted driving among a range of groups and audiences (including traffic safety personnel, law enforcement personnel, the public, the media, legislative personnel, judges, the industry).

Based on the limited research and evaluation, as well as the lack of clearly defined numbers about the extent of distracted driving, many individuals and groups are not clear with one another about how much distracted driving actually exists. Different groups have different definitions of distracted driving and have various interpretations about the causation of distracted driving. This begins in the research and literature and permeates all other aspects of the issue. As addressed in Theme 1, several reasons exist for the ambiguity or lack of consistency in research and data. Further, the focus upon cell phones as a primary distracted driving activity has moved the discussion towards that behavior specifically, without complementary attention to other distracted driving behaviors. Many of the driver education instructors interviewed agreed that distracted driving transcends all ages, races, and genders. Most individuals engage in distracted behaviors while driving, but those specific behaviors are as different as the reasons behind them.

Attendees at the Virginia Department of Transportation focus group believe that distracted driving is primarily the result of a lack of focus on the driver's part and not necessarily as a result of the use of telecommunication devices. The attendees stated that the problem of distracted driving was around long before cell phones and the media attention surrounding them.

Finding 7b - Police and judges have different views about the need for more specific legislation.

Police and judges view the issue of distracted driving in different ways. Specifically, police believe that more legislation is needed while judges believe that the current laws are sufficient and simply need to be enforced. As discussed earlier, police officers are frustrated by the inability to cite distracted driving behaviors as anything other than reckless. Generally, they view the need for legislation in different ways and base their perspectives on what they see with respect to distracted driving issues.

Finding 7c - Different constituency groups have different perspectives regarding proactive and reactive approaches.

Just as police and judges have different perspectives, other groups have a range of perspectives about proactive and reactive approaches and what is appropriate and necessary. This is found among driver educators, researchers, individuals working who rely on telecommunication devices in the course of their position responsibilities, and those who deal primarily with older or younger driving populations. A majority of participants in the AARP focus group believe that younger drivers are responsible for most distracted driving and that is, primarily, the result of the use of cell phones. As a result, a majority of AARP focus group members suggested legislation banning the use of cell phones as an effective way to deal with the problem.

Finding 7d - There appears to be a lack of appropriate and inclusive dialogue among key constituency groups regarding distracted driving.

Based on varying perspectives of different groups, a tendency remains to identify the problem with other groups rather than one's own. The tendency is to identify the solution in other areas, and at times to blame specific issues and groups for their zealous approaches or their inattention to appropriate methodologies, rather than take responsibility on one's own for finding solutions.

Finding 7e - When the issue of distracted driving is brought up, there appears to be a focus on cell phones.
As noted earlier, the focus of the media's approach to distracted driving has been cell phone use. This is in contrast to the range of other potential behaviors that can contribute to distracted driving. Participants in the Virginia Chamber of Commerce focus group suggested that the emphasis on cell phones seems to overshadow other types of distraction. During the intercept interviews, the interviewer always used the term "telecommunications device" when referring to radios, pagers, computers and cellular phones. When respondents were answering questions posed to them about distracted driving, their answers focused on cell phones and did not address any other type of telecommunications device. Similarly, when driver education instructors were asked to name contributing factors to distracted driving, the majority of them cited the use of cellular phones. These responses were echoed by police officers and in focus groups with driver education instructors as well as AARP members.
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Theme 8 - LEADERSHIP

There is a call for more clearly defined and anticipatory thinking among leadership at both the state and local levels. Awareness of what various community groups and organizations are doing to address distracted driving is lacking, as well as a research-driven, comprehensive approach by national organizations. Aggressive and impaired driving are still priorities at the national and state level as opposed to distracted driving. Because distractions and environment vary so greatly, multi-pronged solutions are necessary.

Findings 8a- Leadership at the national and state levels appears to be lacking.
Both at the state and national levels, clearly defined, future-thinking leadership addressing distracted driving does not appear to exist. Responses to the National Survey revealed that state offices dealing primarily with the issues of law enforcement and traffic safety, while they were the most involved of any groups in addressing distracted driving, still only spent a small portion of their time on this issue. Other groups and agencies including youth and parents groups, health agencies, commercial industry and state departments of education were involved to a lesser extent.

Of the driver education instructors interviewed, only a few could provide examples of what is being done at the national level to address distracted driving. The instructors stated that the National Safety Council provides them with information regarding distracted driving while the American Automobile Association also address these issues, though they were not sure how.

It was mentioned in the legislative interviews that education needs to take place in the minority communities with the assistance of community leaders, as such an approach was successful with seat belt campaigns.

Finding 8b – A widespread call for leadership at national and state levels exists.
Just as leadership appears to be lacking, state and national leaders are calling for clearly defined vision and direction regarding a range of distracted driving initiatives. Not only is the call for a clear vision about what would be appropriate to address distracted driving, but also for identifying specific ways of managing this within an overall comprehensive approach. Legislative interview respondents expressed a need to gather information at the NAGHSR conference and examine research conducted by the National Conference of State Legislatures. They are looking for more direction and information at the national level. In a response to a call for leadership, the Governor's Highway Traffic Safety Commission in one state is in the process of examining all crashes that were caused by distraction, then categorizing the types of distractions.

Finding 8c - Nationally, traffic safety leaders state that distracted driving is not a priority, particularly when compared with other driving issues (such as DUI or aggressive driving).
Overall, the findings point to the issue of distracted driving as not being as significant a priority as impaired or aggressive driving. While they acknowledge that distracted driving is important, it is not viewed at the same level of importance as other potentially dangerous driving behaviors. Some of these, such as drunk and impaired driving, have had decades of attention and still are believed to pose a greater risk than distracted driving. Further, 62% of legislative interview respondents were not aware of any studies, programs, services, policies or laws implemented in states other than their own that addressed distracted driving. Forty percent were not sure that any efforts were being done by other organizations to address the issue either. About 25% were aware of some media campaigns, and another 14% knew of education and training efforts being conducted. It was mentioned that distracted driving is often tied to other campaigns such as seat belt use or aggressive driving. This leads to the conclusion that single efforts focusing on distracted driving either do not exist to a great extent, or are not well known, with a few exceptions.

Finding 8d - Leadership should include a multi-pronged "solution", acknowledging that no one single approach is sufficient to address the problem
Leadership personnel acknowledge that a single solution is not deemed appropriate or viable for addressing distracted driving. They acknowledge that while many of the approaches appear legislative in nature, public awareness, enforcement, training and other approaches are necessary to compliment legislative strategies. Participants in the Virginia Department of Transportation focus group agreed that the primary problems of distracted driving result from individuals getting lost in thought while behind the wheel. Since every citizen has a different lifestyle, the thoughts and concerns that are distracting them while driving are different. The solution needs to be multi-pronged in order to address individuals and their varying concerns. A program designed to help drivers in a dense urban area will have to be different than one addressing drivers in a small rural area. One state's traffic safety leader summarized it well by stating that what is needed are, "realistic enforcement options, packaged media efforts and workable educational programs."

Theme 9 - HUMAN FACTORS and BEHAVIORS

Individuals vary on their ability to "multitask," which has implications for safe driving practices. The literature is unclear on its definitions of primary and secondary tasks, their relationship with the driving task, and their interrelationship with one another and the task of driving. Driving is no longer viewed as a complex activity, especially given the power devices (e.g. power steering, automatic transmission) that make driving relatively simple. This lends itself to taking on other tasks while driving. Driving is viewed as a task that one learns once and never returns for refresher courses unless mandated. Upgrading one's driving knowledge is not viewed as necessary or desirable. Safe driving practices may be dependent upon changing this mindset.

Finding 9a - An upper limit on an individual's cognitive ability to multitask appears to exist, and seems to be related to the cognitive complexity of the task.

Groundbreaking research in the field of human cognition suggests that individuals may have a biologically imposed upper limit on the amount of brain tissue that can be activated at any given time, thereby limiting the quantity of attention one individual has and is able to distribute over multiple tasks. This suggests that attention is a cognitive ability or "commodity" with finite limits in terms of multitasking. This same research also suggests that the reduced brain activation and lower amount of attention per task when multitasking could cause performance degradation in all tasks in which the individual is concurrently engaged.

This is not inconsistent with other psychological studies on the general ability of humans to manage a range of tasks simultaneously. This upper limit may vary, as some individuals are better able to "multitask" than others. Subsequently, efforts to impose certain standards of multitasking, whether by legislation or by company policies, may not seem fair or possible for many people who may not be able to live up to the expectations of their companies, or who may feel unnecessarily restricted by laws or policies limiting multitasking.

Finding 9b - The relative relationship between primary and secondary tasks associated with driving is unclear.

Implicit in any discussion of distracted driving is the understanding that any driver engaged in any task other than and in addition to driving has made a conscious or unconscious decision to carry out tasks secondary to driving. There is also the assumption that the driver consciously or unconsciously views driving as the primary task. Typically, the primary task when driving is to operate the automobile in a consistently safe manner. When other tasks are involved while driving, they may temporarily take precedence as a primary task. What is not fully specified or document is the manner in which secondary tasks are handled, so that the actual primary task of driving the automobile safely is maintained.

There is minimal discussion in the research literature regarding the workload or attention demands specifically associated with any secondary task. However, there is mention of a potential distinction between those secondary tasks that involve or are directly related to driving-related tasks (e.g. adjusting mirrors) versus those tasks that are indirectly related to driving (e.g. navigation) or entirely unrelated to driving (e.g. eating). There is also very little exploratory research into the additional tasks associated with the secondary tasks, thereby placing further attentional demands on a driver (e.g. reading a phone number from a piece of paper while dialing a cell phone while driving). This combination of potential distractions, when taken into consideration along with the host of other factors including the driver, the vehicle, the

environment, and the situation makes it highly difficult – if not impossible – to accurately associate a specific degree of risk or distraction with a specific device or behavior.

Finding 9c - Many drivers do not see driving as a complex activity.
This finding suggests that many drivers view driving as a fairly simple and relatively easy activity that does not require their full attention. This is complemented by the fact that the operation and manipulation of the automobile has been made simpler through power devices and a range of improvements in the vehicle. The comfort and ease of operating the automobile gives the driver the impression that the actual safe driving of the vehicle is relatively simple and straightforward. However, the complexities are subtle and often elude the driver on a conscious level. The data from the self-monitoring survey suggested that most participants used their time while driving for conducting other activities such as eating, drinking, and talking on cell phones.

Finding 9d - Many drivers do not see the need to improve or update their driving skills.
This finding examines the relative importance and complexity with which drivers view the driving activity. Driving is viewed as a skill that is learned once and then retained for the duration of one's lifetime. The skills required for the driving task are not ones that are renewed on an ongoing basis. Driver improvement classes are viewed as mandatory only for those who have traffic safety offenses. With some tasks, such as computer-based knowledge, continually upgrading skills is often viewed as desirable and helpful. A similar mindset about updating driving skills is not found.

RECOMMENDATIONS

In this section, recommendations are discussed within each of the thematic areas for which findings have been identified. For each recommendation, a brief outline of the nature and scope is given to provide greater insight regarding the content and context of the recommendation. Detailed elaboration is not provided for each of these recommendations; these are best accomplished through ongoing discussions among key players about the issues surrounding distracted driving.

It is also important to note that each finding does not necessarily correspond to a specific recommendation. The findings have been specified in as great a detail as possible; some findings are contextual or historical and, as such, do not readily lend themselves to a recommendation. More helpful is the overall perspective of what recommendations emerge from the set of findings within a thematic area.

Finally, the issue of distracted driving is such that there are several recommendations that overlap with others. These will be cited throughout the document as appropriate.

Theme 1 - RESEARCH

The research theme incorporates recommendations regarding the needed increase in breadth and depth of data collection, research and evaluation. *For each of the following recommendations, attention to cell phones and other telecommunications devices should be emphasized and addressed.*

1a. Concerted efforts should be undertaken to clearly define distracted driving.
This is a central issue, as current research as a whole is not clearly defined in its conceptualization or operationalization and covers a range of factors. The current lack of a clear definition about distracted driving confounds research, making findings from different studies non-comparable, and raises barriers and limitations in data collection and analysis efforts. Further, this lack of definition makes conversation about distracted driving difficult, as individuals may have different interpretations of the same concept concurrently. Finally, this makes enforcement a difficult task, as law enforcement personnel need clearly defined behaviors and standards in order to reasonably accomplish their responsibilities. Within this recommendation, it is important that a definition of distracted driving be prepared to guide discussion, policy, research, evaluation, enforcement, and citizen behavior. This definition would benefit from clearly specifying the range of behaviors of concern, and, where feasible, their relative "intensity" or "contribution" to distractions from the primary task of driving.

Within this recommendation is the acknowledgment that a normal tension exists between how judges handle their responsibilities and how police officers handle their responsibilities. Judges see the outcomes of crashes and violations of the law; these cases require flexibility for them to make an appropriate determination for each case. Police officers see the driving behavior, and want to know what to do in order to address the behavior. For individuals in these roles, in particular, as well as for those in training, education, and public awareness roles, greater clarity is

needed about distracted driving issues and *what is appropriate to do and not to do* in order to maintain a safe driving environment.

1b. Clearly defined research studies are needed to define, validate and determine the extent of distracted driving.

Parallel with the previous recommendation, the nature and extent of the "problem" related to all distracted driving is unclear. While numerous studies have been undertaken, there is often a lack of consistency between studies, not only in terminology but in data collection and analysis methods as well, thus making it difficult to make comparisons. The innate nature of the distracted driving issue is such that inherent limitations exist regarding what research methodologies can be employed and what naturalistic and real-time data can be collected. While it may not be feasible to entirely overcome such limitations, developing the most effective means for addressing and working around them demands collaborative efforts locally and nationally, publicly and privately. With the implementation of this recommendation, a better understanding of the scope of the distracted driving problem will be specified. Within this recommendation, it would be appropriate for organizations and agencies within Virginia to identify relevant, clearly defined and focused studies on this issue, including feasible and appropriate research methods for application. It would also be appropriate for state leaders to encourage studies on a national level.

1c. Research and evaluation studies to be performed regarding the role of information technology devices with distracted driving should be conducted in real-life conditions.

To adequately and most accurately assess potential distractions from the primary task of driving, as well as safety implications, it is important that this assessment be done in conditions that approximate, to the greatest extent possible, the real world of drivers. This means conducting studies in real time situations and in real driving environments (without, of course, violating ethical boundaries and placing research subjects at risk). All too often, studies are currently conducted in simulated conditions incorporating a test track or computer-generated simulation; while these controlled environments can be helpful in guiding the discussion and in informing policy decisions, they make it more difficult to extrapolate to real world environments and settings.

1d. Research and evaluation efforts should incorporate existing sources of information.

These sources of information can provide information that has already been gathered; they may also be supportive in providing technical support and vehicles for gathering new information. For example, insurance companies may have information already gathered, but not coded in a manner that provides a more complete understanding of distracted driving. Similarly, law enforcement personnel may not currently gather information of a particular type, but could be encouraged to do so with appropriate forms, data collection standards, criteria, and training in specific data collection.

1e. A range of personnel who have regular access to the target audiences should be utilized to collect data.

With this recommendation, information gathering from a research and an evaluation perspective can be enhanced. Specifically, front line people, such as police, VDOT employees, bus drivers, couriers, taxi drivers, and others can be engaged to gather data and information about their observations or experiences. This data collection could be about their own behavior or attitudes, or it could be about their general experiences (based on their role) with others, such as drivers in

general. Similarly, supervisors of these individuals could be engaged to collect data regarding their employees; this may include, for example, supervisors of those whose professional responsibilities include driving (this would also include those whose driving responsibilities include using some form(s) of in-vehicle technologies), and the supervisors' observations of their employees' behavior and attitudes. The focus of this is primarily to gather information about what is happening on the roadways in real time, real world driving environments, and not for the purpose of incriminating individuals.

1f. Research and evaluation documentation should attend to the range of individual variabilities regarding multitasking and its impact on distracted driving.
Specifically, current research suggests a range of variability regarding the ability of individuals to multi-task. This multi-tasking skill or capability varies from one person to the next, and is undoubtedly affected by a confluence of variables, including individual factors, environmental conditions, the cognitive complexity of the tasks, and the primary or secondary nature of the tasks. To the extent possible, research and evaluation should attempt to determine the relative importance of each of these factors, and develop criteria or recommendations regarding the role of these factors in terms of developing educational, policy, or legislative strategies for addressing distracted driving.

Theme 2 – EDUCATION/AWARENESS/TRAINING

2a. The general public should be educated about distracted driving issues through public awareness campaigns and similarly appropriate strategies.
Based on the general confusion about the nature and scope of distracted driving, the disproportionate attention cell phones have received, and the tendency for culture lag to exist, it is not surprising that the general driving public is not clear about the range of behaviors that might constitute unsafe or potentially unsafe behavior. These drivers would benefit from a variety of public awareness materials including campaigns, tips for maximizing safe driving behavior and avoiding unnecessary distractions, as well as better ways of handling the behaviors of other drivers around them. While several quality approaches to address distracted driving, including cell phone use, have been identified in the study, many more education and awareness initiatives are needed. With this recommendation, a call is placed for increased quantity and quality of approaches, thereby expanding the public's awareness about the range of issues associated with distracted driving and, ultimately, a safer driving environment.

2b. With any awareness or training efforts, attention should be paid to factors such as perceived severity and perceived susceptibility.
Essential to awareness and training activities that occur, is the inclusion of focused efforts to identify clearly what behaviors are and are not appropriate. This is true whether the audience is general citizens, professionals whose driving might become distracted or intermediaries reaching either of these groups. This recommendation calls for efforts that move beyond the approaches currently implemented by the non-profit and private sectors.

Overarching this emphasis is an individual's perceived susceptibility or personal risk for becoming involved in a situation (i.e., a crash). In addition, attention should be given to an individual's

perceived severity, which relates to a person's opinion about how serious the outcome would be of their driving distracted (i.e., how much personal damage might occur if they were in a crash). This may include self-assessment monitoring, identification of potential risk behaviors, and review of one's own potential vulnerability. This recommendation emerges from the Health Belief model, found in the public health and health behavior literature.

2c. Educational approaches should include skills training about appropriate and safe multitasking.
Educational strategies should include more than heightened awareness, as awareness alone is not sufficient for addressing a change in behavior. Educational efforts should include a range of skills training activities to help the audience (whether the general driving public or those whose profession includes driving) maximize their abilities for appropriate and safe multitasking. This training should expand upon the limited training on this issue that already exists. As indicated with the research findings, individuals have a range of abilities with multitasking; thus, this recommendation should <u>not</u> be interpreted as meaning that any multitasking is safe and appropriate. Within the scope of this recommendation, individuals should be made aware of proper times, places and settings when multitasking can be safe and appropriate, as well as strategies for avoiding the need to multitask whenever possible.

2d. Driver education programs, both for novice drivers and with driver improvement programs, should incorporate significant attention to distracted driving issues.
Based on the current limited attention to distracted driving in driver education efforts, significant increases in these initiatives should be undertaken to improve driver awareness, understanding, and, ultimately, skill in distracted driving issues. In conjunction with the previous recommendation, the emphasis should be upon if, and then when, where, and how multitasking can be done in a safe and appropriate manner. While some curricula, including that in Virginia, is beginning to incorporate attention to distracted driving, this would benefit from even greater attention.

2e. Driver improvement programs should be encouraged for the general driving public, with attention to possible incentives for involvement.
Currently, most individuals involved in the majority of driver improvement programs are court-referred. While some programs do exist for select populations (e.g., the 55 Alive program for mature drivers), the general driver does not have access to, but would benefit from enhanced awareness and skills training regarding, distracted driving. These skills-based training and education efforts could focus on a range of issues, including preventive and reactive strategies, as well as self-monitoring and observation of others. This will help drivers in their reeducation and retooling of skills, which may benefit from improvement, particularly after many years of driving experience during which driving laws, signage, and context have changed. A range of incentives to promote their participation might be considered, including an adjustment with insurance premiums as well as safe driving points with the driver's license.

2f. More employers should identify ways in which they can be involved in addressing distracted driving.
While some employers are already addressing distracted driving, more would benefit from increased focus on this specific safety issue. Approaches to be included might include education

and awareness efforts, skills training, and policy adjustments, each of which could complement one another.   Further, this might also include environmental changes, such as the location of equipment in the vehicle.   The primary thrust of this recommendation is with employers whose employees are engaged in driving as part of their job.   However, this could also include employers who provide information to employees to assist in their overall quality of life and safety considerations, possibly through worksite health or employee assistance programs.

2g. Young children should be educated on distracted driving issues so that they can serve as a resource for their parents.
Engaging young children as intermediaries can be helpful in reaching their parents, as youth who gain knowledge about what constitutes safe and unsafe behaviors can provide motivation to parents regarding safe driving. What occurred with youth talking with their parents about the harmful effects of tobacco use, could be replicated with safer driving.   For example, if children learn that driving safety is compromised when a driver is engaged in some type of distracting activity, they may comment to a parent who engages in this activity.   Similarly, children and adolescents of driving age, or approaching the driving age, typically look to parents and guardians to model the appropriate behaviors.

2h. The media should be better engaged to help deliver a comprehensive message on distracted driving.
The public media is in a good position to communicate safety messages to the public, as well as to those in leadership positions.   The public has already gained a significant amount of awareness about the dangers and safety considerations associated with driving, with particular recent attention to the potential role that cell phones play with driving distraction. Based on this recent history, the media can fill a similar educational role in promoting awareness, and potentially skills training, on driving safety and appropriate multitasking activities.

2i. Specific groups, such as police, judges, young drivers, and older drivers, should be educated and trained about ways they can help address distracted driving.
This recommendation extends the scope of who can be involved with distracted driving issues, based on different spheres of responsibility.   Currently, judges see cases that involve crashes; they need flexibility to make appropriate determinations on these cases.   Similarly, police officers see driving behavior, and in some instances related behavior (such as distractions); they need guidance regarding what to do to address this situation. Some of these groups, such as young drivers and older drivers, would receive information about their own driving skills.   Judges would gain additional insight on how to apply existing laws; police would receive training regarding specific skills, such as how to multitask, observe and record driver behaviors.

Theme 3 – LEGISLATION AND POLICY

3a. Any legislation to be introduced should be supported by current research and evaluation findings.
With the current lack of quality research and evaluation data, legislative initiatives can be difficult to identify and support.   Since research and evaluation data is emerging quite rapidly, caution should be practiced in considering legislative approaches.   Legislation without quality data can

become confusing for the driving public as well as law enforcement personnel, and can be more difficult to change should emerging or later research reveal that a legislative action was inappropriate.

3b. Better data needs to be collected regarding the specific role played by the use of cellular phones prior to introducing legislation.
Consistent with the previous recommendation, legislation that addresses the use of cellular telephones should be based on quality research and evaluation studies employing research designs that closely approximate real time and real driving environments. As noted in the literature review, much of this research is currently underway. Thus, policy and legislative proposals designed to incorporate these results or target these factors in particular should await their release.

3c. Legislative and policy approaches are appropriate to encourage education and data collection initiatives.
Currently, legislative approaches with distracted driving, and particularly with telecommunications devices, tend to emphasize criminalization; these approaches incorporate restrictions and standards of behavior. This recommendation suggests that legislation and policy initiatives are appropriate to focus on education and data collection. Specifically, educational efforts can foster greater awareness among the general driving public and key intermediaries regarding the role of distracted driving; this may include ways drivers can increase their awareness of potential distractions they currently face, as well as ways of responding to the distracted behavior of other drivers. In addition, legislation and policy approaches can be used to encourage greater data collection and behavioral monitoring strategies, including means that can be employed by law enforcement personnel and the establishment of task forces and studies to further support quality research and evaluation. Of the 8 initiatives proposed and passed in 2001, 3 focus on improving and mandating data collection efforts to help identify the nature and scope of the distracted driving problem. Subsequent to the presence of quality research and evaluation data, legislative and policy approaches that incorporate sanctions associated with certain behaviors would be appropriate.

3d. Individual worksites should review ways in which they can promote greater attention to issues surrounding distracted driving.
Regardless of the nature of the business, it is appropriate for worksites to identify ways that distracted driving issues can be appropriately handled. For some worksites, particularly those where driving is an essential part of the business (e.g., delivery services, couriers, law enforcement, public transportation), policies regarding potential driver distractions (including but not limited to the use of work or personal telecommunications devices) are most appropriate. For other worksite settings, where driving is less involved or not involved at all, it still may be appropriate to attempt to reach employees about safety considerations associated with distracted driving, perhaps as part of a larger employee wellness program.

3e. Prior to introducing new legislation, attempts should be made to determine whether current legislation is already sufficient.
Due to the finding that some current legislation is not being enforced (at various levels and for various reasons), it would be appropriate to monitor current legislation to determine whether or not it is sufficient. In addition, current legislation may meet emerging needs with refinement in

wording and its interpretation.   Ultimately, law enforcement personnel and judges need options that are consistent with the behavior that has an impact on driving safety; currently, with only reckless driving as the option for citation, a judgment call is necessitated.

3f. Multiple aspects of the driver licensing process should incorporate increased attention to distracted driving issues.

This recommendation incorporates a range of elements linked particularly to the new driver.   The preparation processes incorporated with driving, such as the educational approaches and Virginia Driver's Manual, should include detailed information regarding distracted driving. In addition, the licensing exam - both the first exam as well as any license renewal exams - should address a range of questions on this issue. Further, the *Juvenile Driver Licensing Ceremony* is appropriate for including attention to distracted driving issues, and can serve as an appropriate medium through which to remind experienced drivers (in this case parents) of distracted driving issues. These components help stress the importance of distracted driving from a range of sources.

Theme 4 – ENFORCEMENT

4a. Crash reporting and citation forms should be changed to included attention to distracted driving behaviors.

It will be helpful to have data collection processes implemented that give attention to distracted driving, as stated in an earlier recommendation on training. Currently, crash reporting and citation forms do not include a formal, standardized location where this issue is specifically identified and addressed.   Not only will a uniform process assist in the data collection and review processes, but it will also assist law enforcement personnel in their efforts to examine and review the scene of a crash with this perspective in mind. Most crash reporting typically includes whether safety belts were worn and whether alcohol was involved. This recommendation would help identify, in a systematic way, the nature and extent of distracted driving behaviors.

4b. Enforcement efforts in other states should be reviewed.

The attention given to distracted driving issues is evolving and increasing in states throughout the nation. The way that various states handle the data recording, including both crash reporting forms and citation forms, should be reviewed to determine the best ways of gathering data about the nature and extent of distracted driving, as well as to provide some data for comparisons over time and across sites.   In addition, the ways that other states monitor the existence of distracted driving should be examined in terms of their rigorousness and potential application in Virginia. These various alternative approaches used by different states and localities should be gathered and reviewed for consideration.

4c. Laws that currently exist which encompass distracted driving behaviors should be enforced.

Consistent with the earlier recommendation about not having new legislation is this recommendation about enforcing the laws that already exist.   Noted through the findings is the belief that new laws are not needed to adequately address distracted driving; what is needed is the enforcement of laws that already exist, as well as the modification of selected laws to encompass the behaviors and factors inclusive in distracted driving. Current laws that incorporate distracted driving components are available in the state.

4d. Law enforcement personnel should look for opportunities for "teachable moments" regarding distracted driving.

When law enforcement personnel encounter a situation that is the result of distracted driving, it is desirable to educate the driver about risks and safety considerations associated with driving distractions. While enforcement of the law for safety considerations is of primary importance, there may be situations where a fine, ticket, citation or other enforcement response is not appropriate or is not available. This recommendation is designed to highlight the fact that law enforcement personnel are in an excellent position to promote safety among the driving population, and should emphasize education as a sole response or a complementary response in such situations.

Theme 5 – CONFOUNDING SOCIAL FACTORS

This thematic area is linked, in particular, to two other thematic areas: Research and Education, Awareness and Training. The evolutionary nature of distracted driving issues is highlighted with attention to current and emerging research. Further, the content and approaches for addressing this with key constituencies, including the general driving public, shows the need to remain up-to-date with emerging research and strategies.

5a. Advocacy should be undertaken with the original automobile manufacturers and designers, and manufacturers of "after-market" in-vehicle technologies, to continue to identify ways of making their products safer.

With continued changes in technology and equipment, it is important that dialog about potential distraction considerations be undertaken prior to the actual manufacturing of the automobile or vehicle. Within this recommendation, technological modifications should be examined with regard to the potential distraction for the use of the device (what attention is required from the driver, and what is the magnitude of the attentional resource demand); the frequency of use with the device; the length of time it may be used or takes to use; where it would be situated in the vehicle; and conditions surrounding its use (such as a lockout feature when the vehicle is in gear). This recommendation is designed to consider a range of safety factors when modifications are being considered for automobiles and other vehicles. This may have to do with the placement of the device, the features associated with the device, the conditions under which it may be used, and, under some circumstances, whether or not to proceed with its availability.

5b. All technology made available, whether installed in vehicles or potentially used in vehicles, should include information about how to use it safely.

With any device or equipment that can be used in an automobile or other vehicle, it is very important that this include specific information about ways of using it safely. Since the nature and scope of technological devices has changed in recent years, it is anticipated that this will continue in the same manner in years to come. Thus, there will undoubtedly be equipment or devices that are not designed for use in an automobile or other vehicle, but which becomes used in these settings, such as the personal digital assistant on the market today (i.e. hand held computer, or pocket pc). Thus, monitoring of the ways in which these are used in a potentially distracting way when driving should continue, with new instructions made available as appropriate. This recommendation emphasizes the need to communicate clearly with drivers about how new

resources might be used. Further, the emphasis should always be on how and when to use these devices with respect to maintaining safe driving activities.

5c. Public discussions and forums should be held to discuss distracted driving issues.
Because of the ongoing and emerging changes with distracted driving, and with much of the controversy surrounding what constitutes distracted driving, public debates and dialogues should be scheduled. These town hall-type meetings and dialogues will help promote greater public awareness about concerns surrounding distracted driving, as well as engage communities in generating what they believe to be community-appropriate strategies for addressing distracted driving. With the ongoing changes in society and the context of driving - including greater traffic, time constraints, increased technology, and the confluence of these factors - it is important that the general driver be kept up-to-date and aware of new information. Further, concerns exist about the potential interface between public safety and personal liberty issues; thus, discussion and debate about these elements should be promoted to increase public awareness. Thus, included in these discussions and debates should be topics of interest and relevance to drivers not acknowledging the linkages between specific distracted driving factors (whether inside the vehicle, outside the vehicle, or inside the individual's thinking processes) and the appropriate and safe behavior with driving.

Theme 6 – CULTURE LAG

6a. Norms and acceptable etiquette for safe driving practices with regard to distractions should be developed based on what is learned through ongoing public discussions.
With emerging technology and evolving perspectives held by citizens, the appropriate and safe standards for handling distractions should be clearly specified and communicated. Due to the overall culture lag of implementing desirable attitudes and behaviors, specific standards will be expected to evolve. The dialog that occurs (through the theme on confounding social factors) will help shape these specific standards. It is anticipated that there will be an ongoing balance or blend between what is appropriate (in an ideal sense) and what is realistic (based on the perspective of the driving population). This blend will be expected to evolve over time, as what is realistic ties into what is most appropriate from the current point of view.

6b. Emerging technology should be anticipated as strategies identified for implementation regarding distracted driving are discussed and implemented.
Based on the relative quick speed with which technology gets incorporated, a way of minimizing the culture lag is to anticipate these technological changes. Specifically, as etiquette and safe driving standards are discussed, an emphasis should be upon potential new approaches and technological advances that might be considered. This helps to maintain the current nature of the initiatives, so that these do not require updating every year or two.

6c. Safety principles should be developed for in-vehicle information and communication systems to encompass current and potential future devices.
These principles will be helpful to manufacturers and others who develop new technology for inclusion in vehicles. Some standards may address access, ease of use, ease of understanding, and

other factors, particularly as they might affect the important safe driving behavior of the individual and in what capacity they compete for attentional resources. Just as with the previous recommendation, these principles would anticipate potential future devices so that their inclusion is clear, thus minimizing the need for continuous updates.

6d. A range of groups should be engaged at the local and state levels to discuss ways of assisting the various approaches to be consistent and synergistic.
A variety of groups should discuss legislative, policy, educational, and other approaches used to address distracted driving. These groups include stakeholders (such as those with a vested interest in elements contributing to distracted driving), intermediaries (such as judges, law enforcement personnel, worksite supervisors), and drivers.

Theme 7 – LACK OF CLARITY IN DEFINING THE ISSUE

7a. Efforts that are both research–based and realistic should be encouraged to help reduce ambiguity surrounding distracted driving.
As cited in the findings of this study, current lack of clarity is found regarding distracted driving issues. A range of approaches should be encouraged from a research and realistic perspective to help reduce this lack of clarity. As greater clarity is obtained, greater public awareness (and, hopefully, buy-in) should be found to reduce confusion about what constitutes distracted driving. Further, with greater specificity, drivers should learn ways in which their personal behavior can be made safer. These might include joint government-private industry research efforts, community forums, or Stakeholder Discussion.

7b. Ongoing communication should be maintained with a range of key constituencies about new research and new findings regarding distracted driving.
It is important to maintain ongoing contact with a variety of key constituencies who are directly and indirectly involved with addressing distracted driving, and maintaining highway safety. These include media, educators, law enforcement personnel, judges, driving instructors, parents, and others. With these individuals kept up-to-date regarding what is occurring regarding innovative strategies for addressing distracted driving they are more likely to understand specific issues and areas of concern, as well as identify potential areas of action through their roles.

7c. Media vehicles should be encouraged to further develop messages about the breadth of distracted driving issues.
Currently, the media appears to have been quite successful in raising public and legislative awareness about the cell phone aspect of distracted driving. With this recommendation, they are encouraged to expand that interest to the broad range of concerns surrounding distracted driving. Media approaches are encouraged to expand the development, both in depth and in breadth, regarding distracted driving and the promotion of a safe driving environment. As a result of this emphasis, it is expected that citizens and intermediaries would have a better understanding about the range of ways in which they can increase their consciousness with respect to their own behaviors and skills to become safer drivers.

7d. A range of groups should be convened to discuss their varying perspectives about distracted driving.

This type of Stakeholder Discussion will help clearly identify the various points of view and perspectives surrounding distracted driving.   For example, the fact that judges and law enforcement personnel were observed to have different perspectives about distracted driving and to identify different strategies to address the issue highlights the value of bringing them together to articulate their different and similar perspectives.   This engagement in problem-solving discussions can be quite beneficial, just as it was helpful several decades ago to have a range of different constituencies together to address drinking and driving.

Theme 8 – LEADERSHIP

8a. Approaches attempting to address distracted driving should be shared among state and local leadership personnel.

State leaders have clearly articulated a call for those approaches found to be particularly helpful; they are desirous that others share their best practices in order to assist in their own state's implementation activities.   In addition, strategies and approaches that are found *not* to have the desired impact should also be shared, particularly with insights regarding what seemed not to work, and suggestions for improvement.   This sharing is helpful for advancing the collective knowledge about what does and does not seem to work in addressing distracted driving, and thus promoting greater highway safety.

8b. The definition of distracted driving, and of safe driving practices, should be made as clear as possible.

The current ambiguity surrounding distracted driving, and what constitutes "distracted driving," limits a clear understanding of the issue among a range of individuals and groups. With greater clarity in defining distracted driving, leaders at the local, state and national levels can help promote greater public awareness about behaviors that are desired and not desired.

8c. Oversight and benchmarking should be maintained at the state level regarding distracted driving.

The fact that a clear understanding about the nature and scope of distracted driving is evolving requires due vigilance about this issue, particularly in upcoming years. Based on the current attention to this issue and the observation that many of the insights, perspectives, and approaches used to address this will undoubtedly evolve in the near future, it would be appropriate to maintain close scrutiny on this issue.   This recommendation further includes the identification of benchmarking criteria, whereby progress can be monitored on an ongoing basis to determine whether a positive difference is being made.   Specifically, this may include monitoring the emerging research and evaluation findings, and assisting in whatever ways possible with national research or data collection efforts. It may also include engaging the range of appropriate groups and constituencies to help ensure that attention to this issue incorporates the represented diversity both professionally and demographically.

8d. Leadership personnel should acknowledge the need for a multi-pronged, consistent approach to address distracted driving.
Within this perspective, the range of aspects associated with safe driving would be incorporated, including enforcement, education, legislation, curriculum, laws, public awareness, and driver licensing. Through engaging each of these approaches in a consistent, reinforced manner, the likelihood of obtaining the desired result of safe driving with the driving population is increased. Said differently, if various groups do not promote a consistent, reinforced message, the driving population will likely receive mixed messages, and will not be clear on what is desired for their behavior.

8e. Leadership should be as informed and vocal as possible at the state and national levels. With a range of individuals seeking the leadership of others on distracted driving issues, it remains imperative that leaders are as informed as possible. Through the range of recommendations identified, they should take the opportunity to become as up-to-date as possible on distracted driving research, evaluation, and potential counter-strategies. With this heightened awareness, they should actively promote, through their various constituencies and roles, ways of further enhancing safe driving behaviors. The vocal nature of this informed leadership will undoubtedly be helpful in promoting greater attention to distracted driving issues.

8f. The media has an important leadership role in helping address distracted driving.
The media can be helpful in a variety of ways, from attracting greater attention to the breadth of issues and factors associated with distracted driving, to providing helpful coverage of legislative, educational and enforcement approaches dedicated to reducing distracted driving. They can also help prepare packaged media that can be used widely at the state and local levels. Further, they can work closely with the task force to help identify ways of more effectively delivering safe driving messages.

Theme 9 – HUMAN FACTORS AND BEHAVIORS

9a. Drivers should be reached through the vehicles and mechanisms appropriate to their setting and role.
With this recommendation, it is important to reach drivers "where they are," whether based on their specific role (e.g., as a worksite manager or law enforcement officer), their demographics (e.g., as a mature driver reached at an AARP meeting), or interests (e.g., voluntary or required). This recommendation is consistent with the importance of current research and evaluation findings, and the importance of addressing drivers and intermediaries based on their identified area of interest.

9b. Individuals should be aided in understanding their own individual variability, within the context of safety considerations.
It is important to clearly communicate to the driving public that research shows that individuals have a range of abilities with respect to multi-tasking. While many individuals may assume that they are at the higher level of capability, it is important to communicate that this is not the case. Further, even with a greater capability for multi-tasking, individuals' safety limitations should be set. With this recommendation, it will be helpful to assist individuals to understand and

accept their own individual variability and vulnerability.   Linked with this is the importance of not creating a culture of expecting that multiple tasks can be done without safety risks.

9c. Those who implement information and awareness strategies should understand the range of needs of various audiences.
Specific abilities will vary based on factors such as training, individual differences (see finding above), and age. This presents particular challenges for those implementing these communications and related approaches, as "one size will not fit all."   This recommendation is based on the fact that individuals will learn and be motivated to change based on their own internal factors; program planners and leaders will benefit from acknowledging this at the outset in their planning activities. It is suggested that this recommendation be incorporated with the awareness, education and training cluster of recommendations.

9d. A repertoire of packaged media will be helpful in presenting clear, consistent messages.
A range of approaches - tested and evaluated with a range of audiences - will be helpful in addressing distracted driving.   Greater resource expenditure at a more centralized level (state, region, or nation) will facilitate the search for clear, consistent messages that are insightful and motivating for the driving public.   This packaged media strategy is designed to assist those who implement approaches on the local level to adapt or incorporate this message for their specific audience. This approach may include drop-in media messages, public service announcements, print ads, artwork, and similar approaches.   Clearly, this recommendation links directly with those in the awareness, education and training segment.

9e. Realistic and workable approaches should be promoted.
Realistic enforcement options should be made available for local and state law enforcement personnel; this includes the need to have enforcement strategies that are suitable for different populations.   Further, workable educational programs should be included, such as a range of strategies within a variety of settings that can be adapted and used as needed.   This recommendation emphasizes strategies that can be used in a host of settings, and with appropriate audiences.