A Comprehensive Law Enforcement Deployment Model to Reduce Fatal and Serious-Injury Motor Vehicle Crashes Caused by Drunk Drivers in Wisconsin

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The undertaking of this seminar research project began as a professional challenge. This was not because of the magnitude of such an effort, but instead the profound reasons for which I felt compelled to address the public safety role to further reduce the dangers associated with drunk driving on our highways. My twenty-five-year career with the Wisconsin State Patrol has been professionally rewarding as a solemn privilege and obligation to protect and serve the citizens and visitors to our great state. A central aspect of this has been promoting and ensuring their safety and security as they travel on the highways, and on the streets and roads of our communities, to enjoy family, friends and life in the beautiful surroundings that Wisconsin offers. With this dedication to service, I have embarked on a theme in my graduate education of more thoroughly understanding the responsibility of law enforcement in those efforts and how we, as sworn officers, can refine and improve our methods and practices. I certainly do not profess to have discovered any sort of silver bullet solution or approach in this seminar paper to solve the continuing challenge that drunk driving and its potentially deadly consequences to the public on our highways and roadways presents. Instead, I have gathered many perspectives and theories that have been studied, in various ways over the years, and combined them in a cohesive model for the deployment of law enforcement resources to reduce drunk driving. With this, I offer my recommendations with humility and respect to all of those professionals dedicated to improving traffic safety in Wisconsin and throughout the United States.

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Abstract

A Comprehensive Law Enforcement Deployment Model to Reduce Fatal and Serious-Injury Motor Vehicle Crashes Caused by Drunk Drivers in Wisconsin

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Under the Supervision of Dr. Banachowski-Fuller

Statement of the Problem

Drunk drivers pose a serious threat to public safety in Wisconsin as evidenced by annual numbers of fatal and serious-injury traffic crashes they cause. The overall downward trend of those numbers has been compelling however; alcohol-related crashes continue to be significant. The likelihood of motorists encountering a drunk driver on Wisconsin's highways, almost anywhere at any time, makes the risk of being killed or injured in a resulting crash unacceptably high. A comparative example can be drawn regarding homicides and non-negligent manslaughter in Wisconsin during 2015, to the number of alcohol-related crash fatalities in that same year. There were 190 alcohol-related traffic fatalities and almost 2,700 others were injured in such crashes (Wisconsin Department of Transportation, 2018). Even though the homicide and non-negligent manslaughter numbers were somewhat higher, an important difference between them and the alcohol-related crash fatalities is the geographic dispersion of each. There were 145 homicides that occurred in the City of Milwaukee alone in 2015 and only twenty counties altogether, mostly in urban locations, experienced this crime (Federal Bureau of Investigation, 2018). Meanwhile, alcohol-related fatal traffic crashes occurred in 54 counties during 2015 (Wisconsin Traffic Operations and Safety Laboratory, 2017). This suggests the public is more susceptible to being killed as a result of encountering a drunk driver than a homicidal individual.

The issue of reducing traffic crashes caused by drunk drivers requires solutions that include a law enforcement component with the goal of changing the culture of drunk driving acceptance in the long term and increasing detection and arrests in the short term. Aspects of more refined law enforcement efforts have emerged that appear to have proven effective in recent years (Romanski, 2018). Analysis of theoretical foundations and empirical results of these initiatives, along with others, may point to a more comprehensive enforcement approach statewide in both urban and semi-rural environments.

The application of improved tactical measures to support enforcement strategies should be based on predictive analytics, including crash, enforcement and other data, using an "intuitive model" to deploy resources that increase actual and perceived "enforcement presence to enhance safety" (Romanski, 2018). Enforcement methodology must also be nested with social messaging against drunk driving in order to accomplish this. The message needs to counter a cultural attitude of acceptance of drunk driving, the underestimation by drunk drivers of their impaired ability to drive safely, and the apparent perception that assured detection by law enforcement is not likely (Roberts and Fillmore, 2017). Detection should result from observed dangerous driving behavior rather than other reasons because the public may otherwise believe that drunk driving behavior is not that dangerous. Law enforcement deployment efforts, and related media, must reinforce the social message that drunk driving is not common, that related driving behavior is dangerous and detection of it is assured. A comprehensive Operating While Intoxicated (OWI) enforcement deployment model that considers not only what officers do in the short term, but how they do it, consistent with the longer-term effort to change the cultural acceptance of drunk driving is essential. This, along with other non-law enforcement programs and efforts, may serve to further reduce the dangers posed by drunk drivers to public safety.

Method of Approach

Secondary empirical data and qualitative research referenced in this paper supports elements of a recommended comprehensive law enforcement strategic and tactical approach in Wisconsin to further reduce drunk driving and its resulting traffic crash fatalities. This includes theoretical discussion and application of deterrence, displacement, directed patrol, saturation patrol, high-visibility enforcement and education, zero-tolerance policing and media outreach. The context of discussion includes a brief overview of public/private efforts being made in regard to legal aspects, the court system, sanctions, and partnerships among the business, other governmental and non-governmental agencies, healthcare and non-profit organizations. Both short and long-term goals and outcomes of the approach consider increased compliance with applicable laws, reduced alcohol-related crashes and a meaningful change in the general cultural acceptance of drunk driving. Analysis supports a proposal for a more comprehensive law enforcement effort that focuses on cultural change messaging; in terms of deployment strategies and tactics, enforcement action, and media as opposed to a more random approach.

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SECTION I. INTRODUCTION

Statement of the Problem

Summary of Current Impacts of Drunk Driving

Alcohol-related motor vehicle crashes resulting in the death or serious injury to those involved continue to be a considerable public safety problem in Wisconsin and across the United States. There were 35, 092 traffic deaths in the United States in 2015 and 10, 265, roughly 30 percent, of those deaths resulted from crashes where alcohol was identified as a contributing factor (National Highway Traffic Safety Administration, 2016). Meanwhile, Wisconsin experienced 190 alcohol-related traffic deaths in 2015, which was 34 percent of all motor vehicle crash fatalities in the state. While there are many causal or contributing factors for motor vehicle crashes in Wisconsin, the presence of alcohol in an involved driver remains the most common (Wisconsin Department of Transportation, 2018). It should be noted that the 2012-2016 annual average number of such fatalities in Wisconsin was 188, again being about 34 percent of all statewide traffic fatalities (Wisconsin Strategic Highway Safety Plan, 2018). Drivers are considered impaired under the law if they operate a motor vehicle on public highways, streets or roadways under the influence of alcohol and/or if they have a blood alcohol concentration (BAC) in their system of 0.08 percent or higher according to Wisconsin Statutes 346.63 (1)(a) and (b) respectively (Wisconsin Legislature, 2018). As a comparison to traffic crash fatalities, and in the context of public safety, criminal violence claimed the lives of an estimated 17,000 people in the United States each year over recent decades (Kleimen, 2009). In Wisconsin, it is significant that there were 240 reported deaths attributed to murder and non-negligent manslaughter during 2015 (Federal Bureau of Investigation, 2018). However, those deaths were relatively concentrated geographically in comparison to alcohol-related traffic deaths, occurring mostly in urban areas

within twenty counties. Meanwhile, the overall total of alcohol-related traffic deaths took place in 54 of the 72 counties in the state that same year (Wisconsin Traffic Operations and Safety Laboratory, 2017). This demonstrates the widespread threat to public safety posed by drunk drivers in that they may be encountered almost anywhere on highways, streets and roadways by virtually anyone. In addition to the public safety impacts of alcohol-related motor vehicle crashes resulting in fatalities and serious injuries, the economic costs associated with such incidents are estimated to be over $1.5 million per fatality and nearly $90,000 per incapacitating injury as a result from such crashes (Wisconsin Department of Transportation, 2018).

Overview of Non-Law Enforcement Components That Have Contributed to a Downward Trend in Alcohol-Related Traffic Crashes and Fatalities

As a public safety matter, fatal and serious-injury motor vehicle crashes caused by drunk drivers must have a law enforcement component included in any strategy to address the problem. It is also important to stress that this law enforcement component is only one, along with several non-law enforcement elements, that are essential for success. A comprehensive approach is underway by the Wisconsin Department of Transportation (DOT) to address impaired driving, including both drunk and drugged driving, comprised of prevention, technology, legislation, transportation alternatives, public education, screening and treatment, and improved data and records management, along with enforcement. Among specific initiatives in this area are the reduction of cultural acceptance of impaired driving, "streamlining" the processes for Operating While Intoxicated (OWI) arrests and prosecution, and improvements in the collection, sharing and distribution of related data, among others. The data-sharing aspect is necessary for meaningful analysis and in the development and implementation of law enforcement efforts, most notably the countermeasure of high-visibility law enforcement, along with other strategies, tactics and methodologies (Wisconsin Department of Transportation, 2018). While the

aforementioned elements should work in concert with one another to reduce drunk driving overall, the primary focus of law enforcement for public safety must be to prevent the potential deadly and serious-injury crashes that may result from drunk driving. With that stated, the enforcement strategy and methodologies embraced by law enforcement agencies should be in conjunction with, and not contradict non-law enforcement efforts toward the reduction of alcohol-related traffic crashes. Both formal and informal social control mechanisms are necessary to positively affect the problem of drunk driving and resulting fatal and serious-injury motor vehicle crashes. These aspects, and a proposed enforcement model encompassing them, will be further explained in their relationship to law enforcement efforts and social messaging in this paper. Again, the problem of alcohol-related traffic crashes is clearly a public safety challenge that Wisconsin law enforcement officials must address with well-constructed enforcement strategies and tactics that are compatible with non-law enforcement efforts to achieve meaningful and lasting results.

Importance of Nesting Law Enforcement Methodology with a Desired Social Message to Change Cultural Attitudes in the Long-Term

Law enforcement efforts toward detecting and arresting drunk drivers, and therefore preventing related motor vehicle crashes, have consisted of several dimensions in terms of strategies, tactics and methodologies across the United States. These approaches have appeared to be effective in their intended purpose when focused on drunk driving violations. Studies have shown that OWI arrests per capita resulting from "enforcement intensity" have contributed to reduced numbers of alcohol-related fatal traffic crashes, especially in urban environments (Yao, Johnson & Tippetts, 2015). Nevertheless, it has been estimated that a significant majority of drunk drivers remain undeterred and undetected by law enforcement efforts. Another issue is that any dramatic increase in arrests by law enforcement of individuals for driving under the

influence of alcohol could still leave the overall likelihood of detection a somewhat remote possibility. Open container laws and lowered legal BAC levels are partially intended to increase the risk of detection and arrest of drunk drivers but studies show these to have a rather minimal deterrent effect, except for those individuals with a low propensity to drink and drive in the first place. Many repeat offenders ignore them and other inhibiters, such as ignition interlock devices (IIDs). In addition, many individuals who choose to drink and drive often underestimate their own levels of intoxication (Bertelli and Richardson, 2008).

While some law enforcement strategies and tactics have been touted as effective, there is evidence that suggests limits to that effectiveness. A 1996 study by Weiss and Freels in Dayton, Ohio resulted in the conclusion that increased traffic enforcement activity did not lead to reductions in motor vehicle crashes but, instead, resulted in reductions of OWI arrests (Gaines and Kappeler, 2015). More recent data has indicated there were approximately 10,000 fatalities in the United States because of alcohol-related motor vehicle crashes during 2015 while only "about one percent of drunk drivers per trip are ever arrested" for OWI (Mothers Against Drunk Driving, 2017). Finally, a 2006 analysis of statewide data in Tennessee suggested that law enforcement efforts are generally ineffective pertaining to further reduction of drunk driving but they are necessary to "maintain" the reductions already realized in the 1980s and 1990s (Dula, Dwyer, and LeVerne, 2006). A purposeful application of theoretical foundations concerning deterrence, displacement, and social control to a more comprehensive enforcement deployment model may enhance the effectiveness of enforcement strategies and tactics currently being used.

Enforcement methodology must be nested with social messaging against drunk driving. The message needs to counter the cultural attitude of public acceptance of drunk driving, underestimation by drunk drivers of their own impairment and inability to drive safely, and their

apparent perception that assured detection by law enforcement is not likely (Roberts and Fillmore, 2017). Detection of OWI violators should result from observed driving behavior, rather than other reasons, because the public, and potential drunk drivers, may otherwise believe that related driving behavior is not problematic and, therefore, not dangerous. Law enforcement deployment efforts, and related media, must reinforce the social message that drunk driving is not common, that related driving behavior is potentially dangerous to the extent that death or serious injury may result, and detection of such driving behavior by law enforcement is assured.

Analysis of Law Enforcement Deployment Models with High-Visibility Enforcement Strategic Aspects Aimed at Reducing Drunk Driving

A common strategic technique used by law enforcement agencies, known as high-visibility enforcement (HVE), combines enforcement with a marketing component to ensure public awareness and gain voluntary compliance with OWI laws. HVE encompasses measures that include sobriety checkpoints, crackdowns, and saturation patrols to maximize the visibility of law enforcement presence and efforts to detect and arrest drunk drivers with a goal to change driver behavior. This is different from "fishing hole" policing tactics in that public notification simultaneous with enforcement deployments is integral to HVE (Maryland Chiefs of Police Association, 2016). Positive results have been reported regarding HVE effectiveness, primarily when using checkpoints and saturation patrols, to reduce alcohol-related fatal traffic crashes (National Highway Traffic Safety Administration, 2015).

A Law Enforcement Deployment Model for Urban and Non-Urban Traffic Environments in Wisconsin that Incorporates Tactical Considerations in Support of HVE and OWI Task Force Strategies

The geographical nature of Wisconsin, in terms of urban and non-urban traffic environments, needs consideration when formulating an effective and comprehensive HVE deployment model and incorporating a multi-agency task force strategy. The concept of a task

force, as set forth in the current Wisconsin DOT Bureau of Transportation Safety Task Force Operational Plan template, is a "multi-jurisdictional traffic safety task force geared to a…HVE effort." It further describes a task force as "formed and comprised of sworn personnel from all jurisdictions listed…" and the participating agencies "work in concert to address objectives" (Wisconsin Department of Transportation, 2018).

Strategies and tactics need to reflect the traffic environment, traffic volume, available law enforcement resources, and driving behavior patterns of actual and potential drunk drivers (Wisconsin Department of Transportation, 2018). Related enforcement methodology must foster a desired public perception as it pertains to their sense of detection by police of dangerous driving behavior. This is important because such behavior is a contributing factor in deadly alcohol-related motor vehicle crashes. A belief by the public that most people drink and drive but their driving behavior is generally not affected and detection by law enforcement, therefore, is unlikely, must be minimized. Instead, an increase in the public's sense that those who choose to drink and drive are relatively few among the population, their driving behavior is dangerous, detection is assured, and that celerity of sanction is certain, should be the goal of law enforcement efforts. Further examination of OWI task force initiatives and other enforcement methodologies will be examined in this paper with an aim to synthesize them into an effective recommended comprehensive enforcement deployment model to further reduce alcohol-related fatal and serious-injury motor vehicle crashes.

Assumptions and Limitations of the Study

This study assumes numbers of available Wisconsin law enforcement officers and funding for OWI enforcement will remain relatively unchanged during any timeframe that recommendations are implemented. It also holds the premise that no significant parallel

enforcement programs or related efforts will occur, and changes in legal, judicial and other relevant processes are not substantial. Limitations of the study will be enforcement data collection methods that may vary among agencies.

Method of Approach

Secondary empirical data and qualitative research will be used to support elements of a recommended comprehensive law enforcement strategic and tactical model in Wisconsin to further reduce drunk driving and its resulting traffic crash fatalities and serious injuries. This will include theoretical discussion and application of deterrence, displacement, directed patrol, saturation patrol, HVE and education, zero-tolerance policing and media outreach among others. The context of the discussion will include overview of efforts being made in the public/private environment regarding legal aspects, the court system, sanctions, and partnerships among businesses, governmental and non-governmental agencies, healthcare and various non-profit organizations. Both short and long-term goals and outcomes of the approach will consider increased compliance with applicable laws, reduced alcohol-related traffic crashes and a meaningful change in lessening the general cultural acceptance of drunk driving. Analysis will support a proposal for a more comprehensive law enforcement deployment effort that focuses on cultural change messaging; in terms of deployment strategies and tactics, enforcement action, and media as opposed to a random approach.

SECTION II. Extensive Literature Review

Empirical Data and Studies Demonstrating the Significance of the Drunk Driving Problem in Wisconsin as a Public Safety Concern

Wisconsin deaths resulting from alcohol-related motor vehicle crashes were somewhat comparable to deaths resulting from murder and non-negligent manslaughter during 2015, as mentioned earlier in Section I. More importantly, it was noted the geographic concentration of the latter has been more so than that of the former, suggesting a greater likelihood by the general public of encountering a drunk driver than a would-be murderer anywhere in the state. It is significant that nearly 30 million people in the United States aged twelve and older reported they drove while intoxicated during 2014 and 2015, with the highest rates being for those aged eighteen to twenty-five years. Further, roughly half of all those reporting such activity also admitted to "heavy drinking" (Peak, 2015). In Wisconsin, male drivers in the twelve to forty-year-old age range constitute the majority of drunk drivers reported to be killed in motor vehicle crashes. Meanwhile, deaths of vehicle drivers and occupants aged sixteen to twenty-years have been declining since the 1980s (Wisconsin Department of Transportation, 2018). A motor vehicle, as it pertains to this discussion, is defined under Wisconsin statutes as a vehicle that is "…a combination of 2 or more vehicles or an articulated vehicle, which is self-propelled, except a vehicle operated exclusively on a rail" (Wisconsin Legislature, 2018). The rate of alcohol-related motor vehicle crash fatalities in Wisconsin has been reported as being greater than the national average with the highest levels occurring in the sixteen to thirty-four-year-old age group (Baesman, 2009). In addition, estimates of self-reported drunk driving by respondents to a 2009 survey indicated Wisconsin had the highest percentage of drunk drivers among all drivers compared to all other states (Substance Abuse and Mental Health Services Administration, 2010). While a general downward trend of alcohol-related traffic crash fatalities has occurred

over past decades, they increased by 1.7 percent between 2015 and 2016 (National Highway Transportation Safety Administration, 2017). Meanwhile, OWI arrests during 2014, 2015 and 2016, respectively, were highest in the 25-29 age category, second highest in the 30-34 age category, and third highest in the 35-39 age category according to the Wisconsin DOT Bureau of Transportation Safety (Romanski, 2018). Clearly, meaningful OWI enforcement activity is taking place but there is a continuing need to conduct focused law enforcement, using a more comprehensive deployment model, to counter drunk driving and resulting fatal and serious-injury motor vehicle crashes as a public safety issue. Law enforcement agencies have a responsibility to safeguard the "domestic well-being of the public" including "those who violate the law" (Adams, 1999). Further, there can exist a "negligent failure to arrest and apprehend" on the part of law enforcement officers related to their responsibility to protect the public if enforcement action is not taken when warranted (Gaines and Kappeler, 2015).

Non-Law Enforcement Components of Efforts to Reduce Drunk Driving Offenses and Alcohol-Related Vehicle Crashes

Non-law enforcement elements of a comprehensive approach to address the problem of alcohol-related fatal and serious-injury motor vehicle crashes are important. Among these are applicable drunk driving laws and policies, outreach and education, use of technology, such as IIDs, and alcohol treatment programs as reflected in the Wisconsin Highway Safety Plan. Wisconsin considers 2003 as the base year in its Highway Safety Plan during which there were 9,007 alcohol-related traffic crashes with 348 fatalities. There has been a downward trend in these statistics since then with 5,171 alcohol-related crashes and 178 deaths in the state during 2016 but, this still accounts for over 30 percent of all motor vehicle crash fatalities (Wisconsin Department of Transportation, 2018).

Wisconsin Act 30 was enacted in 2003 establishing a 0.08 BAC per se limit. This, along with passage of other traffic laws prior to 2003 and afterward, may also have had a cumulative effect on the behavior of drivers throughout the state. An overview of state traffic laws passed during 2005 through 2010 reveals that primary seatbelt enforcement was added in 2009 and Act 100, focusing on increased sanctions for repeat drunk driving offenders and requiring installation of IIDs, became law in mid-2010 (Wisconsin Legislature, 2018). It is important to consider how passage of these laws potentially affected the amount of contact law enforcement had with the motoring public thereby increasing the deterrence factor of visible enforcement in the minds of drivers who may have feared being stopped and cited or otherwise arrested. A meaningful reduction in alcohol-related motor vehicle crashes and fatalities, along with a drastically lowered number of OWI convictions in the state, occurred in 2008 and those lower numbers have generally been sustained. The primary seatbelt law went into effect on June 30, 2009, occurring too late to have a significant impact on overall traffic law enforcement efforts in 2008, however, it may have contributed to lower alcohol-related traffic crash fatalities and injuries in the latter part of 2009 and throughout 2010 (Wisconsin Department of Transportation, 2018). It is difficult to ascertain whether passage of new laws during the above timeframe influenced the sudden reduction in alcohol-related motor vehicle crash and fatality statistics in 2008. Instead, changes in law enforcement practices or other reasons may have been responsible. Furthermore, assessments by professors at the University of Wisconsin downplayed the effectiveness of related law changes and suggested the economic recession was the more explainable factor in the lowered numbers of motor vehicle crashes involving drunk drivers because less people were travelling on the highways (Romel, 2009).

OWI laws and policies have been implemented in Wisconsin in a generally consistent manner with national-level guidance on highway safety countermeasures. (National Highway Transportation Safety Administration, 2015). Recent drunk driving-related law changes in Wisconsin include Act 124, regarding court orders for IIDs, and Act 125, establishing a Safe-Ride program. Others pending are Assembly Bill (AB)-97/Senate Bill (SB)-73, Homicide by Intoxicated Use of a Vehicle, which requires a five-year minimum sentence, AB-99/SB-72, Fifth and Sixth Offense OWI, requiring a minimum 18-months incarceration for convictions, and SB-688, Ignition Interlock. The latter would require courts to order the operating privileges of anyone who commits an OWI offense, regardless of measured BAC, to only be allowed to operate motor vehicles with an IID installed (Wisconsin Legislature, 2018). It remains to be seen how effective these enacted and proposed laws will be. It is also important to consider how laws are perceived by those expected to obey them. An example is zero-tolerance BAC laws, which studies have shown to be ineffective regarding driver behavior and, therefore, likely to have little effect on reducing alcohol-related traffic crash fatalities and injuries according to data from the Fatality Analysis Reporting System (FARS) of the National Highway Traffic Safety Administration (NHTSA). This is so because such laws present marginal disincentives for potential drunk drivers to consume the first alcoholic drink while the disincentive becomes smaller for successive consumption of alcoholic drinks. An unintended consequence can result where some potential drunk drivers may consume more alcohol if they have a "taste" for it based on the marginal penalty for doing so at certain BAC levels. Therefore, some may drink less at lower prohibited BAC levels and drink more at higher levels because the latter have a zero-tolerance effect. Prohibition laws in the 1920s were ineffective for this reason as people continued to drink despite them (Grant, 2010).

Public education and outreach may be more significant than enforcement or sanctions regarding declining trends of drunk driving in Wisconsin. The Zero in Wisconsin and the Drive Sober or Get Pulled Over campaigns are examples of these efforts (Wisconsin Department of Transportation, 2018). An attempt to change the underlying culture of drinking, and the general acceptance of drunk driving, may be best achieved through public education. To do so, an appeal to the moral responsibilities of the public toward their communities and their loved ones would need to be enhanced. Mass media, billboards and other advertising, and public safety talks to school and community groups by law enforcement and crash victims may have an impact. While it is difficult to measure its effectiveness, the costs associated with media outreach in reducing drunk driving has been demonstrated to be worthwhile when implemented in conjunction with high-visibility law enforcement efforts (Elder, Shults, Sleet, Nichols, Thompson, and Rajab, 2004).

There must also be consideration given to the demographics and related behavioral characteristics in age groups of those who consume alcohol and drive in order to ascertain the effectiveness of public outreach efforts. Results of studies indicate younger people, especially teenagers, are higher risk-takers than their older counterparts regarding driving and other activities. While drivers of all age groups exhibit risky driving behaviors to varying degrees, teenagers may take additional risks when driving after consuming alcohol (Williams, 2003). The margin for error allowed for by teenagers concerning vehicle speed, driver response distances and timing is less for drivers in the 17 to 21-year-old age range and is compounded when operating motor vehicles while under the influence of alcohol (Leung, 2005). However, other analysis has suggested young people are actually more risk averse when drinking alcohol and driving and, instead take more risks when under the influence of narcotics or other drugs. This is important because it may be the result of effective public health campaigns against

drunk driving whereas such efforts against drugged driving have not been as prevalent (Danton, Misselke, Bacon, and Done, 2003). This may partially explain why drivers under the age of 21 years in Wisconsin comprised only seven percent of the total OWI convictions during 2015 (Wisconsin Department of Transportation, 2018).

Other non-law enforcement elements having contributed to the declining trend in drunk driving include the use of IIDs and alcohol treatment programs. A recent study at Johns Hopkins University, published in the American Journal of Preventive Medicine, indicated 28 states and Washington, D.C. utilize ignition interlock laws for all-offenders. This has resulted in a seven percent reduction in fatal alcohol-related motor vehicle crashes, along with 1,250 lives saved, involving drivers with a 0.08 BAC or greater (Mothers Against Drunk Drivers, 2017). In addition, alcohol treatment has been mandated for repeat offenders in special OWI treatment courts in 38 Wisconsin counties. These courts are aimed at reducing recidivism and address underlying issues contributing to criminal behavior. Recidivism rates for those successfully completing court treatments have been demonstrably lowered over recent years (Wisconsin State Patrol, 2014).

A Review of Effective Law Enforcement Strategies to Reduce Drunk Driving

The various laws and policies outlined above appear to have had an effect on addressing choices made by individuals regarding alcohol consumption and driving. An overall strategy of both law enforcement and non-law enforcement components needs to address the reduction of drunk driving by including a focus on the culture of acceptance, along with the age of the offenders and the extent and volume of alcohol consumed, relative to those being involved in a traffic crash. In fact, studies have shown that no law or policy alone can solve the problem (Bertelli and Richardson, 2008).

The premise that potential drunk drivers will choose not to drive when confronted with situational factors, being consistent with rational choice theory (Piquero and Tibbetts, 1996), is fundamental to high-visibility OWI enforcement efforts as a deterrent and underscores the important role of law enforcement in reducing alcohol-related motor vehicle crashes. Studies have indicated that potential drunk drivers, with a perception that they are likely to be caught and subjected to meaningful sanctions, are more apt to choose not to drink and drive (Beck, Fell, & Yan, 2009). This perception of assured detection by law enforcement is key as a deterrence factor concerning all potential drunk drivers although, for many of these drivers, the mere presence of OWI-related and other traffic laws is enough to deter them while "medium-to-high-propensity individuals" are deterred by a "broader perception" that includes enforcement efforts (Bertelli and Richardson, 2008).

A 1996 study indicated that small law enforcement agencies, in terms of their number of employed sworn officers, made seven times more arrests for OWI than larger agencies, those employing more than 100 sworn officers, suggesting that the former agencies may generally be "more committed" to enforcement of OWI laws (Gaines and Kappeler, 2015). With this stated, it is also noteworthy that nearly all law enforcement agencies have the majority of their contacts with the public during traffic patrol. Further, the goals of any patrol function include "crime prevention and deterrence" in addition to detecting violations (Roberg, Novak, Cordner and Smith, 2015). This would suggest that any comprehensive law enforcement deployment model to reduce drunk driving must incorporate the utilization of patrol tactics as a central element.

It has been argued that "hard-core" drinkers, those that consume alcohol at a relatively high frequency and attain higher BAC levels, who drive may not be effectively deterred by enforcement efforts. These hard-core drunk drivers are involved in an estimated 50 percent of

alcohol-related fatal motor vehicle crashes. In the meantime, so-called "social drinkers," those with lower BAC levels, appear to be "more responsive to general deterrence" when they hold a compelling belief of assured detection by law enforcement should they drink and drive. Studies have shown that social drinkers constitute more than half of all intoxicated drivers meaning they are potentially a greater danger to the public based on numbers alone. This supports the notion that deterrent law enforcement efforts towards social drinkers, who drink and drive, being more prevalent than hard-core drinkers who do so, are vital (Grekul and Thue, 2013). As mentioned earlier in the introduction of this paper, law enforcement efforts are necessary to maintain reductions in drunk driving that have already been achieved. With this in mind, potential drunk drivers who are social drinkers, and therefore more receptive to deterrence, are certainly a worthwhile, but by no means the only, segment of the drunk driving population for targeted efforts by law enforcement along with social messaging. This may be accomplished with a comprehensive deployment model encompassing strategy and tactics that leverage deterrence to further reduce the overall threat to public safety posed by drunk drivers in the aggregate. A study has indicated that the meaningfulness of sanctions is reduced when individuals feel they will not be detected or arrested, but may be increased with a greater sense of assured detection (Ritchey and Nicholson-Crotty, 2011). Importantly, this suggests that a reduction in drunk driving occurrences overall may be achieved, even if current OWI penalties and fines themselves are not increased, by fostering a sense of assured detection by law enforcement. Of note, sanctions should be adequately severe to be meaningful. Wisconsin law provides that first-time drunk driving offenders may be immediately granted an occupational license if their driver's license was not suspended or revoked within the prior twelve months (Wisconsin Department of Transportation, 2018). This has the potential to undermine the impact of sanctions for a first-

time OWI conviction because the offender's employment is not significantly affected. Some may reasonably argue it is prudent to shield one's source of economic livelihood from a mere one-time indiscretion. However, the immediate occupational license allowance for a first-time OWI conviction appears to not recognize that even a single instance of drunk driving could result in a fatal or serious-injury traffic crash. At any rate, meaningful sanctions matter when there is a sense by potential drunk drivers that they will be detected and arrested. Otherwise, any sanction is not likely a consideration if the risk of being caught violating in the first place is negligible.

Law Enforcement HVE Deployment Models in Other States and Jurisdictions

Evaluations have been completed throughout the United States regarding HVE and education programs targeting drunk drivers. Importantly, most of these programs have included the use of sobriety checkpoints as a component of enforcement (Fell, Tippetts, & Levy, 2008) which is not a variable of such programs in Wisconsin. There is substantial literature on various elements which pertain to rational choice theory and deterrence that are inherent in HVE and education programs targeting drunk driving, but comparatively limited literature on high-visibility OWI enforcement programs themselves.

The legality and utilization of sobriety checkpoints for OWI enforcement is not without controversy. While successful HVE programs have incorporated them, as stated earlier, saturation patrols appear more effective in comparison regarding public awareness and social control efforts because the former focuses on driver behavior while the latter does not (Greene, 2003). The United States Supreme Court, in the 1990 case of Michigan Department of Public Safety v. Sitz, ruled that checkpoints are legal using a balancing test consisting of three factors to include "…gravity of public concerns served by the seizure, the degree to which the seizure advances the public interest, and the severity of the interference with individual liberty." The

checkpoints pertaining to this case were "highly publicized prior to initiation" and a Checkpoint Advisory Committee had established guidelines which were used by the law enforcement officers conducting them (Roberg, Novak, Cordner and Smith, 2015). Checkpoints do not violate the United States Constitution if they are truly random in determining which vehicles are stopped. Otherwise, traffic stops by police must be based upon probable cause. (Peak, 2015). Nevertheless, use of checkpoints is illegal in Wisconsin under 349.02(1) and (2) of the Wisconsin statutes and, therefore, they are not available as a tool for OWI enforcement in the state (Wisconsin Legislature, 2018).

Enforcement crackdowns, as an effective tactic for reducing alcohol-related motor vehicle crashes, have been described as "…one of the great success stories of world policing." Quasi-experimental evaluations of proactive crackdowns targeting drunk driving "suggest a clear cause and effect" (Thurman and Zhao, 2004). The focus of crackdowns is on a "narrow set of offenses or offenders" with "intensive, short-term" enforcement by concentrated numbers of officers in a defined geographical area and has been used in OWI enforcement efforts across the United States since the 1980s. Crackdowns may lead potential drunk drivers to be uncertain regarding the risk of being detected and arrested which, in essence, could increase their sense of the likelihood of being detected (Roberg, Novak, Cordner and Smith, 2015). A difference between crackdowns and saturation patrols is that the former present a sudden officer presence and enforcement effort which, while being visible to the public, does not offer the degree of public awareness beforehand as the latter. The tactic of using crackdowns can also have a residual deterrence effect on potential violators because of its relative unpredictability according to five studies which indicated that a "free bonus" of continued deterrence occurs when the police were no longer conducting the crackdowns. What is more is that, in two studies, this

residual deterrence appeared to last longer than the duration of the crackdown itself (Sherman, 1990). There is also evidence that short-term crackdowns rotated among various target areas have less deterrence decay that those that are longer term and consistently in a more limited geographic area or location (Roberg, Novak, Cordner and Smith, 2015). However, it has been demonstrated the "risk of arrest is extremely low" in some crackdowns and this includes circumstances where dangerous driving behavior by drunk drivers is observable. An explanation for this has been offered which points to "enforcement practices and limited numbers of police" that lead to a low perceived risk on the part of drunk drivers of being detected and sanctioned (Walker, 2011). The use of multi-agency OWI enforcement task forces, as mentioned earlier, may help to counter this perception when appropriately deployed.

Saturation patrols have been a successful enforcement tactic as part of an HVE strategy aimed at reducing alcohol-related motor vehicle crashes in Wisconsin. These have relatively concentrated numbers of officers deployed in targeted locations, at specified times, with a precise enforcement focus, to conduct highly visible patrols and arrests (Romanski, 2018). Saturation patrols, similar to crackdowns regarding OWI enforcement, normally focus on geographic areas where the frequency of incidents resulting from driver behavior is known to be high. Studies have indicated that saturation patrols are more effective than checkpoints in increasing public awareness of the drunk driving problem, in terms of driver behavior as a causal factor in traffic crashes, and result in more OWI arrests (Greene, 2003). In addition, a proactive method, known as directed patrol, has a similar goal of targeting violators and fosters the public impression of law enforcement "watchfulness." Directed patrol is "proactive" and "based on crime and problem analysis" of patterns with concentrated enforcement efforts directed to address them. This approach is normally made on a more sustained basis than saturation patrols

and replaces a random patrol model. Random patrols may cover a large geographic area, but do not necessarily focus on specific offenses and have less likelihood of resulting in a "measurable impact" in terms of perceived and actual crime reduction (Roberg, Novak, Cordner and Smith, 2015).

Formal social control mechanisms, as previously described involving enforcement, laws, policies and programs, must be carried out in a manner that promotes a change in how the individuals in a society view their social obligations to be law-abiding. Social control theory encompasses "a belief in the correctness of social obligations and the rules of larger society." Social learning is essential to achieve social control and embraces a concept that behavior, whether desirable or undesirable, is learned by observing others in society. Deterrence can be used to prevent individuals from behaving in undesirable ways and employs a "threat of punishment" (Schmallenger, 2009). Three primary factors for social control are "deterrence, peer opinion, and personal morality." The formal aspect of social control is characterized by individual behavioral conformance resulting from external pressure while the informal aspect involves internalization of group norms by an individual. Enforcement of laws and resulting sanctions for non-compliance are formal mechanisms and need reinforcement to sustain the desired social control. Informal mechanisms nurture internalization of values which motivates individuals to behave in desired ways without continued external pressures to do so. Taken further, this internalization goes beyond individuals to a societal level which serves to create social norms and, later, creation of laws to perpetuate them. Personal interaction among group members in a society is a powerful informal mechanism to bring about internalization of values and norms (Vago, 2012). It is not realistic to ensure that obedience to laws be sustained solely through continued law enforcement efforts. As stated earlier, there are not enough police

officers in enough locations to do so. Therefore, it is necessary to pursue enforcement deployment models and methods that foster desired perceptions by the public and counter any prevailing attitudes and beliefs they may hold which perpetuate acceptance of drunk driving as a social norm. Some likely misconceptions may be that drinking and driving is a chronic behavior of many rather than a small element within society and, also that the relatively small numbers who are repeat offenders can be deterred from drinking alcohol and driving by the fear of being arrested or by harsher penalties. The reality is that drunk driving is a common, but not a chronic, behavior among the general population and those who are repeat offenders do so because they do not consider the potential consequences. The important point here is the degree that drinking and driving is commonly accepted in our society (Walker, 2011). Further, it appears as evidence of a widespread cultural acceptance of drunk driving in Wisconsin in that the state legal statutes categorize first-time OWI offenses, except for those where a passenger under 16-years of age is in the vehicle, as civil forfeitures. All other offenses involving driving while intoxicated in Wisconsin are categorized as traffic crimes (Wisconsin Legislature, 2018).

At the strategic level, law enforcement in Wisconsin is guided by the Wisconsin Strategic Highway Safety Plan in efforts to reduce alcohol and drug-impaired driving with an action plan emphasis on overtime enforcement utilizing federal funding. Within this plan is employment of HVE on a multi-jurisdictional and multi-agency basis, utilizing task forces working at specified times and at targeted geographical locations, while making OWI enforcement a priority to "stop impaired drivers before they crash." While a task force approach is central to this aspect of the strategy, it also calls for law enforcement agencies to enforce OWI laws "in all jurisdictions as a core function" (Wisconsin Department of Transportation, 2018).

Wisconsin's first formalized multi-agency OWI enforcement task force was implemented in Brown County during 2011. The program was based on a similar one established in Anoka County, Minnesota in 2007, known as the Anoka County Driving While Impaired (DWI) Task Force and, also called "Night Cap." That program consisted of joint-law enforcement agency saturation patrols, in specified locations during predetermined timeframes in conjunction with messages highlighting their presence and purpose via television and radio outlets. The Night Cap program was "intensely aggressive" utilizing "heavy" media coverage and with a concerted goal to arrest "every impaired driver" detected on the road. Within a relatively short timeframe of one to two years, the alcohol-related traffic fatalities in Anoka County decreased almost 75 percent. The program was noticed by other states and was instrumental in the decision to obtain federal funding for the effort in Brown County, Wisconsin which has had apparent successes in reducing alcohol-related traffic crashes since its implementation (Romanski, 2018). The public awareness aspect of task force patrols is intended to deter drunk drivers by reinforcing the message that they will be detected and that arrest is assured (Beiderwieden, 2014).

There is a general cultural acceptance of drinking and driving by Americans overall while few of them actually drink and drive themselves. The goals of HVE and education programs are to target the general public in an effort to change that attitude of cultural acceptance along with deterring drunk drivers, consistent with applicable theoretical tenets, in the long term. An aspect which must be considered in HVE and education efforts regarding both short-term and long-term outcomes is a phenomenon known as the announcement effect. This refers to an apparent behavior change by individuals when they are notified via media outreach and observe increased enforcement patrol and, as a result, they become compliant. When those saturation patrols and related media outreach cease, the non-compliant behavior eventually returns (Walker, 2011).

For this reason, there must be intermittent but sustained saturation patrol deployments and related media outreach over an extended timeframe with the longer-term goal to gradually instill compliant behaviors so those behaviors eventually become independent of the HVE and education program.

A comprehensive law enforcement deployment model to reduce drunk driving and related traffic crashes should consider several variables when being developed and implemented. In the context of law enforcement strategies utilizing HVE, sobriety checkpoints, crackdowns and saturation patrols, among others, it must be noted that probability stops are also utilized in efforts to detect crime. This has been referred to as "playing the percentages" and involves "selective" stops made by police that are not based on prejudicial reasons but, instead, on probabilities that contribute to an officer's belief that a crime has, or will, occur (Peak, 2015). An example may be the practice of an officer's observance of a vehicle leaving the parking lot of a tavern and, based on that alone, selecting that vehicle to follow and potentially observe adverse driving behavior. The officer may feel that, in all probability, erratic and/or illegal driving behavior might occur and the officer will then have probable cause or reasonable suspicion to legally stop the vehicle. Any observed adverse driving behavior may well be determined to be the result of OWI, leading the officer to make an arrest.

HVE is a "data-driven" law enforcement effort using appropriate countermeasures that also involves a "marketing strategy" with public education and outreach as an overall "problem-solving" initiative (Maryland Chiefs of Police Association, 2016). A high-profile example of HVE was the "More Cops, More Stops" (MCMS) campaign in states other than Wisconsin, primarily Oklahoma and Tennessee, which involved a combined targeting of speed, seatbelt and OWI violations during 2011 through 2013. MCMS enforcement efforts, and results, included the

use of checkpoints, arrests for seatbelt, speed, and OWI violations, and data indicated that unrelated warrants, recovery of stolen vehicles and other arrests for violations also occurred. This effort showed mixed results in terms of the social messaging component of the program in that combining the targeted offenses, along with a combined media message, appeared to dilute other individual messages pertaining to each of those offenses. However, public awareness of OWI-related enforcement and media outreach was determined to be relatively high in both states during the program even though OWI arrests were relatively infrequent compared to all other arrests made. Surveys conducted in conjunction with the program indicated that perceived risk of detection and arrest for OWI violations increased while overall risk of detection for traffic violations did not (Nichols, Chaffe, and Solomon, 2016). A more detailed analysis of the MCMS program will be made later in this paper. In many HVE programs conducted outside of Wisconsin, such as West Virginia and those involved in MCMS, sobriety checkpoints have been a significant component of enforcement and credited with contributing to the "sudden and sustained" downward trend in alcohol-related vehicle crash fatalities (National Highway Traffic Safety Administration, 2007). For this reason, it is difficult to compare the results of HVE efforts of Wisconsin, where checkpoints are not legal as previously mentioned, to such efforts in other states.

A Predictive Analytics Approach to Targeting Drunk Driving Behavior and Implementing an Enforcement Deployment Model That Seeks to Combine Short-Term Efforts with Long-Term Cultural Change Results

The nature of law enforcement successes and challenges regarding detection and arrest of drunk drivers and reducing alcohol-related traffic crashes has involved both enforcement and non-enforcement aspects as stated in earlier. Predictive policing is central to enforcement efforts where data analysis using computers has prompted agencies to become "more data-driven,

intelligence-led, and even predictive." Further, predictive policing has a goal to anticipate and apply data to do more than simply "react to incidents and patterns...but also to predict them" (Roberg, Novak, Cordner, and Smith, 2015). Consistent with this philosophy, and to improve the efficiencies and effectiveness of enforcement efforts, the Wisconsin DOT has embarked on an initiative to develop and employ predictive analytics to better apply data in an attempt to "target resources and improve traffic safety." This means the use of existing resources, including intuitive models to deploy law enforcement by allocating them in a spatial and time-determined manner, in order to counter predicted problematic traffic incident patterns and trends for enhanced traffic safety. The law enforcement component is geared to addressing "…traffic crash hot spots to reduce fatalities." More specifically, this effort is focused on traffic violations, based on citations and warnings issued, and resulting motor vehicle crashes such as those that are alcohol-related. This initiative was introduced in 2017 as a program by the Wisconsin DOT Division of State Patrol and Division of Transportation Investment Management, along with the Traffic Operations and Safety (TOPS) Laboratory at the University of Wisconsin, and includes a general three-step process. Data-mining and analysis of factors is conducted emphasizing the value of quality data provided through the DOT crash database that is populated electronically by law enforcement agencies throughout the state and updated daily. In the future, this data may also include existing traffic patterns and volume, infrastructure characteristics, weather, and economic elements, such as fuel pricing and locations of certain business establishments or other venues. Statistical analysis and modeling, including predicted times and locations of types of traffic incidents and causal elements, such as OWI behaviors, are completed as the next step in the process. Finally, deployment of the results of preceding steps is incorporated into operational decisions on how and when law enforcement resources, such as patrols, are utilized in the field,

and will be used in the future to evaluate the effectiveness of predictive analytics as a tool. Thus, application of predictive analytics for improved statewide traffic law enforcement efforts is being developed and implemented with an inductive geospatial approach (Romanski, 2018). This kind of initiative is occurring in other states as well, such as Maryland, with the use of Geographic Information Systems (GIS) as a tool for conducting spatial analysis to "monitor driving behavior based on location" with the philosophy that "data driven policing is the foundation of place-based problem solving" (Maryland Chiefs of Police Association, 2016).

The use of data is certainly not new to enforcement methodology. A report issued by the Wisconsin Legislative Council in 1955, based on a study by the Traffic Institute of Northwestern University and the Traffic Division of the International Association of Chiefs of Police, identified how traffic law enforcement should be applied by officers. The guidance in the report states, "It must be applied at the places where accidents are occurring, at the times they are occurring, and to the violations which predominately contribute to accidents." The report continues by recommending enforcement as a deterrent from "improper driving habits" and identifies OWI as one of the twelve leading behaviors that contributed to accidents (Wisconsin Legislative Council, 1955). It is important to note the focus on locations and times of vehicle crashes and related violations in the aforementioned report. It is probable that the application of law enforcement resources to the identified locations at specified times will have tertiary and other effects, both present and future, beyond those locations and times which should also be considered using predictive analytics.

A more recent example of applied data analysis for law enforcement is the Data-Driven Approaches to Crime and Traffic Safety (DDACTS) initiative. This is an operational model supported by NHTSA and federal law enforcement that, "integrates location-based crash, crime,

calls for service and enforcement data to establish effective and efficient methods for deploying law enforcement resources" (National Highway Transportation Safety Administration, 2014). The effort involves mapping where traffic crash and crime hotspots overlap and deploying more concentrated enforcement resources to those target areas. DDACTS builds on HVE and other policing activities to reduce overall crime and disorder in select locations. Cities in Wisconsin, including Sheboygan, Ashland and Milwaukee, have successfully used DDACTS during the past decade. Notably, the Milwaukee Community Mapping and Analysis for Safety Strategies (COMPASS) uses GIS in its DDACTS approach regarding public safety efforts (Wisconsin Department of Transportation, 2010).

Further discussion of theoretical aspects regarding geographical impacts, such as crime displacement, in a more comprehensive law enforcement deployment model to reduce drunk driving and related motor vehicle crashes will be included in the next section. Again, such a model must consider the goals of short-term public compliance with OWI laws and traffic crash reduction resulting from enforcement along with achievement of desired long-term changes in the general cultural acceptance of drunk driving in Wisconsin.

SECTION III. THEORETICAL FOUNDATIONS

Rational Choice and Deterrence

Law enforcement deterrence efforts are rooted in rational choice theory. This theory considers both formal, or official, and informal elements and recognizes that individuals take these elements into account when choosing how they will behave. However, increased risk of being caught and the certainty and severity of punishment are especially important for effective deterrence. Studies conducted by H. L. Ross assert that many repeat arrestees for drunk driving have a fear of sanctions but they do not fear that they will be detected and arrested by law enforcement. This is because they know from experience that chances of detection are negligible. Further, the sanctions they fear are not certain to be imposed even if they are caught. This undermines the premise that intoxicated individuals can and will make a rational choice not to drive a motor vehicle based on detection by law enforcement. Conversely, individuals who are not habitual drunk drivers often have an unrealistically high expectation that they would be detected if attempting to drink and drive (Tibbetts and Hemmens, 2010).

Rational choice postulates that people decide to behave in a certain manner based on perceived costs and benefits associated with their behavior but, that decision is also affected by the situation at hand. Formal external deterrence factors, such as detection and sanction, are important relative to this but, informal internal variables are even more so. The latter includes an individual's employment, economic opportunities, and social relationships and responsibilities, to include family and friends. For example, someone who is unemployed may perceive that they have little to lose if they are convicted of drunk driving. However, there are other internal dimensions to consider as well. Alcoholic consumption may be viewed in certain environments as a virtuous trait or ability and one's self-esteem, based on social and cultural standards, might be reflected in this. In such circumstances, an individual might not admit they are impaired to a

degree that it is dangerous for them to drive, even when others tell them they are, because they may fear social disapproval. This may be at odds with other cultural norms that view alcoholic impairment in an opposite fashion. Perceptions of self-esteem and shame are relevant from this perspective as they can have very different effects on behavior depending on the cultural environment one is in. Shame has been shown to negatively affect drunk driving in those who have a sense of guilt or embarrassment for having done so, even in situations where no one else knows the act occurred (Piquero and Tibbetts, 1996). In the meantime, others may view getting away with drunk driving as a thrill or an accomplishment. In this aspect, rational choice involves the weighing of costs and benefits but can differ on how individuals view those costs and benefits. These considerations will be further discussed later in this section regarding the role of social control theory in the enforcement of drunk driving laws.

Potential drunk driving offenders make decisions regarding subsequent actions based on situational factors, such as presence of law enforcement and/or others. This recognition is consistent with rational choice theory advocated by Cornish and Clarke in the late 1980s (Tibbetts and Hemmens, 2010). Rational choice theory, as proposed by Cornish and Clark, offers a valid basis on which to determine appropriate and effective methods and practices to reduce drunk driving in Wisconsin.

Deterrence may be general or specific in nature. General deterrence, regarding law enforcement practices, involves an effort to maximize the traffic stops and other police contacts with the public to promote a perception, to be held by the public, that overall police presence is extensive. Specific deterrence efforts focus on "targeted offenders," such as drunk drivers, and studies suggest this to be more effective in reducing the level of related offenses committed by those individuals (Roberg, Novak, Cordner and Smith, 2015). General deterrence, regarding traffic enforcement, "is intended to make motorists think twice about breaking the law," which

would include any motorist and any traffic law, not just that of OWI. By definition, specific deterrence involves "the use of some form of punishment for unlawful activity that is intended to discourage a specific individual from re-offending" such as OWI laws and sanctions regarding drunk drivers (Maryland Chiefs of Police Association, 2016).

It appears that deterrence, resulting from enforcement efforts regarding certain offenses, can have an initial deterrence effect which diminishes over subsequent time (Roberg, Novak, Cordner and Smith, 2015). Lawrence Sherman characterized this as "initial deterrence decay." In this sense, the effectiveness of deterrence in law enforcement has been questioned. For example, data related to law enforcement efforts suggests that when a new law is passed and a subsequent crackdown or other emphasis on enforcement of it takes place, immediate results can be achieved but the effect of the enforcement wears off over time. This phenomenon is the "announcement effect," as mentioned earlier, and causes citizens to alter their behavior only in the near-term as they initially become aware of the threat of detection and punishment by law enforcement and the courts. This might also encompass aggressive enforcement efforts by law enforcement officers related to the new law but, after publicity decreases, those enforcement efforts decrease as well (Walker, 2011). An example of the role of publicizing a new law and how much effort is made by law enforcement officers to enforce it can be observed concerning the 2001 enactment of Wisconsin Statute 346.072(1)(a) and (b), which requires motorists to move over to the left lane or slow down when passing stopped emergency or other vehicles on a divided highway (Wisconsin Legislature, 2018). This law was not accompanied by a major media campaign or other outreach to the general public except for a relatively limited distribution of bumper stickers, mostly displayed on some police vehicles, and information posted on the internet (Romanski, 2018). The modest publicizing of this law and the related

anemic law enforcement effort made by police appear to support the argument by Walker (2011) that officer efforts are, at times, only proportional to media outreach efforts.

Data has indicated that deterrence decay is more likely after long-term law enforcement crackdowns and such crackdowns can be made more effective when they are of short duration and rotated among targeted geographic locations and areas (Roberg, Novak, Cordner and Smith, 2015). The concept of initial deterrence is supported in that most people maintain a fear of being and caught and punished for violations of the law and will, even if only for a short time period, make a rational decision to avoid that potential outcome (Walker, 2011).

While deterrence decay may occur in the aftermath of a crackdown or other enforcement emphasis period, a degree of residual deterrence can remain. It is incumbent on those who formulate law enforcement strategy and tactics to increase residual deterrence effects in amount and duration. Studies have underscored that short-term crackdowns alone do not bring about attainment of such a goal, but should instead involve other tactics in conjunction with those crackdowns. Notably, potential drunk drivers do not appear to maintain a level of concern regarding the risk of being detected and sanctioned over the long-term, even if exhibiting adverse driving behavior, after a publicized enforcement, or HVE, effort (Walker, 2011). Even though residual deterrence is not readily apparent after OWI enforcement crackdowns in general, there have been studies which demonstrate that residual deterrence occurs, even in the long-term in some cases. This "free bonus" was shown to last for a longer duration than the crackdowns themselves in two cases (Sherman, 1990). With this in mind, a comprehensive OWI enforcement deployment model must consider ways to leverage potential residual deterrence by utilizing crackdowns and parallel enforcement patrols in a synchronized and deliberate manner.

Displacement

The theory of crime displacement may be relevant in terms of whether one is likely to be caught by police while drunk driving. Displacement can occur when offenders perceive that alternative locations have "weak guardianship" as compared to places where the risk of detection is higher (Sherman, Gartin, and Buerger, 1989). An example of this, as it pertains to drunk driving, may be when law enforcement patrols on major traffic routes are prevalent, such as state troopers on Interstate and other primary highways. Those patrols are intended to detect violators, including drunk drivers, and to deter potential violators of the law. However, bypass and secondary routes may have fewer or no enforcement patrols observed by the public so drunk drivers might choose to drive on them as an alternative to reduce the risk of detection. The underlying premise to HVE efforts is to both detect and deter drunk driving as stated earlier in this paper. However, this may have the potential to displace some of the offender activity in the manner described above. An example that suggests displacement may be a consideration in how and where law enforcement resources are deployed can be illustrated in Washington County, Wisconsin where there were 323 alcohol-related traffic crashes during the three-year timeframe inclusive of January 1, 2015 through December 31, 2017. Figure 1 shows the locations of alcohol-related traffic crashes in question that occurred (Wisconsin Traffic Operations and Safety Laboratory, 2018). Figure 2 shows the relative concentration of Wisconsin State Patrol enforcement efforts, indicated by blue-shaded areas on Interstate 41 (formerly US Highway 41), US Highway 45 and other arterial routes, based on traffic stop data for the same timeframe (Wisconsin State Patrol, 2018). It is notable there also were alcohol-related traffic crashes along State Highways 144 and 175, the latter being to the west and parallel to I-41, even though they were likely less travelled in terms of traffic volume compared to I-41. Meanwhile a

simultaneous enforcement effort, measured by traffic stops conducted by the Wisconsin State Patrol in this case, in those areas are not apparent. With that stated, there may be other reasons contributing to the presence of drunk drivers on the segment of Highway 144 where alcohol-related traffic crashes have occurred, such as the locations of restaurant establishments that serve alcohol or convenience relative to origin and destination of travel routes. All such factors should be considered when developing and implementing a comprehensive enforcement deployment model to reduce drunk driving and related traffic crashes.

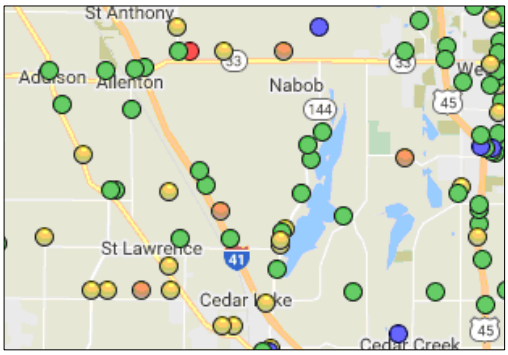


Figure 1.

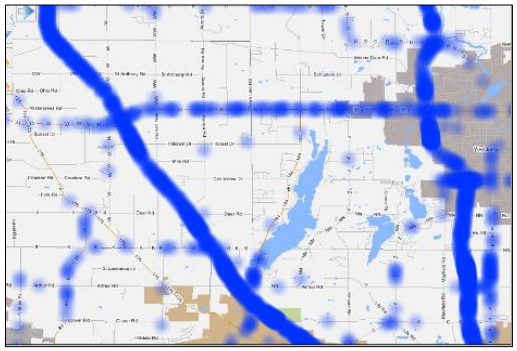


Figure 2.

The use of crash rate data appears to be a relatively more accurate method to potentially assess the true magnitude and geographic extent of the drunk driving problem. This is because blood alcohol tests performed on drivers in fatal and serious-injury traffic crashes, and in some less severe crashes, reveal whether alcohol is a contributing factor. Simply using OWI arrest data alone is not accurate because detection and arrest do not occur if police are not there to carry out those functions.

The practice of using bypass and alternative routes by drunk drivers, even those that are habitual repeat offenders, supports the hypothesis that many of these individuals make rational choices regarding their behaviors. Saturation patrols strategically deployed in identified high-crash rate areas where alcohol has been shown to be a contributing factor can be effective, as

explained earlier, but parallel enforcement efforts may also be needed to address potential displacement. This will require a larger contingent of officers, including those conducting saturation patrols and others in parallel efforts. Nevertheless, analysis regarding displacement trends must be an element when evaluating where and how these officers are to be deployed. Rational choice theory involves the perceived certainty of being detected and more officers strategically deployed can potentially increase that component. A law enforcement patrol model designed to convey police "omnipresence" can reduce or eliminate "the actual opportunity, or belief that the opportunity exists, for successful misconduct" by potential violators, such as drunk drivers (Roberg, Novak, Cordner and Smith, 2015).

Sir Robert Peele advocated that a function of police is to provide "unremitting watch" to "deter offenders." This goal of deterrence was evaluated in the Kansas City Preventative Patrol experiment during the early 1970s, which showed that random patrols covering large geographic areas were not effective. While the theory of deterrence, according to Beccaria and Bentham during the 18th Century, was characterized by the costs of certain apprehension with severe and swift punishment being greater than any perceived benefit of committing a crime, it was shown that spreading officers too thinly undermined this consideration. Instead, "hotspot" policing appears to be more effective which involves focusing law enforcement resources and efforts on determined "high-crime locations." As discussed earlier, deterrence decay can occur due to the announcement effect. Another reason can be initial "overestimation" by offenders of being caught which can give way to a realization that the police are, in fact, not detecting and arresting all violators and are not able to do so. Short-term crackdowns and saturation patrols in hotspots can counter this to some extent, creating a residual deterrence. (Sorg, Haberman, Ratcliffe, and Groff, 2013). In this way, the potential violators are made aware that police presence exists but,

they know it is not constant. This fosters uncertainty as to whether police actually are present in given locations and times, the certainty that they could be, and may be effective to promote a sense of police omnipresence while lessening "offender adaptation" in terms of displacement (Sorg, Haberman, Ratcliffe, and Groff, 2013).

Studies have indicated displacement "is most likely to occur within close proximity to a treatment area" because "familiarity" is greater in such locations. Another study in Europe addressed the displacement of "drinkers" who frequented "drinking spaces" as a result of "police presence," such as that which occurs during a crackdown or saturation period. It was discovered that these drinkers eventually "returned to their original drinking space" after the police presence decreased (Pennay and Room, 2012). This may support the hypothesis that drinkers will choose familiar taverns or similar destinations at which to consume alcohol and are likely to seek alternate routes for travel, where police are not patrolling, to reach those destinations and return from them rather than frequent different and unfamiliar taverns. The importance of this observation is how it potentially relates to patrol strategies and the use probability stops as an enforcement tactic to counter this behavior. Further exploration of this consideration will be covered in Sections IV and V of this paper. Other data suggests that some violators act within a context of "bounded rationality" often believing that crackdowns and saturation patrols may be part of a "general increase" in enforcement (Weisburd, Wycoff, Ready, Eck, Hinkle, and Gajewski, 2006). These aspects should be considered in any comprehensive law enforcement deployment model to reduce drunk driving and resulting fatal and serious-injury traffic crashes. This is because the origin of vehicular travel, such as one's residence, and destinations, including locations where alcohol may be consumed, of drunk drivers are not likely to readily change because of familiarity and economic reasons.

Social Control

Deterrence laws and enforcement efforts may not affect the decisions of "hard core" drunk drivers because they are "weakly affected" by perceived costs. While some may perceive the associated costs as real, they simply may not care. This could be the result of addiction and related low self-control or simple lack of concern for any prevailing social norms that take a negative view of drunk driving. Interestingly, for others who may hold strong ethical and moral positions against drunk driving, the existence of deterrence laws is normally not a factor in their decision not to drink and drive. There are still others who seek immediate gratification to the extent they do not adequately consider future consequences. Therefore, "sanction threats" for the latter are not effective. The remainder and largest percentage of the population, marginal offenders referred to earlier in this paper as social drinkers, do consider deterrence and sanctions in their decision-making regarding drinking and driving. These individuals perceive the probability of being detected and punished as high (Bertelli and Richardson, 2008).

Low self-control, impulsiveness and lack of moral or emotional commitment have been identified in many younger adult male drunk driving offenders. Studies indicate that risk-taking behavior is common among these offenders. Deterrence is not fully effective in preventing such individuals from drinking and driving. The general model of rational offending presented by Piquero and Tibbetts considers situational variables, including internal variables previously mentioned, and low self-control together. Their model assumes low self-control is a "stable personality characteristic" in some individuals. The situational variables may be whether individuals have prior offenses, their moral views and sense of shame or perceived pleasure, and the likelihood of being caught and punished (Piquero and Tibbetts, 1996). Again, the element of risk-taking is a factor among young adults but is less common among youth as studies have

shown the latter may be more affected by moral, religious and social responsibilities to their parents and families (Danton, Misselke, Bacon, and Done, 2003).

Social process theories involve the interaction of individuals and society and the role of learned behavior. They are important when considering the effects of deterrence and how it can serve to prevent illegal behavior but also reinforce positive social values along with acceptable individual behavior. The theory of differential association suggests that crime is the product of socialization and relates to this discussion in that people, when exposed to certain cultures and environments, adopt behaviors they think are deemed as acceptable. To clarify, it may be necessary to not only prevent bad behavior but also to instill good behavior through deterrence efforts (Schmalleger, 2009).

Edwin Sutherland, in his theory of differential association, noted that intimate relationships, especially among peer groups, are profoundly significant in influencing one's attitudes and behaviors. Differential reinforcement, according to Burgess and Akers, occurs when an individual learns that certain behaviors are acceptable, or even admired, in a particular social environment (Sutherland and Cressey, 1955). The practice of excessive alcohol consumption and associated indifference to the potential dangers of drunk driving are examples of behaviors, along with a lack of social stigma related to them, that are reinforced by such learning. In that differential association is an outcome of socialization that leads individuals to embrace acceptable behaviors among a particular cultural environment, the prevention of those behaviors through deterrence is necessary. In addition to preventative measures, there must be efforts to instill behaviors that are deemed acceptable by the larger society (Schmallenger, 2009). With regard to drunk driving, it is important to develop laws and policies that foster a decline in such offenses and, also attempt to change the cultural acceptance of it with public education and outreach. Again, an appeal to both internal and external elements of rational

choice theory, including law enforcement efforts nested with those that are non-law enforcement, pertaining to individual behaviors is necessary.

The formal elements that affect ones' decision whether to drink and drive are mainly external involving law enforcement, sanctions and other actions by authorities as described earlier. HVE efforts by police in Wisconsin, coupled with a concurrent media outreach campaign, appear to have been effective in contributing to downward OWI-related traffic crash trends (Wisconsin Department of Transportation, 2018). This suggests the overall downward trend throughout the past two decades, both in Wisconsin and throughout the nation, is attributable to a gradual cultural change. Law enforcement must continue commensurate with efforts in outreach and education that appeal to informal, internal dimensions of rational choice based on social responsibility, morals and self-respect. A comprehensive law enforcement deployment model should fully incorporate the social control considerations discussed here.

SECTION IV. ENFORCEMENT STRATEGIES

Zero-tolerance Policing

The strategy of using a zero-tolerance stance in law enforcement activities has been associated with advocacy of "aggressive policing" which saw a "proliferation across the nation" during the 1990s (Adams, 1999). Research during that time suggested this helped lead to a decrease in overall violations of laws. This is consistent with an emphasis on a "broken-windows-zero tolerance arrest hypothesis" whereby police attempt to lower the likelihood of "serious crime" by taking enforcement action on "street activity," which generally consists of offenses of a less serious nature (Sherman, 1997). In the practice of identifying hotspots of criminal activity and deploying law enforcement resources to those locations, also known as "cops on dots," the intent has been to increase "police visibility" and "engage in relentless enforcement" (Roberg, Novak, Cordner and Smith, 2015).

Zero-tolerance enforcement of traffic laws may not be effective for reducing motor vehicle crashes to the extent that there is a point where more issued traffic citations no longer has an impact (Gaines and Kappeler, 2015). Nevertheless, directives regarding OWI task force efforts in Wisconsin funded by federal monetary grants mandate that participating law enforcement agencies "take a zero-tolerance" regarding "OWI violations, ", other "impaired driving violations" and, also "seatbelt violations" (Wisconsin Department of Transportation, 2018). This is important because, as stated earlier in this paper, the public safety concern for enforcing OWI laws is to reduce alcohol-related fatal and serious-injury motor vehicle crashes. With this in mind, it is essential that a zero-tolerance strategy for OWI violations be properly employed to be effective.

Deontological ethics regarding an officer's "duty to act…when a violation of law is observed" can be an "excuse" for police to take enforcement actions, such as issuing citations, when there is "little utility" in doing so (Gaines and Kappeler, 2015). As it pertains to traffic

enforcement, this can lead to adverse consequences and undermine police legitimacy, especially in the view of "minority groups" (Roberg, Novak, Cordner and Smith, 2015). It has been demonstrated that increased officer "productivity" is normally accompanied by a rise in the associated "number of citizen's complaints" (Lersch, 2003). An example, with regard to the use of DDACTS as discussed earlier, can be found in the Milwaukee Police Department (MPD) where its Chief of Police noted a related decrease in overall crime after a "surge in traffic enforcement" and touted significant drops in several categories of crime, including a 12 percent reduction in traffic crashes, in targeted areas of the city (Garza, 2017). However, a draft report from the United States Department of Justice in 2016 indicated "This program has a disparate effect on…African-American and Hispanic communities…" while acknowledging that hotspot policing is effective but, "can have both positive and negative consequences for crime and community trust." A finding in the report, related to the DDACTS initiative, was that, "Proactive traffic stops…around crime hotspots…contribut[e] to racial disparities" (United States Department of Justice, 2016).

The role of discretion in policing, using "reasonableness and surrounding circumstances" to make enforcement decisions is important (Gaines and Kappeler, 2015). The goals of the MPD, consistent with the DDACTS initiative, include a reduction in traffic crashes and crime, among others, using HVE as a deterrent. This effort, according to MPD directives, utilizes written warnings as a preferred enforcement action during traffic stops, for deterrence. Along with that, officers are encouraged to "stop as many vehicles as possible in high crime areas." Again, even, though there is not an emphasis on written citations for every detected violation, the use of "targeted stops" by MPD was found to contribute to the finding that "traffic stop practices" by MPD "have a disparate impact on the African-American community" (United States Department of Justice, 2016).

The above considerations are relevant for the development of a comprehensive OWI enforcement model and suggest that mere increases in related traffic stops for any and all violations, in a shotgun fashion, should not be utilized if the goal is to reduce drunk driving. Instead, saturation and crackdown efforts need to focus zero-tolerance on specific OWI-related violations. Conversely, parallel efforts to increase a sense of police omnipresence and counter potential displacement should consider all traffic violations for reasons that will be explained later in this paper. The issue of using a zero-tolerance approach to OWI enforcement needs to be consistent with the social messaging effort to change the cultural acceptance of drunk driving. A zero-tolerance approach should not be applied in a way that it may be undermined by potential controversy that proves a distraction to the public. Further, if applied to all traffic and related violations, the message to the public may appear that the police detect many drunk drivers by happenstance rather than because of observed driving behavior.

Data-Driven Resource Allocation and Enforcement

The use of data is essential to efficient and effective enforcement and is a central part of a strategic effort to reduce drunk driving and overall traffic crashes. Data-analysis and problem identification are utilized to support HVE using tools, such as GIS, to "collect, maintain, and analyze data for risk terrain analysis of impaired driving" (Maryland Chiefs of Police Association, 2016). The University of Wisconsin has developed web applications, currently available for use by law enforcement agencies, to include crash data analysis tools, crash mapping, and a crash database and resolve system. These applications provide information to the public and, with special user access, additional data for law enforcement and other agencies relevant to addressing traffic safety issues (Wisconsin Traffic Operations and Safety Laboratory, 2018). Mobile Architecture for Communications Handling (MACH) is multi-agency communications software that includes mapping capability and integration with Traffic and Criminal Software (TraCs) to link arrest incident report data with location maps. MACH and

TraCS are utilized daily by agencies throughout Wisconsin, via in-car mobile data computers and dispatch centers, and facilitate dynamic information exchange for multi-agency law enforcement operations, and safety analysis (Wisconsin Department of Transportation, 2018).

The Wisconsin Strategic Highway Safety Plan 2017-2020 identifies the improvement of "data collection, sharing and distribution" as a specific task in its action plan regarding traffic enforcement to encourage interagency consistency in data collection and analysis (Wisconsin Department of Transportation, 2018). In addition, the 2018-2023 Wisconsin State Patrol Strategic Plan (2018) identifies the expansion of MACH, including its use by additional agencies; and development of predictive analytics tools as part of its goal to leverage technology. Under another goal in this plan, the enhancement of public safety, the strategy to "implement a data-driven approach for resource allocation and traffic enforcement efforts" underscores the importance of data in such efforts. It is notable that the utilization of MACH is "encouraged for use by task forces" in the Wisconsin Department of Transportation Bureau of Transportation Safety Task Force Operational Plan template for federally-funded traffic enforcement activities (Wisconsin Department of Transportation, 2018).

High Visibility Enforcement and Education

Evidence supports the premise that most people fear the prospect of being "caught and punished" and will make efforts to avoid this occurrence (Walker, 2011). This is consistent with rational choice theory, as discussed in Section III, and HVE conveys the prospect that being caught is more likely as police actively conduct patrols to detect specific violations. As a deterrence countermeasure, HVE has been central to traffic safety strategies throughout the United States (National Highway Traffic Safety Administration, 2015). The concept of HVE, as a strategy for traffic enforcement, is rooted in Selective Traffic Enforcement Programs (STEPs) used in Canada during the 1970s. STEPs focused on certain violations, such as failure to wear

safety belts, in an effort to reduce fatal traffic crashes. These programs involved intense, high-visibility, including targeted enforcement with simultaneous media campaigns to maximize public awareness (Jonah, 1985). High-visibility traffic enforcement in Wisconsin has the goal to "change the public's negative drinking behaviors…and educates the public" to embrace "positive driving behaviors" (Wisconsin Department of Transportation, 2018).

The Wisconsin Strategic Highway Safety Plan 2017-2020 underscores a "commitment to HVE multi-jurisdictional targeted enforcement grants" including OWI enforcement efforts, (Wisconsin Department of Transportation, 2018). Disbursement of federal traffic safety enforcement grants to law enforcement agencies throughout Wisconsin is made by the Wisconsin DOT Bureau of Transportation Safety. The grants include funding for enforcement activities, related media campaigns and other events. Evaluations of HVE activity in Wisconsin under such grants have been periodically conducted, in the context of various factors, to determine the associated expenditures and effectiveness as measured by reductions in traffic crashes and fatalities (Romanski, 2018).

Analysis of federal traffic safety grant expenditures in Wisconsin during the years of 2005 through 2010, including both enforcement funds and overall funds (see Table 1), suggests an inverse relationship existed between those grant expenditures and the numbers of all traffic crash fatalities, alcohol-related traffic crash fatalities and OWI convictions (Wisconsin Department of Transportation, 2010). This is a period that saw a notable and sudden downward shift in overall and alcohol-related fatal traffic crashes, after an upward spike in such incidents, during 2008. More specifically, alcohol-related traffic crash fatalities declined by more than 30 percent (Wisconsin Department of Transportation, 2018).

The federal funding sources for the traffic safety grants were NHTSA and the United States Department of Justice. The funds were allocated for targeted enforcement programs for safety belts, speed, alcohol, youth alcohol, motorcycle safety, school bus and human services vehicle safety, among others. Monies for equipment, such as speed detection devices, along with planning, administration, public education, media outreach and related training, were included (Wisconsin Department of Transportation, 2010). The funding was not intended to supplant normal law enforcement operating budgetary funds but was only to be used for extraordinary efforts, such as saturation patrols and multi-agency task force enforcement activities. While there were obligated and non-obligated funding allocations for all programs and activities during 2005 through 2010, expenditures of these funds serve as a measure of the amount of money used for saturation patrol activity by the participating law enforcement agencies (Romanski, 2018).

Federal Program Funding for Wisconsin 2005-2010

Year	Total Expenditures	Enforcement Expenditures
2010	$11, 771, 448.00	$4, 151, 494.10
2009	$10, 367, 401,45	$3, 880, 299.40
2008	$9, 513, 197.50	$2, 949, 776.90
2007	$6, 091, 989.80	$1, 727, 834.80
2006	$4, 011, 790.00	$1, 334, 932.50
2005	$5, 758, 147.86	$1, 414, 794.30

Table 1

Total expenditures and those dedicated specifically to enforcement activities included significant increases in 2007 and 2008. In each of those years, the increase in total expenditures was more than 51.8 percent and 56.1 percent, respectively, compared to the prior year. Before 2005 and after 2010, increases in total federal grant fund expenditures for traffic enforcement were relatively modest in comparison. Enforcement expenditures in that same period included a

dramatic increase in 2008 of 70.7 percent over the previous year. Again, the prior and subsequent years had much lower increases in expenditures, if at all (Wisconsin Department of Transportation, 2010). The overall expenditures are important to consider, along with those of enforcement, because the former covers the costs of related media and public outreach which are essential components of HVE and education.

Convictions for OWI violations during 2005 through 2010 exhibit a declining trend with a sudden downward shift of about nine percent from the prior year in both 2008 and 2010 relative to annual decreases of about one percent before and five percent after those years (Wisconsin Department of transportation, 2018). The conviction numbers are a reliable measure compared to arrest totals because of different, and potentially inconsistent, arrest reporting procedures among law enforcement agencies. The reductions in OWI convictions might seem counterintuitive to a related increase in law enforcement efforts. However, this trend may be the result of effective media campaigns, outreach and public education in conjunction with the deterrent effects of HVE. The dampening of the rate of decline in OWI convictions and alcohol-related traffic crashes, while still showing an overall downward trend, may be explained by the announcement effect and deterrence decay discussed earlier in Section III. Many factors could have contributed to the sudden declines in the above statistics during 2008 and 2009 in addition to law enforcement efforts. In any case, federal traffic safety enforcement grant funding and related statistics appear to demonstrate that HVE was most likely a key ingredient for success. With that stated, the specter of diminishing returns from grant expenditures beyond a certain level could be a concern. A more comprehensive enforcement deployment model, with broader applications of proven strategies and tactics, may be the most effective approach to achieve continued and lasting reductions in alcohol-related fatal and serious-injury traffic crashes.

It must be noted that an overarching application of HVE was made in the MCMS campaign evaluated in Oklahoma and Tennessee during 2011 through 2013 as explained earlier in Section II. This campaign demonstrated that combined media messaging for enforcement of seatbelt, speed and OWI, termed "Key-3" offenses as opposed to "single-issue" media specific to each of them, was not effective overall as a deterrent. However, there was an exception regarding young adults, in the 18-34 age group, who expressed in surveys a heightened sense in the risk of being stopped for OWI. Surveys of individuals stopped by law enforcement to determine the levels of awareness, among other variables, achieved pertaining to the Key-3 offenses were completed during the campaign. Statistical methods used Chi-Square testing to ascertain the "significance of changes," and Binary Logistic Regression analysis was employed in determining" interaction effects" among comparison groups targeted by enforcement and related media messaging over time. Emphasis periods, or "waves" consisting of enforcement with simultaneous combined messaging and intermittent waves with single-issue messaging were conducted. Arrests and warnings for Key-3 offenses comprised 44 to 49 percent of all enforcement activity with OWI arrests being "very low" compared to others. However, 63 percent of those responding to surveys in Oklahoma indicated detection for OWI would be "very likely" and a sense that such detection would lead to being arrested was the highest among all other violations (Nichols, Chaffe, and Solomon, 2016). MCMS efforts also occurred in the states of California, Illinois, Indiana, Iowa, Nebraska, New Jersey, Nevada, Ohio, Pennsylvania, Utah, and Wyoming in July of 2013 as a "multi-state traffic enforcement operation" with "combined effort" using HVE to "eliminate fatalities" along the Interstate 80 corridor (Dahler, 2013). HVE, as exhibited by programs such as MCMS in other states and various efforts in Wisconsin, appears to be an effective strategy. In particular, when consistent with meaningful social

messaging, HVE is a proven strategy for OWI enforcement and reducing alcohol-related fatal and serious-injury traffic crashes.

Multi-agency Task Force Deployment

The Wisconsin DOT Bureau of Transportation Safety awards federally-funded traffic safety grants to law enforcement agencies throughout the state each year using "data-driven targeting processes" based on crash data. The grants are primarily intended to fund overtime HVE activity regarding violations of seatbelt, speed and OWI laws. These grants, while issued to agencies in jurisdictions where data indicates that a compelling traffic safety problem exists, are designed to encourage multi-agency participation in joint task force efforts. Some of the participating agencies may be in adjacent jurisdictions not specifically targeted based on data analysis but they are invited to become a task force member by an agency that has received a grant award. The participating agencies work together as a "group" to conduct HVE in a concentrated geographical area or in separate areas but "all on the same day and time" (Wisconsin Department of Transportation, 2018).

Enforcement task forces can have the effect of greatly increasing the perceived presence of police by leveraging officer staffing from numerous agencies rather than relying on a single agency. Federal traffic safety grant awards were made to thirteen agencies in Wisconsin during 2017, including six police departments and seven sheriff's departments, several of which who invited other agencies to participate with them. During previous years, prominent Wisconsin OWI enforcement task force efforts were made in Brown County, with six participating agencies and in Manitowoc and Sheboygan Counties with nine participating agencies, including the Wisconsin State Patrol (Romanski, 2018).

The nature of task force activity must be appropriate for the traffic environment in which it is conducted. As stated previously, strategies and tactics employed in traffic enforcement need to consider the traffic environment and volume, driving behavior patterns, and the available law enforcement to conduct patrols (Wisconsin Department of Transportation, 2018). A comparison study of rural versus urban counties in Wisconsin revealed that alcohol-related traffic crash fatality rates have been "significantly higher" in the former, even when accounting for vehicle miles travelled (VMT). The study offered a conclusion that the "rural alcohol subculture" of consumption may be the reason. One limitation of the study, as acknowledged in the study itself, was potential variance of how rural and urban environments are defined. Other research in 2004 recognized four "primary contributors" to traffic crashes including 1) human behavior, 2) roadway environment, 3) vehicles, and 4) the medical care crash victims receive at the scene and thereafter (Baeseman, 2009). A behavioral factor that may be compelling is that urban driving encompasses "less automatic process" and "requires more attentional demand" (Meskali, Hirt, Aillerie, Gineyt, Louveton, and Berthelon, 2011).

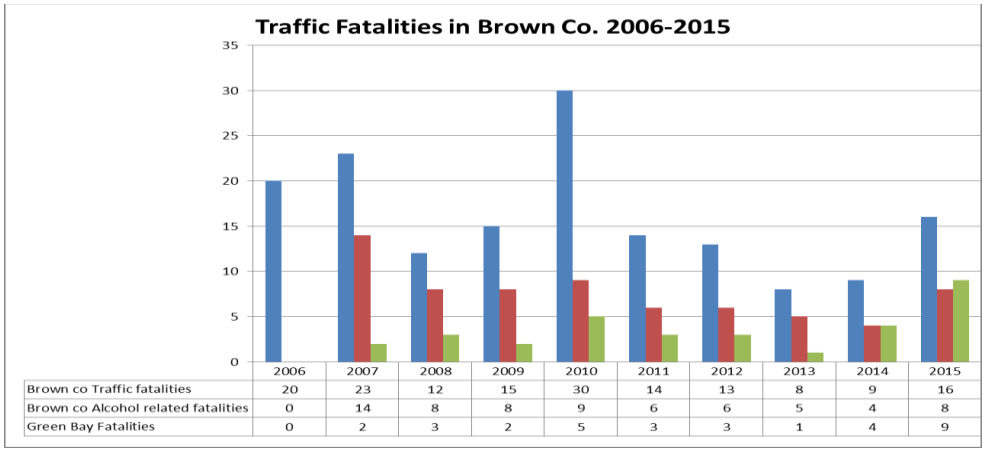
Arguably, an important factor to consider in an enforcement deployment model is the relative volume and concentration of vehicular traffic and the ability of law enforcement to be visible and active in wider rural geographic areas versus smaller urban ones. OWI arrest rates have been found to be more prevalent in urban areas where reductions in OWI violations were relatively greater in number compared to rural areas suggesting that "enforcement intensity" is a factor (Yao, Johnson, and Tippets, 2015). Again, task forces can leverage multiple agency resources by assigning them in targeted areas at specific times. However, incorporating tactics which convey omnipresence elsewhere is necessary and will be further explained in the next section of this paper.

Anoka County, Minnesota, mentioned earlier as the jurisdiction which served as a model for the first formal OWI task force in Wisconsin, is located in the Minneapolis metropolitan area (Legislative Coordinating Commission, 2001). The Anoka DWI Task Force, commonly known as "Night Cap" described in Section II, consisted of eleven participating law enforcement agencies conducting 'aggressive enforcement" in 2007 on arterial highways, roads and streets in an urban/semi-urban environment. During the task force deployments, a zero-tolerance approach to arrests was followed pertaining to OWI and seatbelt violations with guidance to use "common sense" when issuing other traffic citations and warnings. Officers were primarily deployed during "night" shifts and the HVE effort consisted of signage indicating "DWI Arrest Zone," reflective vests with "DWI Task Force" lettering and other elements. Of note, the use of tint meters was specified which suggests that pretext stop tactics were a component of this program. This is significant and will be further discussed in the next section. Results included a decline in alcohol-related traffic crashes and an increased sense by the public that arrest and detection were "highly likely" according to surveys. These aspects were integral in constructing a similar model in Brown County, Wisconsin (Romanski, 2018).

Alcohol-related traffic crash statistics indicated a spike during 2010 in Brown County and officials were concerned with a potential continuing upward trend in such incidents. With a goal to "combine components of enforcement, education and awareness," the Brown County Sheriff's Department authorized an OWI Enforcement Task Force in 2011. Joint-agency saturation patrols in identified zones served as the enforcement component of the operational plan. An educational component utilizing "billboard displays and media," to both notify the public that task force activity was underway and that drunk driving is dangerous, was included. In addition, the awareness component was intended to alert drivers of the planned times and locations of

saturation patrols. HVE has been robustly pursued, especially in the City of Green Bay where "OWI Arrest Processing Centers" have been set up approximately three times per year since 2011 with media invited to cover the arrest processing activities at those locations. These have included on-site accelerated blood draws for evidence by a licensed phlebotomist, a dedicated city bus for temporary holding and transport of arrested subjects, and a judge. The intent of having the media at the processing centers was to send a "zero tolerance" message as part of the public awareness component (Ackermann, 2017).

The results of the Brown County OWI Task Force have been encouraging overall during the first five years of its implementation. Grant expenditures and related enforcement efforts have occurred concurrent to a downward trend in alcohol-related traffic crash fatalities as shown in Figure 3. There were respective declines 47.9 and 52.8 percent in urban-area and rural-area alcohol-related traffic crashes for the five-year period after 2011 compared to the 2007 to 2011 period (Wisconsin Department of Transportation, 2018). Table 2 illustrates notable overall declines in OWI traffic crashes related to fatalities during that same timeframe but shows an upward spike during 2015 for both (Ackermann, 2017).



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Brown co Traffic fatalities	20	23	12	15	30	14	13	8	9	16
Brown co Alcohol related fatalities	0	14	8	8	9	6	6	5	4	8
Green Bay Fatalities	0	2	3	2	5	3	3	1	4	9

Figure 3

Brown County OWI Crashes and Fatalities 2010-2015

Year	Fatalities	Vehicle Crashes
2015	7	205
2014	2	141
2013	3	161
2012	5	177
2011	9	226
2010	11	293

Table 2

Related OWI arrest and conviction data is important in evaluating the effectiveness of the Brown County OWI Task Force. The task force experienced a downward trend in reported OWI arrests during 2011 through 2015. Table 3 shows the reported numbers of such arrests for the City of Green Bay Police Department and the Brown County OWI Task Force in that time period. Meanwhile, OWI convictions in Brown County, after increasing by approximately five percent from 2009 to 2010, declined in all successive years through 2016 (Wisconsin Department of Transportation, 2018).

OWI Arrests for City of Green Bay and OWI Task Force 2011-2015

Year	City of Green Bay	OWI TF
2015	744	97
2014	769	123
2013	755	139
2012	866	172
2011	1071	110

Table 3

There are potentially several reasons for declining alcohol-related traffic crashes, related fatalities, OWI arrests and convictions during the time period of 2011 through 2015 in Brown County. It appears that the program has been successful in achieving the declining trends, including less OWI arrests and convictions because of an effective social messaging campaign to

change driver behavior and cultural acceptance of drunk driving. However, there is a need for an independent program evaluation to determine if the success can be fully or partially attributed to the efforts of the Brown County OWI Task Force. Such an evaluation must include analysis of the strategies and tactics utilized, frequency of emphasis periods including media outreach and simultaneous deployment of officers, the nature of enforcement practices before and during traffic stops, and sustainment issues related to the vehicle crash, fatalities, arrests and conviction measures. Nevertheless, the Brown County OWI Task Force has been praised for its apparent success (Schuller, 2015). The strategy of using OWI enforcement task forces to maximize a perceived presence of law enforcement makes sense where such resources are limited and targeted geographical areas are extensive.

SECTION V. Enforcement Tactics

Directed Patrol, Saturation and Crackdowns

A primary goal of the patrol function in law enforcement is to foster the prevention of crime and disorder (Roberg, Novak, Cordner, and Smith, 2015). Tactics utilized to support patrol, with this goal in mind, include those of suppression, intended to "scare offenders away without necessarily catching them." Suppression patrol tactics encompass the use of directed patrols and saturation patrols, both of which involve presence of police "in certain locations at certain times" (Bruce, 2008). However, each of these tactics is appropriate in different circumstances with the latter being useful in a geographically concentrated effort and the former for more widespread patrol deployments. Crackdowns are another patrol tactic conducted at specific locations and times but, unlike directed and saturation patrols, are not intended to simply suppress illegal activity but to also involve increased arrests in the short term (Roberg, Novak, Cordner, and Smith, 2015).

Directed patrols are proactive, target specific violators and promote an impression among the public that the police are being watchful, as stated earlier in Section II. The Kansas City Patrol Experiment, conducted in the early 1970s, demonstrated that random police patrols are "ineffective" for "large geographical areas" (Sorg, Haberman, Ratcliffe, and Groff, 2013). The study concluded, among other findings, that random patrols do not help to reduce "traffic accidents." More so, it is "not feasible" for agencies to deploy enough officers, "due to manpower and budgetary constraints" in a random fashion to a level having a meaningful impact in this effort. In addition, urban and suburban growth over recent decades has increased the challenge of maintaining patrols in larger geographic areas. It is unlikely that "adding a patrol car or two in a relatively large area" will lead to a "measurable impact" (Roberg, Novak,

Cordner, and Smith, 2015). Another demand on existing law enforcement resources is the necessity that they remain continually available for emergency calls. This underscores the "importance of staying in service" and the expectation that police officers must "get back in service" as soon as possible after engaging in arrest processing or other duties (Hoover, 2010). A means to overcome such limitations is to employ directed patrols in a manner so they convey omnipresence in that they can be anywhere at any time rather than everywhere at all times. To do this, it can be argued that police should be deployed to areas, and at times, where data-analysis has indicated a high level of incidents or hot spots, such as alcohol-related traffic crashes, or where there could be based on apparent developing patterns, such as potential displacement (Roberg, Novak, Cordner, and Smith, 2015). The resulting sense of omnipresence can thus be perpetuated however, mere police presence alone, even on an intermittent basis, may not be sufficient to accomplish this.

Research has shown that policing "hot spots" is effective but experiments conducted in Sacramento, California, Jacksonville, Florida and Minneapolis, Minnesota focused on the "dosage" of patrol activity in such locations. The results suggested that police "randomly rotate" among hotspots and "spend about [fifteen minutes] patrolling in each." Other studies indicated that officers should "make [ten to fifteen minute] stops at these locations throughout their shift…on a random basis." After this length of time, a diminishing return pertaining to residual deterrence appears to occur, as discussed earlier, which can be measured on the "Koper Curve," a graphic representation of the "duration response curve" showing "benefits of officer time spent in the hot spot until a plateau is reached." Along with this, the studies considered the possibility that actual activity of officers when they are at a hot spot is even more important and "officers

were encouraged to…initiate citizen contacts while present in the hot spot" (Telep, Mitchell and Weisburd, 2014).

The premise that mere police presence cannot, by itself, foster a public perception of deterrence can be illustrated by doctrine employed by the United States military. For example, large-scale joint military exercises in and around the Korean Peninsula are intended to deter enemy aggression with a demonstration of capability involving field maneuvers with "large numbers of troops." The United States troop presence has been a mainstay in Korea since 1953 but, it is the activity of troops during exercises that receive notice and effectively deter the enemy (D'Orazio, 2012). Another example is the practice of "deterrent patrolling" used by the military in counterinsurgency operations with the intent is "to keep the enemy off balance" with "unpredictable activity which, over time, deters attacks" (Kilcullen, 2006). In a similar manner, directed patrols involving actual police traffic stops, with the visibility of activated emergency lighting on the patrol vehicle(s) and the demonstration of police enforcement action taking place, as opposed to mere presence, can be important components in achieving deterrence. These traffic stops, while meant to show active police presence to deter drunk driving as part of the overall effort to reduce alcohol-related fatal and serious-injury traffic crashes, can focus on any traffic or related violation, not just OWI. The reason for this is to demonstrate law enforcement actions taking place in a wide geographic area to foster deterrence. While directed patrol pertaining to reduction of drunk driving is part of comprehensive OWI enforcement efforts, saturation patrols and crackdowns in more concentrated geographic areas, encompassing detection efforts aimed specifically at OWI-related violations, should also be used. To be clear, directed patrols, as discussed here, are not intended to be used in the same manner as saturation

patrols and crackdowns, but should be a parallel effort. This concept will be further described as a recommendation in Section VI.

Saturation patrols, as noted at the beginning of this section, are a suppression tactic like directed patrols, but are more focused regarding the violations there are intended to detect and, more importantly, deter. Such patrols for the purpose of traffic enforcement, according to studies, have shown results of decreased, rather than increased, arrests, including those for drunk driving (Gaines and Kappeler, 2015). The Brown County OWI Task Force effort is an example in which saturation patrol tactics have been used. A centerpiece of the Wisconsin Strategic Highway Safety Plan 2014-2016 (2014) was to utilized crackdowns during selected emphasis periods on holidays while "conducting sustained saturation patrols at least monthly using HVE." The use of directed patrols in areas, where potential displacement may occur, along with saturation patrols in selected locations where traffic crash data indicates that OWI is problematic, is an efficient combination when leveraged in support of HVE and task force strategies. Both of these tactics convey the message that police are present and active which, in turn, serves to suppress OWI violations as previously explained.

Crackdowns, as described earlier, are like directed patrols and saturation patrol efforts in that they are also oriented toward locations and times where data analysis shows a relatively high level of traffic incidents, such as alcohol-related traffic crashes, occur. Unlike, directed and saturation patrols, crackdowns do not involve extensive pre-deployment public notification. However, they are also similar in that they should be short in duration and rotated among targeted locations to avoid deterrence decay as discussed in Section II. The sense by potential drunk drivers that detection and arrest is certain will not be sustained when they realize after awhile that not all drunk drivers in the area of a prolonged crackdown are being detected and

arrested (Sherman, 1990; Sorg, Haberman, Ratcliffe, and Groff, 2013). In reality, drunk drivers have a relatively low risk of arrest in crackdowns, even when exhibiting erratic and potentially dangerous driving behavior because of "enforcement practices" by police (Walker, 2011). With that stated, data indicates that OWI crackdowns conducted by the Wisconsin State Patrol have led to higher numbers of arrests for OWI based on officer-observed driver behavior compared to enforcement efforts in which OWI detection was not prioritized. As an example, OWI enforcement activity conducted by the agency during 2017 under the federally-funded Multi-Agency OWI Task Force Grant indicated there were .08 OWI arrests per traffic stop compared to .004 OWI arrests per traffic stop under the Statewide Seatbelt Overtime Grant (Wisconsin State Patrol, 2018). This suggests it is likely that officers who make a concerted effort to recognize OWI driver behavior indicators are more successful in detection of OWI violators.

An approach that has been used to increase detection of OWI drivers, and can promote a sense of assured detection by violators, is the promotion of citizen call-in reports. One such program in Edmonton, Canada, known as Curb the Danger (CTD) was implemented during 2006 with the goal to leverage police and community collaboration in detecting drunk drivers. CTD was structured so that reports of possible drunk drivers on highways were provided to the police from citizens and the police would then conduct "interception" of the potential violator. Over the past decade, CTD has led to 40 percent of the total OWI charges of drunk driving in the jurisdiction and 30 percent of reported OWI drivers were successfully "intercepted by police." With this stated, surveys indicated that nearly 40 percent of citizens claiming they observed potential drunk drivers chose not to report those observations to police. Nonetheless, this suggests a majority of observations are reported and promotes a sense of "dual guardianship" by concerned citizens and police which is beneficial in the context of cultural acceptance of

drinking and driving (Grekul and Thue, 2013). It must be cautioned, however, that drawbacks exist with some police departments in jurisdictions where similar programs have been attempted and they received "many more" calls than they could respond to. This failure to respond led to increased dissatisfaction on the part of citizens with the police. Another aspect to this is that police can be "overburdened" with calls that are baseless or unfounded (Gaines and Kappeler, 2015) although, this must be weighed in context of the opportunity to prevent even one alcohol-related fatality or serious-injury traffic crash resulting from a citizen's call.

Checkpoints

Enforcement tactics such as directed patrols, saturation patrols and crackdowns are intended to promote a sense of assured detection as explained previously. The use of checkpoints is, like that of directed patrols and saturation but unlike crackdowns, a suppression tactic intended to deter rather than one with a specific goal to make arrests (Bruce, 2008). It was acknowledged in Section II that the use of checkpoints is not legal in Wisconsin. Even where checkpoints are legal, they have the potential to convey to the public that dangerous driving behavior by OWI violators is not compelling and police need to take drastic measures to detect such violators for that reason. This potential outcome is not consistent with a social message aimed toward changing the cultural acceptance of drunk driving and the understanding by the public that the associated dangerous driving behavior is a public safety problem that could adversely affect anyone encountering a drunk driver on the highway. Again, studies support the assertion that saturation patrols and other efforts to detect drunk drivers based on their dangerous driving behavior, as a potential causal factor in traffic crashes, is a more effective approach to reducing such crashes and changing cultural attitudes toward drunk driving (Greene, 2003).

Pretext Stops

Another tactic that may be utilized in efforts to detect drunk drivers is that of pretext traffic stops. This tactic involves police officers making such stops based upon their observation of any "clear illegal behavior," known as probable cause, which is commonly a misdemeanor violation (Roberg, Novak, Cordner, and Smith, 2015). However, the intent of the stop may not be to arrest for the observed violation but, instead, to discover another violation and make an arrest for the latter. By definition, "A pretext stop… occurs where the police employ a stop based on probable cause or reasonable suspicion as a device to search for evidence of an unrelated offense for which probable cause is lacking (Gamrath and Johnson, 1997). The United States Supreme Court, in their 1996 ruling on the case of Michael A. Whren and James L. Brown v. United States, determined that any traffic stop based on probable cause created by an observed violation of any traffic law is constitutional, regardless of what the motives of the police officer making the stop may be. When, after the stop is made, the officer gains probable cause to arrest for an unrelated violation, that arrest is "reasonable" under the Fourth Amendment of the United States Constitution (Supreme Court of the United States, 1996). This case did not determine that motives of police are at issue, only that "subjective intentions of police officers do not invalidate an objectively reasonable action" (Roberg, Novak, Cordner, and Smith, 2015). In the 2015 case of State of Wisconsin v. Daniel S. Iverson, the Wisconsin Supreme Court determined that an OWI arrest resulting from a traffic stop based on a state trooper's observation of a passenger throwing a "cigarette butt" out of the window of a vehicle being operated by the defendant was valid. It is significant the trooper testified that he observed the target vehicle "drift within its lane toward the centerline and back" but that "he did not feel that he possessed the reasonable suspicion necessary to conduct a traffic stop" and made the stop only after observing the littering

violation (Supreme Court of Wisconsin, 2015). Therefore, it appears that the officer verbally admitted a pretextual motive for conducting the traffic stop and the court upheld it. Based on these cases, the practice of using pretext stops as a tactic for OWI enforcement is clearly legal.

The Night Cap task force program in Anoka County, Minnesota expressly provided for the use of tint meters, as previously mentioned, in its guidance to participating officers while the focus of the enforcement activity was to detect and deter drunk drivers. Again, this constitutes a legal approach in that detection of window tint violations and, after stopping a vehicle for this violation, seeking probable cause for an OWI violation is valid. However, the reason for the stop, in this circumstance, would not be related to dangerous driving behavior and the detection of OWI is incidental to the traffic stop.

Even though they are legal, when known to the public, the tactic of using pretext stops to detect drunk drivers may convey a message that OWI-related driving behavior is not problematic and an OWI enforcement program must rely on pretext to effectively detect and arrest drunk drivers. Along with the potential to undermine a desired social message that dangerous driving behavior by drunk drivers is not acceptable and that it places the public at risk of death or serious injury, pretext stops may lessen the public's sense of police legitimacy. Two components that are logically crucial to a comprehensive law enforcement deployment model to reduce drunk driving are deterrence and cooperation. Compliance using "deterrence through fear and cooperation through legitimacy" must be balanced with each other to enhance "acceptance of the legitimacy of the government and its agents" (Blanks, 2016). It has been stated that "police style may be as important as police substance" and police legitimacy leads to a greater likelihood that citizens "will cooperate with the police and feel a moral obligation to obey the law" (Roberg, Novak, Cordner, and Smith, 2015). These considerations are important in the application of

tactics that are part of an HVE strategy. OWI arrest data from the Wisconsin State Patrol indicates that approximately ten to fifteen percent of such arrests in 2017 resulted from non-moving violations as a reason for the traffic stop which includes equipment, registration and others that are not related to observed driver behavior. As an example, 86 percent of the OWI arrests made by the agency in Dane County, with substantial urban, suburban and rural geographic characteristics, during December of that year were a result of moving violations, an indicator of driver behavior, as the reported reason for making the traffic stop (Wisconsin State Patrol, 2018). This supports the contention that dangerous OWI driving behavior is being detected in a majority of these arrests. Therefore, the reliance on pretext stops as a tactic in any OWI enforcement strategy may not be necessary or desirable.

Probability Stops

Finally, the employment of probability stops must be considered as an OWI enforcement tactic. As discussed earlier, a police officer may observe a vehicle leave the parking lot of a tavern and decide to follow it while looking for probable cause or reasonable suspicion, such as driving behavior, to stop it for an OWI violation. Of course, the officer may make this effort based on a probability that the driver of the vehicle has been consuming alcohol because he or she was patronizing a tavern. Police officers must be careful in using probability stops in this manner for OWI enforcement, especially in the context of economic concerns of the hospitality industry; although this tactic may have merit in certain situations. Some, such as former Los Angeles Police Chief Bernard Parks, have suggested the selective stopping of individuals as a crime prevention effort, and "following" such individuals based on their location and other characteristics is "common sense" (Peak, 2015). Again, this tactic must be employed in a

judicious manner so that any potentiality which could undermine the overall law enforcement and social messaging effort to reduce alcohol-related traffic crashes is avoided.

Another aspect of probability, however, concerns the route a drunk driver may take when travelling between his or her residence and a tavern or other establishment that serves alcohol. There is a possibility that enforcement efforts along identified highways where alcohol-related traffic crashes have occurred could promote the displacement of drunk driving activity. This could encompass the probability that such displacement will be in "close proximity" to the normally travelled route as suggested by Pennay and Room (2012) in Section III. While that particular study was of pedestrian traffic rather than vehicular traffic, the principle is arguably the same. The earlier example of the prevalence of alcohol-related traffic crashes on Highways 144 and 175 in Washington County, Wisconsin as illustrated in Figures 1 and 2, where enforcement efforts were not occurring, may involve this kind of probability factor regarding displacement. The various routes from locations of tavern and/or restaurant establishments relative to the residential or other destinations between which drunk drivers may travel are likely to be near the routes that are patrolled more heavily by police. These considerations should be included in a data-driven predictive analytics approach to deploy officers on directed or saturation patrols and crackdown efforts in the context of the probability that drunk drivers will use certain alternate routes between known locations as described.

SECTION VI. Conclusion and Recommendations

Applied Strategies and Tactics

A comprehensive law enforcement deployment model to successfully reduce alcohol-related motor vehicle crashes on public highways, streets and other roads in Wisconsin should include all the strategic and tactical dimensions discussed in previous sections of this paper. The important aspect in the implementation of those dimensions is that they be applied in a manner that supports the social message that drunk driving is not acceptable because it poses a profound public safety risk of death or serious injury to anyone involved in an alcohol-related traffic crash. More so, the likelihood of such a crash occurring in Wisconsin due to drunk driving behavior continues to be compelling according to recent statistical data (Wisconsin Strategic Highway Safety Plan, 2018). Primary to the desired social message is that police detection of drunk drivers, based on their dangerous driving behavior, is assured and that arrest and meaningful sanctions will result. This component, in the context of actions by law enforcement, can serve to more effectively deter drunk driving using a comprehensive deployment model in the near term that helps to change the general cultural acceptance of drinking and driving in the longer term. Furthermore, the challenge to law enforcement agencies is to accomplish this within the realm of their given resources with respect to available funding, numbers of sworn officers, cross-jurisdictional considerations, sanctions and other law enforcement and non-law enforcement programs that may exist.

To effectively illustrate how the OWI enforcement strategies and tactics discussed previously can be incorporated into a comprehensive statewide approach; a deployment model can be generalized from analysis of its application in a representative county within Wisconsin. Washington County will serve as that example in this recommendation. As shown in Figures 1

and 2 earlier, comparisons of the locations of alcohol-related traffic crashes with that of traffic law enforcement activity indicate potential gaps in the deployment patterns of police patrols that, if appropriately addressed, may lead to less drunk driving and resulting traffic crashes, related fatalities and/or serious injuries (Wisconsin Traffic Operations and Safety Laboratory, 2018).

Washington County, Wisconsin is characterized by urban/suburban development in the southeastern area of its jurisdiction and is rural in nature in other areas. It is included in the Milwaukee-Waukesha-West Allis metropolitan statistical area (MSA). The overall population is an estimated 133,486 according to the 2015 United States Census, with the largest concentrations in West Bend, Germantown, and Hartford. The median age of the population was 37.16 years for 2010 through 2014, which is comparable to that of the entire state at 38.48.years for the same period. The top three sectors of employment are manufacturing, retail trade and health care/ social assistance, altogether comprising over fifty percent of the employment demographic. The unemployment rate in the county has been roughly 0.6 percent below that of Wisconsin overall during the past ten years. In addition, Washington County has over 300 licensed liquor establishments. Notably, Interstate 41 passes through the county from the Milwaukee area in the southeastern portion and orienting toward the northwest, and US Highway 45 branches off from it near Richfield, in a northerly direction toward West Bend. State Highway 33 runs in an east-west direction through West Bend and intersects with I-41 in the northwestern part of the county. Over forty percent of the alcohol and drug-related fatal and non-fatal injury traffic crashes have categorically occurred on Interstate, US and State highways while local roads experienced over thirty and over forty percent, respectively, during 2011 through 2015. Such traffic crashes in which alcohol or drugs were determined to be a contributing factor amounted to $31, 275, 539.40

in total costs and 199 years of human life lost annually (Wisconsin Traffic Operations and Safety Laboratory, 2018).

Law enforcement resources available in Washington County, as they may pertain to efforts toward OWI enforcement, include the numbers of full-time employed sworn officers in each jurisdiction, budgetary constraints and federal OWI enforcement grant monies for overtime salaries and other related costs. The total full-time officers regularly assigned in the county is an estimated 209 inclusive of ten from the Wisconsin State Patrol and 70 from the Washington County Sheriff's Department, among others (Federal Bureau of Investigation, 2016; Wisconsin State Patrol, 2017). Federal grants are made available to agencies in the county each year, including the statewide Impaired Driving Enforcement project grant. The Wisconsin State Patrol has consistently utilized two grant funding streams to pay for yearly OWI enforcement overtime in the county. For the purpose of this recommendation, the status of available law enforcement resources and funding that has been in effect during recent years will be assumed and expected to continue relatively unchanged in the near term (Romanski, 2018).

The heat map presented as Figure 2, in Section III, illustrates that traffic enforcement activity has generally been concentrated on I-41, US Highway 45 and State Highway 33 in Washington County. This is understandable in that most traffic crashes have historically occurred along these arterial routes (Wisconsin Traffic Operations and Safety Laboratory, 2018). However, this circumstance has led agencies, most notably the Wisconsin State Patrol, to predominately employ a fixed-sector patrol methodology consisting of a linear patrol and traffic stop pattern on specified highway sectors, in this case to cover I-41 and US Highway 45 (Wisconsin State Patrol, 2018). Highways are legally defined in Wisconsin as "all public ways and thoroughfares and bridges on the same…" (Wisconsin Legislature, 2018). Fixed sector

patrol normally involves the assignment of "one patrol unit to each sector with no overlapping boundaries" but cross-boundary dispatch may occur if needed. In addition, assigned sector patrol officers are expected to respond to any emergency calls within the sector and there is an understanding that incidents can occur anywhere within that sector. For this reason, the patrols assigned to the sector are done so in a manner intended to position them geographically for "quick response" to such incidents (Taylor, 1981). The result of this deployment model, as shown in Washington County, has fostered a relatively greater amount of police presence and related enforcement activity on the above-mentioned arterial highways. This likely has contributed to a deterrent effect with regard to drunk driving and other potential traffic violations, although there are aspects to this extent of presence, especially stationary presence, that could undermine deterrence as will be explained momentarily. Further, the notion that patrol is a mobile operation, rather than stationary police activity, suggests that mobility is central to any patrol model. With that stated, the police practice of utilizing speed detection equipment or other means of identifying violators from a stationary position is not discouraged except that remaining visible in a single location for too long could be detrimental to fostering residual deterrence. This is because the practice may have the potential to convey that not all violators will be stopped and cited if some violators, such as those exceeding speed limits, are allowed to pass by without being stopped. This result could undermine the desired impression of assured arrest and sanction (Telep, Mitchell and Weisburd, 2014).

Alcohol-related traffic crash data in Washington County for the years of 2013 to 2018 indicates that certain highways experience such crashes while enforcement patrols at those locations have been minimal. These segments of highways are shown in Figure 4 (Wisconsin State Patrol, 2018; Wisconsin Traffic Operations and Safety Laboratory, 2018). The possibility

that the routes identified; State Highways 144 (purple), 164 (green), 167 (blue) and175 (red), may be occurring because of displacement, as discussed in Section III, must be considered consistent with rational choice and deterrence theories (Tibbetts and Hemmens, 2010; Pennay and Room, 2012). Another important consideration is that traffic crashes, including those that are alcohol-related, remain significant on the arterial routes themselves (Wisconsin Traffic Operations and Safety Laboratory, 2018). This may speak to the premise that the dosage of law enforcement presence and activity may be too little in some areas, and possibly too extensive in others, resulting in limited duration of residual deterrence (Telep, Mitchell and Weisburd, 2014).

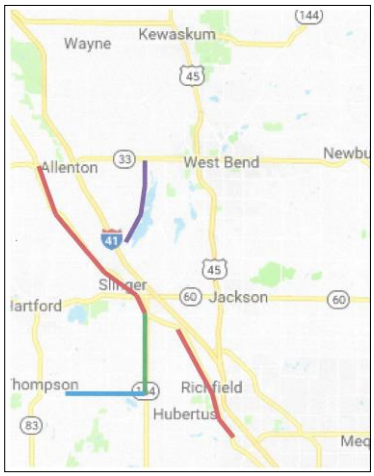


Figure 4.

The latter can undermine a sense of assured detection and arrest because the continued presence of police with a only a small associated percentage of violators, in this case drunk drivers, being detected and stopped might lead those violators to believe they can beat the odds and avoid detection (Roberts and Fillmore, 2017). As mentioned in Section II, shorter term enforcement crackdowns that are rotated to different targeted locations can have less deterrence decay for this reason, and therefore be more effective, because drunk drivers may feel that police could be present at any time, even though they are not or, if they are, may not be immediately visible (Roberg, Novak, Cordner and Smith, 2015). It was also pointed out that the risk of arrest

associated with some crackdowns is low owing to "enforcement practices and limited numbers of police" (Walker 2011). A recommended methodology to counter this in Washington County is to employ a circuitous patrol and traffic stop pattern with sectors being expanded to include potential and actual alternate routes used by drunk drivers displaced from more heavily patrolled routes. Figures 5 and 6 demonstrate linear and circuitous patrol patterns, respectively, on I-41 with the latter incorporating more law enforcement presence on the identified US highways where alcohol-related crashes have been prevalent. However, it is important that more than mere police presence be increased. As stated earlier, enforcement activity must accompany that presence in order to maximize an HVE strategy in much the same fashion as military operations compel notice versus simple troop presence (D'Orazio, 2012). The circuitous patrol pattern in Figure 6 should embrace the use of directed patrol, especially in actual and potential locations of displacement, as a "proactive" tactic with enforcement efforts focused on identified violations, such as drunk driving (Roberg, Novak, Cordner and Smith, 2015). These directed patrol efforts should also involve traffic stops for a variety of traffic and other violations, in addition to OWI. This is because the goal of such traffic stops is intended primarily to demonstrate activity by officers in the displacement locations, rather than presence only, to enhance residual deterrence and underscore that the police can be active anywhere at any time. Such a result is more likely to be obtained when police make a traffic stop in a location, take enforcement action, and then continue on with a mobile patrol along that route to another location to make the next traffic stop. This kind of application of a "dosage" methodology is preferred, rather than remaining visibly stationary in one location or using a "fishing hole" approach, in an effort to increase residual deterrence (Telep, Mitchell and Weisburd, 2014; Maryland Association of Chiefs of Police, 2016).

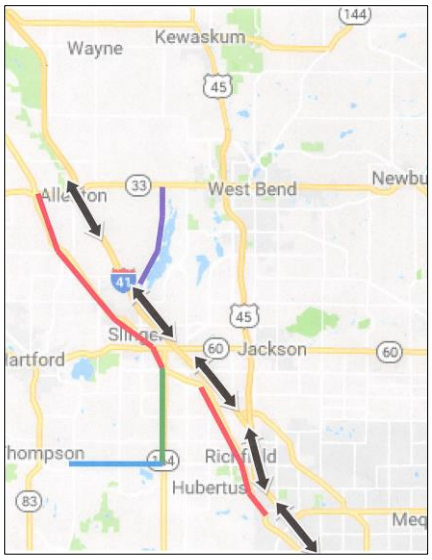


Figure 5

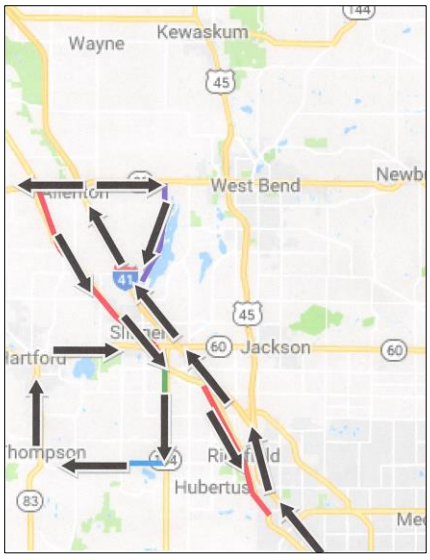


Figure 6

The above recommendation of employing directed patrol tactics for addressing possible displacement can be utilized by a single sector patrol officer or by a greater number than that if other officers, including those from multiple agencies operating within the jurisdiction as a task force, are deployed. Again, directed patrols may, like saturation patrols, focus on specific violations but it can allow for traffic stops of a wider array of violations and effectively serve as a general deterrent (Roberg, Novak, Cordner and Smith, 2015). Both, however, as previously described are aimed at suppression, rather than arrests, as a goal (Bruce, 2008).

Saturation patrols are integral to federally-funded OWI enforcement activities in Wisconsin and must be a component of a comprehensive patrol deployment model. These are normally scheduled to occur during identified emphasis mobilizations in conjunction with media outreach, including the Drive Sober Campaign in the late December and late August/early September Holiday time periods, and at other times and locations as may be desired. This tactic is intended to be utilized in a multi-agency task force strategy to maximize the concentration of deployed law enforcement officers in the patrols (Wisconsin Department of Transportation, 2018). Data-driven information in the determination of deployment locations is incorporated

which indicates that the areas in and around West Bend, Slinger and Richfield in Washington County are the most problematic in the aforementioned time periods (Wisconsin Traffic Operations and Safety Laboratory (2018). Saturation patrols, like crackdowns, leverage specific deterrence to "target" violators and offenses, such as drunk drivers, which has proven effective to reduce those offenses (Roberg, Novak, Cordner and Smith, 2015).

The tactic of using enforcement crackdowns, earlier explained as an "intensive, short-term" effort without forewarning to detect and arrest, rather than suppress violators, is useful to perpetuate a sense on the part of violators of police omnipresence and, therefore, a greater likelihood of detection (Roberg, Novak, Cordner and Smith, 2015). It also serves to reduce "offender adaptation" such as displacement (Sorg, Haberman, Ratcliffe, and Groff, 2013). Areas within Washington County in which data suggests are potential targets for OWI crackdowns include Hartford/Slinger, West Bend and Richfield during the summer months of June through August based on traffic crash volumes (Wisconsin Traffic Operations and Safety Laboratory (2018).

While the tactics of directed patrols, saturation patrols and crackdowns should be applied in a balanced manner in concert with each other, with a regulated dosage of officer presence and activity, the manner in which traffic stops are made is also vital. Pretext and probability stop tactics must either be avoided or, pertaining to the latter, properly applied. Traffic stops should not be done using pretextual motives because it might convey a public message that driving behavior is not dangerous and it can undermine the perceived legitimacy of police as previously explained (Blanks, 2016). This is not to suggest that traffic stops made for reasons other than driving behavior which lead to OWI detection should not occur. Instead, an effort to detect unsafe driving behavior must be central to any focused OWI enforcement efforts and can be

successful as is evident in Wisconsin State Patrol arrest statistics associated with focused OWI details in Dane County during 2017 where nearly 90 percent of traffic stops were the result of observed illegal driving behavior (Wisconsin State Patrol, 2018). Probability stops may also be a useful tactic when officers "select" which locations to detect targeted violations (Peak, 2015). This, as previously discussed, should consider possible displacement locations which may be in "close proximity" to more heavily travelled routes to and from establishments where alcohol is sold and consumed (Pennay and Room (2012). The identified routes in Figure 4, specifically State Highways 144, 164 and 167, are in areas where such establishments are located in Washington County (Tavern League of Wisconsin, 2018). With those considerations, the tactic of probability stops should be judiciously employed by officers when patrolling those areas.

The tactics recommended all support the HVE strategy as a deterrence effort but, must encompass a multi-agency task force strategy and applied quality crash and enforcement data in a coordinated enforcement effort to reduce drunk driving. The relatively limited numbers of law enforcement officers deployed in Washington County, with fractions being employed by several different agencies (Federal Bureau of Investigation, 2016), necessitate a combined strategy to act as a force-multiplier with all of those agencies adopting the strategies and tactics described above. This is the purpose of providing federal grants each year for OWI enforcement and promoting a multi-agency task force strategy when utilizing them. With that, employment of data-driven predictive analytics to ascertain where traffic crashes and incidents have been problematic, how discretionary enforcement efforts should be increased relative to those crash and incident locations, and where tertiary effects, such as displacement could occur as a result of increased or re-directed traffic enforcement, is essential. In addition, as predictive analytics becomes more advanced in its use of algorithms that consider traffic volume, VMT, vehicle

speeds, and other traffic and non-traffic factors, its role will become more profound in efforts to improve traffic safety (Romanski, 2018). The use of Community Maps, as an important predictive analytics tool available to all law enforcement agencies granted necessary user access permissions, should be employed to analyze data and other information provided by county Traffic Safety Commissions (TSCs) and the Wisconsin Police Traffic Crash Reports (DT4000) database (Wisconsin Traffic Operations and Safety Laboratory (2018). Together, strategic application of HVE, data-driven resource allocation, and multi-agency task force deployments; along with the systematic use of aforementioned tactics, in a comprehensive OWI enforcement deployment model in counties across Wisconsin may prove effective to further reduce the public safety challenge posed by alcohol-related traffic crashes.

Suggested Future Evaluation and Research

The effort to reduce drunk driving behavior in the short term using the components of a comprehensive OWI enforcement deployment model carries with it the underlying challenge to fundamentally change societal attitudes and behaviors in the long term. Ultimately, the need for aggressive law enforcement efforts may lessen if this occurs. Social control mechanisms, both formal and informal, must work together to achieve this outcome (Schmallenger, 2009; Vago, 2012). With that stated, it is imperative to measure the effectiveness of OWI enforcement programs that have been utilized in Wisconsin. These include the Brown County OWI Task Force mentioned earlier and other multi and single-agency programs that are, or will be, initiated across the state, in both urban/suburban and rural areas. Those that employ the strategies and tactics, as discussed in this paper, in a comprehensive manner are of particular interest for validation as part of a recommended enforcement deployment model.

A systematic evaluation should follow a clearly defined logic model. It should also incorporate surveys and data analysis of both formal and informal dimensions, including education and outreach. The logic model would provide a sequential "road map" of related events that connect the "need" for the program to "desired results" and allow stakeholders to identify areas for improvement. Intervals for evaluation should be periodic on a predetermined basis according to a basic logic model template (W. K. Kellogg Foundation, 2004). Quantitative data available at annual intervals, including deployments, expenditures, and arrest, crash, and fatality data can be sequentially accounted for as inputs or outputs, as applicable, to account for outcomes and impacts. The findings of evaluations are essential to determine whether any aspect of the studied program is to be continued or that grant funds be reallocated to other traffic safety programs (McDavid, Huse and Hawthorn, 2013).

A multiple linear regression analysis to establish causal relationships could be used and describe associations among variables, both dependent and independent. External validity aspects to be considered, such as changing economic and weather conditions affecting VMT, other programs simultaneously initiated, and political factors are appropriate. Internal validity issues should include VMT because the number of OWI-related fatal traffic crashes may increase or remain static while VMT rises, which would mean the rate of those crashes is, in fact, decreasing. On the other hand, the fatal traffic crash rate could increase while numbers of fatal traffic crashes have decreased if the VMT has also decreased. Another concern regarding internal validity is the quality and consistency of deployment data reported by participating agencies and related enforcement activity including arrests, citations and warning totals and the times they occurred. Triangulation of data collected from various sources regarding quantitative data and qualitative survey data with regard to media and high-visibility strategies to promote

public education and awareness should be conducted to ensure components of any program are continuing to be effective. Inferential application of the qualitative results from survey samples should be made. A cost-effective analysis is important to demonstrate that grant expenditures in terms of monetary inputs for salaries and other law enforcement agency costs are worthwhile in achieving desired outcomes and impacts, especially for those that do not have clearly associated monetary values (McDavid, Huse and Hawthorn, 2013).

In addition to program evaluation, research regarding the relationship of law enforcement presence and activity with reductions in alcohol-related motor vehicle crashes, and detected OWI violations, should be made to determine the extent of realized residual deterrence. Further study of allocation and deployment of patrols using a dosage approach is necessary to determine the appropriate blend that may contribute to optimal results in various highway/traffic environments. Research of this nature can provide law enforcement managers insight for improvement of a comprehensive patrol deployment model, as part of a multi-faceted approach, to further reduce alcohol-related traffic crashes and resulting fatalities and serious injuries. The safety of all who travel on public highways, streets and roads in Wisconsin, and across the United States, is dependent upon it.

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REFERENCES

Ackermann, K.D. (2017, August 23). Lieutenant of Police Operations, City of Green Bay Police Department. Personal Interview.

Adams, K. (1999). What we know about police use of force. In Q.C. Thurman & J. Zhao (Eds.) (2004). *Contemporary Policing: Controversies, Challenges, and Solutions*, 187-188. Los Angeles, CA: Roxbury Publishing.

Baeseman, Z. J. (2009). Alcohol-related motor vehicle accident fatality: Wisconsin rural-urban trends and observations. *Wisconsin Medical Journal*, 108 (7), 359-364. Retrieved from http://www.wisconsinmedicalsociety.org/_WMS/publications/wmj/pdf/108/7/359.pdf

Beck, K.H., Fell, J.C., & Yan, A. F. (2009). A comparison of drivers with high versus low perceived risk of being caught and arrested for driving under the influence of alcohol. *Traffic Injury Prevention*, 10, 312–319. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=bef2d3fc-e2e9-4a58-af12-869421988ce0%40sessionmgr120

Bertelli, A. M., & Richardson, L. E. (2008). The behavioral impact of drinking and driving. *The Policy Studies Journal*, 36 (4) 546-562. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=3&sid=c35adaba-a05c-4104-919b-1170b7816783%40sessionmgr101

Biederweiden, D. (2014). Consideration of police participation in OWI task force and grant. Internal Memorandum, City of De Pere, Wisconsin.

Blanks, J. (2016). Thin blue lies: how pretextual stops undermine police legitimacy. *Case Western Reserve Law Review*, 66 (4) 933. Retrieved from https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?referer=http://scholar.google.com/&httpsredir=1&article=4660&context=caselrev

Bruce, C.W. (2008). Police strategies and tactics: what every analyst should know. *Police Chief*. Retrieved from http://www.iaca.net/Resources/Articles/PoliceStrategiesTactics.pdf

Dahler, D. (2013, July 25). Interstate 80 challenge: more cops, more stops" for summer drivers. *CBS News*, Retrieved from https://www.cbsnews.com/news/interstate-80-challenge-more-cops-more-stops-for-summer-drivers/

Danton, K., Misselke, L, Bacon, R., & Done, J. (2003). Attitudes of young people toward driving after smoking cannabis or after drinking alcohol. *Health Education Journal*, 62 (1), 50-60. Retrieved from http://uhra.herts.ac.uk/bitstream/handle/2299/629/103033.pdf%3Bjsessionid%3DCA3635E33077954486DB9B3400C2139A?sequence%3D1

D'Orazio, V. (2012). War games: North Korea's Reaction to US and South Korean Military Exercises. *Journal of East Asian Studies*. 12, 275-294. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=6&sid=5150dd20-0a8f-420d-acd3-f3b9a74ca416%40sessionmgr101

Dula, C.S., Dwyer, W.O., & LeVerne, G. (2007). Policing the drunk driver: measuring law enforcement involvement in reducing alcohol-impaired driving. *Journal of Safety Research*, 3 (3), 267-272. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/detail/detail?vid=3&sid=0de929b7-65c9-4974-98e6-811cb8de76af%40sessionmgr101&bdata=JkF1dGhUeXBlPWlwLHVpZCZzaXRlPWVob3N0LWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#AN=25625940&db=a9h

Elder, R.W., Shults, R.A., Sleet, D.A, Nichols, J.L. Thompson, R.S., & Rajab, W. (2004). Effectiveness of mass media campaigns for reducing drinking and driving and alcohol-involved crashes: a systematic review. *American Journal of Preventive Medicine*, 27 (1), 57-65. Retrieved from http://www.ajpmonline.org/article/S0749-3797(04)00046-7/fulltext

Federal Bureau of Investigation (2018). Table 5 crime in the United States by state 2015. *Uniform Crime Report*. Retrieved from https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/table-5

Federal Bureau of Investigation (2016). Table 26 crime in the United States Wisconsin full-time law enforcement employees by city, 2016. *Uniform Crime Report*. Retrieved from https://ucr.fbi.gov/crime-in-the-u.s/2016/crime-in-the-u.s.-2016/tables/table-26/table-26-state-cuts/table-26-wisconsin.xls

Federal Bureau of Investigation (2016). Table 28 crime in the United States Wisconsin full-time law enforcement employees by state by metropolitan and nonmetropolitan counties, 2016. *Uniform Crime Report*. Retrieved from https://ucr.fbi.gov/crime-in-the-u.s/2016/crime-in-the-u.s.-2016/tables/table-28/table-28-state-cuts/table-28-wisconsin.xls

Gaines, L.K., & Kappeler, V.E. (2015). *Policing in America* (8th Ed.), 243-245, 396, 401, 430, 460. Waltham, MA: Elsevier.

Gamrath, C.G., & Johnston, I.D. (1997). The law of pretext stops since Whren v. United States. *Illinois Bar Journal*, 85 Ill. B.J. 488. Retrieved from http://www.sdflaw.com/files/The_Law_of_Pretext_Stops_Since_Whren_v_United_States.pdf

Garza, J. (2017, December 20). City crime decreases after surge in traffic enforcement surge, Flynn says. *Milwaukee Journal Sentinel*, Retrieved from https://www.jsonline.com/story/news/2017/12/20/city-crime-decreases-after-surge-traffic-enforcement-surge-flynn-says/971597001/

Grant, D. (2010). Dead on arrival: zero tolerance laws don't work. *Economic Inquiry*, 48 (3), 756-769. Retrieved from https://core.uk/download/pdf/6375859.pdf

Greene, J.W. (2003). Battling DUI: a comparative analysis of checkpoints and saturation patrols. *FBI Law Enforcement Bulletin*, 1-5. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=8&sid=15e668d5-42b9-4742-8062-f378a4ebb979%40sessionmgr4008

Grekul, J. & Thue, L. (2013). Curb the danger: a police-community collaboration to 'curb' impaired driving. *Police Practice and Research*, 14 (5), 402-414. Retrieved from http://web.a.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=3&sid=ff20785d-7fa0-4d36-aae3-cc587b1e6c7c%40sessionmgr4008

Hoover, L.T. (2010). Rethinking our expectations. *Police Practice and Research*. 11 (2), 160-165. Retrieved from http://web.a.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=6&sid=c1c495e3-a411-4501-bb3f-e1c9b6cbaaca%40sessionmgr4008

Jonah, B.A. & Grant, B.A. (1985). Long-term effectiveness of selective traffic enforcement programs for increasing seat belt use. *Journal of Applied Psychology*, 70 (2). Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.456.1334&rep=rep1&type=pdf

Kilcullen, D. (2006). "Twenty-eight articles": Fundamentals of company-level counterinsurgency. *Military Review*. 103. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=4&sid=5150dd20-0a8f-420d-acd3-f3b9a74ca416%40sessionmgr101

Kleiman. M. A. (2009). *When brute force fails*. 25. Princeton, NJ: Princeton University Press.

Legislative Coordinating Commission, Geographic Information Services Office (2001). Minnesota metropolitan area. Retrieved from https://www.gis.leg.mn/pdf/misc/metro.pdf

Lersch, K. (2003). When badges get too big: identifying and misidentifying police misconduct from citizen complaints. In Q.C. Thurman & J. Zhao (Eds.) (2004). *Contemporary Policing: Controversies, Challenges, and Solutions*, 306. Los Angeles, CA: Roxbury Publishing.

Leung, S.Y. & Starmer, G.A. (2005). Gap-acceptance and risk-taking by young and mature drivers, both sober and alcohol-intoxicated, in a simulated driving task. *Accident Analysis and Prevention*, 37 (6), 1056-1065. Retrieved from https://pdfs.semanticscholar.org/8ce6/8700a5a1f092f41727cafe0bf540635f4f3e.pdf

Maryland Chiefs of Police Association (2016). *Law-enforcement executive's guide to high visibility enforcement*. 4-13. Retrieved from www.nlelp.org/wp-content/uploads/2016/09/LE_Exec_Guide.pdf

McDavid, J.C., Huse, I., & Hawthorn, L.R.L. (2013). Program evaluation and performance measurement: An introduction to practice. 2nd ed. p. 245-251, 293-294, 412. Thousand Oaks, CA: Sage Publications.

Meskali, M., Hirt, S., Aillerie, I., Gineyt, G., Louveton, N., & Berthelon, C. (2011). Effect of moderated doses of alcohol on behavior of drivers confronted to simulated scenarios of accident. *Advances in Transportation Studies: An International Journal*, Section B 25, 91-96. Retrieved from p95http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=3&sid=c1e402c5-e9bf-4831-9747-7a2bc47d6544%40sessionmgr104

Mothers Against Drunk Driving (2017). Drunk driving statistics. Retrieved from http://www.madd.org/statistics/

Mothers Against Drunk Drivers (2017, January 5). New study finds ignition interlocks reduce fatal drunk driving crashes by 7%. Retrieved from https://www.madd.org/blog/press-release/new-study-finds-ignition-interlocks-reduce-fatal-drunk-driving-crashes-by-7-2/

National Highway Traffic Safety Administration (2015). *Countermeasures that work. a highway safety guide for state highway safety offices*. (8th Ed.), 1-21 – 1-24. Washington, D.C.: U.S. Department of Transportation. Retrieved from https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812202-countermeasuresthatwork8th.pdf

National Highway Traffic Safety Administration (2014). *Data-driven approaches to crime and traffic safety operational guidelines*. 1. Retrieved from https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/811185_ddacts_opguidelines.pdf

National Highway Traffic Safety Administration (2018). *Drunk driving*. Retrieved from https://www.nhtsa.gov/risky-driving/drunk-driving

National Highway Traffic Safety Administration (2016). 2015 motor vehicle crashes: overview, DOT HS 812 318. *Traffic Safety Facts: Research Note*. 1-2, 9. Retrieved from https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318

National Highway Traffic Safety Administration (2007). West Virginia's impaired driving high visibility enforcement campaign. *Traffic Safety Facts: Traffic Tech-Technology Transfer Series*. 332. Retrieved from https://rosap.ntl.bts.gov/view/dot/1814

Nichols, J.L., Chaffe, R.H. B., & Solomon, M.G. (2016, October). *More cops more stops: evaluation of a combined enforcement program in Oklahoma and Tennessee*. (Report No. DOT HS 812 337). 1-28. Washington, DC: National Highway Traffic Safety Administration. Retrieved from https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812337_morecopsmorestops.pdf

Peak, K. J. (2015). *Policing America: challenges and best practices*. (8th Ed.) 179, 210-211, 325. Boston, MA: Prentice.

Pennay, A. & Room, R. (2012). Prohibiting public drinking in urban public spaces: a review of the evidence. *Drugs, Educations, Prevention, and Policy*. 19(2) 95. Retrieved from http://web.a.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=9&sid=2378b848-1c29-4df5-af7c-0d151306a898%40sessionmgr4009

Piquero, A.R., & Tibbetts, S.G. (1996). Specifying the direct and indirect effects of low self-control and situational factors in decision making: toward a more complete model of rational offending. *Justice Quarterly* 13 (3), 481-510. In Tibbetts, S.G. & Hemmens, C. (Eds.) (2010). *Criminological theory: A text/reader*. Reading 5, 120-135. Thousand Oaks, CA: Sage Publications.

Ritchey, M., Nicholson-Crotty, S. (2011). Deterrence theory and the implementation of speed limits in the American states. *Policy Studies Journal*. 39 (2), 336-340. Retrieved from http://search.proquest.com.ezproxy.uwplatt.edu/docview/868928156?rfr_id=info%3Axri%2Fsid%3Aprimo

Roberg, R., Novak, K., Cordner, G., & Smith, B. (2015). *Police & society*. (6th Ed.). 61-70, 92-96, 117, 143-144, 234-237, 243-246, 286, 515. New York: Oxford University Press.

Roberts, W. & Fillmore, M.T. (2017). Curbing the DUI offender's self-efficacy to drink and drive: A laboratory study. *Drug and Alcohol Dependence*. 172, 73-79. Elsevier B.V.

Romanski, R. (2018, January 26). Program and Policy Chief. Wisconsin Department of Transportation, Bureau of Transportation Safety. Personal Interview.

Romel, R. (2009, December 19) Wasted in Wisconsin: New laws are the easy part of alcohol reform. *Milwaukee Journal/Sentinel*. Retrieved from http://archive.jsonline.com/news/wisconsin/79738467.html/

Schmallenger, F. (2009). *Criminal justice today: an introductory text for the 21st century* (10th Ed.), 97-99. Upper Saddle River, NJ: Pearson Prentice Hall

Schuller, K. (2015, December 24). OWI task force makes difference in Brown County. WFRV Green Bay, Wisconsin. Retrieved from http://www.wearegreenbay.com/news/local-news/owi-task-force-makes-a-difference-in-brown-county/306893326

Sherman, L.W. (1990). Police crackdowns: initial and residual deterrence. *Crime and Justice*, 12 (1990), 1-48.

Sherman, L. W. (1997). Policing for crime prevention. In Q.C. Thurman & J. Zhao (Eds.) (2004). *Contemporary Policing: Controversies Challenges, and Solutions*, 65. Los Angeles, CA: Roxbury Publishing.

Sherman, L.W., Gartin, P.R., & Buerger, M.E. (1989). Hot spots of predatory crime: routine activities and the criminology of place. *Criminology*, 27-56. In Tibbetts, S.G. & Hemmens, C. (Eds.) (2010). *Criminological theory: A text/reader*. Reading 6. 155. Thousand Oaks, CA: Sage Publications.

Sorg, E.T., Haberman, C.P., Ratcliffe, J.H., & Groff, E.R. (2013). Foot patrol in violent crime hot spots: the longitudinal impact of deterrence and posttreatment effects of displacement. *Criminology*, 51 (1), 66-88. Retrieved from https://s3.amazonaws.com/academia.edu.documents/46893012/Sorg_et_al_2013_Foot_patrol_in_violent_crime_hot_spots.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1518213349&Signature=8gxjJSAiyPemMv8uvyhWiJ54xAc%3D&response-content-disposition=inline%3B%20filename%3DFOOT_PATROL_IN_VIOLENT_CRIME_HOT_SPOTS_T.pdf

Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality (2010). *The NSDUH report: state estimates of drunk and drugged driving*, 2. Rockville, MD.

Supreme Court of the United States (1996). Michael A. Whren and James L. Brown, Petitioners v. United States. No. 95-5841. Cornell University Law School, Legal Information Institute. Retrieved from https://www.law.cornell.edu/supct/html/95-5841.ZO.html

Supreme Court of Wisconsin (2015). State of Wisconsin v. Daniel S. Iverson. Case No. 2014AP515-FT. Retrieved from https://www.wicourts.gov/sc/opinion/DisplayDocument.pdf?content=pdf&seqNo=156089

Sutherland, E.H., & Cressey, D. (1955). A sociological theory of criminal behavior. *Principles of Criminology*, (5th Ed.), 77-80. In Tibbetts, S.G. & Hemmens, C. (Eds.) (2010). *Criminological theory: A text/reader.* Reading 23. 472-475. Thousand Oaks, CA: Sage Publications.

Tavern League of Wisconsin (2018). Washington County members. Retrieved from http://www.tlw.org/index.php?module=tlw.websiteforms&cmd=tavernsearchresults&league=Washington County

Taylor, R.W. (1981). Police patrol deployments in small urban areas: an application of integrated management decision-making. Dissertations and Theses. Paper 814. 140-144. Retrieved from https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1813&context=open_access_etds

Telep, C.W., Mitchell, R.J., & Weisburd, D. (2014). How much time should police spend at crime hot spots? Answers from a police agency directed randomized field trial in Sacramento, California. *Justice Quarterly*, 31(5), 905-929. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=3&sid=a37c5dd2-80b3-474b-a858-e141c28fc29d%40sessionmgr101

Tibbetts, S.G. & Hemmens, C. (2010). *Criminological theory: A text/reader*. 97-98. Thousand Oaks, CA: Sage Publications.

United States Department of Justice (2016). *Milwaukee police department assessment report draft*. 81-94. Office of Community Oriented Policing Collaborative Reform Initiative. Retrieved from https://graphics.jsonline.com/jsi_news/documents/doj_draftmpdreport.pdf

Vago, S. (2012). *Law and society*. (10th ed.), 195-202, 318. Upper Saddle River, NJ: Pearson Prentice Hall.

W. K. Kellogg Foundation (2004). Using Logic Models to Bring Together Planning, Evaluation, and Action: Logic Model Development Guide. Pp. 1-3, 17. Retrieved on March 17, 2018 from http://www.bttop.org/sites/default/files/public/W.K.%20Kellogg%20LogicModel.pdf

Walker, S. (2011). *Deter the criminals. sense and non-sense about crime, drugs, and communities* (7th ed.), 132-140. Belmont, California: Wadsworth.

Weisburd, D., Wycoff, L.A., Ready, J., Eck, J.E., Hinkle, J.C. & Gajewski, F. (2006). Does crime just move around the corner? a controlled study of spatial displacement and diffusion of crime control benefits. *Criminology*, 44 (3), 551-554, 579-580. Retrieved from https://s3.amazonaws.com/academia.edu.documents/39681998/Is_problem-oriented_policing_effective_i20151104-10702-1v1nk2u.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1518215348&Signature=DX7WeWsT6wnBFYOr8N2B1ReN9SQ%3D&response-content-disposition=inline%3B%20filename%3DIs_problem-oriented_policing_effective_i.pdf

Williams, A.F. (2003). Teenage drivers: patterns of risk. *Journal of Safety Research*, 34, 1-15. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.602.1047&rep1&type=pdf

Wisconsin Department of Transportation, Bureau of Transportation Safety (2010). *Wisconsin Traffic Safety Reporter* 13 (3) 1-3, 7. Madison, WI: Wisconsin Department of Transportation. Retrieved from http://wisconsindot.gov/Documents/aboutwisdot/newsroom/newsletters/safety/tsr-vol13no3.pdf

Wisconsin Department of Transportation, Bureau of Transportation Safety (2018). Impaired driving enforcement. Federal Grant No. FG-2018-WSP HEAD-04273.

Wisconsin Department of Transportation, Bureau of Transportation Safety (2014). *Wisconsin Traffic Safety Reporter*. 17 (4) 1-5. Madison, WI: Wisconsin Department of Transportation. Retrieved from http://wisconsindot.gov/Documents/aboutwisdot/newsroom/newsletters/safety/tsr-vol17no4.pdf

Wisconsin Department of Transportation (2018). Drive sober or get pulled over campaign. *Daredevils Dare Not-Impaired Driving Enforcement Media Campaign*. Retrieved from http://witrafficsafety.org/drivesober/

Wisconsin Department of Transportation (2018). Drunk driving arrests and convictions. Retrieved from http://wisconsindot.gov/Pages/safety/education/drunk-drv/ddarrests.aspx

Wisconsin Department of Transportation (2018). Drunk driving crashes, fatalities and injuries. Retrieved from http://wisconsindot.gov/Pages/safety/education/drunk-drv/ddcrash.aspx

Wisconsin Department of Transportation (2018). Drunk driving risk factors. Retrieved from http://wisconsindot.gov/Pages/safety/education/drunk-drv/ddrisk.aspx

Wisconsin Department of Transportation (2018). Economic cost due to drunk driving. Retrieved from http://wisconsindot.gov/Pages/safety/education/drunk-drv/ecocost.aspx

Wisconsin Department of Transportation, Bureau of Transportation Safety (2010). *Grant status reports for highway safety funds for federal fiscal years 2005-2010.*

Wisconsin Department of Transportation (2018). Law enforcement traffic safety grants. Retrieved from http://wisconsindot.gov/Pages/safety/enforcement/agencies/grants.aspx

Wisconsin Department of Transportation (2018). Mobile architecture for communications handling (MACH). Retrieved from http://wisconsindot.gov/Pages/safety/enforcement/agencies/mach/default.aspx

Wisconsin Department of Transportation (2018). Required waiting period for occupational license eligibility. Retrieved from http://wisconsindot.gov/Pages/dmv/license-drvs/susp-or-rvkd/occ-wait.aspx

Wisconsin Department of Transportation (2011). Seatbelt law. Retrieved from http://wisconsindot.gov/Pages/safety/education/seat-belt/law.aspx

Wisconsin Department of Transportation (2018). *State of Wisconsin federal fiscal year 2018 highway safety plan*.19-23. Retrieved from http://wisconsindot.gov/Documents/safety/education/frms-pubs/hsp2018.pdf

Wisconsin Department of Transportation (2018). *Task force operational plan template*. Bureau of Transportation Safety.

Wisconsin Department of Transportation (2018). *Traffic fatalities in Brown Co. 2006-2015*

Wisconsin Department of Transportation (2014). *Wisconsin strategic highway safety plan 2014-2016*. 27. Retrieved from http://wisconsindot.gov/Documents/doing-bus/local-gov/astnce-pgms/highway/hwy-safety.pdf

Wisconsin Department of Transportation (2018). *Wisconsin strategic highway safety plan 2017-2020*. 21-23. Retrieved from http://wisconsindot.gov/Documents/safety/education/frms-pubs/strategichwy-17-20.pdf

Wisconsin Legislative Council (1955). A report to the state of Wisconsin on the development of a rural traffic supervision program. *Northwestern University Traffic Institute Research Report on State Traffic Patrol.* 5, 72-77.

Wisconsin Legislature (2018). Chapter 340 vehicles-general provisions. Retrieved from https://docs.legis.wisconsin.gov/statutes/statutes/340/01

Wisconsin Legislature (2018). 346.072 Passing stopped emergency or roadside service vehicles. Retrieved from https://docs.legis.wisconsin.gov/2015/statutes/statutes/346/II/072

Wisconsin Legislature (2018). 346.63 (1) and (2) Operating under the influence of intoxicant or other drug. Retrieved from https://docs.legis.wisconsin.gov/statutes/statutes/346/X/63

Wisconsin Legislature (2018). 346.65 Penalty for violating sections 346.62 to 346.64. Retrieved from https://docs.legis.wisconsin.gov/statutes/statutes/346/X/065

Wisconsin Legislature (2018). 349.02 Police and traffic officers to enforce the law. Retrieved from https://docs.legis.wisconsin.gov/statutes/statutes/349/I/02

Wisconsin Legislature (2018). *2003 Wisconsin Act 30*. Retrieved from https://docs.legis.wisconsin.gov/2003/related/acts/30.pdf

Wisconsin Legislature (2018). *2009 Wisconsin Act 100*. Retrieved from http://docs.legis.wisconsin.gov/2009/related/acts/100.pdf

Wisconsin Legislature (2018). *2017-assembly bills*. Retrieved from https://docs.legis.wisconsin.gov/2017/proposals/reg/asm/bill

Wisconsin Legislature (2018). *2017-senate bills*. Retrieved from https://docs.legis.wisconsin.gov/2017/proposals/reg/sen/bill

Wisconsin Legislature (2018). *2017-related documents-acts*. Retrieved from https://docs.legis.wisconsin.gov/2017/related/acts

Wisconsin State Patrol (2018). *2017-activity totals, by reason, by county.*

Wisconsin State Patrol (2018). *2017-federally-funded traffic enforcement overtime grant data.* Bureau of Field Operations.

Wisconsin State Patrol (2017). Wisconsin State Patrol Staffing Allocation.

Wisconsin State Patrol (2018). *2018-2023 Wisconsin State Patrol strategic plan*. 6-8.

Wisconsin State Patrol (2018). *Wisconsin State Patrol traffic stop data-Washington County 2015-2017*. Bureau of Field Operations.

Wisconsin Traffic Operations and Safety Laboratory (2018). *Community maps - Wisconsin county TSC crash mapping*. Retrieved from https://transportal.cee.wisc.edu/partners/community-maps/crash/search/BasicSearch.do

Wisconsin Traffic Operations and Safety Laboratory (2018). Web applications. *The WisTransPortal System*. Retrieved from https://transportal.cee.wisc.edu/applications/

Yao, J., Johnson, M.B., & Tippetts, S. (2015). Enforcement uniquely predicts reductions in alcohol-impaired crash fatalities. *Addiction*, 111 (3), 448-453. Retrieved from http://web.b.ebscohost.com.ezproxy.uwplatt.edu/ehost/pdfviewer/pdfviewer?vid=3&sid=15e668d5-42b9-4742-8062-f378a4ebb979%40sessionmgr4008