VOLUME 16

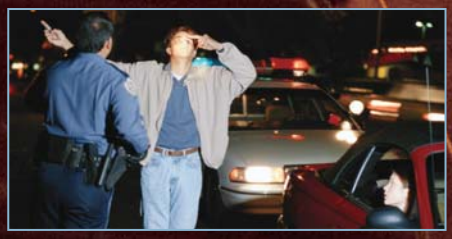
NCHRP

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

REPORT 500

Guidance for Implementation of the AASHTO Strategic Highway Safety Plan

Volume 16: A Guide for Reducing Alcohol-Related Collisions



TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP REPORT 500

Guidance for Implementation of the AASHTO Strategic Highway Safety Plan

Volume 16: A Guide for Reducing Alcohol-Related Collisions

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SUBJECT AREAS
Safety and Human Performance

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in Cooperation with the Federal Highway Administration

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

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FOREWORD

By Charles W. Niessner
Staff Officer
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The goal of the AASHTO Strategic Highway Safety Plan is to reduce annual highway fatalities to 1.0 fatality per 100 million vehicle-miles of travel. This goal can be achieved through the widespread application of low-cost, proven countermeasures that reduce the number of crashes on the nation's highways. This sixteenth volume of *NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan* provides strategies that can be employed to reduce crashes involving alcohol. The report will be of particular interest to safety practitioners with responsibility for implementing programs to reduce injuries and fatalities on the highway system.

In 1998, AASHTO approved its Strategic Highway Safety Plan, which was developed by the AASHTO Standing Committee for Highway Traffic Safety with the assistance of the Federal Highway Administration, the National Highway Traffic Safety Administration, and the Transportation Research Board Committee on Transportation Safety Management. The plan includes strategies in 22 key emphasis areas that affect highway safety. The plan's goal is to reduce the annual number of highway deaths by 9,000 by 2008. Each of the 22 emphasis areas includes strategies and an outline of what is needed to implement each strategy.

NCHRP Project 17-18(3) is developing a series of guides to assist state and local agencies in reducing injuries and fatalities in targeted areas. The guides correspond to the emphasis areas outlined in the AASHTO Strategic Highway Safety Plan. Each guide includes a brief introduction, a general description of the problem, the strategies to address the problem, and a model implementation process.

This is the sixteenth volume of *NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan*, a series in which relevant information is assembled into single concise volumes, each pertaining to specific types of highway crashes (e.g., run-off-the-road and head-on) or contributing factors (e.g., aggressive driving). An expanded version of each volume with additional reference material and links to other information sources is available on the AASHTO Web site at http://safety.transportation.org. Future volumes of the report will be published and linked to the Web site as they are completed.

While each volume includes countermeasures for dealing with particular crash emphasis areas, *NCHRP Report 501: Integrated Management Process to Reduce Highway Injuries and Fatalities Statewide* provides an overall framework for coordinating a safety program. The integrated management process comprises the necessary steps for advancing from crash data to integrated action plans. The process includes methodologies to aid the practitioner in problem identification, resource optimization, and performance measurements. Together, the management process and the guides provide a comprehensive set of tools for managing a coordinated highway safety program.

Contents

Acknowledgments

This volume of *NCHRP Report 500* was developed under NCHRP Project 17-18(3), the product of which is a series of implementation guides addressing the emphasis areas of AASHTO's Strategic Highway Safety Plan. The project was managed by CH2M HILL, and the co-principal investigators were Kevin Slack of CH2M HILL and Ron Pfefer. Timothy Neuman of CH2M HILL served as the overall project director for the team. Kelly Hardy, also of CH2M HILL, served as a technical specialist on the development of the guides.

The project team was organized around the specialized technical content contained in each guide, and the overall team included nationally recognized experts from many organizations. The following team of experts, selected for their knowledge of this emphasis area, served as lead authors for this guide:

- Robert Foss, Arthur Goodwin, and Jamie Sohn
  University of North Carolina Highway Safety Research Center
- James Hedlund
  Highway Safety North

Development of the volumes of NCHRP Report 500 utilized the resources and expertise of many professionals from around the country and overseas. Through research, workshops, and actual demonstration of the guides by agencies, the resulting documents represent best practices in each emphasis area. The project team is grateful to the following people and their agencies for supporting the project by providing material, participating in workshops and meetings, and providing input and comments during the development of this guide:

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SECTION I

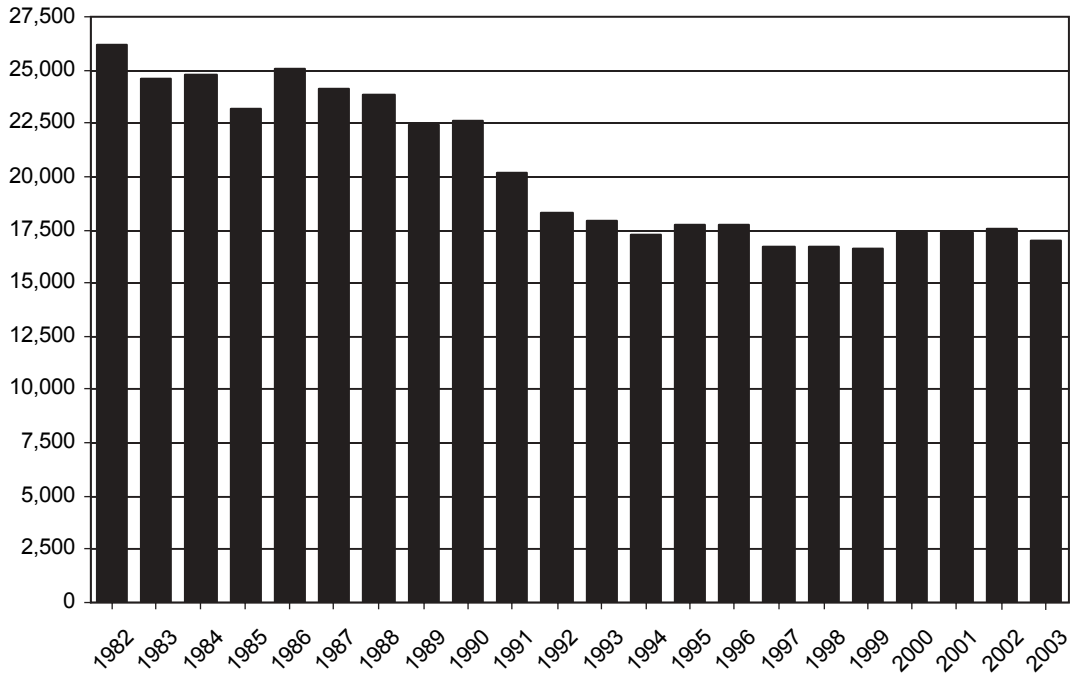
Summary

The Problem

Alcohol-impaired driving is among the most common contributors to motor vehicle crashes in the United States. In 2003, 17,013 individuals were killed in a motor vehicle crash in which the driver or other participant had a positive blood alcohol concentration (BAC), and 15,630 of those were above 0.08 percent, which is the legal limit for drivers in all 50 states and the District of Columbia. The 17,013 alcohol-related fatalities represent 40 percent of the 42,643 motor vehicle fatalities that occurred in 2003. Alcohol-related crashes are estimated to cost the public more than $50 billion yearly.

Although hundreds of millions of dollars have been spent during the past two decades on efforts to reduce alcohol-impaired driving, the problem has proved frustratingly resistant to change. There were marked declines in alcohol–related crash fatalities from the mid-1980s to the early 1990s; however, there has been little change since that time. Between 1994 and 2003, alcohol-related traffic fatalities have hovered between 16,500 and 17,500 a year (see Exhibit I-1). Although additional progress will be difficult, states can do much to further reduce the size of this problem.

EXHIBIT I-1
Number of Alcohol-Related Fatalities in the U.S., 1982–2003
Source: NHTSA, 2005



The two fundamental methods to reduce alcohol-related crashes are (1) to reduce excessive drinking through policies and programs to control alcohol sales and inform drinkers of the dangers of excessive drinking and (2) to deter driving while impaired by alcohol. Each method includes several distinct strategies directed at different target populations.

The drinking while intoxicated (DWI) criminal justice system of laws, enforcement, prosecution, adjudication, sanctions, and offender monitoring is complex. All elements of this system must function well—both individually and cooperatively—to ensure that DWI offenders are (1) frequently detected, (2) routinely charged, (3) effectively prosecuted, (4) suitably punished when convicted, and (5) appropriately treated for alcohol abuse or dependency. If these enforcement efforts are to have a general deterrent effect on potential impaired drivers, as well as a specific deterrent effect on DWI offenders, the public needs to be regularly made aware of these activities.

Strategies designed to prevent impaired driving before it occurs apply to the entire driving population. These are typically referred to as *general deterrence* strategies. These hold the greatest potential to substantially reduce impaired driving and alcohol-related crashes. Strategies that focus on punishing and rehabilitating individuals who have been arrested for DWI to discourage a repeat of the behavior are known as *specific deterrence* strategies. Individuals who have been arrested represent a relatively small proportion of the overall drinking-driving problem.

To function well, all participating agencies in the DWI control system need readily available, up-to-date information about persons who have been arrested for impaired driving. In addition, these agencies need adequate resources. In view of the huge societal costs created by alcohol-related crashes and the demonstrated cost-efficiency of several countermeasures (NHTSA 2004a; http://www.nhtsa.dot.gov/people/injury/alcohol/impaired-drivingusa/US.pdf), additional resources applied to carefully selected programs are considered by many to be a wise investment of public resources. For further discussion on these issues, see Robertson et al., 2004 (http://www.trafficinjuryresearch.com/publications/pub_details.cfm?intPubID=196).

Several specific attributes of the alcohol-related crash problem influence development and selection of prevention strategies. Foremost among these is that the criminal justice system through which impaired driving is largely addressed involves a set of complexly interrelated elements. These elements often don't function well together; therefore, the system fails to achieve the objective of discouraging impaired driving. In addition, impaired drivers often have an alcohol dependency or abuse problem, which strategies need to address both directly and indirectly. Young drivers have long been recognized as a higher-risk segment of the driving population. The combination of young drivers and alcohol is hence particularly troublesome. When young people drive after drinking, they have a higher crash risk than more experienced drivers, and this fact merits special attention. Finally, one in eight alcohol-related fatalities involves an impaired pedestrian or bicyclist. Although some of the strategies described here may affect these individuals, the focus of this guide is on alcohol-impaired drivers.

Objectives and Strategies

Exhibit I-2 shows the objectives and strategies identified as the most promising approaches to reduce alcohol-related crashes.

EXHIBIT I-2
Objectives and Strategies to Reduce Alcohol-Related Collisions

Objectives	Strategies
5.1 A—Reduce Excessive Drinking and Underage Drinking	5.1 A1—Increase the State Excise Tax on Beer (T)
	5.1 A2—Require Responsible Beverage Service Policies for Alcohol Servers and Retailers (P)
	5.1 A3—Conduct Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons (T)
	5.1 A4—Employ Screening and Brief Interventions in Health Care Settings (T)
5.1 B—Enforce DWI Laws	5.1 B1—Conduct Regular Well-Publicized DWI Checkpoints (P)
	5.1 B2—Enhance DWI Detection Through Special DWI Patrols and Related Traffic Enforcement (T)
	5.1 B3—Publicize and Enforce Zero Tolerance Laws for Drivers Under Age 21 (P)
5.1 C—Prosecute, Impose Sanctions on, and Treat DWI Offenders	5.1 C1—Suspend Driver's License Administratively Upon Arrest (P)
	5.1 C2—Establish Stronger Penalties for BAC Test Refusal Than for Test Failure (T)
	5.1 C3—Eliminate Diversion Programs and Plea Bargains to Non-Alcohol Offenses (T)
	5.1 C4—Screen All Convicted DWI Offenders for Alcohol Problems and Require Treatment When Appropriate (P)
5.1 D—Control High-BAC and Repeat Offenders	5.1 D1—Seize Vehicles or Vehicle License Plates Administratively Upon Arrest (P)
	5.1 D2—Require Ignition Interlocks as a Condition for License Reinstatement (P)
	5.1 D3—Monitor All Convicted DWI Offenders Closely (P)
	5.1 D4—Incarcerate Offenders (P)

Note: (P) indicates that a strategy is proven effective. (T) indicates that a strategy has been tried extensively but is not yet proven effective. Further explanation of (T) and (P) appears in Section V.

Explanation of Objectives and Strategies

This guide discusses four objectives with successively restricted target populations:

- Reduce excessive drinking and underage drinking.
- Deter driving after drinking through effective DWI law enforcement.
- Improve the system for prosecuting, imposing sanctions against, and treating DWI offenders.
- Control the most recalcitrant offenders.

The strategies within each objective were identified using a two-step process. Potentially useful approaches were first identified through an extensive review of the research literature on programs and policies to reduce alcohol-impaired driving. The most promising strategies were then selected and clarified in consultation with an expert panel composed of experienced researchers and state officials with responsibility for DWI programs. A large number of strategies to reduce alcohol-related crashes have been tried. Many have not been evaluated, and others have shown no benefits when evaluated. The strategies presented here are considered to be the most effective based on results from well-designed evaluation studies and the opinions of top experts in the field. Although these strategies often require state-level action, several of these strategies can also be adapted and productively used in individual communities.

Some widely used or commonly advocated approaches are not included because there is no evidence that they reduce alcohol-related collisions and no compelling reason to believe that they could. Given that resources to address behavioral factors that contribute to traffic crashes are severely limited, consideration should be given to directing resources toward implementation, expansion, or enhancement of strategies discussed here and away from approaches not covered by this guide. States where all or most of the included strategies already are in place may wish to consider whether these strategies could be implemented more effectively or more widely throughout the state before turning to other, unproven strategies.

To select which strategies will most likely produce the greatest benefit in a given jurisdiction, an important first step is to conduct a careful assessment of the nature of the jurisdiction's drinking-driving problem and how the DWI countermeasure system is currently functioning. This assessment requires a multidisciplinary team. States frequently use a task force that represents all the key elements of this system. Without such an approach, a fragmented and incomplete understanding of the problem is likely and progress will be difficult. The system for dealing with alcohol-impaired driving may be the most complex and involve the greatest number of disciplines and state agencies of any traffic safety issue. For further discussion of the process for implementing strategies, see Section VI.

Reduce Excessive Drinking and Underage Drinking

Excessive drinking often leads to alcohol-impaired driving. Drinking habits can be changed. The decreases in alcohol-related crashes during the past two decades have partly resulted from such changes. States can use the strategies within this objective to reduce excessive drinking and subsequent impaired driving.

Increase the State Excise Tax on Beer. Studies over the past 20 years repeatedly show that higher beer prices are associated with less drinking and fewer motor vehicle crashes. This holds true for heavier drinkers as well as more typical drinkers. The relationship is somewhat stronger among underage drinkers. States influence beer prices through excise taxes. In most states, the value of this tax has been substantially eroded by inflation since the current rate was established.

Require Responsible Beverage Service Policies for Alcohol Servers and Retailers. Prohibiting marketing tactics that encourage excessive consumption and reducing the sale of alcohol to persons who are already impaired can reduce excessive drinking and impairment. Although

alcohol advertising is largely a national-level matter, state alcoholic beverage control laws can address many problematic sales tactics, as well as some kinds of advertising. In addition, laws allowing injured parties to recover damages from licensed establishments (so-called dram shop laws) can encourage alcohol retailers to adopt responsible beverage service policies.

Conduct Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons. Responsible beverage service policies generally are effective only when they are adequately enforced. One effective tactic is well-publicized compliance checks, in which underage persons working with law enforcement attempt to purchase alcohol.

Employ Screening and Brief Interventions in Health Care Settings. Many persons arrested for DWI have some level of problem controlling their drinking. Alcohol screening to identify individuals with alcohol problems—followed when appropriate by brief, single-session interventions by health care professionals to encourage changes in drinking behavior—has proved to be effective for persons who are not seriously dependent on alcohol. Those who are dependent often require treatment.

Enforce DWI Laws

DWI law enforcement is critical in controlling impaired driving. The enforcement strategies identified here have been demonstrated to be more effective than other enforcement activities. The goal of all enforcement strategies is to deter persons from driving while impaired by alcohol, not just to arrest and punish impaired drivers.

Conduct Regular Well-Publicized DWI Checkpoints. At a DWI checkpoint, law enforcement officers stop cars to determine whether drivers are impaired by alcohol. Regular well-publicized checkpoints may be the single most effective strategy for deterring impaired driving. Highly visible and well-publicized checkpoints help convince the public that impaired drivers are likely to be arrested and punished.

Enhance DWI Detection Through Special DWI Patrols and Related Traffic Enforcement. Checkpoints operate only at specific times and locations. By highlighting DWI in all traffic enforcement activities, officers continually reinforce the message that impaired drivers will be stopped and arrested. Checking for alcohol impairment among persons stopped for speeding or seatbelt violations is particularly important since drinking drivers often speed and fail to buckle up.

Publicize and Enforce Zero Tolerance Laws for Drivers under Age 21. All states prohibit persons under 21 from driving after drinking any detectable amount of alcohol, although for technical reasons this is sometimes reflected by a legal BAC limit of 0.01 or 0.02 rather than zero. In many jurisdictions, these laws are not well understood and are not enforced. In several states, provisions of the law create unnecessary barriers to enforcement. Removing any such barriers, actively enforcing the law, and publicizing both the law and the enforcement activities can discourage driving after drinking by underage persons.

Prosecute, Impose Sanctions on, and Treat DWI Offenders

DWI laws and enforcement are empty threats without effective prosecution, adjudication, and punishment for offenders. The consequences should be swift, certain, and appropriately severe. Swiftness and certainty are more important than severity. The strategies within this

objective will help states increase the swiftness and certainty of DWI offender punishment. In addition, because many drinking drivers have an uncontrolled problem with drinking, it is important to identify those individuals and to ensure that they complete treatment for the problem before they are allowed to regain unrestricted driving privileges.

Suspend Driver's License Administratively Upon Arrest. A critical feature of laws that are widely heeded is the perception that punishment for a violation is likely and will occur quickly. However, DWI laws often result in substantial delays and frequently allow individuals to escape punishment altogether despite their guilt. To provide quick and certain consequences, most states also administratively suspend the driver's license of a person arrested for DWI. The effectiveness of administrative license suspension in reducing impaired driving is well documented.

Establish Stronger Penalties for BAC Test Refusal Than for Test Failure. As part of the driving privilege, implied consent laws require individuals to provide a breath or blood test upon the request of an officer who has reason to believe a driver has been drinking. In states where the penalty for test refusal is less than the penalty for a DWI conviction, many drivers refuse the test. Without a BAC test result, achieving a DWI conviction often is more difficult.

Eliminate Diversion Programs and Plea Bargains to Non-Alcohol Offenses. To reduce demands on overloaded prosecutors and judges, DWI charges are often dropped in exchange for guilty pleas to lesser charges. In other instances, drivers who complete an alcohol education or community service program have their DWI conviction removed from their record (in so called "diversion" programs). Both practices undermine the integrity of DWI countermeasure systems by allowing individuals to escape appropriate punishment and preventing states from identifying and treating multiple offenders more seriously.

Screen All Convicted DWI Offenders for Alcohol Problems and Require Treatment When Appropriate. Many persons arrested for DWI have driven while impaired many times and have some problem controlling their drinking. These individuals often need professional treatment. The DWI arrest provides an opportunity to determine if alcohol treatment is needed. When it is, the court's control over convicted offenders can provide the incentive these individuals need to complete the full treatment requirements.

Control High-BAC and Repeat Offenders

Some individuals drive repeatedly while impaired by alcohol in spite of the threat of being arrested and punished. Many of them have been convicted of DWI more than once; many have a very high BAC at their first arrest. The strategies within this objective provide methods to control their drinking and driving behavior.

Seize Vehicles or Vehicle License Plates Administratively Upon Arrest. Many persons whose driver's license has been suspended or revoked continue to drive. The next step to stop their driving is to apply measures to their vehicles by taking the license plate or by immobilizing or impounding the vehicle. These procedures are generally quite effective when applied, but courts rarely use them. They are more effective when applied administratively by the motor vehicle licensing agency.

Require Ignition Interlocks as a Condition for License Reinstatement. An alcohol interlock prevents a vehicle from being started if the driver has been drinking. Interlocks allow DWI

offenders to resume driving after a period of license suspension or revocation but prevent the offender from driving after drinking. Interlock effectiveness is well documented.

Monitor All Convicted DWI Offenders Closely. Many convicted DWI offenders fail to comply with conditions of their sentences such as alcohol treatment requirements and prohibitions on driving. This failure to comply with sentences is particularly common when offenders are not monitored closely. Methods to monitor offenders closely include intensive supervision probation, home confinement with electronic monitoring, specialized DWI/drug courts, and dedicated detention facilities.

Incarcerate Offenders. Although this strategy is far too costly to be used widely, incarcerating recalcitrant offenders, as a matter of last resort, will prevent these individuals from driving while impaired. More importantly, the ultimate threat of incarceration can serve as the key to encouraging individuals to comply with a variety of less restrictive mandates to stop driving while impaired.

SECTION II

Introduction

Driving while intoxicated (DWI)[1] is among the most common contributors to fatal motor vehicle crashes in the United States. In 2003, 17,013 individuals were killed in a motor vehicle crash in which the driver or other participant had a positive blood alcohol concentration (BAC), and 15,630 of those were above 0.08 percent, which is the legal limit for drivers in all 50 states and the District of Columbia. The 17,013 alcohol-related fatalities[2] represent 40 percent of the 42,643 motor vehicle fatalities that occurred in 2003. Alcohol-related crashes cost the public more than $50 billion yearly.

Although hundreds of millions of dollars have been spent during the past two decades on efforts to reduce driving after drinking, the problem has proved resistant to change. There were marked declines in alcohol–related crash fatalities from the mid-1980s to the early 1990s; however, there has been little change since that time. Between 1994 and 2003, alcohol-related traffic fatalities have hovered between 16,500 and 17,500 a year (see Exhibit II-1).

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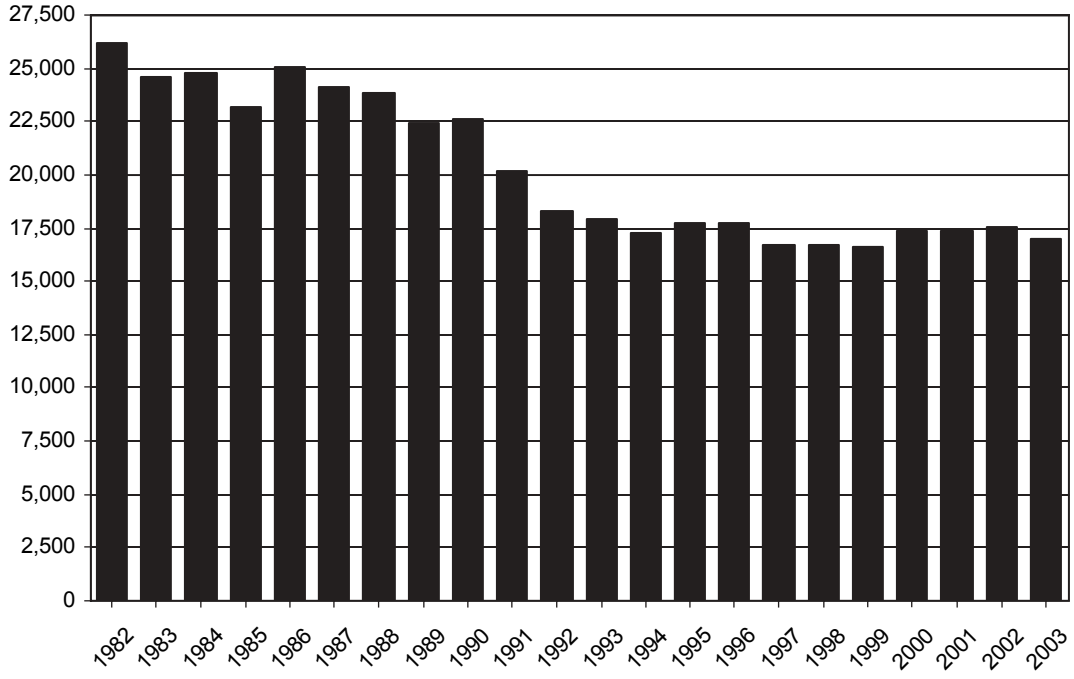
Number of Alcohol-Related Fatalities in the U.S., 1982–2003
Source: NHTSA, 2005



[1] Different terms are used in various states to describe alcohol-impaired driving. The term DWI is used to designate the legal infraction of driving in violation of a state's statute concerning alcohol use and driving.

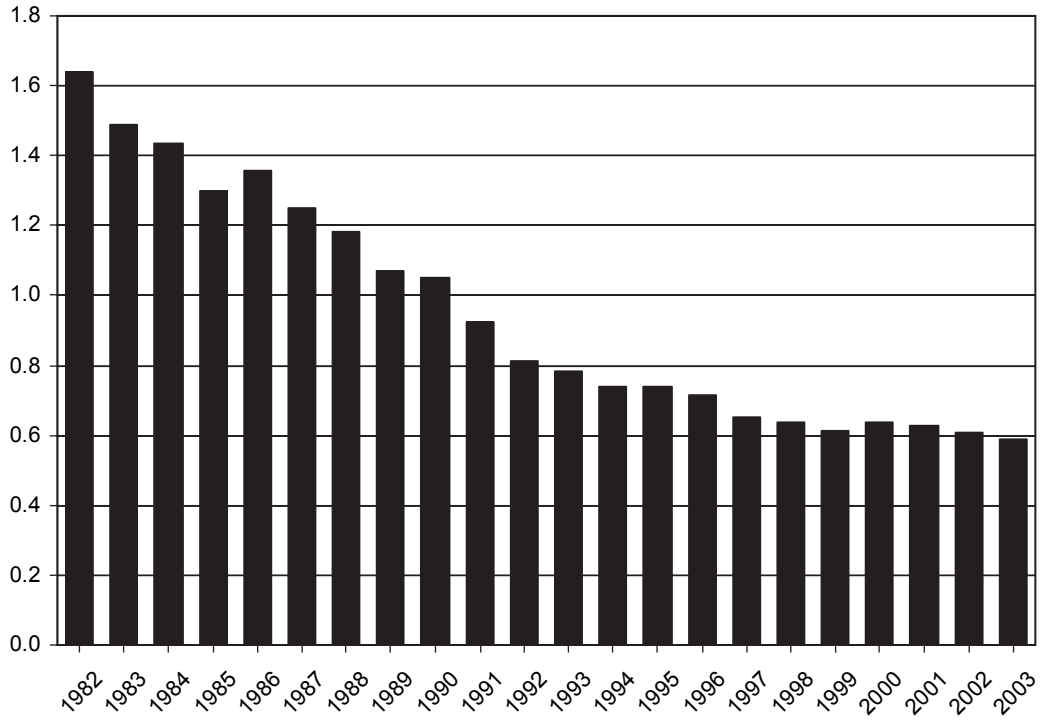
[2] "Alcohol-related fatalities" refers to deaths occurring in crashes where at least one participant (driver, pedestrian, or bicyclist) had a BAC of 0.01 percent or higher. In 2003, about 12 percent of persons with BACs above 0.08 percent were pedestrians or bicyclists.

Population growth and increased driving can obscure an actual decrease in alcohol-related crash fatality rates. Hence, another useful indicator of the actual rate of progress is an exposure-adjusted crash rate. Exhibit II-2 shows the number of alcohol-related fatalities per 100 million vehicle-miles traveled from 1982 to 2003. Taking increases in population and travel into account, it is evident that substantial progress was made in reducing alcohol-related fatalities until about 1992, with another modest drop from 1996 to 1998. However, since 1999 there have been small increases and decreases, with only a slight overall downward trend. The actual number of alcohol-related fatalities has been higher in each of the past 4 years than it was from 1997 to 1999. Hence, by either measure (number and exposure-adjusted rate of alcohol-related crash fatalities), little progress has been made in recent years.

Despite the slowed progress in recent years, most experts agree that further reductions in alcohol-related crashes and fatalities are possible. Several strategies, when properly implemented, have been demonstrated by careful research studies to effectively address the problem. By adopting the strategies described in this guide, or by improving the implementation of these strategies where they are already in place, states can further reduce their alcohol-related crashes and the variety of health and economic problems they cause.

Although this guide is not intended to address driving while impaired by either medicinal or illicit drugs, at least some of the strategies described here may also help deter drug-impaired driving since most individuals who drive after using illicit drugs have also been drinking.

EXHIBIT II-2
Alcohol-Related Fatalities per 100 Million Vehicle-Miles Traveled in the U.S., 1982–2003
Source: NHTSA, 2003a



SECTION III

Type of Problem Being Addressed

General Description of the Problem

Alcohol-impaired driving has been a subject of great concern among traffic safety professionals in the United States for the past three decades. During this time, alcohol-related crashes have decreased substantially. In all likelihood, the decline in alcohol-related crashes has resulted from a combination of the myriad programs directed at reducing driving after drinking, broad shifts in societal values that resulted in more disapproving attitudes toward DWI, the pursuit of healthier lifestyles, engineering improvements in roadways and vehicles, substantially increased use of seatbelts, and the changing age composition of the population (there is a decreasing number of people in the age group most likely to drink heavily and to drive after doing so).

The two fundamental methods to reduce alcohol-related crashes are (1) to reduce excessive drinking through policies and programs to control alcohol sales and inform drinkers of the dangers of excessive drinking and (2) to deter driving while impaired by alcohol. Each method includes several distinct strategies directed at different target populations.

The DWI criminal justice system of laws, enforcement, prosecution, adjudication, sanctions, and offender monitoring is complex. All elements of this system must function well—both individually and cooperatively—to ensure that DWI offenders are (1) frequently detected, (2) routinely charged, (3) effectively prosecuted, (4) suitably punished when convicted, and (5) appropriately treated for alcohol abuse or dependency. If these enforcement efforts are to have a general deterrent effect on potential impaired drivers, as well as a specific deterrent effect on DWI offenders, the public needs to be regularly made aware of these activities.

Strategies designed to prevent impaired driving before it occurs apply to the entire driving population. These strategies are referred to as *general deterrence* strategies. They hold the greatest potential to substantially reduce impaired driving and alcohol-related crashes. Strategies that focus on punishing and rehabilitating individuals who have been arrested for DWI to discourage a repeat of the behavior are known as *specific deterrence* strategies. Recent estimates suggest that, on average, individuals may make anywhere from 50 to 200 impaired trips before being arrested (Hedlund and McCartt, 2002), and about 30 percent of persons involved in an alcohol-related fatal crash have been previously convicted of DWI or a comparable alcohol-related offense (Tashima and Helander, 2000). Consequently, efforts to dissuade all drivers from driving after drinking are essential; focusing only on those who have been previously arrested—even though they are a particularly problematic group—will miss a large part of the problem. Moreover, the criminal justice system struggles to cope with the current load; efforts to deal with impaired drinking solely by attempting to arrest and impose sanctions on all impaired drivers is not logistically feasible without a massive infusion of additional resources at all levels of the criminal justice system.

To function well, all participating agencies in the DWI control system need readily available, up-to-date information about persons who have been arrested for impaired driving. In addition, these agencies need adequate resources. In view of the huge societal costs created by alcohol-related crashes and the demonstrated cost-efficiency of several countermeasures (NHTSA 2004a; http://www.nhtsa.dot.gov/people/injury/alcohol/impaired-drivingusa/US.pdf), additional resources applied to carefully selected programs are considered by many to be a wise investment of public resources. For further discussion on these issues, see Robertson et al. (2004) (http://www.trafficinjuryresearch.com/publications/pub_details.cfm?intPubID=196.)

Specific Attributes of the Problem

Exhibit III-1 shows the BAC distribution for drinking drivers involved in fatal crashes. In 2003, 84 percent of drinking drivers who were involved in a fatal crash had a BAC above 0.08 percent; more than half were above 0.16 percent. This clearly illustrates that alcohol-related crashes involve a broad spectrum of drinkers, not merely those who have consumed very large amounts of alcohol.

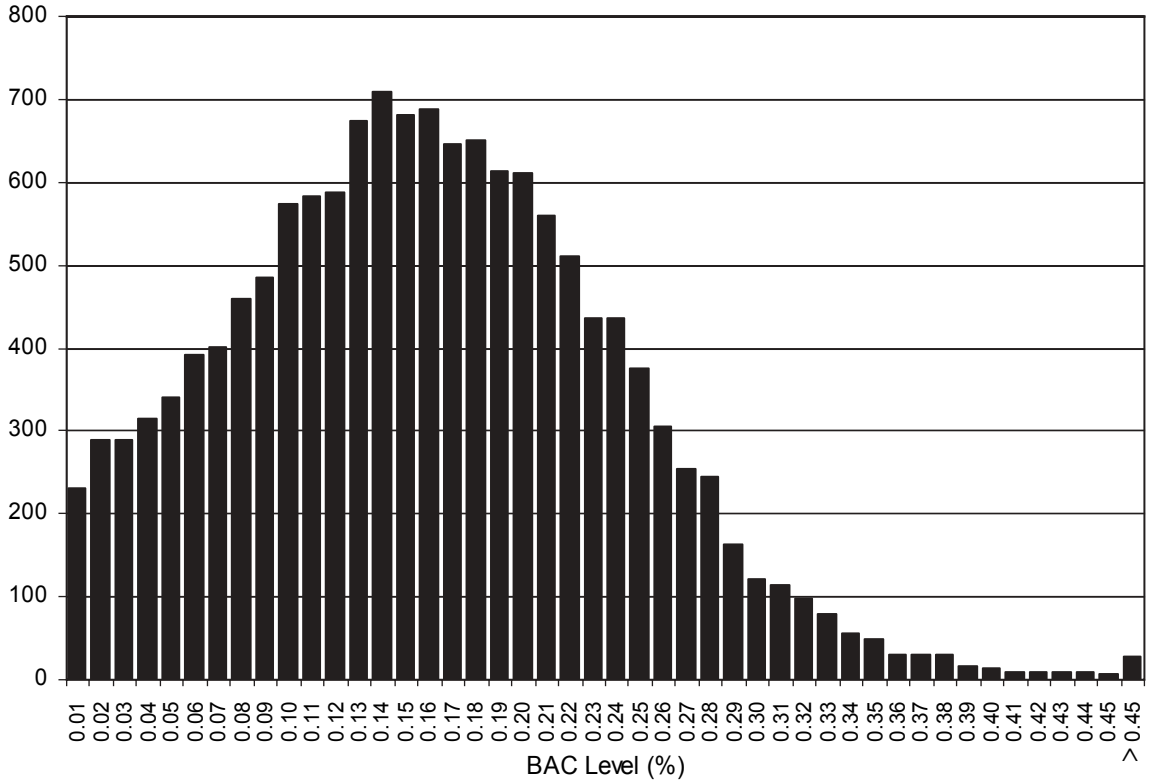
DWI Countermeasure System Inherently Interrelated

The several distinct phases of the criminal justice process are closely interrelated. Consequently, the policies and practices in one part of the system can have unintended—and often undesirable—consequences elsewhere. One example of this interrelatedness is that severity of (threatened) sanctions is inversely related to the likelihood of a conviction. More severe potential sanctions increase the likelihood that individuals will mount a strong defense, which often results in a dismissal or acquittal on technical rather than substantive grounds. In addition, despite legal mandates, individuals who comprise the various aspects of the criminal justice system are able to use discretion and clearly do so. Officers who believe a sanction is inappropriate for a particular offense may be less inclined to charge an individual, prosecutors who consider a penalty too harsh may agree to a plea bargain to a lesser charge, juries may be less likely to convict when they believe the required punishment is inappropriate for the crime, and judges may refuse to apply a sanction they consider too harsh.

Similar deleterious effects can result when, for example, an emphasis is placed simply on increasing arrests. In many instances, court and prosecutor case loads are already excessive and additional arrests result in further delays, which decrease the chances of conviction, or result in outright dismissals of cases that might otherwise have been pursued.

The various participants in the DWI system also need to know what the others are doing, or have done, in specific cases. In all states, individual circumstances influence how cases should be handled. Thus, for example, officers need to be able to determine whether an individual they are arresting has a previous conviction to know how to proceed, judges need to know whether an individual has completed treatment that was ordered, and driver licensing agencies need to know the resolution of a case and what restrictions may have been imposed by a judge. It is widely recognized that a modern, integrated database information system is critical to the effective handling of DWI cases in the criminal justice system. Few, if any, states have an adequate system at present.

EXHIBIT III-1
Blood Alcohol Concentration of Drinking Drivers Involved in Fatal Crashes, 2003
Source: NHTSA, 2004d



In addition to the coordination afforded by a shared data system, states can reap substantial benefits from collaborative planning wherein representatives of all components of the DWI countermeasure system participate in planning for program or policy changes. By ensuring that all relevant parties are involved, states will develop more organized and efficient DWI countermeasure systems, and policy changes will be less likely to have unintended, possibly negative, effects.

Other High-Risk Groups

Unlike many behaviors that create traffic safety risks, driving after drinking is not always under the complete volitional control of drivers. About one quarter of all persons convicted for a first DWI offense are estimated to be alcohol dependent (Simpson et al., 1996). Efforts that rely on providing information or threatening punishments have little chance of affecting the behavior of these drivers.

Several studies have demonstrated the increased risk of crashing at increased BAC levels. A noteworthy finding from further analyses is that drivers under the legal drinking age in the United States (i.e., age 21) are more likely than legal-age drinkers to crash at low-BAC levels (Phelps, 1990).

Males, motorcyclists, and persons between the ages of 21 and 35 are also more likely than others to drive while impaired by alcohol. The guide to reducing motorcycle collisions contains some suggested approaches to alcohol-related motorcycle crashes.

SECTION IV

Index of Strategies by Implementation Timeframe and Relative Cost

Exhibit IV-1 provides a classification of strategies according to the expected timeframe and relative cost for this emphasis area. In several cases, the implementation time will depend on such factors as the speed with which enabling legislation is passed. For strategies where most states require enabling legislation, we have assumed a long timeframe for implementation. Once legislation is enacted, the time required to implement the strategy will vary substantially across these strategies. For strategies requiring legislation that most states already have in effect, we have estimated the time needed simply to implement the strategy. The range of costs may also vary depending on how states choose to implement these strategies. Placement in the table below is meant to reflect the most common expected application of the strategy.

EXHIBIT IV-1
Classification of Strategies According to Expected Timeframe and Relative Cost

		Relative Cost to Implement and Operate			
Timeframe for Implementation	**Strategy**	**Low**	**Moderate**	**Moderate to High**	**High**
Short (<1 year)	5.1 A3—Conduct Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons	✔			
	5.1 A4—Employ Screening and Brief Interventions in Health Care Settings	✔			
	5.1 B1—Conduct Regular Well-Publicized DWI Checkpoints*			✔	
	5.1 B2—Enhance DWI Detection Through Special DWI Patrols and Related Traffic Enforcement	✔			
	5.1 B3—Publicize and Enforce Zero Tolerance Laws for Drivers Under Age 21		✔		
Medium (1–2 years)	5.1 C1—Suspend Driver's License Administratively Upon Arrest*	✔			
	5.1 D1—Seize Vehicles or Vehicle License Plates Administratively Upon Arrest*		✔		
	5.1 D2—Require Ignition Interlocks as a Condition for License Reinstatement		✔		

EXHIBIT IV-1 (Continued)
Classification of Strategies According to Expected Timeframe and Relative Cost

		Relative Cost to Implement and Operate			
Timeframe for Implementation	**Strategy**	**Low**	**Moderate**	**Moderate to High**	**High**
Long (>2 years)	5.1 A1—Increase the State Excise Tax on Beer	✔			
	5.1 A2—Require Responsible Beverage Service Policies for Alcohol Servers and Retailers		✔		
	5.1 C2—Establish Stronger Penalties for BAC Test Refusal Than for Test Failure	✔			
	5.1 C3—Eliminate Diversion Programs and Plea Bargains to Non-Alcohol Offenses		✔		
	5.1 C4—Screen All Convicted DWI Offenders for Alcohol Problems and Require Treatment When Appropriate			✔	
	5.1 D3—Monitor All Convicted DWI Offenders Closely			✔	
	5.1 D4—Incarcerate Offenders			✔	

* The actual time needed for implementation will vary from state to state. Most states already have legislation allowing these strategies to be implemented; estimate is for time to implement a thorough program to carry out the intent of the legislation. Other states will need to address the question legislatively before the strategy can be applied, thereby making these strategies long term.

SECTION V

Description of Strategies

Objectives

The approach described in this guide begins with a broad perspective to discourage alcohol-impaired driving. It then provides recommendations for narrowing in on a subset of the population and effectively dealing with those individuals. Finally, it suggests strategies for dealing with the most recalcitrant individuals who resist less controlling efforts to encourage them to avoid driving while impaired. The four general objectives are to

- Reduce excessive drinking and underage drinking;
- Enforce DWI laws;
- Prosecute, impose sanctions on, and treat DWI offenders; and
- Control high-BAC and repeat offenders.

Types of Strategies

Exhibit V-1 shows the objectives and strategies to reduce alcohol-related collisions.

EXHIBIT V-1
Objectives and Strategies to Reduce Alcohol-Related Collisions

Objectives	Strategies
5.1 A—Reduce Excessive Drinking and Underage Drinking	5.1 A1—Increase the State Excise Tax on Beer (T)
	5.1 A2—Require Responsible Beverage Service Policies for Alcohol Servers and Retailers (P)
	5.1 A3—Conduct Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons (T)
	5.1 A4—Employ Screening and Brief Interventions in Health Care Settings (T)
5.1 B—Enforce DWI Laws	5.1 B1—Conduct Regular Well-Publicized DWI Checkpoints (P)
	5.1 B2—Enhance DWI Detection Through Special DWI Patrols and Related Traffic Enforcement (T)
	5.1 B3—Publicize and Enforce Zero Tolerance Laws for Drivers Under Age 21 (P)
5.1 C—Prosecute, Impose Sanctions on, and Treat DWI Offenders	5.1 C1—Suspend Driver's License Administratively Upon Arrest (P)
	5.1 C2—Establish Stronger Penalties for BAC Test Refusal Than for Test Failure (T)

EXHIBIT V-1 (Continued)
Objectives and Strategies to Reduce Alcohol-Related Collisions

Objectives	Strategies
	5.1 C3—Eliminate Diversion Programs and Plea Bargains to Non-Alcohol Offenses (T)
	5.1 C4—Screen All Convicted DWI Offenders for Alcohol Problems and Require Treatment When Appropriate (P)
5.1 D—Control High-BAC and Repeat Offenders	5.1 D1—Seize Vehicles or Vehicle License Plates Administratively Upon Arrest (P)
	5.1 D2—Require Ignition Interlocks as a Condition for License Reinstatement (P)
	5.1 D3—Monitor All Convicted DWI Offenders Closely (P)
	5.1 D4—Incarcerate Offenders (P)

(P) indicates that a strategy is proven effective. (T) indicates that a strategy has been tried extensively but is not yet proven effective. Further explanation of (P) and (T) is provided in the following pages.

The strategies in this guide were identified from a number of sources, including the research literature on alcohol and traffic crashes, consultation with more than a dozen national and international experts in the area of alcohol-related traffic crashes, contact with state agencies throughout the United States, and federal programs. Some of the strategies are widely used, while others are less commonly employed. Some have been subjected to well-designed evaluations that demonstrate their effectiveness. Others are based on solid research but have been implemented and evaluated in only a few isolated instances.

The reader should exercise some caution in adopting a particular strategy for implementation and consider how well the strategy fits into the overall social, political, and economic environment of the state. To help the reader, the strategies have been classified into two types, each identified by a letter:

- Tried (T)—Those strategies that have been implemented in a number of locations and that may even be accepted as standards or standard approaches, but for which there have not been found valid evaluations. These strategies—while in frequent, or even general, use—should be applied with caution, carefully considering the attributes cited in the guide, and relating them to the specific conditions for which they are being considered. Implementation can proceed with some degree of assurance that there is not likely to be a negative impact on safety and very likely to be a positive one. It is intended that as the experiences of implementation of these strategies continues under the AASHTO Strategic Highway Safety Plan initiative, appropriate evaluations will be conducted so that effectiveness information can be accumulated to provide better estimating power for the user, and the strategy can be upgraded to a "proven" (P) one.
- Proven (P)—Those strategies that have been used in one or more locations and for which properly designed evaluations have been conducted that show it to be effective. These strategies may be employed with a good degree of confidence, but any application can lead to results that vary significantly from those found in previous evaluations. The

attributes of the strategies that are provided will help the user judge which strategy is the most appropriate for the particular situation.

Four General Objectives

The strategies in this guide were identified using a two-step process. Potentially useful approaches were first identified through an extensive review of the research literature on programs and policies to reduce alcohol-impaired driving. The most promising were then selected and clarified in consultation with an expert panel composed of experienced researchers and state officials with responsibility for DWI programs. A large number of strategies to reduce alcohol-related crashes have been tried; many have not been evaluated and others have shown no benefits when evaluated. The strategies presented here are considered to be the most promising based on either results from well-designed evaluation studies or the opinion of top experts in the field. Although these strategies often require state-level action, several can also be adapted and productively used in individual communities.

Some widely used or commonly advocated approaches are not included because there is no credible evidence that they reduce alcohol-related collisions and no compelling reason to believe that they could. Given that resources to address behavioral factors that contribute to traffic crashes are severely limited, consideration should be given to directing resources toward implementation, expansion, or enhancement of strategies discussed here and away from approaches not listed. In states where all or most of the included strategies may already be in place, efforts to improve the quality of implementation, the extent to which they are used, or both should be considered before turning to other strategies.

To determine which strategies will most likely produce the greatest benefit in a given jurisdiction, an important first step is to conduct a careful assessment of the nature of the local drinking-driving problem and how the current DWI countermeasure system is currently functioning. This is best done by a task force that represents all the key elements of this system issue (see Section VI). Without such an approach, a fragmented and incomplete understanding of the problem(s) is likely, and progress will be difficult. The system for dealing with alcohol-impaired driving may be the most complex and inherently interrelated of any traffic safety.

Reduce Excessive Drinking and Underage Drinking

Impaired driving and alcohol-related crashes can be reduced in other ways besides trying to separate drinking from driving. Decreasing drinking and decreasing driving can also help achieve the goal. The first four listed strategies are designed to reduce excessive drinking and to prevent drinking at all by young persons, whose alcohol-related crash risk is much higher than that of more experienced drivers, even at low BAC levels. To the extent that these approaches are successful in reducing alcohol impairment, impaired driving will necessarily decline as well. Detailed information about state laws pertaining to underage drinking and drinking to intoxication is available from the National Liquor Law Enforcement Association at http://www.nllea.org/reports/ABCEnforcementLegalResearch.pdf.

Increase the State Excise Tax on Beer. Econometric studies conducted during the past 20 years repeatedly show that higher beer prices are associated with less drinking and, as a result,

fewer motor vehicle crashes. This holds true for heavier drinkers as well as more typical drinkers. The relationship is somewhat stronger among underage drinkers. The mechanism by which states can influence beer prices is the excise tax. In most states, the value of this tax has been substantially eroded by inflation since the current rate was established.

Require Responsible Beverage Service Policies for Alcohol Servers and Retailers. Prohibiting marketing tactics that encourage excessive consumption and reducing the sale of alcohol to persons who are already impaired can reduce excessive drinking and impairment. Although alcohol advertising is largely a national level matter, state alcoholic beverage control laws can address many problematic sales tactics as well as some kinds of advertising. In addition, laws allowing injured parties to recover damages from licensed establishments (so called "dram shop" laws) can encourage alcohol retailers to adopt responsible beverage service policies.

Conduct Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons. Although requiring responsible sales practices and educating retailers about these requirements is important, this strategy is generally effective only when requirements are adequately enforced. Conducting a program wherein underage persons working with law enforcement attempt to purchase alcohol can be highly effective in discouraging illegal sales if the existence of this program is widely known to the retail community. The primary purpose of such programs is to discourage illegal sales rather than arrest sellers. Widespread publicity of the existence of an ongoing compliance check program is essential to accomplish this goal.

Employ Screening and Brief Interventions in Health Care Settings. Many persons arrested for driving after drinking have some level of problem controlling their drinking. Those with a serious alcohol dependency generally require treatment. However, it is well established that brief, single-session interventions by health care professionals to encourage changes in drinking behavior have proved to be effective for persons with less severe problems. Greater attention to the possibility of drinking problems among patients during routine health care visits holds the promise of reducing driving after drinking.

Enforce DWI Laws

Another approach to reducing alcohol-related crashes is to discourage all individuals who drink from driving after doing so. The next three strategies are the most promising strategies for achieving this goal. This preventive approach is referred to as "general deterrence" because the focus is on the entire driving population rather than on individuals who have already been identified as DWI violators.

Conduct Regular Well-Publicized DWI Checkpoints. Establishing a program in which checkpoints are routinely conducted to determine whether drivers have been drinking may be the single most beneficial drinking-driving countermeasure currently known. The existence of these checkpoints must be widely publicized, since the primary goal, and primary benefit, is to discourage individuals from driving after they have been drinking. Although each checkpoint will generally result in a small number of arrests, the mere knowledge of their existence extends the effect far beyond those drivers who are arrested, affecting much of the driving population in a community.

Enhance DWI Detection Through Special DWI Patrols and Related Traffic Enforcement. A substantial problem in obtaining compliance with DWI laws is that many individuals do not believe it is likely that they will be caught. There is some truth to this belief because law

enforcement resources are stretched thin, especially in comparison with the number of alcohol-impaired trips that occur each day. However, law enforcement resources can be effectively leveraged by including attention to DWI in all traffic enforcement activities. Paying attention to the possibility of alcohol impairment among persons stopped for speeding or seatbelt violations is particularly promising because these behaviors often occur in conjunction with drinking.

Publicize and Enforce Zero Tolerance Laws for Drivers under Age 21. All states prohibit driving after drinking any detectable amount of alcohol by young persons. In many instances, these laws are not well understood and are not enforced. In several states, complications in the way these laws are written create unnecessary barriers to their enforcement. Removing such barriers where they exist and publicizing the fact that the law is actively enforced is a sound approach to discouraging driving after drinking by underage persons.

Prosecute, Impose Sanctions on, and Treat DWI Offenders

The next set of strategies narrows the focus from the general driving population to individuals who have been arrested for DWI. This approach is generally referred to as "specific deterrence," since the efforts are directed toward a specific and problematic subset of all drivers. The goal of these strategies is to ensure that the system to handle these individuals functions as effectively as possible to prevent them from continuing to drive while impaired.

Suspend Driver's License Administratively Upon Arrest. A critical feature of laws that are widely heeded is the perception that punishment for a violation is likely and will occur quickly. The court procedures through which criminal charges for DWI are handled often result in substantial delays in punishment and frequently allow individuals to escape punishment altogether despite their guilt. Most states supplement the criminal justice process by the administrative procedure of immediately suspending driving privileges when a person is arrested for DWI. This procedure ensures a minimal level of punishment, and the punishment occurs quickly. Administrative license suspension has proved to be effective in decreasing driving after drinking. However, several states do not yet take advantage of this useful tactic for reducing impaired driving.

Establish Stronger Penalties for BAC Test Refusal Than for Test Failure. As part of the driving privilege, implied consent laws require individuals to provide a breath or blood test upon the request of an officer who has reason to believe a driver has been drinking. Because failure to comply with this request in many states results in a penalty that is substantially less than for DWI, non-compliance is high. The resulting low rate of conviction for DWI undermines many elements of states' integrated DWI countermeasure systems. Establishing penalties for refusing to cooperate that are stronger than those for the conviction helps ensure the proper functioning of a states' DWI program.

Eliminate Diversion Programs and Plea Bargains to Non-Alcohol Offenses. In efforts to reduce overloaded courts and understaffed prosecutor offices, DWI charges are often dropped in exchange for guilty pleas to lesser charges. In some instances, convicted individuals are even allowed to have a DWI conviction removed from their record by participating in various diversion programs such as providing community service or participating in an alcohol education program. Both of these practices undermine the integrity of DWI countermeasure programs, allowing individuals to escape appropriate punishment and

preventing states from treating multiple offenders more seriously. Multiple offenders nearly always have an alcohol abuse or dependency problem, but the effective combination of sanctions and treatment that are generally targeted at multiple offenders cannot be employed if individuals' driving records do not contain accurate information about their past experience.

Screen All Convicted DWI Offenders for Alcohol Problems and Require Treatment When Appropriate. Most persons arrested for DWI have driven while impaired many times and have some problem controlling their drinking. Since problems of alcohol abuse or dependency are a medical condition that cannot generally be altered with education or punishment, these individuals often need professional treatment. Combining the pressure of the court with therapeutic efforts can be particularly effective in helping individuals to overcome problems with alcohol. Since a DWI arrest is often a strong indication of a problem, it is important to take advantage of this opportunity to assess individuals and ensure that they obtain needed treatment.

Control High-BAC and Repeat Offenders

Some individuals are particularly recalcitrant and will not willingly comply with either administrative requirements that they not drive or court sanctions prohibiting driving or requiring other activities. For those individuals, a greater degree of coercion and control is needed to ensure that they do not drive, especially after drinking, and that they complete ordered sanctions. The following strategies are designed to deal with this particularly problematic set of individuals. (See also the guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses).

Seize Vehicles or Vehicle License Plates Administratively Upon Arrest. Although suspending or revoking a driver's license reduces driving somewhat, more than 7 in 10 individuals continue to drive after a suspension. To ensure greater compliance with prohibitions on driving resulting from a DWI offense, it is sometimes necessary to extend sanctions to individuals' vehicles by taking the license plate, immobilizing the vehicle, or impounding the vehicle. These procedures are generally quite effective when employed, but when they are administered through the court they are rarely employed. The most effective approach to prohibiting driving by individuals is to control individuals' use of their vehicle through the use of administrative procedures of the motor vehicle licensing agency.

Require Ignition Interlocks as a Condition for License Reinstatement. Prohibiting individuals from driving for an extended period of time can be counterproductive since it interferes with their ability to work and otherwise to reestablish a relatively normal lifestyle. Consequently, driver licenses are often restored quickly, but with limitations on when, where, and under what conditions a person may drive. Most such limitations are ineffective because they cannot be adequately enforced. Requiring participation in an interlock program, wherein a device is installed on the driver's vehicle that prevents it from being started if the driver has been drinking, is a proven effective strategy for reducing impaired driving, even among those persons who continue to drink heavily.

Monitor All Convicted DWI Offenders Closely. Many convicted DWI offenders fail to comply with prohibitions on driving, requirements to obtain alcohol treatment, or other sentences. Without close monitoring, this problem is particularly common; without follow-through, the goals of the DWI system in controlling impaired driving are not achieved. Devoting

additional resources to probation systems, using specialized DWI/drug courts, and monitoring offenders electronically are some of the promising approaches for ensuring better compliance by convicted DWI offenders with their court-ordered obligations.

Incarcerate Offenders. Although this strategy is far too costly to be used widely, incarcerating recalcitrant offenders, as a matter of last resort, will prevent individuals from driving while impaired. More importantly, the ultimate threat of incarceration is an important key to encouraging individuals to comply with a variety of less restrictive mandates to stop driving while impaired.

Related Strategies for Creating a Truly Comprehensive Approach

The strategies described above directly address alcohol-impaired driving. Other, more general strategies also should be included in a comprehensive approach:

- **Public Information and Education (PI&E) Programs—**Many highway safety programs work hand in hand with a properly designed PI&E campaign. PI&E campaigns, performed in conjunction with most DWI enforcement programs, will add greatly to the general deterrent effect. The PI&E needs of each strategy are identified in the strategy descriptions.
- **Strategies Directed at Implementing and Improving the Safety Management System—** The management of the highway safety system is foundational to success. There should be in place a sound organizational structure and an effective decision support system, as well as an infrastructure of laws, policies, and so forth to monitor, control, direct, and administer a comprehensive approach to highway safety. It is important that a comprehensive program not be limited to one jurisdiction, such as a state DOT, because local agencies, which often oversee the majority of the road system and its related safety problems, know better than others what the problems are. As additional guides are completed for the AASHTO Strategic Highway Safety Plan, these guides may address the details regarding the design and implementation of strategies for safety management systems. An important element of the management system is the information system. For particular discussion of needs for the improvement of information systems for the DWI area, see the section on "Record Linkages, Availability and Access" in the Traffic Injury Research Foundation's "Working Group on DWI System Improvements: Proceedings of the Inaugural Meeting" (Robertson et al., 2004). A guide on safety information systems is also planned for this series.
- **Strategies to Improve Emergency Medical and Trauma System Services—**Treatment of injured parties at highway crashes can have a significant impact on the level of severity and length of time in which an individual spends treatment. Thus, a basic part of a highway safety infrastructure is a well-based and comprehensive emergency care program. Although the types of strategies that are included here are often thought of as simply support services, they can be critical to the success of a comprehensive highway safety program. Therefore, for this emphasis area, an effort should be made to determine if there are improvements that can be made to this aspect of the system, especially for programs which are focused upon location-specific (e.g., corridors), or area-specific (e.g., rural areas), issues. The guide to enhancing rural emergency medical services covers one specific aspect of this.

- **Strategies That Are Detailed in Other Emphasis Area Guides—**Any program targeted at alcohol-related crashes should also consider applicable strategies covered in guides addressing the following subjects:
  - Head-on crashes
  - Horizontal curves
  - Motorcyclists
  - Pedestrians
  - Run-off-road crashes
  - Unbelted occupants
  - Unlicensed drivers
  - Crashes involving utility poles

Objective 5.1 A—Reduce Excessive Drinking and Underage Drinking

Strategy 5.1 A1—Increase the State Excise Tax on Beer (T)

The goal of this strategy is to reduce drinking by drivers who are most likely to be involved in alcohol-related crashes. Beer is the alcoholic beverage most commonly consumed by individuals who are arrested for impaired driving (Jones and Lacey, 1998). Beer is also consumed in a more hazardous fashion (leading to high BACs) than wine or distilled spirits (Rogers and Greenfield, 1999). Increasing the cost of beer reduces consumption just as it does with many other goods. Decreased consumption reduces the BAC level among those who drive after drinking. Although this is a small effect, it applies to a very large number of trips, producing a measurable reduction in alcohol-related crashes. A number of studies have shown that higher beer taxes are associated with lower alcohol consumption and lower rates of alcohol-related traffic fatalities (Chaloupka et al., 2002). This finding is particularly true for crashes involving underage drinkers who are somewhat more price sensitive than adults (Grossman et al., 1998).

As is the case with gasoline, beer is taxed at both the federal and state levels via an excise tax. The excise tax on beer is based on volume rather than sales price. Consequently, the excise tax is eroded by inflation. In 1990, the federal tax was doubled in an effort to restore the value that the tax had lost as a result of inflation. However, in most states, excise taxes on beer have changed very little, if at all, during the past several decades. (Taxes on distilled spirits and wine have been updated more frequently.) Partly as a result, the real price of beer (adjusted for inflation) has declined. This is especially the case in states that have not adjusted their excise tax since the high-inflation era of the early 1980s. Information on the effects of alcohol excise taxes on alcohol-related crashes may be found on the Trauma Foundation website at http://www.tf.org/tf/alcohol/ariv/facts/fac25.html. Information on the erosion of beer excise taxes in each state is available at http://www.epi.umn.edu/alcohol/uspolicy/chrtbook.pdf, and current tax rates can be found at http://www.taxadmin.org/fta/rate/beer.html.

Despite the substantial research base that supports the effectiveness of this strategy, the strategy is controversial. Proposals to increase state excise taxes on beer are often introduced and are routinely defeated or ignored. Presently there is an effort to roll back the 1990

increase in the federal excise tax on beer. In addition, there is strong organized opposition from the beer and hospitality industries to any attempt to increase the beer excise tax. Nonetheless, several states have increased their excise taxes in the past few years, recognizing that there is widespread public support for doing so. Public support for increasing excise taxes on beer generally exceeds 80 percent (Wagenaar et al., 2000a). A recent multi-state survey found that 81 percent of respondents support raising the excise tax on beer by a nickel a drink if the proceeds are used to address problems of underage drinking and to support alcohol treatment. Sixty-nine percent support a nickel increase if the proceeds are simply used to offset other taxes (Harwood et al. 2002). A potential benefit of increased excise taxes could be their specific allocation to address the costs of dealing with alcohol-involved crashes. Current excise taxes in all but a few states do not yield sufficient funds to cover these costs. Consequently, the excise taxes are currently paid largely from general revenue sources.

EXHIBIT V-2
Strategy Attributes for Increasing the Excise Tax on Beer (T)

Technical Attributes	
Target	All beer drinkers (most of whom presumably drive).
Expected Effectiveness	The relationship between excise tax rates on beer and motor vehicle crashes is well-documented. One recent study, using more sophisticated analyses than earlier studies, found a clear relationship between higher excise taxes and decreased alcohol-related traffic fatalities (Ruhm, 1996). Based on a best-fitting model of the relationship between fatal crashes and alcohol costs, Kenkel (1993) estimated that increasing the federal excise tax on beer in 1988 to adjust for the effects of inflation since 1975 (a 78 percent increase in the tax—not the total price) would have saved approximately 3,500 lives annually in the United States. Other studies confirm that even though alcohol can be addictive for some individuals, heavy drinkers are affected by alcohol prices (Sloan et al., 1995; Cook & Moore, 2002).
Keys to Success	Any increase in excise tax on beer is likely to reduce the total amount of alcohol consumed by drinkers in a state and, as a result, alcohol-related traffic fatalities. However, the larger the increase, the greater the expected benefits. Because it can be challenging to pass any tax increase, states that pursue this strategy should also consider indexing the beer tax to inflation by basing the beer tax on the retail price (as is the case with liquor) rather than on volume as is currently done with the excise tax. This indexing will prevent the need to periodically revisit this issue to address erosion of the excise tax in the future. See Appendix 1 for further discussion of this issue. It is also important that the general public see the tax increase as a public health and safety measure, rather than as simply a revenue generator. Relating the amount of revenues expected to the estimated cost from DWI crashes (and other alcohol-related public health costs) may help make the case. Reserving all or a part of the revenues for specific DWI reduction programs will help maintain the appropriate message about this strategy, as well. It will be helpful to form a coalition of support groups from among the stakeholders to help bring resources to bear in gaining public and legislative support. Because legislation is required to implement this strategy, it will be important to the success of the effort to identify at least one legislator who will "champion" the effort. Support of other public figures will also be valuable.

EXHIBIT V-2 (Continued)
Strategy Attributes for Increasing the Excise Tax on Beer (T)

Technical Attributes	
Potential Difficulties	This strategy requires legislative action. This requirement will be a major obstacle to overcome, despite the substantial public support for this particular tax. Moreover, one can expect active organized opposition to this strategy from the beer and hospitality industries. For further discussion of opponents' arguments, see Appendix 2.
Appropriate Measures and Data	Unlike many policies, if the excise tax is increased, there is no question that it will be fully implemented. Increasing this excise tax should have a number of measurable outcomes, including reductions in alcohol consumption, alcohol-related traffic crashes and fatalities, and injuries and fatalities arising from other alcohol-related causes (e.g., homicide, suicide, and liver cirrhosis). Exposure measures, such as the actual increase in revenue from the excise tax, will also be helpful.
Associated Needs	PI&E efforts will be needed to explain the purpose of the legislation to the public.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	It will be critical to educate legislators, other stakeholders, and the general public about the societal costs of alcohol-related crashes as well as the potential benefits of increasing the excise tax. This requirement may involve some training for state highway safety officials who are not familiar with the details of alcohol taxation and its effects on drinking-driving. Examples of materials to conduct this training can be found at: http://www.tf.org/tf/alcohol/ariv/facts/fac25.html and http://www.epi.umn.edu/alcohol/uspolicy/chrtbook.pdf. Responsibility for implementing this strategy will be with the state's alcohol taxation agency rather than department of transportation personnel.
Issues Affecting Implementation Time	This strategy will require enabling legislation in each state. The primary determinants of how long it will take to implement this strategy are the effectiveness of advocacy efforts in support of this legislation, the prevailing political climate in a state, the degree to which opponents of this legislation are active, and the economic conditions of the state. The time needed to implement this strategy will vary accordingly by state.
Costs Involved	Unlike most strategies, implementing this strategy will substantially increase revenue for states rather than incur costs. Since systems are already in place to collect excise taxes, the costs involved in enacting this strategy are the time and effort that will be required to pass enabling legislation, as well as the cost of any PI&E effort that may be mounted.
Training and Other Personnel Needs	No special training is needed to implement this policy. The excise tax structure and procedures are already in place and should not be affected by an increase in the tax.
Legislative Needs	This strategy requires legislative action.
Other Key Attributes	
	None.

Strategy 5.1 A2—Require Responsible Beverage Service Policies for Alcohol Servers and Retailers (P)

Nighttime roadside surveys indicate that drivers coming from bars are twice as likely to have a positive BAC as those whose trip originated at any other location (Beirness et al., 2004). Thus, alcohol servers and retailers are an important target for interventions to

prevent alcohol-related crashes. Responsible beverage service (RBS) policies have received increased attention in recent years as efforts to reduce alcohol-related harm have broadened. Now, such efforts address elements in the social environment affecting excessive drinking in addition to the more traditional approach that addresses only the drinker.

A number of programs have been developed to educate servers of alcoholic beverages. These programs decrease the likelihood that servers will sell to already impaired individuals (for more information on responsible beverage service, see http://www.tf.org/tf/alcohol/ariv/facts/factsh3.html). Servers have the potential to reduce driving after drinking by learning to identify the signs of intoxication and how to better intervene with intoxicated patrons. For example, servers can encourage patrons to space their drinks over time and eat while drinking, thereby slowing the absorption of alcohol. For intoxicated patrons, servers can refuse to serve additional alcohol or help arrange alternative transportation. Research shows that such interventions may reduce the frequency of alcohol-related crashes (Holder and Wagenaar, 1994). Furthermore, server training can decrease the likelihood that servers sell alcohol to persons under the legal drinking age. Coupled with well-publicized compliance checks of alcohol retailers (see Strategy 5.1 A3), communities can substantially reduce the sales of alcohol to underage persons. There are many practical obstacles to servers being able or motivated to intervene adequately. Consequently, training servers should only be viewed as a small part of RBS policy.

Many states have laws that allow persons injured as a result of the service of alcohol to intoxicated patrons to recover damages from licensed establishments (so called "dram shop" laws). This potential for legal liability has prompted some alcohol retailers to adopt RBS policies. Therefore, dram shop laws can play an important role in reducing excessive drinking and underage drinking.

Although responsible beverage service is often thought of as synonymous with training alcohol sellers about how to avoid selling to intoxicated or underage persons, RBS is a much broader concept, extending to all aspects of alcohol sales that can either encourage or discourage patrons from consuming too much to drive safely when they leave an establishment. For example, marketing and sales tactics that encourage drinking large amounts of alcohol quickly contribute to patrons' becoming legally intoxicated and should be prohibited. These are commonly found in college communities. Examples of such practices are happy hours that offer half-price drinks or "2 for 1" specials for a brief period of time, $0.10 beer nights, or "Bladder Buster" specials (extremely cheap beers—e.g., $0.05 each—until somebody in the establishment goes to the bathroom). This strategy focuses on server training because most research on RBS has addressed server training. Nonetheless, states may wish to consider whether it would be useful to address other aspects of RBS as well.

The University of Minnesota alcohol epidemiology program website provides a detailed coverage of the benefits and implementation of RBS training programs and also includes a discussion of other polices regarding alcohol marketing and sales (see http://www.epi.umn.edu/alcohol/policy/rbst.shtm).

EXHIBIT V-3
Strategy Attributes for Requiring Responsible Beverage Service Policies for Alcohol Servers and Retailers (P)

Technical Attributes	
Target	Alcohol retailers and, ultimately, their patrons.
Expected Effectiveness	Research suggests that changes in server behavior can result in fewer patrons being impaired when they leave licensed establishments, thus reducing the subsequent risk of an alcohol-related crash. In Oregon, a law was passed in 1985 requiring all new applicants for beverage service permits to successfully complete a state-approved server training course; existing service permit holders were given 5 years to complete training. Three years after the implementation of this law, single-vehicle nighttime injury crashes—a commonly used proxy measure for alcohol-related crashes because a high percentage of these crashes involve a drinking driver—decreased by 23 percent (Holder and Wagenaar, 1994). Oregon's server training law (ORS 471.542) is available at http://www.leg.state.or.us/ors/471.html.
Keys to Success	Although voluntary efforts by retailers are helpful, they are insufficient to obtain the cooperation of all retailers in selling alcohol responsibly. Therefore, state law should mandate that all owners, managers, and servers complete a standardized RBS training course as a condition for an alcohol retailer obtaining and maintaining a license (or permit). The management of establishments must support the training and performance of servers for RBS programs to achieve success. To be effective, RBS policies should be accompanied by adequate enforcement of laws that prohibit the service of alcohol to intoxicated and underage patrons. In most jurisdictions, serving alcohol to intoxicated patrons is prohibited by state or local law; however, these laws are seldom enforced. Following an enforcement effort in one county in Michigan, the refusals of service to "pseudo-patrons" who simulated intoxication rose from 17.5 percent to 54.3 percent (McKnight and Streff, 1994). Thus, the threat of enforcement is important for ensuring that alcohol retailers follow responsible serving practices. In addition, state alcohol beverage policies that prohibit sales and marketing tactics that encourage excessive alcohol consumption can further encourage RBS.
Potential Difficulties	Alcohol retailers may resist a state mandate for server training. There is a tendency to react to government control of a business' practices. Owners should be made aware that, although this requirement may appear to be a burden for alcohol retailers, server training will help reduce the exposure of establishments and servers to lawsuits, especially in the presence of dram shop liability laws (see, for example, http://www.tf.org/tf/alcohol/ariv/dram4.html). Thus, there should be a strong incentive for alcohol retailers to support the policy. Although employees may initially be unhappy about being required to obtain responsible service training, anecdotal accounts suggest that many leave with a positive attitude about RBS policies and an understanding of how they can increase their tips by being a responsible server. This experience needs to be communicated to persons not yet trained.
Appropriate Measures and Data	The clearest indicator of the efficacy of RBS training is whether it results in the control of excessive drinking in an establishment. This can be assessed by the use of compliance checks by alcohol law enforcement officers. These involve determining how an establishment responds to an individual simulating obvious impairment. In addition, when making arrests for DWI, law enforcement officers can determine where the individual last drank as a way of determining the "problem" retailers in a community. The ultimate measure of success of an RBS policy is a reduction in alcohol-related crashes. However, this may be difficult to adequately assess if RBS policies do not cover all sellers in a jurisdiction.

EXHIBIT V-3 (Continued)
Strategy Attributes for Requiring Responsible Beverage Service Policies for Alcohol Servers and Retailers (P)

Technical Attributes	
	An important process measure will be the proportion of servers in a jurisdiction who have completed server training. Another measure is the number, timing, and location of compliance checks made.
Associated Needs	Clear guidelines for how to conduct effective compliance checks are needed for local law enforcement agencies that are unfamiliar with this type of operation. Training on how to conduct compliance checks will also be helpful. Finally, in addition to doing such checks, it is important to publicize to the retail community that the checks are routinely conducted (see Strategy 5.1 A3 in this guide).
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	It is important that server training programs meet an explicit set of learning objectives. Classes should describe the need for responsible alcohol service, identify the signs of intoxication, provide information on state alcohol service laws and drinking and driving laws, and present methods for dealing with problem customers (for an example, see http://eeando.unl.edu/rbst/ga/). Although there is currently little empirical evidence on what must be included in a truly effective server training program, simply providing an informational brochure or showing a video to new employees is clearly not adequate. Training programs should include written materials, present realistic scenarios, provide interaction between participants (e.g., role playing), and encourage discussion. Information about Oregon's server training program and requirements is available at the following website: http://www.olcc.state.or.us/. Oregon's server training rules can be found at: http://arcweb.sos.state.or.us/rules/OARS_800/OAR_845/845_016.html. In some cases, legislative authorization of compliance checks using underage persons may be required. Ideally, server training programs and compliance checks would be established at the state level (see the example of Oregon cited above). Statewide implementation ensures that all alcohol retailers participate in state-approved server training, and it can facilitate monitoring the compliance of alcohol retailers.
Issues Affecting Implementation Time	If a server training program is being administered statewide, it may take several years for all servers and managers to complete the required course. As in Oregon, it may be helpful to have alcohol retailers send their employees to the course as a condition for reinstatement of an alcohol license. This will naturally spread out the number of servers taking the course over a few years (depending on how long licenses are valid within a state). Once the program is in place, all newly hired employees should be required to successfully complete state-approved server training within 1 month of hiring. If new legislation is required, implementation cannot begin until the law is enacted, further extending the time until most servers are trained.
Costs Involved	RBS courses can be provided either through state agencies or private companies. In either case, the costs of administering server training can be borne by establishments or by individual servers. Requiring individual servers to pay for their own training may not be popular, but has some precedent. As an analogy, drivers typically are required to obtain their own commercial driver's license before they are qualified for various driving jobs.
Training and Other Personnel Needs	Adequate server education classes typically require at least one full day to complete. To be effective, classes should be conducted by state-certified providers. This program must be ongoing in order to accommodate newly hired servers and new retail establishments. In addition, law enforcement officials need to be trained to establish and conduct an effective compliance check program. This will require a cadre of trained instructors.

EXHIBIT V-3 (Continued)
Strategy Attributes for Requiring Responsible Beverage Service Policies for Alcohol Servers and Retailers (P)

Organizational and Institutional Attributes	
Legislative Needs	More than half of the United States currently has dram shop laws that allow persons injured as a result of the service of alcohol to intoxicated patrons to recover damages from licensed establishments. This potential for legal liability has prompted some alcohol retailers to adopt RBS policies. At present, 12 states have laws that mandate at least some employees to complete a server training program (Mosher et al., 2002). Another 11 states offer some form of incentive to alcohol retailers that train their staff. To ensure that RBS practices become widespread, legislative action to mandate server training and other RBS practices is needed. A recent review, however, indicates that server training legislation is generally weak even in states where server training is mandated (Mosher et al., 2002). Sample ordinances for mandatory and incentive-based responsible beverage server training are available at http://www.epi.umn.edu/alcohol/local/servord.shtm.
Other Key Attributes	
	None.

Strategy 5.1 A3—Conduct Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons (T)

This strategy will reduce the likelihood that underage drinkers can purchase alcohol easily, which is an important part of a comprehensive approach to reducing underage drinking and driving. Both on-premise retail establishments (e.g., bars and restaurants) and off-premise outlets (e.g., convenience stores, grocery stores, and liquor stores) play a key role in regulating the availability of alcohol to young people. Minimum drinking age laws in all 50 states implicitly require alcohol retailers to verify the age of young customers to be sure they are legally allowed to purchase alcohol. However, several studies have shown that this is not done consistently. A study of both on-premise and off-premise alcohol outlets in Minnesota and Wisconsin found that young buyers were successful in purchasing beer without identification in approximately 50 percent of attempts (Forster et al., 1995). Another study found that underage males successfully purchased beer from off-premise outlets in 44 percent of attempts in Albany/Schenectady Counties, New York; 80 percent in Westchester County, New York; and 97 percent in Washington, D.C. (Preusser and Williams, 1992). A study conducted in eight U.S. cities found that only about one-third of establishments refused to sell alcohol to an underage buyer (McKnight, 1990).

Retailers are seldom punished for selling alcohol to underage persons. It has been estimated that only 5 in every 100,000 youth drinking episodes results in action being taken against an alcohol retailer (Wagenaar and Wolfson, 1994). Furthermore, prescribed penalties are often insufficient to deter alcohol retailers from selling to underage persons. Much more rigorous enforcement of laws restricting sales of alcohol to underage persons is needed. Frequent, well-publicized compliance checks of alcohol retailers can reduce alcohol availability to underage persons at a relatively low cost (Scribner and Cohen, 2001). During compliance checks, law enforcement officers supervise attempts by persons under age 21 to purchase alcohol from licensed establishments. If a sale is made, both the

server and the license holder may be subject to penalties, depending upon state law. These compliance checks, when well publicized, have been shown to significantly reduce sales of alcohol to underage persons.

A how-to guide for conducting compliance checks can be found at http://www.epi.umn.edu/alcohol/manual/manual.pdf.

EXHIBIT V-4
Strategy Attributes for Conducting Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons (T)

Technical Attributes	
Target	Alcohol retailers directly and underage drinkers indirectly
Expected Effectiveness	A study in Louisiana demonstrates the effectiveness of well-publicized compliance checks in reducing alcohol sales to underage persons (Scribner and Cohen, 2001). In 1995, Louisiana modified its law to allow retailers to be cited for selling alcohol to underage persons. During a first wave of compliance checks in New Orleans, only 11 percent of 143 alcohol retailers asked for age identification before selling to an underage buyer. Five months later, after a media campaign covering the new law and the accompanying compliance checks, a second wave of checks found that compliance had increased to 40 percent. Compliance levels dropped somewhat 1 year later, suggesting the importance of sustained enforcement efforts. The study also found that outlets receiving a citation were more likely to ask for age identification from a young-looking buyer at follow-up compliance checks. Although studies to evaluate community-level interventions are extremely difficult to conduct, one study in Minnesota and Wisconsin found that, as part of a multi-faceted community program, compliance checks showed promise in reducing underage drinking and driving after drinking (Wagenaar et al., 2000c).
Keys to Success	It is essential that compliance checks be accompanied by sustained publicity targeting both retailers and the general public. The goal of compliance checks is to deter retailers from selling alcohol to minors. Although establishments and retailers are punished when caught, the effects of these punishments in some jurisdictions are relatively small compared with the broad effect on all retailers from knowing that compliance checks are routinely conducted. Therefore, compliance checks must be accompanied by sustained publicity targeting both retailers and the general public. In Louisiana, publicity included a press conference attended by the mayor and the state alcohol beverage control (ABC) commissioner. At the press conference, the press conducted “ride-alongs” with law enforcement officers conducting the compliance checks to stimulate TV and newspaper coverage of the compliance check program. To be effective, the penalties for infractions should be administrative rather than criminal in nature. This increases the likelihood that penalties will be swiftly and consistently levied. In many states, the penalties are currently too lenient to deter retailers from selling alcohol to underage persons. Fines for alcohol retailers may be $300 or less. Furthermore, suspensions of alcohol licenses are infrequent and typically last, at most, only a few days. Considering the revenue that a retailer can generate by selling alcohol to underage persons, a $300 penalty with no suspension is a weak deterrent. Penalties for retailers, including alcohol sales permit suspensions, should be substantial enough to encourage retailers to actively adhere to minimum drinking age laws. Some states have had success employing graduated penalties for license holders who sell to minors so that both fines and suspension periods increase with each conviction. Finally, to be most effective, minimum drinking age law enforcement should be part of a broad community commitment not to tolerate illegal drinking by young people (Wagenaar et al., 2000b).

EXHIBIT V-4 (Continued)
Strategy Attributes for Conducting Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons (T)

Technical Attributes	
Potential Difficulties	The greatest potential difficulty for conducting well-publicized compliance checks is limited resources. Funding for alcoholic beverage enforcement agencies has decreased in many states in recent years. Local police agencies also can conduct compliance checks. In order to do so, however, the police need to divert personnel away from other needs. In most jurisdictions that actively conduct compliance checks, enforcement activities are shared between local police agencies and the state liquor authority. In some communities, the political power of local retail establishments is an obstacle to conducting compliance checks. Retailers sometimes view law enforcement and public officials who support compliance checks as anti-business. Nonetheless, carefully designed compliance check programs that have law enforcement work closely with retailers can be implemented (see Associated Needs).
Appropriate Measures and Data	Careful implementation of this strategy should result in fewer alcohol-related crashes among young drivers. However, as an important interim measure, the success of well-publicized compliance checks should be measured by the rate of retailer compliance over time. If enforcement is well-publicized and penalties are substantial enough, compliance with minimum drinking age laws should increase significantly.
Associated Needs	Although purchasing alcohol directly from retailers is a common way in which young people obtain alcohol, the most frequent source of alcohol is noncommercial sources, such as older siblings, friends, and co-workers (Wagenaar et al., 1996). Many states have statutes that prohibit adults other than parents from providing alcohol to underage persons; however, these laws are difficult to enforce because the transaction between adult and minor usually takes place in private. States should also continue to address the use of false age identification by youth. Research has shown that fewer than 10 percent of underage drinkers report using a false identification during the previous month (Wagenaar et al., 1996). The use of false identifications is relatively low because (1) young persons have learned that they are seldom asked for identification when purchasing alcohol and (2) the legal risks are often high if caught with a false identification. Many states are also making it more difficult to duplicate or falsify identifications.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	Compliance checks of alcohol retailers will require political support. This may be hard to obtain in some communities, particularly smaller towns where local merchants have strong influence. However, political support is necessary for law enforcement to carry out a successful program. Therefore, it will be desirable to establish a group of stakeholders in the early stages of the process so that the cooperation and support of all key members of the community can be achieved.
Issues Affecting Implementation Time	Compliance checks can be organized relatively quickly and easily. The primary issue affecting time to implementation is the existence of political and organizational support for this activity. If local community leadership or law enforcement leaders do not see the value of doing compliance checks, then establishing the necessary support can take some time. Media attention can be easy to acquire in the beginning of a compliance check program, since it is a fresh story. As the program ages, resources should be allocated to ensure that the program continues to be effectively publicized, especially to retailers.

EXHIBIT V-4 (Continued)
Strategy Attributes for Conducting Well-Publicized Compliance Checks of Alcohol Retailers to Reduce Sales to Underage Persons (T)

Organizational and Institutional Attributes	
Costs Involved	The primary cost associated with this strategy is for local enforcement personnel, especially staff time for conducting compliance checks. Costs will also include training for officers who are not familiar with this kind of activity. Alcohol beverage enforcement officials can often conduct this training at relatively little cost.
Training and Other Personnel Needs	Additional ABC enforcement personnel are needed in most states. At the present time, it is not uncommon for an ABC officer to be responsible for a thousand or more retail outlets. As a consequence, it should come as little surprise that many retailers perceive the risk of selling alcohol to youths as very low. Unfortunately, a number of states are currently decreasing, rather than increasing, their ABC enforcement staff. Information and assistance in training officers for alcohol law enforcement is available from the National Liquor Law Enforcement Association at http://www.nllea.org. Formal training of employees in retail establishments is also critical. Employees must be familiar with store policies, as well as state laws and penalties for selling alcohol to youths. Employees also need training to learn how to detect false age identification and how to refuse sales to underage persons.
Legislative Needs	Although all 50 states and the District of Columbia prohibit persons under the age of 21 from purchasing or publicly possessing alcohol, states vary considerably in the details of their minimum legal drinking age laws, as well as their procedures for administering and enforcing them and the penalties for violations. Prohibiting persons under age 21 from possessing or consuming alcohol is an important part of a comprehensive approach to underage drinking that requires legislative action. In addition, a law making it illegal for persons under 21 to attempt to purchase (or to actually purchase) alcohol are necessary for effective control of underage drinking. Finally, a law prohibiting the use of false identification to obtain alcohol is needed. For alcohol retailers, the penalties for selling to underage persons should be sufficient to deter retailers from doing so. Administrative penalties are more likely than criminal penalties to be swiftly and consistently enforced. A sample ordinance regarding compliance checks is available at http://www.epi.umn.edu/alcohol/local/adminpen.shtm.
Other Key Attributes	
	None.

Strategy 5.1 A4—Employ Screening and Brief Interventions in Health Care Settings (T)

There is a great opportunity within the U.S. health care system to identify and treat people who have problems with alcohol. Over the past several decades, a number of screening tests have been developed to identify at-risk drinkers, and many research studies indicate that opportunistic "brief" interventions in medical settings can reduce the amount of alcohol that these individuals consume. (For recent reviews, see research by Bien et al.

[1993], Miller and Wilbourne [2002], Moyer et al. [2002], and Wilk et al. [1997].) The goal of brief interventions is to motivate a patient to examine his or her drinking behavior and to reduce excessive drinking. When alcohol has caused or contributed to a patient's injuries, a brief intervention conducted at this "teachable moment" may help some patients realize the value of either reducing their alcohol consumption or controlling their driving after drinking.

Brief interventions are inexpensive, often single-session methods to provide feedback and advice to individuals with alcohol problems, with the objective of reducing or eliminating alcohol consumption. Brief interventions typically involve a screening procedure that may include a structured questionnaire or a short interview with a medical professional. If the patient is identified as being a problem drinker or the health care provider expresses concern about how much the patient drinks and how this may be affecting the patient's health, the patient is then advised to reduce his or her drinking. The health care provider may also suggest where to go for more information or may recommend related treatment options. In some cases, a physician or nurse may contact the patient at a later date to answer questions, track progress, or re-emphasize the dangers of excessive alcohol use.

Brief interventions have been successfully employed in hospitals, primary care clinics, college campuses, and other settings. Recently, considerable attention has focused on brief interventions in emergency departments. Alcohol is widely recognized as a major risk factor for severe trauma. For example, 46 percent of persons admitted to the emergency department of a large trauma center in Seattle were found to have a BAC of 0.08 percent or greater (Gentilello et al., 1999). Many of these individuals had been injured in a motor vehicle crash. Brief interventions in emergency departments thus represent a "front line" approach to identify and reduce recidivism among drinking drivers.

Brief interventions are relatively inexpensive, and they can be implemented by physicians or other appropriate personnel in many different medical settings. The American Medical Association recommends that clinicians routinely discuss patterns of alcohol use with all patients. Nevertheless, brief interventions are currently underutilized within the U.S. health care system. Although recent surveys suggest that patients in trauma centers are screened for alcohol disorders more frequently than they were 5 years ago, only half (55 percent) of facilities currently perform screening, while one-third (37 percent) perform brief interventions (Schermer et al., 2003). Much wider use of screening and brief interventions for alcohol problems is currently needed.

A substantial amount of information about how to create and implement an effective brief intervention in a health care setting is available at http://www.cdc.gov/ncipc/pubres/alcohol_proceedings/alcohol_proceedings.htm. See also Appendix 3 for an example of a state implementation effort.

EXHIBIT V-5
Strategy Attributes for Employing Screening and Brief Interventions in Health Care Settings (T)

Technical Attributes	
Target	Individuals who are drinking at hazardous levels but are not yet alcohol dependent and who have come in contact with the health care system, often in a hospital emergency department as a result of alcohol-related injuries.
Expected Effectiveness	A substantial body of research indicates that brief interventions delivered in primary care settings can reduce the amount of alcohol consumed by persons who are identified as problem drinkers. For example, Monti et al. (1999) randomly assigned 94 young patients (ages 18 or 19) at a hospital emergency department to either a brief motivational interview or standard care. All of the patients either had a positive BAC or reported drinking prior to seeking treatment in the emergency department. In comparison with patients who received the brief motivational interview, those who did not were four times more likely to report drinking and driving at 3 and 6 month follow-up interviews. To date, few studies have examined the effect of brief interventions on motor vehicle crashes. In one recent study in a primary care setting, 226 young patients were randomly assigned to either their usual care or an experimental brief intervention (Grossberg et al., 2004). At a 4-year follow-up, young adults receiving the brief intervention were less likely than their counterparts to have been in a motor vehicle crash involving injuries (9 percent versus 20 percent). These findings are encouraging, but they must be replicated in other health care settings, with different types of brief interventions and larger study samples, before this strategy can be considered proven. It is noteworthy that in many studies employing randomized, controlled trials, patients in the control condition also show decreases in alcohol consumption at follow-up assessment. This suggests that the assessment procedure itself may serve as a brief intervention. That is, simply asking patients to complete a screening questionnaire about their alcohol consumption may reduce future drinking.
Keys to Success	It is possible for brief intervention programs that do not include a screening component to be effective. However, a program that includes a well-defined screening protocol will identify a larger proportion of patients with mild-to-moderate problems—the type of patient for whom a brief intervention is intended—than a program that does not. When systematic screening is not used, clinicians tend to identify patients with the most severe problems. This type of patient generally needs more intensive, specialized treatment. A screening mechanism that is easy to use and interpret is key to any intervention process, since staff time and resources are limited. To improve physicians' use of brief interventions, procedures should be developed and evaluated within entire clinics or hospitals to ensure that brief interventions become a systematic part of routine care. This will require the active participation of all clinical staff, not just individual clinicians.
Potential Difficulties	Even if a systematic program for conducting brief interventions has been established within a health care setting, there are still several difficulties facing effective implementation. Some patients may not speak English, and there may be insufficient bilingual staff to assess and intervene with these individuals. Some patients may have injuries of a severe nature that preclude the opportunity to employ a brief intervention. Other patients who are asked questions about their drinking behavior may be unwilling to participate in the screening process, or they may understate their drinking. Although a number of screening instruments have been developed to identify individuals who may be at-risk or problem drinkers, these instruments are imperfect—some individuals who have problems with alcohol will be missed (Chang et al., 2002). Moreover, not all physicians see the value of conducting brief interventions. In one survey, only 27 percent of emergency department doctors agreed that brief interventions could have a positive effect on reducing alcohol abuse problems (Danielson et al., 1999). Thus, not all physicians can be expected to implement brief interventions as intended.

EXHIBIT V-5 (Continued)
Strategy Attributes for Employing Screening and Brief Interventions in Health Care Settings (T)

Technical Attributes	
	A major difficulty in establishing a successful intervention program is having adequate staff time to carry out the interventions. Staff must be equipped with sufficient resources and training to initiate and maintain the intervention beyond the initial startup enthusiasm. Another potential difficulty concerns the nature of the medical industry and record keeping. Forty-seven states have laws, intoxication exclusion policies for insurance companies, or precedent-setting court cases that may relieve insurers of liability in instances where an injured individual was "intoxicated" or under the influence of non-prescription drugs (referred to as uniform accident and sickness policy provision laws). Thus, many health care institutions are hesitant to implement alcohol-screening procedures because these procedures could result in insurers denying payment for treatment costs. In practice, this issue pertains only to a relatively small number of individuals seen in emergency departments; many patients either are uninsured or have insurance policies that don't actively enforce the provisions of these laws. Nonetheless, for reasons of logistic feasibility, health care providers may discourage screening for alcohol problems among patients seen in emergency departments.
Appropriate Measures and Data	Providing brief interventions, especially within the arena of emergency medicine, has the potential to yield a number of favorable outcomes, including reductions in alcohol consumption, alcohol-related traffic crashes and fatalities, and injuries and fatalities arising from other alcohol-related causes (e.g., liver cirrhosis and domestic violence). Indications suggest that while the actual intervention may be brief, the effects of the intervention may be felt across society on a much larger basis. To ensure that brief interventions are conducted consistently and in the manner intended, useful process measures would include the percentage of patients in the target population who receive an intervention, the percentage of appropriate staff trained to provide brief interventions, and the type of training available to staff.
Associated Needs	Further research is needed. Although brief interventions have been shown to be effective in a variety of medical settings, many research questions remain to be answered. For example, researchers have not yet determined the optimal components of brief interventions, including their content, their length, the number of contacts, and the credentials of the health professional delivering the intervention. Moreover, most studies have employed follow-up assessments within 3 to 12 months of the intervention. The long-term effects of brief interventions are currently unknown.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	To be most effective, screening for alcohol-related problems should be incorporated into the initial emergency department intake or triage process and applied to all individuals seeking medical treatment for an injury. A well-designed intervention will take into consideration the individual's willingness to cooperate and will allow the provider to take that attitude into account when making subsequent referrals and follow-up plans. It will be important to gain the support of relevant medical institutions and practitioners for the use of brief interventions. Policies to support this practice and procedures to make staff aware of the latest techniques should be encouraged.
Issues Affecting Implementation Time	Once changes in policy have been made, appropriate staff will need to be trained to carry out the intervention. If training materials must be developed and trainers must be found or trained, the implementation time will be longer.

EXHIBIT V-5 (Continued)
Strategy Attributes for Employing Screening and Brief Interventions in Health Care Settings (T)

Organizational and Institutional Attributes	
Costs Involved	The primary costs of this strategy involve adequate training for health care providers and the time that is required to implement brief interventions in practice. In some settings, additional personnel may be needed to provide adequate staff time for these interventions. However, brief interventions should ultimately be a cost-effective benefit because they lower the number of problem drinkers who are hospitalized or who seek treatment for an alcohol-related injury or illness. For example, one study suggested that every $10,000 invested in brief interventions results in a cost savings of $43,000 (Fleming et at., 2002).
Training and Other Personnel Needs	Several recent studies indicate that formal courses with lectures and handouts do little to change physicians' behavior in practice settings (Davis et al., 1995). These studies suggest that peer education, role-playing, and hands-on training are needed to help medical professionals learn how best to communicate with patients to improve success rates of brief interventions. To improve the use of brief interventions, it will also be important to educate health providers about the potential value of this intervention to problem drinkers and society.
Legislative Needs	In states with uniform accident and sickness policy provision laws or intoxication exclusions, revision or repeal of those laws and exclusions would be helpful in encouraging widespread implementation of this strategy. In states where health care providers may, in effect, be penalized for obtaining information on alcohol use during patient screening, providers are unlikely to obtain this information.
Other Key Attributes	
	None.

Objective 5.1 B—Enforce DWI Laws

Strategy 5.1 B1—Conduct Regular Well-Publicized DWI Checkpoints (P)

Well-publicized DWI checkpoints are highly effective in deterring drinking and driving. At DWI checkpoints, law enforcement officers stop vehicles at a predetermined point on the roadway. Drivers are then evaluated for signs of alcohol impairment. DWI checkpoints discourage impaired driving by increasing the perceived risk of arrest. To be effective, DWI checkpoints should be conducted regularly and include extensive media coverage to ensure that the driving public is aware that these checkpoints are being conducted. The main benefit of checkpoints comes from their effectiveness in deterring drinking drivers, rather than from actual arrests. Drinking drivers often believe they can drive without being caught. Well-publicized DWI checkpoints increase the perception that DWI laws are enforced in such a way that apprehension is difficult to avoid. Although research is still needed to determine how often, when, and where checkpoints should be conducted in order to have the maximum impact, it is clear that well-publicized DWI checkpoints are effective in reducing drinking-driving.

NHTSA has produced a "how-to" guide for planning and publicizing a checkpoint program. The guide can be found at http://www.nhtsa.dot.gov/people/injury/alcohol/saturation_patrols/SatPats2002.pdf. See also Appendix 4 for an example of a state implementation effort.

EXHIBIT V-6
Strategy Attributes for Conducting Regular Well-Publicized DWI Checkpoints (P)

Technical Attributes	
Target	The general public (all potential drinking drivers) and actual drinking drivers.
Expected Effectiveness	DWI checkpoints can have a significant deterrent impact on drinking-driving. Several studies have shown that the use of well-planned checkpoints, coupled with campaigns to publicize them, can reduce alcohol-related crashes from 10 to 30 percent (Jones and Lacey, 2001; Ross, 1992; Shults et al., 2001). NHTSA estimates that the routine use of high-visibility checkpoints would reduce alcohol-related fatalities by 15 percent, at a cost saving of approximately $62,000 per checkpoint (NHTSA, 2004a).
Keys to Success	DWI checkpoints are most effective as part of a sustained effort to deter impaired driving. Ideally, checkpoints would be scheduled every weekend of the year in several counties or jurisdictions within a state or region. Regardless of how wide a region is covered, or how frequently checkpoints are conducted, in order to have a clear safety benefit, it is critical that the checkpoint program be widely publicized. Checkpoints not only catch drinking drivers but also, more importantly, deter individuals from driving after drinking because they are more likely to believe they will be detected and apprehended if they know a checkpoint program is in progress.
Potential Difficulties	One of the main difficulties associated with DWI checkpoints is staffing and associated costs (Fell et al., 2003). Conducting checkpoints often involves overtime work for police officers, and enthusiasm for overtime work may wane over time. Hence, scheduling checkpoints and staffing them can become a challenge. Using small-scale checkpoints that require fewer officers can help to alleviate this problem. Research suggests that smaller checkpoints using three to five officers can have just as great a deterrent effect as larger, more costly checkpoints (Stuster and Blowers, 1995). To assist with staffing needs, jurisdictions can combine resources. This is especially important in less populated and rural areas. Finally, it can be difficult to obtain political support and media interest for a sustained checkpoint program. There is often considerable excitement at the outset of a checkpoint program; however, media interest in the program may diminish over time as the program is no longer new.
Appropriate Measures and Data	Police should routinely collect and report process data from checkpoint activities, including the number of agencies involved, the number of vehicles stopped, and the number and types of arrests made as a way of tracking how well a checkpoint program is implemented. However, the actual effectiveness of a checkpoint program should be measured by the reduction in alcohol-related crashes in the community. Gauging the success of a checkpoint operation simply by the number of drinking drivers arrested or the number of checkpoints conducted is inappropriate. At least one study suggests that program effectiveness is not predicted simply by the number of checkpoints conducted (Mercer, 1985). The deterrent effect of a well-designed and carefully implemented checkpoint program will reduce the number of drinking drivers on the road far more than the actual arrests made at checkpoints will.
Associated Needs	DWI checkpoints require time and sustained commitment by law enforcement agencies (i.e., local police, sheriff's departments, and the highway patrol). Some equipment will be necessary, including traffic cones, warning signs, passive alcohol sensors (ideally), portable breath-testing devices, and readily available evidential breath-testing equipment. A number of states have funded DWI enforcement vans to assist with these efforts. Although costly, these vans contain and transport all necessary equipment for conducting a DWI checkpoint, including evidential BAC test equipment. These vans can dramatically reduce the time required to process arrests and can draw attention to the checkpoint program. Finally, officers should provide educational materials to every stopped driver explaining the purpose of checkpoints and the dangers caused by drinking-driving.

EXHIBIT V-6 (Continued)
Strategy Attributes for Conducting Regular Well-Publicized DWI Checkpoints (P)

Technical Attributes	
	Publicity in support of the program should include a wide variety of both "earned" and paid media coverage. Press releases should be issued the week before and day before to announce a checkpoint. Local television stations should be contacted in advance and informed of the checkpoint program, and media coverage of the checkpoints themselves should be encouraged. When checkpoints are part of a continuous program, it may be difficult to obtain sustained media coverage. Therefore, paid media (e.g., billboards, radio, and TV ads) may be necessary to ensure that awareness for the program remains high.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	Political support is essential for implementing an effective and sustainable checkpoint campaign. The top political official (i.e., the governor and/or mayor) and other political leaders must understand the value of and endorse the campaign. Additionally, local prosecutors must support the use of checkpoints, and the heads of law enforcement agencies, including the state highway patrol, must make DWI checkpoints a priority if the checkpoints are to achieve their potential. Judges who will handle the arrest cases should be informed of the objectives and effectiveness of this strategy and the importance of their role in its success.
Issues Affecting Implementation Time	The primary factor affecting implementation time is the scope of the program and whether a supportive political climate exists for conducting checkpoints. A statewide program will require a considerable amount of planning and coordination between agencies. This process will take several months before the checkpoint operation can begin. Local checkpoint programs can be organized more quickly. However, it will still take time to ensure the appropriate and necessary media coverage for the program to produce the desired effect. In all cases, a good first step is to assign a senior law enforcement officer as the manager and primary contact for the checkpoint operation.
Costs Involved	Funds are needed to cover law enforcement salaries, publicity costs, and other program expenses. Although checkpoints entail time and resources, considerable savings can be achieved through the associated reduction in alcohol-related crashes and fatalities. Examples of the costs for conducting a DWI checkpoint are available from NHTSA at http://www.nhtsa.dot.gov/people/injury/alcohol/impaired-drivingusa/US.pdf. See also the report on "Checkpoint Tennessee," which provides an example of a comprehensive, statewide checkpoint campaign (http://www.nhtsa.dot.gov/people/injury/research/ChekTenn/ChkptTN.html). A variety of federal and state funding is available to law enforcement agencies to assist with the cost of conducting checkpoints. These funds are generally administered through each state's highway safety office. Information on the NHTSA assistance grants may be found at http://www.nhtsa.dot.gov/people/injury/alcohol/StopImpaired/funding.html.
Training and Other Personnel Needs	Establishing an effective DWI checkpoint program may require some specialized training of law enforcement personnel. Officers may need some training in detecting drivers' alcohol use based on the minimal amount of information available from a driver sitting in a stopped vehicle, a task more difficult than most officers tend to believe. For this reason, the use of passive alcohol sensors as screening devices is highly recommended, and training in the use of these devices is important. Officers who work checkpoints should also be trained in administering standardized field sobriety tests to suspected impaired drivers. Furthermore, officers should be aware of the need to follow all requirements of statutory and case law when conducting checkpoints.

EXHIBIT V-6 (Continued)
Strategy Attributes for Conducting Regular Well-Publicized DWI Checkpoints (P)

Organizational and Institutional Attributes	
Legislative Needs	In 1990, the U.S. Supreme Court ruled in *Michigan v. Sitz* that DWI checkpoints do not constitute illegal search and seizure. The Court decided that the brief intrusion of a checkpoint is justified by the public interest in reducing drinking-driving. Currently, Idaho, Iowa, Michigan, Minnesota, Oregon, Rhode Island, Texas, Washington, Wisconsin, and Wyoming prohibit law enforcement officers from conducting checkpoints for the purposes of apprehending drinking drivers. Alaska does not currently conduct checkpoints as a matter of policy. In states where checkpoints are not permitted (usually by provisions in the state constitution or by enacted statute), efforts should be made to remove this legal barrier to the use of a proven effective approach to reducing driving after drinking. More information regarding the legality of DWI checkpoints is available at http://www.nhtsa.dot.gov/people/injury/alcohol/SobrietyCheck/caselaw.html.
Other Key Attributes	
	In states where checkpoints are not permitted, saturation patrols can be used to reduce impaired driving. Under this approach, teams of law enforcement officers target specific traffic corridors that have a high potential for drinking-drivers (e.g., weekend evenings on roads near bars). Some jurisdictions have developed much larger saturation patrols that cover entire geographic regions, combining efforts of multiple police agencies. As with checkpoints, the effectiveness of saturation patrols depends on extensive publicity about police activity. Some jurisdictions publicize their saturation patrols in the same way as they do DWI checkpoints.

Passive Alcohol Sensor

Strategy 5.1 B2—Enhance DWI Detection Through Special DWI Patrols and Related Traffic Enforcement (T)

The key to reducing alcohol-impaired driving is to convince the public that drinking drivers are highly likely to be detected, arrested, and punished. DWI law enforcement is the critical first step in accomplishing this result. Well-publicized checkpoints (Strategy 5.1 B1) are an effective enforcement strategy, but they are conducted infrequently and are limited to specified times and locations. The public needs to hear the message that the police are always on the road, looking for impaired drivers—24 hours every day, 7 days every week. Accordingly, DWI detection should be an integral part of all police traffic activities, including regular traffic patrol, crash investigations, activities directed primarily at other traffic offenses such as speeding or seatbelt law violations, and special DWI patrols.

Most impaired drivers are detected and arrested in these regular traffic enforcement activities and in special DWI patrols, not at checkpoints (Stuster, 2000). In fact, a study conducted in Indianapolis found that of all reasons for being stopped, persons arrested for DWI were most likely to have been stopped for speeding (Lacey et al., 1988).

Officers need appropriate training in the methods and skills required to detect and arrest impaired drivers. Research has developed and validated these methods and training for each stage in the process, and the training is used extensively throughout the United States. Observable driving behaviors, such as failing to stay in the proper lane or driving unusually slowly, help police identify a vehicle whose driver may be impaired and provide the evidence needed to stop the vehicle (Stuster, 2000). Behavioral cues such as slurred speech or difficulty in finding a driver's license or vehicle registration provide the evidence necessary to require a driver to leave the vehicle for sobriety testing (Preusser, 2000). Finally, the standard field sobriety tests provide the evidence of impairment to justify a DWI arrest (Burns, 2000). Passive alcohol sensors and preliminary breath test equipment can help supplement these behavioral observations.

The public gets the message when police departments make DWI enforcement a high priority; provide officers with the incentive, training, and equipment needed; and publicize this DWI enforcement. Drinking and driving will drop, as will DWI crashes, injuries, and fatalities. See also Appendix 5 for an example of a state implementation effort.

EXHIBIT V-7
Strategy Attributes for Enhancing DWI Detection Through Special DWI Patrols and Related Traffic Enforcement (T)

Technical Attributes	
Target	The general public (all potential drinking drivers) and actual drinking drivers.
Expected Effectiveness	Most police departments enforce DWI laws at some level. This strategy highlights the importance of conducting DWI enforcement at a high level throughout a broad range of police activities. Measuring both the intensity and extent of enforcement is difficult, as is evaluating the effect of increased intensity or extent on DWI arrests, traffic crashes, or casualties. However, increased enforcement clearly is effective, as the checkpoint studies demonstrate (see Strategy 5.1 B1). A 5-year program was implemented in six Massachusetts communities aimed at reducing drinking and driving as well as speeding, failure to wear safety belts, and other moving violations (Hingson et al., 1996). The program resulted in a 42-percent decrease in fatal crashes involving alcohol, as well as a reduction in the percentage of vehicles observed to be speeding. The primary author also noted that approximately half of the speeders had been drinking and half of the drinking drivers were speeding.
Keys to Success	To be most effective, detection of drinking drivers should be a continuous focus of police enforcement activities. During every traffic stop and every crash investigation, officers should observe the driver for signs of impairment and conduct appropriate follow-up procedures if alcohol is suspected. It is important that all officers who are engaged in traffic enforcement be familiar with signs that a vehicle's driver may be impaired (Stuster, 2000) and signs that an individual may be impaired (Preusser, 2000), know how to administer standardized field sobriety tests (Burns, 2000), and know the proper procedures for arresting and processing impaired drivers (Simon, 2000).

EXHIBIT V-7 (Continued)
Strategy Attributes for Enhancing DWI Detection Through Special DWI Patrols and Related Traffic Enforcement (T)

Technical Attributes	
Potential Difficulties	Many jurisdictions struggle to maintain a consistent level of resources for routine traffic enforcement. In recent years, funding and staffpower have been diverted to other police activities such as homeland security. Because of limited resources, it is especially critical that police include DWI detection as part of their routine enforcement efforts.
Appropriate Measures and Data	This strategy should increase the number of drivers stopped for suspicion of impaired driving, though the data may not be readily available. DWI arrests may increase. As with DWI checkpoints, the number of drinking drivers on the road and the number of alcohol-related crashes both should drop.
Associated Needs	It is important to provide all traffic enforcement officers with equipment to assist in DWI arrests, such as passive alcohol sensors, preliminary breath test devices, and, if appropriate, in-car video cameras. Passive sensors can be highly useful at DWI checkpoints in helping officers determine whether drivers have been drinking and whether a more thorough investigation is needed for a possible DWI or, especially, a zero tolerance violation (Farmer et al., 1998). A preliminary breath test is a portable breath-testing device that provides a BAC reading from a breath sample. Preliminary breath test results provide evidence to support a driver's arrest, after which an evidentiary breath test is taken. (Use of preliminary breath tests depends on state law, legal opinion, and judicial findings. Not every state permits use of preliminary breath tests.) In-car police video recorders can document an offender's behavior at the time of arrest (including signs of impairment). They also provide evidence that police officers followed the correct procedures during a traffic stop. Although the effectiveness of video recorders has not been fully established, preliminary evidence suggests that they lead to more arrests being resolved in the state's favor (Jones, 1999). Video cameras also can be used to record the driver's behavior at the police station after he or she has been arrested.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	In some jurisdictions, it can be difficult and time consuming for police officers to process DWI arrests. This difficulty provides a disincentive for police officers to make an arrest for DWI, and it reduces the amount of time they have available to apprehend offenders. Therefore, it is important that states streamline their processing of DWI arrests through methods such as simplified and standardized forms and computer-based data entry systems (Jones et al., 1998). It is also important that political and other community leaders support law enforcement officers in their DWI enforcement efforts. Apprehending drinking drivers should be a high priority for law enforcement, policy makers, and the community. The understanding and support of the judiciary is also important. Ongoing liaison with the courts is highly desirable.
Issues Affecting Implementation Time	This strategy can be implemented relatively quickly in every state.

EXHIBIT V-7 (Continued)
Strategy Attributes for Enhancing DWI Detection Through Special DWI Patrols and Related Traffic Enforcement (T)

Organizational and Institutional Attributes	
Costs Involved	Funds will be needed to provide all traffic enforcement officers with both the training and the equipment needed to do effective DWI enforcement. Grants are available for training through state highway safety offices. The funds come from the NHTSA assistance grants. Information on these grants may be found under program number 20.605, "Safety Incentives To Prevent Operation Of Motor Vehicles By Intoxicated Persons," at http://www.nhtsa.dot.gov/people/injury/alcohol/StopImpaired/funding.html.
Training and Other Personnel Needs	Officers whose primary responsibility is traffic enforcement must be given adequate training to detect and arrest impaired drivers and to provide compelling testimony in court. In particular, all officers must have up-to-date training to conduct standardized field sobriety tests.
Legislative Needs	Legislative action may be needed for this strategy to explicitly authorize police officers to use equipment to assist in DWI enforcement, including passive alcohol sensors, preliminary breath tests, and in-car video cameras. In some states, Legislation may also be needed to allow officers to administer an evidentiary breath or blood test after finding positive evidence of alcohol from a passive alcohol sensor or preliminary breath test. Legislation may also need to be changed to simplify the processing of DWI arrests and reduce the time that officers spend away from active patrol duties. States should consider enacting primary seatbelt laws, which allow officers to stop a motorist solely for not wearing a seatbelt. Because of the strong relationship between seatbelt use and impaired driving, seatbelt laws enhance the ability of officers to detect impaired drivers. In addition, states with primary seatbelt laws have higher rates of seatbelt use, thereby protecting more drivers from injury in alcohol-related crashes. For more information, see http://www.nhtsa.dot.gov/people/injury/alcohol/impaired-drivingusa/US.pdf.
Other Key Attributes	
	None.

Strategy 5.1 B3—Publicize and Enforce Zero Tolerance Laws for Drivers Under Age 21 (P)

All 50 states have laws prohibiting individuals under age 21 from driving with a BAC over 0.00, 0.01, or 0.02 percent (depending on the state). These "zero tolerance" laws reflect the fact that, since it is illegal for persons under the age of 21 to drink alcohol, it should also be illegal for them to drive with any alcohol in their system. As with any law, however, individuals will not comply if they are not aware of the law or if they believe that the law is not being enforced. A recent study found that one-third of teens in several states, including California and New York, were unaware of their state's zero tolerance law (Ferguson and Williams, 2001). Moreover, almost half of the teens who were aware of zero tolerance thought that these laws were not enforced very often. Much greater publicity and enforcement of zero tolerance is needed for the full potential of these laws to be realized. Also, removing barriers to enforcement of the laws and policies of several states could improve the laws' and policies' effectiveness.

EXHIBIT V-8
Strategy Attributes for Publicizing and Enforcing Zero Tolerance Laws for Drivers Under Age 21 (P)

Technical Attributes	
Target	Drivers under 21 years of age.
Expected Effectiveness	Although a number of studies have shown that zero tolerance laws are effective in reducing drinking-driving among young people, these laws have their greatest targeted effect when combined with well-publicized enforcement. For example, a study of zero tolerance in Maryland found that the law by itself reduced drinking-driving crashes among drivers under age 21 by 21 percent, while the addition of an extensive public information campaign about enforcement of the law reduced crashes by an additional 30 percent (Blomberg, 1992). The importance of publicity is also illustrated by Maine's zero tolerance law. In 1995, Maine reduced the permissible BAC for young drivers from 0.02 to 0.00. Although substantial decreases were observed in nighttime single-vehicle crashes (a proxy for alcohol-involved crashes), these decreases occurred several months *before* the law took effect, when there was extensive publicity about the legislative debate and the forthcoming law change (Lacey et al., 2000).
Keys to Success	Publicity about enforcement is key to ensuring that young drivers are aware of zero tolerance and the consequences for violating the law. This publicity can take many forms but should use communication channels that are likely to reach teens. Officers speaking to students in schools, educational materials provided to new license applicants at licensing offices, and ads in popular electronic media are just a few examples. Publicity without enforcement will likely be viewed by teens as an empty threat. Therefore, it is critical that law enforcement officers be familiar with the law and look for violations when they stop young drivers for any traffic infraction. Well-publicized special enforcement efforts related to zero tolerance can also substantially increase awareness and perceived enforcement of the law. Finally, zero tolerance is most effective when implemented administratively and when it includes immediate suspension of the young driver's license. The license is a symbol of independence for young persons, and losing it is a severe penalty. As with any sanction, certainty and swiftness are essential if the desired effect is be realized. Judicial involvement in the license suspension process may delay or decrease the certainty of the sanction.
Potential Difficulties	Drinking drivers are difficult to identify when the BAC is low. Such drivers rarely exhibit any visible signs of impairment and may perform well on the standardized field sobriety tests. One solution is to provide officers with equipment that can help identify potential zero tolerance violations. In particular, passive alcohol sensors could greatly improve officers' ability to detect drivers with low BAC levels. In some states, officers are not permitted to test young drivers unless they are believed to be over the legal BAC limit for adults. This requirement makes it much more difficult for officers to enforce zero tolerance laws. In other states, the smell of alcohol or an officer suspicion of alcohol consumption by the driver is sufficient cause for administering a breath test. Another difficulty is that young people may plead guilty to zero tolerance violations as a way to avoid a more serious DWI charge. Similarly, law enforcement officers may decide to "go easy" on young offenders and issue a citation for zero tolerance even when a DWI charge would be more appropriate. Zero tolerance violations should not be issued as a replacement for a DWI charge if the driver has a BAC over the legal limit for adults.
Appropriate Measures and Data	Appropriate outcome measures include increased awareness for zero tolerance laws and greater perceptions of enforcement among young people. The level of enforcement, as demonstrated by a greater number of citations issued for zero tolerance violations, could serve as a process measure. Finally, and most importantly, there should be a reduction in alcohol-related crashes among drivers under the age of 21.

EXHIBIT V-8 (Continued)
Strategy Attributes for Publicizing and Enforcing Zero Tolerance Laws for Drivers Under Age 21 (P)

Technical Attributes	
Associated Needs	Passive alcohol sensors can be highly useful in helping an officer determine whether a driver has been drinking and whether a more thorough investigation for a possible DWI or zero tolerance violation is needed. Because low BACs are particularly difficult to detect, more widespread use of these devices would greatly assist officers in detecting zero tolerance violations. Taking young offenders into legal custody is a major complication that can deter enforcement of zero tolerance laws. The American Probation and Parole Association has created a guide for developing a juvenile holdover program. The guide is available at http://www.nhtsa.dot.gov/people/injury/alcohol/juvenile/index.html.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	It is important that states keep the requirements, evidence, procedures, and paperwork simple. California, for example, allows officers to use a hand-held preliminary breath testing device at the roadside (rather than evidential breath-testing equipment at a police station) as evidence to issue a citation and seize the driver's license. Enforcement of zero tolerance can be much more difficult—and officers may be disinclined to enforce the law as a result—in states that require extensive procedures and paperwork. In practice, police officers often have little incentive to enforce zero tolerance. Police officers are seldom rewarded for issuing this type of citation. Support and appreciation from the command level would be helpful for increasing enforcement of zero tolerance laws.
Issues Affecting Implementation Time	The primary issue affecting the time needed to begin active enforcement is simply the minimal training needs for officers. Once begun, publicity and enforcement of zero tolerance must be sustained. Every year, a new group of young people obtain a driver's license and must be informed about this law and persuaded that it is routinely enforced. Implementation time may be affected by the time to plan and mount a campaign to publicize the program.
Costs Involved	Many forms of publicity can be effective without substantial costs. For example, materials handed to license applicants at licensing offices can be produced at low cost. However, high-visibility publicity (both paid and earned media coverage) is more likely to gain the attention of young drivers. For police, enforcement of zero tolerance should be a part of their routine enforcement activities. Hence, the only cost involved is the diversion of time from other enforcement activities. Passive alcohol sensors can be expensive, costing several hundred dollars, and they require maintenance. Nonetheless, if officers will use the devices when investigating young driver traffic violations, underage drinking-driving can be substantially reduced.
Training and Other Personnel Needs	To encourage active enforcement of zero tolerance, states should implement training programs for law enforcement officers that cover the procedures for enforcing the law (e.g., how to detect low-BAC drivers, special requirements for handling juveniles, and encouragement to file zero tolerance charges). Also important is training to convince officers that using a passive alcohol sensor will dramatically improve their ability to detect violations of their state's zero tolerance law.

EXHIBIT V-8 (Continued)
Strategy Attributes for Publicizing and Enforcing Zero Tolerance Laws for Drivers Under Age 21 (P)

Organizational and Institutional Attributes	
Legislative Needs	All states have enacted zero tolerance laws. However, states should review their laws to ensure that optimal provisions are in place to remove unnecessary obstacles to enforcement and to ensure swift and certain punishment. As mentioned above, zero tolerance laws that are implemented administratively rather than through the courts are more likely to be widely applied. The need to take young offenders into legal custody is a major impediment to enforcing zero tolerance laws; carefully crafted legislation is needed to avoid this problem. Finally, zero tolerance laws are more easily enforced when they specifically stipulate that the smell of alcohol or a reading from a portable breath-testing device or a passive sensor is sufficient evidence upon which to charge an individual.
Other Key Attributes	
	None.

Objective 5.1 C—Prosecute, Impose Sanctions on, and Treat DWI Offenders

Strategy 5.1 C1—Suspend Driver's License Administratively Upon Arrest (P)

Administrative license revocation (ALR) laws provide a strong deterrent to drinking and driving. ALR laws authorize police officers to confiscate the license of a drinking driver at the time of arrest. Offenders typically receive a temporary license and information regarding the right to an administrative hearing. Regardless of the outcome of this hearing, the offender is subject to the criminal process, during which the judge may impose additional penalties, including further license suspension. This approach is highly effective because penalties are swift and certain; offenders immediately feel the consequences of their actions. A recent national survey found that the threat of losing one's license for DWI carried more weight than the threat of fines or incarceration (Richardson and Houston, 2002). Presently, 41 states have ALR laws in place, although the length of the suspension period varies from 7 days to a year. Repeat offenders typically receive longer suspensions than first-time offenders—often a year or more.

EXHIBIT V-9
Strategy Attributes for Suspending Driver's License Administratively Upon Arrest (P)

Technical Attributes	
Target	The general public (all potential drinking drivers) and drinking drivers.
Expected Effectiveness	ALR laws have a strong deterrent effect on drinking-driving among the general public. Numerous evaluations have shown that ALR laws reduce alcohol-related fatal crashes. One recent study found that states that implement ALR laws experienced a 13-percent decline in the proportion of fatal crashes involving drivers with a BAC of 0.10 or higher (Voas and Tippetts, 1999).

EXHIBIT V-9 (Continued)
Strategy Attributes for Suspending Driver's License Administratively Upon Arrest (P)

Technical Attributes	
	ALR laws, in combination with other DWI countermeasures, have also been shown to decrease the likelihood that DWI offenders will be re-arrested for drinking and driving. For example, a recent study in Ohio found a 25-percent recidivism rate for repeat offenders before ALR laws and other legislative actions were taken, compared with a 7-percent recidivism rate after these laws were implemented (Voas et al., 2000). For a full description of Ohio's license suspension law, see http://www.nhtsa.dot.gov/people/injury/research/ohio/toc.html.
Keys to Success	The key to this strategy is that the revocation of the driver's license is swift and certain. In general, it is far simpler to accomplish this administratively, preferably by the arresting officer, than to accomplish this through the court system. Judicial involvement in the license suspension process almost inevitably involves delays and decreases the certainty of the sanction. Although there is no research on what length of time is optimal, NHTSA recommends that ALR laws include a minimum license suspension of 90 days. Ideally, this suspension should be "hard," meaning that offenders are not eligible for restricted driving privileges or a hardship license. A fundamental element of this strategy is the existence of an appropriate law. Therefore, it will be important to have at least one champion for this strategy within the legislative system.
Potential Difficulties	ALR laws have been employed as a DWI countermeasure for more than 20 years. Most of the potential difficulties and concerns associated with this strategy have long been resolved. For example, there were early concerns about whether ALR laws lead to loss of employment and economic hardship for offenders who lose their licenses. However, surveys of first-time and multiple-time offenders have shown that ALR laws have a negligible impact on an offender's job and income (Knoebel and Ross, 1997). Some potential difficulties may arise if the offender requests a hearing to contest the license suspension. For example, law enforcement officers may fail to appear at hearings or hearings may be used by defense attorneys as opportunities for discovery (Jones et al., 1998). To address these problems, Utah passed a law in 2000 allowing parties involved in ALR hearings to participate by telephone. These hearings resulted in a larger percentage of license suspensions being upheld (Wiliszowski et al., 2003). Occasionally, ALR laws have been challenged in the court system on the basis that they impose "double jeopardy" on offenders. That is, persons who have had their license administratively revoked are still subject to criminal proceedings that can lead to additional penalties, including further actions against the offender's license. However, no state Supreme Court has ever upheld such a challenge. It is well documented that many DWI offenders (70 percent or more, according to Ross and Gonzales [1988]) continue to drive even after their license has been suspended, although they appear to drive less frequently and more carefully. Recently, McCartt et al. (2003) conducted unobtrusive observations of DWI offenders with suspended licenses in Milwaukee, Wisconsin, and Bergen County, New Jersey. Among offenders observed traveling, fully 88 percent in Milwaukee and 36 percent in Bergen County were observed driving. The lower prevalence of driving with a suspended license in New Jersey was attributed, in part, to that state's stronger laws and greater perceived enforcement. For a detailed discussion of strategies to address unlicensed driving, see the guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses.

EXHIBIT V-9 (Continued)
Strategy Attributes for Suspending Driver's License Administratively Upon Arrest (P)

Technical Attributes	
	Because of the need for transportation that may prompt some unlicensed driving, several states have begun to issue licenses to convicted DWI offenders that restrict the offenders to driving vehicles equipped with an ignition interlock device (see Strategy 5.1 D1). These devices circumvent the need for alternative transportation while protecting road users from impaired driving by the offender.
Appropriate Measures and Data	To gauge the effectiveness of ALR laws, determine whether the laws deter drinking and driving among the general population. This measure will be reflected in a reduction of alcohol-related crashes and fatalities. Furthermore, ALR laws will reduce the percentage of offenders who recidivate after being convicted for DWI, at least during the period of license suspension.
Associated Needs	None identified.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	It is important that states have good communication systems in place between law enforcement, licensing offices, and the court system so that license suspension systems work efficiently and as intended. If communication is a problem, the formation of a task force, with all stakeholders represented, may be helpful.
Issues Affecting Implementation Time	For states that do not have ALR laws, it may take considerable time to implement this strategy, depending on the speed with which legislators can be persuaded to act on the issue.
Costs Involved	There are costs to establish and maintain an administrative hearing system. In some states, these costs have been a barrier to passage of ALR laws. Many states require offenders to pay a fee at the end of the suspension period to have their license reinstated. A study of ALR laws in Nevada, Mississippi, and Illinois found that revenues from license reinstatement fees can offset the costs associated with the law (National Hardcore Drunk Driver Project, 2003). It is important, however, that these fees be modest; high fees may discourage some offenders from reinstating their license, which may result in higher rates of unlicensed driving.
Training and Other Personnel Needs	States establishing an administrative hearing system will need to hire and train administrative hearing officers. Law enforcement officers will require only minimal training to learn proper procedures for seizing an offender's license.
Legislative Needs	States that do not currently have ALR laws in place will need to enact ARL laws because DOT officials cannot undertake this issue on their own. Useful information for structuring an ALR law can be found at http://www.highwaysafety.org/safety_facts/qanda/alcohol_als.htm, and a model ordinance suggested by the National Committee on Uniform Traffics Laws and Ordinances (NCUTLO) is available at http://www.ncutlo.org/1999dwi.htm (see Section 107).
Other Key Attributes	
	In most states with ALR laws, drivers may appeal their license suspension at an administrative hearing. It is important that this hearing deal only with issues relevant to the administrative suspension (e.g., results of the BAC test and whether there was probable cause to stop the driver). In these cases, hearings are rarely requested and the license suspension is rarely overturned (Rogers, 1995). If ALR hearings are allowed to extend beyond these issues, defense lawyers may use these hearings to discover evidence for the criminal case, thus making it harder to convict the offender of DWI.

Strategy 5.1 C2—Establish Stronger Penalties for BAC Test Refusal Than for Test Failure (T)

This strategy is designed to increase the certainty of conviction and punishment for driving while impaired. Refusal to submit to an evidentiary breath test following arrest for DWI is widely recognized as a substantial problem in the effective prosecution of drinking drivers. By refusing to submit to a breath test, persons arrested for DWI deny prosecutors important evidence for obtaining a conviction. Individuals who have been arrested previously are often advised to accept the consequences of refusing a breath (or blood) test rather than providing this evidence. BAC test refusal rates vary substantially from state to state. Data available from 41 states in 2001 indicated a nationwide test refusal rate of approximately 24 percent (median 18 percent) (Zwicker et al., 2004). Four states had refusal rates that were below 10 percent; two states had refusal rates in excess of 80 percent. Test refusal rates are closely associated with the consequences for refusing. In states where the penalties for test refusal are weaker than for test failure, refusal rates tend to be high. Repeat offenders, in particular, tend to have high refusal rates in states where the penalties for test refusal are weak. These individuals have learned that refusing a breath test is to their advantage, making it more likely that they can avoid the stiffer sanctions that are applied to repeat offenders. Therefore, an important element of a complete DWI prevention system is a penalty structure that encourages individuals to submit to, rather than refuse, an evidential breath or blood test to determine their BAC level.

In states where offenders who register high BACs (typically those above about 0.15 percent) receive more severe penalties than offenders with lower BACs, the penalties for test refusal should be at least as strong as the penalties for a high-BAC offense.

At present, test refusal is considered a criminal offense in 9 states. Other states should consider the benefits of criminalizing test refusal. Doing so increases the conviction rate for an alcohol-related offense and makes it more difficult for drinking drivers to avoid appropriate sanctions and treatment by refusing to take the test (Ross et al., 1995). Furthermore, a conviction for test refusal allows the drinking driver to be identified as a repeat offender upon subsequent arrests. It is important that offenders not be allowed to plea bargain test refusal to a non–alcohol-related offense (see Strategy 5.1 C3).

EXHIBIT V-10
Strategy Attributes for Establishing Stronger Penalties for BAC Test Refusal Than for Test Failure (T)

Technical Attributes	
Target	Individuals stopped by police who are suspected of driving while impaired.
Expected Effectiveness	Given the strong association between refusal rates and the penalties for test refusal, states that establish stronger penalties can expect to see noticeable reductions in refusal rates. As a result, drinking drivers will be more appropriately punished, and those in need of treatment for alcohol problems will be more successfully identified. There is no research to indicate the likely magnitude of effect for this strategy. The size of the effect will depend partly upon the severity of the state's penalties for test refusal prior to implementing this strategy because this initial severity establishes the baseline against which improvements will be compared.

EXHIBIT V-10 (Continued)
Strategy Attributes for Establishing Stronger Penalties for BAC Test Refusal Than for Test Failure (T)

Technical Attributes	
Keys to Success	The support of key government officials will be important for advocating changing the law, as will be establishing the administrative procedures to implement the law once it is changed. Informing the public of the potential benefits of the strategy will also be important to encourage the necessary action by the legislative and executive branches of government. A legislative champion will be important to facilitate the passage of the needed legislation to change penalties for test refusal.
Potential Difficulties	Legislation to increase BAC test refusal penalties may be opposed by some defense attorneys and may also be opposed as an encroachment on civil liberties. However, once enacted and if the legislation is carefully written to avoid loopholes, there should be few difficulties with implementing this strategy.
Appropriate Measures and Data	It will be important to monitor breath test refusal rates before and after this program is instituted to properly measure its effectiveness. By establishing stronger penalties for BAC test refusal than for test failure, states should expect to observe a decrease in refusal rates. In addition, conviction rates in DWI cases will likely improve because prosecutors will have more evidence to present during trial. If the state has an effective system for dealing with convicted offenders, providing adequate sanctions and treatment for those who need it, this strategy should reduce alcohol-related crashes.
Associated Needs	None identified.

Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	There is strong support among law enforcement, prosecution, and judges for stiffer BAC test refusal penalties. In fact, most prosecutors (73 percent) report that the result of the blood alcohol test is the single most critical piece of evidence for obtaining a conviction in DWI cases (Simpson and Robertson, 2001). It will be helpful to form a coalition of stakeholders to encourage legislative, policy, and procedural changes. It will be important to include the involvement of representatives of the judicial and sanctioning systems in a coalition.
Issues Affecting Implementation Time	Since this strategy requires legislative action, the time required to implement this strategy may be substantial.
Costs Involved	No specific costs are associated with implementation of this strategy. However, a refusal takes less time than a BAC test for officers to process. If refusals decrease and tests increase, officers likely will spend more time on DWI arrests.
Training and Other Personnel Needs	It may be helpful for officers to receive training in how to obtain cooperation from DWI suspects and overcome refusals. Although strong penalties for test refusal can encourage DWI suspects to take a BAC test, the behavior and demeanor of officers also influences whether individuals are cooperative during the arrest process in general.

EXHIBIT V-10 (Continued)
Strategy Attributes for Establishing Stronger Penalties for BAC Test Refusal Than for Test Failure (T)

Organizational and Institutional Attributes	
Legislative Needs	This strategy requires legislative action to amend existing state DWI statutes. In a few states, refusal to take a BAC test is inadmissible in court. In jury trials, it can make the arresting officer appear careless. (Juries may incorrectly assume that the officer forgot to administer the test or that the officer did not believe there was sufficient evidence of impairment to request a BAC test.) Therefore, when writing legislation to implement this strategy, consideration should be given to including a provision stating that a driver's refusal to take a breath or blood test to determine BAC is admissible in court. Oregon's DWI statute provides one of the better examples for how to deal with test refusals (http://landru.leg.state.or.us/ors/813.html; see especially Section 813.130).
Other Key Attributes	
	None.

Strategy 5.1 C3—Eliminate Diversion Programs and Plea Bargains to Non-Alcohol Offenses (T)

This strategy is designed to remove loopholes and other weaknesses in the prosecution of drinking drivers that allow these drivers to escape both sanctions and needed treatment. Many arrested drinking drivers avoid being convicted of DWI by entering into a plea bargain to a non-alcohol offense, resulting in conviction of a lesser offense such as reckless driving. As a result, drinking drivers escape prescribed sanctions for impaired driving, and, perhaps more importantly, an alcohol-related offense does not appear on their record. This outcome undermines many elements of the DWI countermeasure system that are designed to treat repeat offenders more comprehensively than first-time offenders.

Similarly, diversion programs allow DWI charges against offenders to be dropped if the offenders agree to complete specified requirements. These requirements typically involve some form of alcohol education. Individuals thereby avoid a DWI conviction. Consequently, if offenders are arrested again for drinking and driving, they are treated as first-time offenders and circumvent the more severe penalties prescribed for repeat offenders. Diversion programs are based on the presumption that the required alcohol education will convince offenders to stop drinking and driving, but recent reviews have found little evidence that diversion programs reduce DWI recidivism (NTSB, 2000).

Plea bargaining eases caseloads for overburdened court systems, but allowing offenders to plead guilty to a non-alcohol offense undermines efforts to reduce drinking-driving by allowing offenders to avoid both sanctions that have been shown to reduce recidivism and requirements to obtain treatment for alcohol problems. Furthermore, plea bargaining and diversion programs may lead offenders to feel they have beaten the system, thereby encouraging offenders to believe they need not worry about being penalized for impaired driving in the future. Widespread plea bargaining or diversion programs can also contribute to a perception among the general public that DWI offenders are not appropriately punished, thereby reducing the public's concern about apprehension for DWI. Recent estimates suggest that, on average, drivers who drink and drive make between 50 and 200

trips with a BAC over 0.08 percent before they are apprehended for DWI (Hedlund and McCartt, 2002). It is further estimated that roughly one-quarter of first-time offenders and almost half of repeat offenders may meet diagnostic criteria for alcohol dependence (Simpson et al., 1996). Consequently, allowing first-time offenders to slip through the system via plea bargains to non-alcohol offenses or diversion programs misses an important opportunity to encourage or require needed treatment for a substantial number of problem drinkers.

EXHIBIT V-11
Strategy Attributes for Eliminating Diversion Programs and Plea Bargains to Non-Alcohol Offenses (T)

Technical Attributes	
Target	Individuals charged with an impaired driving offense.
Expected Effectiveness	Most research has shown diversion to be ineffective in reducing recidivism, although a few studies have found positive results (NTSB, 2000). No studies have yet examined the effectiveness of eliminating diversion programs. Participation in these programs is typically voluntary; that is, it may be the most motivated offenders who choose to enter a diversion program rather than contest the DWI charge, and this possibility alone explains the lower recidivism rates observed in a few studies. There is no clear evidence on how much effect this strategy might have. However, a recent literature review found that restrictions on plea bargaining, *when combined with other policies,* resulted in crash and injury reductions of approximately 10 percent (Wagenaar et al., 2000d).
Keys to Success	For the DWI countermeasure system to work as it is intended, it is important to ensure that all DWI offenses are retained on a driver's record. If offenders are allowed to plea bargain a DWI charge to a non–alcohol-related traffic offense, then the driver cannot be identified as a repeat offender if he or she is arrested again. Judicial discretion in determining penalties can be valuable. However, completely removing evidence of a DWI offense from a driver's record should not be an option. Although treatment for alcohol problems is needed by many offenders, removing evidence of a DWI conviction from the driver's record, or allowing the offender to avoid other sanctions as a result of obtaining treatment or education, is counterproductive.
Potential Difficulties	Although surveys show that prosecutors support the idea of restricted plea bargaining in DWI cases (Robertson and Simpson, 2002), judges may resist procedures that they perceive will slow the adjudication process. Restrictions on plea bargains and elimination of diversion programs may increase the number of DWI cases that are brought to trial, thus expanding caseloads and lengthening the time required to process cases. However, some states, such as New York, do not permit pleas to a non-alcohol offense, and there is no evidence that this situation creates backlogs.
Appropriate Measures and Data	Ultimately, restrictions on plea bargaining and elimination of diversion programs should reduce alcohol-related crashes and injuries. Following the elimination of diversion programs, the conviction rate for DWI—as measured by the number of arrests resulting in a conviction on the original charge—should increase substantially. Similarly, restrictions on plea bargaining to a non-alcohol offense should increase the number of DWI offenders who are convicted and, as a result, receive interventions that are known to be effective in reducing recidivism, such as a requirement to install an ignition interlock device or to obtain treatment for alcohol abuse or dependency.

EXHIBIT V-11 (Continued)
Strategy Attributes for Eliminating Diversion Programs and Plea Bargains to Non-Alcohol Offenses (T)

Technical Attributes	
Associated Needs	One of the enduring problems in the DWI countermeasure system is that judges sometimes do not follow procedures required by law in deciding and sentencing DWI cases. Court-monitoring programs are one means to increase the consistency of DWI sentencing and reduce plea bargains. In court-monitoring programs, citizens track and report on court activities concerning DWI cases. One study in Maine found that court-monitored cases produced higher conviction rates and stiffer sentences than unmonitored cases (Shinar, 1992).
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	There is another common mechanism by which a first-offense conviction for DWI can be masked from the driver record. Many municipalities and counties have adopted the state traffic law as county or municipal ordinance. The drivers are then convicted of violating a municipal ordinance, and any revenue from fines remains in the county. The state receives no revenue, and there is no record of the event. Only after a second or third offense are violators sent to state court, where more serious penalties can be applied. Hence, a person arriving at state court for the first time is considered to be a first-time offender even though he or she may have two previous convictions in county courts.
Issues Affecting Implementation Time	It may take considerable time to implement this strategy, depending on the speed with which legislators, district attorneys, or other policy makers can be encouraged to act upon the issue.
Costs Involved	No particular costs are involved in implementing the strategy, except in cases where additional court and prosecutorial staffing may be needed to handle a heavier caseload.
Training and Other Personnel Needs	It will be important to educate judges about the reasons for restricting plea bargains and eliminating diversion programs. Mentoring programs to train inexperienced DWI prosecutors by pairing them with an experienced prosecutor can help to ease the overload on prosecutors and ensure more effective prosecution of DWI cases. Establishing a traffic safety resource prosecutor in the state to provide training and serve as an information clearinghouse for prosecutors handling DWI cases can also be helpful.
Legislative Needs	This strategy does not necessarily require legislative action. Jurisdictions can set policies for plea bargaining and diversion programs administratively. District attorneys and state attorney generals can also set these practices. State laws, on the other hand, can mandate procedural changes in handling all DWI cases within the state. At present, only about one-third of U.S. states have laws that place some form of restriction on plea bargaining in DWI cases (NTSB, 2000). States that do not have such laws should strongly consider enacting legislation if they wish to effectively prohibit DWI charges from being reduced to a non-alcohol offense. In addition, to ensure that the DWI control system works effectively, states should consider prohibiting plea bargains in high-BAC cases, where pleading guilty to a lower BAC allows individuals to avoid the more stringent sanctions that a number of states now require for first-time, high-BAC offenders. States with diversion programs that allow dismissal of DWI charges after completion of education or treatment should consider eliminating these programs. Where municipalities or counties prosecute DWI offenders under local ordinances, states should consider amending their statutes to ensure that alcohol-related convictions of individuals under these ordinances are recorded in state records so that the full prior record of individuals tried for DWI in a state court can be known.
Other Key Attributes	
	None.

Strategy 5.1 C4—Screen All Convicted DWI Offenders for Alcohol Problems and Require Treatment When Appropriate (P)

This strategy is designed to address a common underlying issue among drinking drivers, particularly repeat offenders: problems with alcohol abuse or dependency. It has been estimated that one-quarter of first-time offenders and almost half of repeat offenders are alcohol dependent (Simpson et al., 1996). If an offender's underlying alcohol problem is not addressed, it is highly likely that he or she will continue to drive after drinking despite threats of punishment.

The purpose of screening and treatment for alcohol problems is to prevent the continuation of problems caused by excessive drinking, including driving after drinking. The procedures for conducting screenings vary from state to state and courtroom to courtroom. In most cases, specially trained personnel administer standardized tests and conduct an interview with the offender. In some jurisdictions, these screeners are full-time employees of the court; in other jurisdictions, they work for state-certified treatment providers who report back to the courts. In most courts, offenders are screened into one of two groups: problem drinkers and all others. Problem drinkers are assigned to a treatment program that may include individual and group counseling, inpatient treatment, and self-help programs (e.g., Alcoholics Anonymous). Other offenders may be required to attend an alcohol education program that teaches offenders about drinking-driving laws, penalties for DWI, and the effects of alcohol on the body and driving. In some courts, all first-time offenders receive the education program while all repeat offenders are required to complete a treatment program.

Most states require screening of first offenders, although in some cases this is only for offenders with high BAC levels or offenders participating in diversion programs (Chang et al., 2002). Thirty-two states use pre-trial screening in addition to post-trial screening; 16 use post-trial screening only. The percentage of offenders who are referred for treatment ranges from 20 percent to 100 percent, depending on the state.

EXHIBIT V-12
Strategy Attributes for Screening All Convicted DWI Offenders for Alcohol Problems and Requiring Treatment When Appropriate (P)

Technical Attributes	
Target	Individuals charged with alcohol-impaired driving.
Expected Effectiveness	Assessment, in combination with treatment programs for DWI offenders, is effective in reducing DWI recidivism. A recent review of high-quality studies found that assessment, treatment, and rehabilitation reduced drinking-driving recidivism and alcohol-involved crashes by an average of 7 to 9 percent (Wells-Parker et al., 1995). Treatment was most effective when it combined education, psychotherapy/counseling, and follow-up contacts.
Keys to Success	It is important that *all* DWI offenders be screened for alcohol problems, not merely repeat offenders. Many first-time offenders have significant problems with alcohol. Recent estimates suggest that offenders make as many as 50 to 200 impaired driving trips before they are first apprehended for DWI (Hedlund and McCartt, 2002). The earlier alcohol problems are detected and addressed, the more likely they can be treated successfully.

EXHIBIT V-12 (Continued)
Strategy Attributes for Screening All Convicted DWI Offenders for Alcohol Problems and Requiring Treatment When Appropriate (P)

Technical Attributes	
	Ideally, screening should take place as soon as possible after the arrest so that an appropriate treatment can be identified and initiated. A desirable goal is that all assessments be ordered and completed prior to sentencing. During the sentencing process, assessment and treatment of an offender's alcohol problems should be considered separately when determining appropriate charges and sanctions against the offender. Treatment should not be offered as a substitute for other sanctions, such as driver's license suspension. Furthermore, offenders should not be permitted to avoid a DWI conviction by completing an assessment and treatment program (i.e., offenders should not have the option to complete so-called diversion programs; see Section 5.1 C3 of this guide). No one treatment approach will be suitable for all offenders. Although it might be convenient to assign all first-time offenders to one form of treatment and all repeat offenders to another, matching a treatment program to an offender's needs will likely result in a treatment that is more likely to reduce recidivism. Matching should be conducted by clinical professionals at an appropriate treatment agency. The strategy seems to work best when the court places broad limits on the length and cost of the mandated treatment, then places the offender in the hands of a competent therapist, allowing individual plans to be developed by the therapist. Successful implementation will require significant coordination and cooperation among the agencies and organizations involved. Therefore, it will be helpful to create a working group consisting of the major players and other stakeholders to work out necessary details early in the planning process.
Potential Difficulties	Organizing a system to ensure the screening of the large number of offenders for alcohol problems is a serious challenge. This may take several years, depending on the existing treatment system in a state. Ensuring that assessments are conducted and treatment provided by qualified professionals is a major task that will involve the licensing of providers by the state's mental health services oversight agency. Adding to the difficulty of this task is the fact that individuals who are mandated to obtain treatment as the result of an impaired driving conviction should be required to show evidence that they have succeeded in addressing problems with drinking before they are allowed to drive again. Merely spending time in treatment should not be considered sufficient to allow the individual to begin driving again. Another difficulty is that the available screening instruments are only partially successful in predicting who will recidivate and who will not. Recent reviews question the accuracy of even the best-rated screening instruments (Chang et al., 2002). This underscores the importance of assessments being conducted by qualified mental health professionals. In some jurisdictions, high numbers of caseloads may make it difficult for all assessments to be completed prior to sentencing. In these jurisdictions, an assessment should be made a condition of probation. Delaying assessments until after sentencing has a number of disadvantages. For example, if the offender plea bargains to a non–alcohol-related charge, he or she may be able to avoid assessment and treatment altogether (see Section 5.1 C3 of this guide for a further discussion on problems associated with allowing plea bargains to a non-alcohol offense). Large courts in urban areas may be able to support large, well-funded treatment agencies to conduct assessments; however, many courts in smaller communities may not have ready access to such treatment providers. Providing for adequate screening and treatment in all areas will be challenging.

EXHIBIT V-12 (Continued)
Strategy Attributes for Screening All Convicted DWI Offenders for Alcohol Problems and Requiring Treatment When Appropriate (P)

Technical Attributes	
	Finally, obtaining the cooperation of offenders during the assessment process can be difficult. Some offenders may view screening and treatment as a form of punishment. Individuals may not show up for a scheduled assessment, they may be less than forthright during testing and interviews, or they may underreport their alcohol-related problems and history. This is especially a problem in pre-trial assessments, where the offender may be concerned about self-incrimination.
Appropriate Measures and Data	Under a successful assessment program, every offender should be screened for alcohol problems, ideally prior to sentencing. Careful records should be kept on the number of offenders screened and the referral decisions. A screening program that successfully mandates effective treatment for alcohol problems can be expected to reduce the number of repeat impaired driving offenses and, consequently, the number of alcohol-related crashes, although the effect on crashes in the general driving population may be difficult to detect.
Associated Needs	It will be necessary to have a sufficient number of qualified service providers available to handle the large number of cases resulting from the requirement of screening and treatment for all DWI offenders.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	For this strategy to reach its full potential, an integrated information system is essential so that representatives from all involved agencies can quickly determine where convicted individuals stand in regard to the various requirements placed on them for screening, treatment, punishment, and future requirements such as the application of a lower BAC limit if stopped in the future for suspicion of impaired driving (in states that have such a law). Mandating treatment for convicted offenders will be most effective if individuals are also required to demonstrate progress before they are allowed to drive. One way to track progress is to require participation in an alcohol interlock program. (See Strategy 5.1 D2 of this guide, as well as Strategy 2.1 C2 of the guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses). Information available from the computer record created by an interlock device provides one possible indicator of whether an individual is likely to commit a future impaired driving offense. Information from the interlock device indicating that the offender has refrained from trying to drive after drinking is therefore a possible indicator of progress in treatment (Marques et al., 2001b). Individuals with untreated or unyielding drinking problems continue trying to start their vehicle when they have an unacceptably high BAC. Hence, including this information may provide one of the best objective indicators of whether an individual should be allowed to drive again without restrictions. The lead agency implementing this strategy is probably the best one to assemble a working group of stakeholders who will be involved in the planning and implementation of this program.
Issues Affecting Implementation Time	Most courts currently have a system in place for screening DWI offenders. However, in many states, establishing a system that ensures that all offenders are screened and treated appropriately will likely require substantial time and additional resources to hire additional qualified service providers and to set up an effective tracking system to which all involved agencies have immediate access.

EXHIBIT V-12 (Continued)
Strategy Attributes for Screening All Convicted DWI Offenders for Alcohol Problems and Requiring Treatment When Appropriate (P)

Organizational and Institutional Attributes	
Costs Involved	Funds are needed to pay qualified service providers to conduct assessments. In part, these funds can be subsidized through assessment fees charged to offenders, although many individuals convicted of impaired driving cannot pay fees for screening and especially for extended treatment. Diverting DWI fines to cover the costs of assessment and treatment for those who cannot afford it may be a wise use of funds. One important element of the assessment should be an analysis of the offender's financial status and his or her access to health insurance that may cover some costs. Service providers should be required to establish fees that will permit reduced charges for those the court finds to be unable to pay full costs.
Training and Other Personnel Needs	To conduct assessments in a timely manner, additional personnel will probably be needed in many states. The additional personnel will require substantial time and training.
Legislative Needs	Although most states have laws in place that mandate screening of offenders following a conviction for impaired driving, improvements can be made in the screening, assessment, and treatment process in most states. It may be useful for states to examine their procedures for how and when offenders are assessed, as well as what incentives are allowed or mandated to encourage offenders to complete the screening and treatment process. It is also important to review required certification for service providers to ensure that individuals who complete the screening and treatment process do not receive inferior care.
Other Key Attributes	
	None.

Objective 5.1 D—Control High-BAC and Repeat Offenders

Strategy 5.1 D1—Seize Vehicles or Vehicle License Plates Administratively Upon Arrest (P)

Administrative driver's license suspension or revocation has been one of the most effective policies for reducing impaired driving during the past two decades. However, it is well established that most individuals who lose their licenses continue to drive, though perhaps somewhat less frequently and somewhat more cautiously (McCartt et al., 2003; Ross and Gonzales, 1988). To address these unlicensed drivers, many states have implemented programs that target their vehicles (Voas and DeYoung, 2001).

Recently, a number of states have enacted laws that permit the vehicles or vehicle license plates of repeat offenders or unlicensed drivers to be impounded and in some cases forfeited. As of May 2003, 44 states have enacted laws that affect the vehicles or license plates of offenders, and 27 states have laws permitting confiscation of the offender's vehicle (NHTSA, 2003b). Although it is clearly impossible to drive a vehicle that has been seized, this strategy has several potential difficulties. Storage for seized vehicles can be expensive. Low-value vehicles often go unclaimed, requiring the state to pay storage costs until it can

legally dispose of them. The seized vehicle may not belong to the offender. Legal procedures necessary to protect innocent third parties from losing access to their vehicles can be cumbersome and costly.

To avoid the problems and costs associated with vehicle confiscation, some states simply immobilize the vehicle on the offender's property using a "boot" or similar locking device. Another method employed with some success is administrative impoundment of the offender's license plate. At the time of arrest, the arresting officer removes and destroys the license plate of the offender's vehicle. The vehicle is stored at the offender's residence and may be immobilized with a wheel lock. Replacement license plates are issued only when the specified driver's license suspension period has been completed and the driver has satisfied all other sentence requirements. If other family members depend on the vehicle, they can obtain a special license plate with a distinctive pattern of characters. Often these plates are easily recognizable by police but not the general public. Police are permitted to stop vehicles with these plates to verify that the unlicensed driver is not driving. If the vehicle belongs to someone other than the offender, the owner may apply to have a new plate issued at no charge; however, he or she must sign a statement promising that the violator may not drive the vehicle in the future. Under these "stipulated agreements," the vehicle is forfeited to the government if the offender is apprehended driving the same vehicle again. This approach has been used effectively for multiple-offense offenders as well as high-BAC (i.e., at or above 0.20 BAC) first-time offenders in Minnesota (Rodgers, 1994).

For details about license plate seizure, see Strategy 2.1 B2 in the guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses. More information about vehicle immobilization, impoundment, and forfeiture can also be found in the unlicensed driver guide under Strategy 2.1 C1.

Strategy 5.1 D2—Require Ignition Interlocks as a Condition for License Reinstatement (P)

A number of research studies have shown that alcohol ignition interlocks reduce DWI recidivism. The interlock uses a breath-testing unit connected to the vehicle's ignition switch which prevents the vehicle from being started by a driver who has been drinking. If the driver's BAC is above a predetermined level, the device prevents the vehicle from starting. Although circumvention of interlocks has been a problem in the past, several technological improvements have made circumvention more difficult. Interlocks now require drivers to provide additional breath samples at random intervals while the car is in operation (known as running retests). This prevents the driver from having another person provide the initial breath sample to start the car or from leaving the engine running while the individual drinks. In addition, interlocks include a data recorder that documents vehicle use, breath test failures, and attempts to tamper with the device. These data can be useful to the courts and/or probation officers in monitoring an offender's driving practices.

The purpose of an interlock is simply to prevent impaired driving by DWI offenders. Requiring that convicted drivers install an interlock device on their vehicle is a less intrusive way than impounding their vehicle to reduce the likelihood that offenders will drive while impaired, and it is more effective than license suspension or revocation.

As of July 2004, 44 states and the District of Columbia had legislation in place that allowed or required interlocks to be installed on the cars of certain offenders (IIHS, 2004). However,

only about 70,000 interlocks are in use in the United States, representing just 5 percent of eligible offenders (Beirness and Simpson, 2003). Cost, inconvenience, and social stigma all play a role in the reluctance of offenders to install an interlock. Many offenders prefer to take the risk of being apprehended for driving with a suspended license rather than install an interlock. Since the vehicle is the property of the offender, he or she must approve the installation. To motivate offenders to choose interlocks, it is necessary to make the alternatives to interlocks even more inconvenient, such as jail or electronically monitored home confinement. Courts have this power but rarely use it. Prosecutors, judges, and probation officers all need more training regarding the purpose and value of interlock programs.

Much greater use of interlocks is currently needed to reduce recidivism among DWI offenders. As suggested by Marques et al. (2001a), alcohol ignition interlocks should be required as a condition of driver's license reinstatement for DWI offenders. This would allow DWI offenders, all of whom have driven while impaired in the past, to demonstrate that they will not continue to do so before being allowed to drive again with no restrictions. Interlocks should also be employed when an offender is issued a hardship or limited driver's license. Detailed guidance on the use of ignition interlocks is provided in Strategy 2.1 C2 of the guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses. See also Appendix 6 for an example of a state implementation effort.

Alcohol Ignition Interlock Device

Strategy 5.1 D3—Monitor All Convicted DWI Offenders Closely (P)

Closely monitoring convicted DWI offenders promises to increase the likelihood that the DWI countermeasure system works as it was intended. Without close monitoring, problematic offenders—that is, offenders with multiple convictions or first-time offenders who are arrested with a high BAC level—often fail to meet the requirements of the sanctions imposed on them. They may not appear for court hearings, they may fail to obtain treatment for a diagnosed alcohol problem (or even submit to screening for alcohol problems), they may continue to drive after their license has been suspended or revoked, and they may fail to reinstate their license when they become eligible to do so. It has been estimated that 40 percent of offenders never report to their probation officer, and that 50 percent of offenders fail to adhere to the terms of their probation (Robertson and Simpson, 2002). Close monitoring is particularly important with repeat offenders. By virtue of their drinking-driving history, repeat offenders have demonstrated an unwillingness or inability to change their behavior.

There are many ways that offenders can be closely monitored. Although periodic contact with a probation officer is perhaps the most common monitoring method, caseloads are

often too large to allow probation officers sufficient contact with offenders. For high-risk offenders, intensive supervision probation, electronic monitoring, DWI/drug courts, and dedicated detention facilities all show promise for increasing compliance with sentences and reducing repeat DWI offenses.

Under intensive supervision probation (ISP), offenders are required to meet with a probation officer two or three times a week while they complete alcohol treatment and other terms of their sentence. ISP programs may last from several months to a year, followed by a period of routine probation. These programs usually do not eliminate jail time entirely, but jail time is considerably reduced if the offender complies with the terms of probation. ISPs also can have swift consequences for failure to meet sentence requirements. Several states—including Oregon, Kansas, Delaware, Nebraska, and Minnesota—have ISP programs in place. A description of a model ISP program implemented in Multnomah County, Oregon, is available at http://www.academyhealth.org/publications/frontlines/sep04.pdf.

Home confinement with electronic monitoring is a condition of probation that begins immediately following conviction for DWI (although sometimes it is also a condition of pre-trial release). Offenders are not allowed to leave their home except to attend work or other activities that are pre-approved by the court. Offenders wear a band with a transmitter around their ankle. The transmitter emits a radio frequency signal that is relayed to a nearby monitoring center. The transmitter is tamper resistant; if an attempt is made to remove it, a signal is sent to the monitoring center. In addition to monitoring offenders' movement, it is now possible to remotely monitor their BAC using a transdermal sensor to ensure that they comply with a court order to refrain from drinking. More than 35 states currently permit home confinement with electronic monitoring. A recent report estimated that 75,000 people in the United States are on electronic monitoring each day (NTSB, 2000). For information on electronic monitoring from the American Probation and Parole Association, see http://www.appa-net.org/publications%20and%20resources/pubs/electronic_monitoring.pdf. Information on the Denver, Colorado, electronic monitoring program is available at http://www.denvergov.org/ElectronicMonitoring/template2948.asp#link10.

In recent years, DWI/drug courts have been established in several jurisdictions. When based on the drug court model (although many are not), DWI/drug courts involve extended judicial monitoring, a focus on treatment of the underlying alcohol problem rather than simply on punishment, and a requirement that participants remain completely sober (Tauber and Huddleston, 1999). DWI/drug courts are voluntary (although the alternative is often jail), and programs are tailored to individual offenders. Not all offenders are appropriate for this intervention: DWI/drug courts are designed to promote recovery and change the offender's lifestyle. DWI/drug courts require substantial resources; judges typically hold monthly hearings for offenders over 6- to 12-month periods. Usually probation officers and treatment providers must also be present. As of December 2003, more than 40 DWI/drug courts had been established in the United States (Huddleston et al., 2004).

All of the programs described above are far less costly to states than incarceration of offenders. Furthermore, each program allows the offender to remain employed, support his or her family, and avoid the stigma of incarceration. There is research demonstrating the effectiveness of each of these approaches. These programs should be strongly considered by states that are striving to reduce their prison populations and improve their DWI prevention efforts. See Appendix 7 and Appendix 8 for examples of state implementation efforts.

EXHIBIT V-13
Strategy Attributes for Monitoring All Convicted DWI Offenders Closely (P)

Technical Attributes	
Target	Repeat offenders and high-BAC first-time offenders.
Expected Effectiveness	A number of studies have demonstrated the effectiveness of monitoring programs. For example, an evaluation of an intensive supervision probation program in Milwaukee County, Wisconsin, found that the program reduced recidivism among multiple DWI offenders by half, from 11 percent to 5.5 percent, after 1 year (Jones et al., 1996). An evaluation in Los Angeles County, California, found that repeat DWI offenders with home detention and an electronic monitoring program had a recidivism rate that was one-third lower after one year, from 6 percent to 4 percent (Jones et al., 1996). Although evaluations indicate that drug courts are effective (Belenko, 1998), additional research is underway examining DWI/drug courts specifically. Some anecdotal evidence suggests that DWI/drug courts may reduce re-arrest for impaired driving among multiple-offense drivers.
Keys to Success	One key to success for this strategy is that officers of the court system (typically either judges or probation officers) must maintain frequent individual contact with offenders. This close monitoring helps ensure that offenders satisfy the requirements of their sentence or probation. Moreover, by demonstrating that offenders cannot escape sanctions and treatment if required, this strategy may help to deter drinking and driving among the general public. The other key is that there must be prompt consequences—often jail time—for failing to satisfy sentence requirements. The monitoring approaches described in this strategy are primarily employed with offenders who face jail sentences. Offenders are allowed to avoid jail if they participate in the intensive monitoring program. Thus, judges must be informed promptly, and must take prompt action, if offenders do not satisfy the terms of their sentence.
Potential Difficulties	The greatest problem with intensive monitoring is probably the substantial costs involved, even though some approaches can be much less costly than others. Decreasing resources coupled with rising numbers of DWI offenders have made it difficult for probation officers to adequately monitor offenders. In many jurisdictions, there are too few probation officers to effectively handle current caseloads. A recent survey of probation officers found an average caseload of 112 offenders, about half of whom were on probation for a DWI offense (Robertson and Simpson, 2003). Not surprisingly, in light of this workload, judges often complain of problems with delayed or inconsistent reports from probation officers. Even more problematic is that some jurisdictions—particularly those in rural areas—do not have a probation department. In these situations, the judge and his or her assistants are responsible for monitoring the compliance of offenders. Heavy caseloads for judges also can impede effective monitoring. Judges often have limited time to review reports provided by probation officers and treatment facilities. Nearly half of judges report that a heavy caseload is the single most significant problem in monitoring offenders (Robertson and Simpson, 2002). DWI/drug courts address this issue by assigning judges a smaller number of cases, thereby allowing them to maintain much closer contact with offenders. DWI/drug courts also allow judges to specialize in DWI cases, so they come to know the complex law and evidence issues and also understand the frequent underlying influence of alcohol dependency or abuse.

EXHIBIT V-13 (Continued)
Strategy Attributes for Monitoring All Convicted DWI Offenders Closely (P)

Technical Attributes	
Appropriate Measures and Data	The effects of close monitoring of offenders should be evaluated directly through examination of recidivism rates. A successful monitoring program will reduce the proportion of offenders who are re-arrested for driving after drinking. Alcohol-related crashes and crash rates should also be reduced among this population. Process measures include the number of cases being monitored, by type, and a measure of time per case spent on monitoring.
Associated Needs	None identified.
Organizational and Institutional Attributes	
Organizational, Institutional and Policy Issues	Close monitoring of offenders requires effective communication among judges, probation officers, treatment providers, the department of motor vehicles, and other agencies. A task force of stakeholders should be formed early in the process to help develop a program plan and guide its implementation. Information must be readily available so that the progress of offenders can be tracked through the system and so that individuals who are not progressing as expected can be quickly identified and dealt with. Where BACs are monitored as part of the program, this information should be shared with therapists to be employed in their counseling program.
Issues Affecting Implementation Time	Creating a system for close monitoring of offenders will take time, resources, and personnel to implement. If a monitoring system is already in place and merely needs additional staffing or new approaches, less time will be required.
Costs Involved	Cost is a major issue in monitoring offenders. Costs include time requirements for judges, parole officers, and in some cases special monitoring equipment such as ankle bracelets (costs for the monitoring equipment are paid by offenders based on their ability to pay). However, many of these strategies have been shown to be more cost-efficient than traditional correctional facilities. Moreover, lower recidivism rates of participants suggest that, over the long term, these programs can save money through reduced alcohol-related crashes and fatalities. NHTSA provides cost estimates at the following website: http://www.nhtsa.dot.gov/people/injury/alcohol/impaired-drivingusa/US.pdf. Currently, a number of location-monitoring systems can monitor the position of an offender continually. The cost of these systems is declining, and they may offer the most effective, low-cost systems for controlling offenders in the future. Transdermal BAC remote monitoring systems are also being introduced to the courts for use with DWI offenders. They may provide lower-cost, more effective systems for monitoring abstinence than the more labor-intensive approaches that have been used by DWI/drug courts in the past.
Training and Other Personnel Needs	In many jurisdictions, there are too few probation officers to effectively handle caseloads. More probation officers are needed so that close contact can be maintained with offenders.

EXHIBIT V-13 (Continued)
Strategy Attributes for Monitoring All Convicted DWI Offenders Closely (P)

Organizational and Institutional Attributes	
	Some judges and probation officers have limited experience with DWI offenders. As a result, they may be unfamiliar with agencies and treatment providers in the community that are appropriate for DWI cases. Training of judges and probation officers is important to ensure that they are acquainted with the critical features of various intensive monitoring approaches, available resources in their community, and the benefits of intensive monitoring.
Legislative Needs	Legislation will not likely be required to implement this strategy.
Other Key Attributes	
	None.

Transdermal Alcohol-Monitoring Ankle "Bracelet"

Strategy 5.1 D4—Incarcerate Offenders (P)

Incarceration should be considered only as a last resort for offenders who do not comply with other, less costly sanctions. Although incarceration is effective during the period of confinement—it is impossible to drink and drive while one is imprisoned—there is little evidence that incarceration reduces recidivism among DWI offenders. Moreover, incarceration is cost-prohibitive and can result in overcrowding in jails. The real value of incarceration in the DWI control system lies in its threat as an ultimate punishment should offenders fail to comply with less restrictive efforts to control their impaired driving, such as a requirement to drive only a vehicle equipped with an ignition interlock device. Thus, incarceration is an important component in the DWI system because it helps to increase participation and compliance with other proven strategies.

As an alternative to traditional incarceration, states should consider employing dedicated detention facilities that provide confinement in conjunction with alcohol treatment. These facilities help ease overcrowding at traditional jails while addressing the offender's

underlying alcohol problems. The details of these programs vary widely. Some dedicated detention facilities operate within existing prison systems. Others are separate. Many of these programs are not limited to DWI offenders, but also provide treatment for other incarcerated individuals who have problems with alcohol. Detention usually ranges from 2 weeks to 90 days. Evaluation of several dedicated detention facilities suggests that these programs can be effective in reducing recidivism of repeat offenders. For example, an evaluation of the San Juan County, New Mexico, Detention and Treatment Program found that, after 5 years, 76.6 percent of offenders who participated in the program had *not* been re-arrested for DWI, compared with 59.9 percent of offenders who did not participate in the program (Kunitz et al., 2002).

More information on incarceration is provided in Strategy 2.1 D2 of the guide for addressing collisions involving unlicensed drivers and drivers with suspended or revoked licenses.

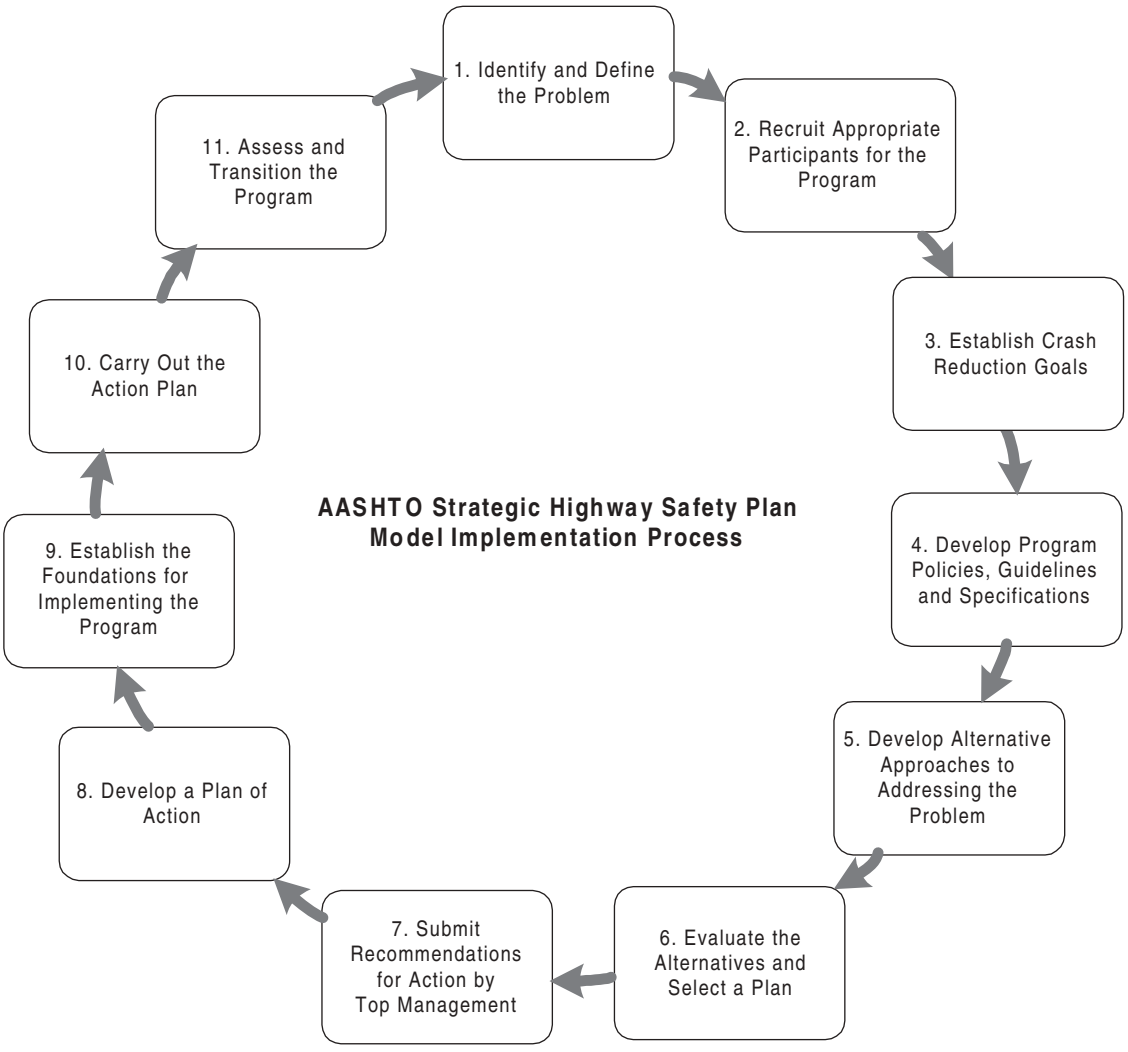
SECTION VI

Guidance for Implementation of the AASHTO Strategic Highway Safety Plan

Outline for a Model Implementation Process

Exhibit VI-1 gives an overview of an 11-step model process for implementing a program of strategies for any given emphasis area of the AASHTO Strategic Highway Safety Plan. After a short introduction, each of the steps is outlined in further detail.

EXHIBIT VI-1



Purpose of the Model Process

The process described in this section is provided as a model rather than a standard. Many users of this guide will already be working within a process established by their agency or working group. It is not suggested that their process be modified to conform to this one. However, the model process may provide a useful checklist. For those not having a standard process to follow, it is recommended that the model process be used to help establish an appropriate one for their initiative. Not all steps in the model process need to be performed at the level of detail indicated in the outlines below. The degree of detail and the amount of work required to complete some of these steps will vary widely, depending upon the situation.

It is important to understand that the process being presented here is assumed to be conducted only as a part of a broader, strategic-level safety management process. The details of that process, and its relation to this one, may be found in a companion guide. (The companion guide is a work in progress at this writing. When it is available, it will be posted online at http://transportation1.org/safetyplan.)

Overview of the Model Process

The process (see Exhibit VI-1, above) must be started at top levels in the lead agency's organization. This would, for example, include the CEO, DOT secretary, or chief engineer, as appropriate. Here, decisions will have been made to focus the agency's attention and resources on specific safety problems based upon the particular conditions and characteristics of the organization's roadway system. This is usually, but not always, documented as a result of the strategic-level process mentioned above. It often is publicized in the form of a "highway safety plan." Examples of what states produce include Wisconsin DOT's Strategic Highway Safety Plan (see Appendix A) and Iowa's Safety Plan (available at http://www.iowasms.org/toolbox.htm).

Once a "high-level" decision has been made to proceed with a particular emphasis area, the first step is to describe, in as much detail as possible, the problem that has been identified in the high-level analysis. The additional detail helps confirm to management that the problem identified in the strategic-level analysis is real and significant and that it is possible to do something about it. The added detail that this step provides to the understanding of the problem will also play an important part in identifying alternative approaches for dealing with it.

Step 1 should produce endorsement and commitments from management to proceed, at least through a planning process. With such an endorsement, it is then necessary to identify the stakeholders and define their role in the effort (Step 2). It is important at this step to identify a range of participants in the process who will be able to help formulate a comprehensive approach to the problem. The group will want to consider how it can draw upon potential actions directed at

- Driver behavior (legislation, enforcement, education, and licensing),
- Engineering,

- Emergency medical systems, and
- System management.

With the establishment of a working group, it is then possible to finalize an understanding of the nature and limitations of what needs to be done in the form of a set of program policies, guidelines, and specifications (Steps 3 and 4). An important aspect of this is establishing targets for crash reduction in the particular emphasis area (Step 3). Identifying stakeholders, defining their roles, and forming guidelines and policies are all elements of what is often referred to as "chartering the team." In many cases, and in particular where only one or two agencies are to be involved and the issues are not complex, it may be possible to complete Steps 1 through 4 concurrently.

Having received management endorsement and chartered a project team—the foundation for the work—it is now possible to proceed with project planning. The first step in this phase (Step 5 in the overall process) is to identify alternative strategies for addressing the safety problems that have been identified while remaining faithful to the conditions established in Steps 2 through 4.

With the alternative strategies sufficiently defined, they must be evaluated against one another (Step 6) and as groups of compatible strategies (i.e., a total program). The results of the evaluation will form the recommended plan. The plan is normally submitted to the appropriate levels of management for review and input, resulting ultimately in a decision on whether and how to proceed (Step 7). Once the working group has been given approval to proceed, along with any further guidelines that may have come from management, the group can develop a detailed plan of action (Step 8). This is sometimes referred to as an "implementation" or "business" plan.

Plan implementation is covered in Steps 9 and 10. There often are underlying activities that must take place prior to implementing the action plan to form a foundation for what needs to be done (Step 9). This usually involves creating the organizational, operational, and physical infrastructure needed to succeed. The major step (Step 10) in this process involves doing what was planned. This step will in most cases require the greatest resource commitment of the agency. An important aspect of implementation involves maintaining appropriate records of costs and effectiveness to allow the plan to be evaluated after-the-fact.

Evaluating the program, after it is underway, is an important activity that is often overlooked. Management has the right to require information about costs, resources, and effectiveness. It is also likely that management will request that the development team provide recommendations about whether the program should be continued and, if so, what revisions should be made. Note that management will be deciding on the future for any single emphasis area in the context of the entire range of possible uses of the agency's resources. Step 11 involves activities that will give the desired information to management for each emphasis area.

To summarize, the implementation of a program of strategies for an emphasis area can be characterized as an 11-step process. The steps in the process correspond closely to a 4-phase approach commonly followed by many transportation agencies:

- Endorsement and chartering of the team and project (Steps 1 through 4),
- Project planning (Steps 5 through 8),
- Plan implementation (Steps 9 and 10), and
- Plan evaluation (Step 11).

Details about each step follow. The Web-based version of this description is accompanied by a set of supplementary material to enhance and illustrate the points.

The model process is intended to provide a framework for those who need it. It is not intended to be a how-to manual. There are other documents that provide extensive detail regarding how to conduct this type of process. Some general ones are covered in Appendix B and Appendix C. Others, which relate to specific aspects of the process, are referenced within the specific sections to which they apply.

Implementation Step 1: Identify and Define the Problem

General Description

Program development begins with gathering data and creating and analyzing information. The implementation process being described in this guide is one that will be done in the context of a larger strategic process. It is expected that this guide will be used when the strategic process, or a project-level analysis, has identified a potentially significant problem in this emphasis area.

Data analyses done at the strategic level normally are done with a limited amount of detail. They are usually the top layer in a "drill-down" process. Therefore, while those previous analyses should be reviewed and used as appropriate, it will often be the case that further studies are needed to completely define the issues.

It is also often the case that a core technical working group will have been formed by the lead agency to direct and carry out the process. This group can conduct the analyses required in this step, but should seek, as soon as possible, to involve any other stakeholders who may desire to provide input to this process. Step 2 deals further with the organization of the working group.

The objectives of this first step are as follows:

1. Confirm that a problem exists in this emphasis area.
2. Detail the characteristics of the problem to allow identification of likely approaches for eliminating or reducing it.
3. Confirm with management, given the new information, that the planning and implementation process should proceed.

The objectives will entail locating the best available data and analyzing them to highlight either geographic concentrations of the problem or over-representation of the problem within the population being studied.

Identification of existing problems is *a responsive approach*. This can be complemented by a *proactive approach* that seeks to identify potentially hazardous conditions or populations.

For the responsive type of analyses, one generally begins with basic crash records that are maintained by agencies within the jurisdiction. This is usually combined, where feasible, with other safety data maintained by one or more agencies. The other data could include

- Roadway inventory,
- Driver records (enforcement, licensing, courts), or
- Emergency medical service and trauma center data.

To have the desired level of impact on highway safety, it is important to consider the highway system as a whole. Where multiple jurisdictions are responsible for various parts of the system, they should all be included in the analysis, wherever possible. The best example of this is a state plan for highway safety that includes consideration of the extensive

mileage administered by local agencies. To accomplish problem identification in this manner will require a cooperative, coordinated process. For further discussion on the problem identification process, see Appendix D and the further references contained therein.

In some cases, very limited data are available for a portion of the roads in the jurisdiction. This can occur for a local road maintained by a state or with a local agency that has very limited resources for maintaining major databases. Lack of data is a serious limitation to this process, but must be dealt with. It may be that for a specific study, special data collection efforts can be included as part of the project funding. While crash records may be maintained for most of the roads in the system, the level of detail, such as good location information, may be quite limited. It is useful to draw upon local knowledge to supplement data, including

- Local law enforcement,
- State district and maintenance engineers,
- Local engineering staff, and
- Local residents and road users.

These sources of information may provide useful insights for identifying hazardous locations. In addition, local transportation agencies may be able to provide supplementary data from their archives. Finally, some of the proactive approaches mentioned below may be used where good records are not available.

Maximum effectiveness often calls for going beyond data in the files to include special supplemental data collected on crashes, behavioral data, site inventories, and citizen input. Analyses should reflect the use of statistical methods that are currently recognized as valid within the profession.

Proactive elements could include

- Changes to policies, design guides, design criteria, and specifications based upon research and experience;
- Retrofitting existing sites or highway elements to conform to updated criteria (perhaps with an appropriate priority scheme);
- Taking advantage of lessons learned from previous projects;
- Road safety audits, including on-site visits;
- Safety management based on roadway inventories;
- Input from police officers and road users; and
- Input from experts through such programs as the NHTSA traffic records assessment team.

The result of this step is normally a report that includes tables and graphs that clearly demonstrate the types of problems and detail some of their key characteristics. Such reports

should be presented in a manner to allow top management to quickly grasp the key findings and help them decide which of the emphasis areas should be pursued further, and at what level of funding. However, the report must also document the detailed work that has been done, so that those who do the later stages of work will have the necessary background.

Specific Elements

1. Define the scope of the analysis
    - 1.1. All crashes in the entire jurisdiction
    - 1.2. A subset of crash types (whose characteristics suggest they are treatable, using strategies from the emphasis area)
    - 1.3. A portion of the jurisdiction
    - 1.4. A portion of the population (whose attributes suggest they are treatable using strategies from the emphasis area)
2. Define safety measures to be used for responsive analyses
    - 2.1. Crash measures
        - 2.1.1. Frequency (all crashes or by crash type)
        - 2.1.2. Measures of exposure
        - 2.1.3. Decide on role of frequency versus rates
    - 2.2. Behavioral measures
        - 2.2.1. Conflicts
        - 2.2.2. Erratic maneuvers
        - 2.2.3. Illegal maneuvers
        - 2.2.4. Aggressive actions
        - 2.2.5. Speed
    - 2.3. Other measures
        - 2.3.1. Citizen complaints
        - 2.3.2. Marks or damage on roadway and appurtenances, as well as crash debris
3. Define measures for proactive analyses
    - 3.1. Comparison with updated and changed policies, design guides, design criteria, and specifications
    - 3.2. Conditions related to lessons learned from previous projects
    - 3.3. Hazard indices or risk analyses calculated using data from roadway inventories to input to risk-based models
    - 3.4. Input from police officers and road users
4. Collect data
    - 4.1. Data on record (e.g., crash records, roadway inventory, medical data, driver-licensing data, citations, other)
    - 4.2. Field data (e.g., supplementary crash and inventory data, behavioral observations, operational data)
    - 4.3. Use of road safety audits, or adaptations
5. Analyze data
    - 5.1. Data plots (charts, tables, and maps) to identify possible patterns, and concentrations (See Appendixes Y, Z and AA for examples of what some states are doing)

5.2. Statistical analysis (high-hazard locations, over-representation of contributing circumstances, crash types, conditions, and populations)
5.3. Use expertise, through road safety audits or program assessment teams
5.4. Focus upon key attributes for which action is feasible:
5.4.1. Factors potentially contributing to the problems
5.4.2. Specific populations contributing to, and affected by, the problems
5.4.3. Those parts of the system contributing to a large portion of the problem

6. Report results and receive approval to pursue solutions to identified problems (a*pprovals being sought here are primarily a confirmation of the need to proceed and likely levels of resources required*)
6.1. Sort problems by type
6.1.1. Portion of the total problem
6.1.2. Vehicle, highway/environment, enforcement, education, other driver actions, emergency medical system, legislation, and system management
6.1.3. According to applicable funding programs
6.1.4. According to political jurisdictions
6.2. Preliminary listing of the types of strategies that might be applicable
6.3. Order-of-magnitude estimates of time and cost to prepare implementation plan
6.4. Listing of agencies that should be involved, and their potential roles (including an outline of the organizational framework intended for the working group). Go to Step 2 for more on this.

Implementation Step 2: Recruit Appropriate Participants for the Program

General Description

A critical early step in the implementation process is to engage all the stakeholders that may be encompassed within the scope of the planned program. The stakeholders may be from outside agencies (e.g., state patrol, county governments, or citizen groups). One criterion for participation is if the agency or individual will help ensure a comprehensive view of the problem and potential strategies for its resolution. If there is an existing structure (e.g., a State Safety Management System Committee) of stakeholders for conducting strategic planning, it is important to relate to this, and build on it, for addressing the detailed considerations of the particular emphasis area.

There may be some situations within the emphasis area for which no other stakeholders may be involved other than the lead agency and the road users. However, in most cases, careful consideration of the issues will reveal a number of potential stakeholders to possibly be involved. Furthermore, it is usually the case that a potential program will proceed better in the organizational and institutional setting if a high-level "champion" is found in the lead agency to support the effort and act as a key liaison with other stakeholders.

Stakeholders should already have been identified in the previous step, at least at a level to allow decision makers to know whose cooperation is needed, and what their potential level of involvement might be. During this step, the lead agency should contact the key individuals in each of the external agencies to elicit their participation and cooperation. This will require identifying the right office or organizational unit, and the appropriate people in each case. It will include providing them with a brief overview document and outlining for them the type of involvement envisioned. This may typically involve developing interagency agreements. The participation and cooperation of each agency should be secured to ensure program success.

Lists of appropriate candidates for the stakeholder groups are recorded in Appendix K. In addition, reference may be made to the NHTSA document at http://www.nhtsa.dot.gov/safecommunities/SAFE%20COMM%20Html/index.html, which provides guidance on building coalitions.

Specific Elements

1. Identify internal "champions" for the program
2. Identify the suitable contact in each of the agencies or private organizations who is appropriate to participate in the program
3. Develop a brief document that helps sell the program and the contact's role in it by
    - 3.1. Defining the problem
    - 3.2. Outlining possible solutions
    - 3.3. Aligning the agency or group mission by resolving the problem
    - 3.4. Emphasizing the importance the agency has to the success of the effort

   3.5. Outlining the organizational framework for the working group and other stakeholders cooperating on this effort
   3.6. Outlining the rest of the process in which agency staff or group members are being asked to participate
   3.7. Outlining the nature of commitments desired from the agency or group for the program
   3.8. Establishing program management responsibilities, including communication protocols, agency roles, and responsibilities
   3.9. Listing the purpose for an initial meeting
4. Meet with the appropriate representative
   4.1. Identify the key individual(s) in the agency or group whose approval is needed to get the desired cooperation
   4.2. Clarify any questions or concepts
   4.3. Outline the next steps to get the agency or group onboard and participating
5. Establish an organizational framework for the group
   5.1. Roles
   5.2. Responsibilities

Implementation Step 3: Establish Crash Reduction Goals

General Description

The AASHTO Strategic Highway Safety Plan established a national goal of saving 5,000 to 7,000 lives annually by the year 2005. Some states have established statewide goals for the reduction of fatalities or crashes of a certain degree of severity. Establishing an explicit goal for crash reduction can place an agency "on the spot," but it usually provides an impetus to action and builds a support for funding programs for its achievement. Therefore, it is desirable to establish, within each emphasis area, one or more crash reduction targets.

These may be dictated by strategic-level planning for the agency, or it may be left to the stakeholders to determine. (The summary of the Wisconsin DOT Highway Safety Plan in Appendix A has more information.) For example, Pennsylvania adopted a goal of 10 percent reduction in fatalities by 2002,[1] while California established a goal of 40 percent reduction in fatalities and 15 percent reduction in injury crashes, as well as a 10 percent reduction in work zone crashes, in 1 year.[2] At the municipal level, Toledo, Ohio, is cited by the U.S. Conference of Mayors as having an exemplary program. This included establishing specific crash reduction goals (http://www.usmayors.org/chhs/traffic/best_traffic_initiative_toledo.htm). When working within an emphasis area, it may be desirable to specify certain types of crashes, as well as the severity level, being targeted.

There are a few key considerations for establishing a quantitative goal. The stakeholders should achieve consensus on this issue. The goal should be challenging, but achievable. Its feasibility depends in part on available funding, the timeframe in which the goal is to be achieved, the degree of complexity of the program, and the degree of controversy the program may experience. To a certain extent, the quantification of the goal will be an iterative process. If the effort is directed at a particular location, then this becomes a relatively straightforward action.

Specific Elements

1. Identify the type of crashes to be targeted
    - 1.1. Subset of all crash types
    - 1.2. Level of severity
2. Identify existing statewide or other potentially related crash reduction goals
3. Conduct a process with stakeholders to arrive at a consensus on a crash reduction goal
    - 3.1. Identify key considerations
    - 3.2. Identify past goals used in the jurisdiction
    - 3.3. Identify what other jurisdictions are using as crash reduction goals
    - 3.4. Use consensus-seeking methods, as needed

[1] Draft State Highway Safety Plan, State of Pennsylvania, July 22, 1999
[2] Operations Program Business Plan, FY 1999/2000, State of California, Caltrans, July 1999

Implementation Step 4: Develop Program Policies, Guidelines, and Specifications

General Description

A foundation and framework are needed for solving the identified safety problems. The implementation process will need to be guided and evaluated according to a set of goals, objectives, and related performance measures. These will formalize what the intended result is and how success will be measured. The overlying crash reduction goal, established in Step 3, will provide the context for the more specific goals established in this step. The goals, objectives, and performance measures will be used much later to evaluate what is implemented. Therefore, they should be jointly outlined at this point and agreed to by all program stakeholders. It is important to recognize that evaluating any actions is an important part of the process. Even though evaluation is not finished until some time after the strategies have been implemented, it begins at this step.

The elements of this step may be simpler for a specific project or location than for a comprehensive program. However, even in the simpler case, policies, guidelines, and specifications are usually needed. Furthermore, some programs or projects may require that some guidelines or specifications be in the form of limits on directions taken and types of strategies considered acceptable.

Specific Elements

1. Identify high-level policy actions required and implement them (legislative and administrative)
2. Develop goals, objectives, and performance measures to guide the program and use for assessing its effect
    - 2.1. Hold joint meetings of stakeholders
    - 2.2. Use consensus-seeking methods
    - 2.3. Carefully define terms and measures
    - 2.4. Develop report documenting results and validate them
3. Identify specifications or constraints to be used throughout the project
    - 3.1. Budget constraints
    - 3.2. Time constraints
    - 3.3. Personnel training
    - 3.4. Capacity to install or construct
    - 3.5. Types of strategies not to be considered or that must be included
    - 3.6. Other

Implementation Step 5: Develop Alternative Approaches to Addressing the Problem

General Description

Having defined the problem and established a foundation, the next step is to find ways to address the identified problems. If the problem identification stage has been done effectively (see Appendix D for further details on identifying road safety problems), the characteristics of the problems should suggest one or more alternative ways for dealing with the problem. It is important that a full range of options be considered, drawing from areas dealing with enforcement, engineering, education, emergency medical services, and system management actions.

Alternative strategies should be sought for both location-specific and systemic problems that have been identified. Location-specific strategies should pertain equally well to addressing high-hazard locations and to solving safety problems identified within projects that are being studied for reasons other than safety.

Where site-specific strategies are being considered, visits to selected sites may be in order if detailed data and pictures are not available. In some cases, the emphasis area guides will provide tables that help connect the attributes of the problem with one or more appropriate strategies to use as countermeasures.

Strategies should also be considered for application on a systemic basis. Examples include

1. Low-cost improvements targeted at problems that have been identified as significant in the overall highway safety picture, but not concentrated in a given location.
2. Action focused upon a specific driver population, but carried out throughout the jurisdiction.
3. Response to a change in policy, including modified design standards.
4. Response to a change in law, such as adoption of a new definition for DUI.

In some cases, a strategy may be considered that is relatively untried or is an innovative variation from past approaches to treatment of a similar problem. Special care is needed to ensure that such strategies are found to be sound enough to implement on a wide-scale basis. Rather than ignoring this type of candidate strategy in favor of the more "tried-and-proven" approaches, consideration should be given to including a pilot-test component to the strategy.

The primary purpose of this guide is to provide a set of strategies to consider for eliminating or lessening the particular road safety problem upon which the user is focusing. As pointed out in the first step of this process, the identification of the problem, and the selection of strategies, is a complex step that will be different for each case. Therefore, it is not feasible to provide a "formula" to follow. However, guidelines are available. There are a number of texts to which the reader can refer. Some of these are listed in Appendix B and Appendix D.

In addition, the tables referenced in Appendix G provide examples for linking identified problems with candidate strategies.

The second part of this step is to assemble sets of strategies into alternative "program packages." Some strategies are complementary to others, while some are more effective when combined with others. In addition, some strategies are mutually exclusive. Finally, strategies may be needed to address roads across multiple jurisdictions. For instance, a package of strategies may need to address both the state and local highway system to have the desired level of impact. The result of this part of the activity will be a set of alternative "program packages" for the emphasis area.

It may be desirable to prepare a technical memorandum at the end of this step. It would document the results, both for input into the next step and for internal reviews. The latter is likely to occur, since this is the point at which specific actions are being seriously considered.

Specific Elements

1. Review problem characteristics and compare them with individual strategies, considering both their objectives and their attributes
    - 1.1. Road-user behavior (law enforcement, licensing, adjudication)
    - 1.2. Engineering
    - 1.3. Emergency medical services
    - 1.4. System management elements
2. Select individual strategies that do the following:
    - 2.1. Address the problem
    - 2.2. Are within the policies and constraints established
    - 2.3. Are likely to help achieve the goals and objectives established for the program
3. Assemble individual strategies into alternative program packages expected to optimize achievement of goals and objectives
    - 3.1. Cumulative effect to achieve crash reduction goal
    - 3.2. Eliminate strategies that can be identified as inappropriate, or likely to be ineffective, even at this early stage of planning
4. Summarize the plan in a technical memorandum, describing attributes of individual strategies, how they will be combined, and why they are likely to meet the established goals and objectives

Implementation Step 6: Evaluate Alternatives and Select a Plan

General Description

This step is needed to arrive at a logical basis for prioritizing and selecting among the alternative strategies or program packages that have been developed. There are several activities that need to be performed. One proposed list is shown in Appendix P.

The process involves making estimates for each of the established performance measures for the program and comparing them, both individually and in total. To do this in a quantitative manner requires some basis for estimating the effectiveness of each strategy. Where solid evidence has been found on effectiveness, it has been presented for each strategy in the guide. In some cases, agencies have a set of crash reduction factors that are used to arrive at effectiveness estimates. Where a high degree of uncertainty exists, it is wise to use sensitivity analyses to test the validity of any conclusions that may be made regarding which is the best strategy or set of strategies to use. Further discussion of this may be found in Appendix O.

Cost-benefit and cost-effectiveness analyses are usually used to help identify inefficient or inappropriate strategies, as well as to establish priorities. For further definition of the two terms, see Appendix Q. For a comparison of the two techniques, see Appendix S. Aspects of feasibility, other than economic, must also be considered at this point. An excellent set of references is provided within online benefit-cost guides:

- One is under development at the following site, maintained by the American Society of Civil Engineers: http://ceenve.calpoly.edu/sullivan/cutep/cutep_bc_outline_main.htm
- The other is *Guide to Benefit-Cost Analysis in Transport Canada*, September 1994, http://www.tc.gc.ca/finance/bca/en/TOC_e.htm. An overall summary of this document is given in Appendix V.

In some cases, a strategy or program may look promising, but no evidence may be available as to its likely effectiveness. This would be especially true for innovative methods or use of emerging technologies. In such cases, it may be advisable to plan a pilot study to arrive at a minimum level of confidence in its effectiveness, before large-scale investment is made or a large segment of the public is involved in something untested.

It is at this stage of detailed analysis that the crash reduction goals, set in Step 3, may be revisited, with the possibility of modification.

It is important that this step be conducted with the full participation of the stakeholders. If the previous steps were followed, the working group will have the appropriate representation. Technical assistance from more than one discipline may be necessary to go through more complex issues. Group consensus will be important on areas such as estimates of effectiveness, as well as the rating and ranking of alternatives. Techniques are available to assist in arriving at consensus. For example, see the following Web site for an overview: http://www.tc.gc.ca/finance/bca/en/Printable_e.htm.

Specific Elements

1. Assess feasibility
    - 1.1. Human resources
    - 1.2. Special constraints
    - 1.3. Legislative requirements
    - 1.4. Other
    - 1.5. This is often done in a qualitative way, to narrow the list of choices to be studied in more detail (see, for example, Appendix BB)
2. Estimate values for each of the performance measures for each strategy and plan
    - 2.1. Estimate costs and impacts
        - 2.1.1. Consider guidelines provided in the detailed description of strategies in this material
        - 2.1.2. Adjust as necessary to reflect local knowledge or practice
        - 2.1.3. Where a plan or program is being considered that includes more than one strategy, combine individual estimates
    - 2.2. Prepare results for cost-benefit and/or cost-effectiveness analyses
    - 2.3. Summarize the estimates in both disaggregate (by individual strategy) and aggregate (total for the program) form
3. Conduct a cost-benefit and/or cost-effectiveness analysis to identify inefficient, as well as dominant, strategies and programs and to establish a priority for the alternatives
    - 3.1. Test for dominance (both lower cost and higher effectiveness than others)
    - 3.2. Estimate relative cost-benefit and/or cost-effectiveness
    - 3.3. Test productivity
4. Develop a report that documents the effort, summarizing the alternatives considered and presenting a preferred program, as devised by the working group (for suggestions on a report of a benefit-cost analysis, see Appendix U).
    - 4.1. Designed for high-level decision makers, as well as technical personnel who would be involved in the implementation
    - 4.2. Extensive use of graphics and layout techniques to facilitate understanding and capture interest
    - 4.3. Recommendations regarding meeting or altering the crash reduction goals established in Step 3.

Implementation Step 7: Submit Recommendations for Action by Top Management

General Description

The working group has completed the important planning tasks and must now submit the results and conclusions to those who will make the decision on whether to proceed further. Top management, at this step, will primarily be determining if an investment will be made in this area. As a result, the plan will not only be considered on the basis of its merits for solving the particular problems identified in this emphasis area (say, vis-à-vis other approaches that could be taken to deal with the specific problems identified), but also its relative value in relation to investments in other aspects of the road safety program.

This aspect of the process involves using the best available communication skills to adequately inform top management. The degree of effort and extent of use of media should be proportionate to the size and complexity of the problem being addressed, as well as the degree to which there is competition for funds.

The material that is submitted should receive careful review by those with knowledge in report design and layout. In addition, today's technology allows for the development of automated presentations, using animation and multimedia in a cost-effective manner. Therefore, programs involving significant investments that are competing strongly for implementation resources should be backed by such supplementary means for communicating efficiently and effectively with top management.

Specific Elements

1. Submit recommendations for action by management
    - 1.1. "Go/no-go" decision
    - 1.2. Reconsideration of policies, guidelines, and specifications (see Step 3)
    - 1.3. Modification of the plan to accommodate any revisions to the program framework made by the decision makers
2. Working group to make presentations to decision makers and other groups, as needed and requested
3. Working group to provide technical assistance with the review of the plan, as requested
    - 3.1. Availability to answer questions and provide further detail
    - 3.2. Assistance in conducting formal assessments

Implementation Step 8: Develop a Plan of Action

General Description

At this stage, the working group will usually detail the program that has been selected for implementation. This step translates the program into an action plan, with all the details needed by both decision makers, who will have to commit to the investment of resources, and those charged with carrying it out. The effort involves defining resource requirements, organizational and institutional arrangements needed, schedules, etc. This is usually done in the form of a business plan, or plan of action. An example of a plan developed by a local community is shown in Appendix X.

An evaluation plan should be designed at this point. It is an important part of the plan. This is something that should be in place before Step 9 is finished. It is not acceptable to wait until after the program is completed to begin designing an evaluation of it. This is because data are needed about conditions before the program starts, to allow comparison with conditions during its operation and after its completion. It also should be designed at this point, to achieve consensus among the stakeholders on what constitutes "success." The evaluation is used to determine just how well things were carried out and what effect the program had. Knowing this helps maintain the validity of what is being done, encourages future support from management, and provides good intelligence on how to proceed after the program is completed. For further details on performing evaluations, see Appendix L, Appendix M, and Appendix W.

The plan of action should be developed jointly with the involvement of all desired participants in the program. It should be completed to the detail necessary to receive formal approval of each agency during the next step. The degree of detail and complexity required for this step will be a function of the size and scope of the program, as well as the number of independent agencies involved.

Specific Elements

1. Translation of the selected program into key resource requirements
    - 1.1. Agencies from which cooperation and coordination is required
    - 1.2. Funding
    - 1.3. Personnel
    - 1.4. Data and information
    - 1.5. Time
    - 1.6. Equipment
    - 1.7. Materials
    - 1.8. Training
    - 1.9. Legislation
2. Define organizational and institutional framework for implementing the program
    - 2.1. Include high-level oversight group
    - 2.2. Provide for involvement in planning at working levels
    - 2.3. Provide mechanisms for resolution of issues that may arise and disagreements that may occur
    - 2.4. Secure human and financial resources required

3. Detail a program evaluation plan
    - 3.1. Goals and objectives
    - 3.2. Process measures
    - 3.3. Performance measures
        - 3.3.1. Short-term, including surrogates, to allow early reporting of results
        - 3.3.2. Long-term
    - 3.4. Type of evaluation
    - 3.5. Data needed
    - 3.6. Personnel needed
    - 3.7. Budget and time estimates
4. Definition of tasks to conduct the work
    - 4.1. Develop diagram of tasks (e.g., PERT chart)
    - 4.2. Develop schedule (e.g., Gantt chart)
    - 4.3. For each task, define
        - 4.3.1. Inputs
        - 4.3.2. Outputs
        - 4.3.3. Resource requirements
        - 4.3.4. Agency roles
        - 4.3.5. Sequence and dependency of tasks
5. Develop detailed budget
    - 5.1. By task
    - 5.2. Separate by source and agency/office (i.e., cost center)
6. Produce program action plan, or business plan document

Implementation Step 9: Establish Foundations for Implementing the Program

General Description

Once approved, some "groundwork" is often necessary to establish a foundation for carrying out the selected program. This is somewhat similar to what was done in Step 4. It must now be done in greater detail and scope for the specific program being implemented. As in Step 4, specific policies and guidelines must be developed, organizational and institutional arrangements must be initiated, and an infrastructure must be created for the program. The business plan or action plan provides the basis (Step 7) for this. Once again, the degree of complexity required will vary with the scope and size of the program, as well as the number of agencies involved.

Specific Elements

1. Refine policies and guidelines (from Step 4)
2. Effect required legislation or regulations
3. Allocate budget
4. Reorganize implementation working group
5. Develop program infrastructure
    - 5.1. Facilities and equipment for program staff
    - 5.2. Information systems
    - 5.3. Communications
    - 5.4. Assignment of personnel
    - 5.5. Administrative systems (monitoring and reporting)
6. Set up program assessment system
    - 6.1. Define/refine/revise performance and process measures
    - 6.2. Establish data collection and reporting protocols
    - 6.3. Develop data collection and reporting instruments
    - 6.4. Measure baseline conditions

Implementation Step 10: Carry Out the Action Plan

General Description

Conditions have been established to allow the program to be started. The activities of implementation may be divided into activities associated with field preparation for whatever actions are planned and the actual field implementation of the plan. The activities can involve design and development of program actions, actual construction or installation of program elements, training, and the actual operation of the program. This step also includes monitoring for the purpose of maintaining control and carrying out mid- and post-program evaluation of the effort.

Specific Elements

1. Conduct detailed design of program elements
    - 1.1. Physical design elements
    - 1.2. PI&E materials
    - 1.3. Enforcement protocols
    - 1.4. Etc.
2. Conduct program training
3. Develop and acquire program materials
4. Develop and acquire program equipment
5. Conduct pilot tests of untested strategies, as needed
6. Program operation
    - 6.1. Conduct program "kickoff"
    - 6.2. Carry out monitoring and management of ongoing operation
        - 6.2.1 Periodic measurement (process and performance measures)
        - 6.2.2 Adjustments as required
    - 6.3. Perform interim and final reporting

Implementation Step 11: Assess and Transition the Program

General Description

The AASHTO Strategic Highway Safety Plan includes improvement in highway safety management. A key element of that is the conduct of properly designed program evaluations. The program evaluation will have been first designed in Step 8, which occurs prior to any field implementation. For details on designing an evaluation, please refer to Step 8. For an example of how the New Zealand Transport Authority takes this step as an important part of the process, see Appendix N.

The program will usually have a specified operational period. An evaluation of both the process and performance will have begun prior to the start of implementation. It may also continue during the course of the implementation, and it will be completed after the operational period of the program.

The overall effectiveness of the effort should be measured to determine if the investment was worthwhile and to guide top management on how to proceed into the post-program period. This often means that there is a need to quickly measure program effectiveness in order to provide a preliminary idea of the success or need for immediate modification. This will be particularly important early in development of the AASHTO Strategic Highway Safety Plan, as agencies learn what works best. Therefore, surrogates for safety impact may have to be used to arrive at early/interim conclusions. These usually include behavioral measures. This particular need for interim surrogate measures should be dealt with when the evaluation is designed, back in Step 8. However, a certain period, usually a minimum of a couple of years, will be required to properly measure the effectiveness and draw valid conclusions about programs designed to reduce highway fatalities when using direct safety performance measures.

The results of the work is usually reported back to those who authorized it and the stakeholders, as well as any others in management who will be involved in determining the future of the program. Decisions must be made on how to continue or expand the effort, if at all. If a program is to be continued or expanded (as in the case of a pilot study), the results of its assessment may suggest modifications. In some cases, a decision may be needed to remove what has been placed in the highway environment as part of the program because of a negative impact being measured. Even a "permanent" installation (e.g., rumble strips) requires a decision regarding investment for future maintenance if it is to continue to be effective.

Finally, the results of the evaluation using performance measures should be fed back into a knowledge base to improve future estimates of effectiveness.

Specific Elements

1. Analysis
    - 1.1. Summarize assessment data reported during the course of the program
    - 1.2. Analyze both process and performance measures (both quantitative and qualitative)

   1.3. Evaluate the degree to which goals and objectives were achieved (using performance measures)
   1.4. Estimate costs (especially vis-à-vis pre-implementation estimates)
   1.5. Document anecdotal material that may provide insight for improving future programs and implementation efforts
   1.6. Conduct and document debriefing sessions with persons involved in the program (including anecdotal evidence of effectiveness and recommended revisions)
2. Report results
3. Decide how to transition the program
   3.1. Stop
   3.2. Continue as is
   3.3. Continue with revisions
   3.4. Expand as is
   3.5. Expand with revisions
   3.6. Reverse some actions
4. Document data for creating or updating database of effectiveness estimates

SECTION VII

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Appendixes

The following appendixes are not published in this report. However, they are available online at http://safety.transportation.org.

1 How Much Should Excise Tax on Beer Be Increased?
2 Some Arguments Given by Opponents of Alcohol Tax Increases
3 Profile of State Agency Implementation Efforts: Strategy 5.1 A4, Employ Screening and Brief Interventions in Health Care Settings
4 Profile of State Agency Implementation Efforts: Strategy 5.1 B1, Conduct Regular, Well-Publicized DWI Checkpoints
5 Profile of State Agency Implementation Efforts: Strategy 5.1 B2, Enhance DWI Detection through Special DWI Patrols and Related Traffic Enforcement
6 Profile of State Agency Implementation Efforts: Strategy 5.1 D2, Require Ignition Interlocks as a Condition for License Reinstatement
7 Profile of State Agency Implementation Efforts: Strategy 5.1 D3, Monitor All Convicted DWI Offenders Closely (1 of 2)
8 Profile of State Agency Implementation Efforts: Strategy 5.1 D3, Monitor All Convicted DWI Offenders Closely (2 of 2)
9 Potential Stakeholders

A Wisconsin Department of Transportation 2001 Strategic Highway Safety Plan
B Resources for the Planning and Implementation of Highway Safety Programs
C South African Road Safety Manual
D Comments on Problem Definition
E Issues Associated with Use of Safety Information in Highway Design: Role of Safety in Decision Making
F Comprehensive Highway Safety Improvement Model
G Table Relating Candidate Strategies to Safety Data Elements
H What is a Road Safety Audit?
I Illustration of Regression to the Mean
J Fault Tree Analysis
K Lists of Potential Stakeholders
L Conducting an Evaluation
M Designs for a Program Evaluation
N Joint Crash Reduction Programme: Outcome Monitoring
O Estimating the Effectiveness of a Program During the Planning Stages
P Key Activities for Evaluating Alternative Program
Q Definitions of Cost-Benefit and Cost-Effectiveness
R FHWA Policy on Life Cycle Costing
S Comparisons of Benefit-Cost and Cost-Effectiveness Analysis
T Issues in Cost-Benefit and Cost-Effectiveness Analyses
U Transport Canada Recommended Structure for a Benefit-Cost Analysis Report
V Overall Summary of Benefit-Cost Analysis Guide from Transport Canada
W Program Evaluation—Its Purpose and Nature

X Traffic Safety Plan for a Small Department
Y Sample District-Level Crash Statistical Summary
Z Sample Intersection Crash Summaries
AA Sample Intersection Collision Diagram
BB Example Application of the Unsignalized Intersection Guide

Abbreviations used without definitions in TRB publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation