A Survey of Strategies for Reducing Alcohol-Impaired Driving and Underage Drinking

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INTRODUCTION

While progress has been made to reduce alcohol-impaired driving and underage drinking, problems remain. Although the nation has experienced dramatic declines in the number of alcohol-related traffic fatalities since the early 1980's, more than 15,000 people still died in alcohol-related crashes in 1999. While fewer young people report drinking alcohol today when compared to ten years ago, about half of all high school seniors still report drinking alcohol in the past month, and binge drinking remains widespread among college students.

OLO Report 01-1, *A Survey of Strategies for Reducing Alcohol-Impaired Driving and Underage Drinking*, represents the first of three "white papers" that the Office of Legislative Oversight (OLO) will produce this year on alcohol-impaired driving and underage drinking. This first report includes four chapters:

I, The Facts, provides a set of basic facts about alcohol-impaired driving and underage drinking in the United States.

II, Highlights of Research on What Works, presents the highlights of what the published empirical research says about the effectiveness of different laws and programs aimed at reducing alcohol-impaired driving and underage drinking.

III, Research Method and Measurement Issues, discusses the challenges inherent in measuring the results of specific strategies.

IV, Strategies, provides more detailed information about the strategies being used across the country to reduce alcohol-impaired driving and underage drinking. The write-up for each strategy includes a general description of how the law or program works, and a summary of the research, if any, on its effectiveness. (Chapter IV is bound separately.)

OLO's second white paper, scheduled for completion in late March 2001, will focus on laws and programs currently in place in Montgomery County. A joint Public Safety and Health and Human Services Committee worksession on OLO's first and second white papers is scheduled for April 5, 2001. OLO expects that the results of the April 5th worksession will determine the scope of OLO's third white paper, which will be completed this summer.

At the County Executive request, the Criminal Justice Coordinating Commission (CJCC) and Blue Ribbon Panel on Traffic and Pedestrian Safety are also doing some work this year on alcohol-impaired driving. At the Council's direction, OLO is working cooperatively with representatives of these groups to avoid duplication. The CJCC and Blue Ribbon Panel have both expressed an interest in using OLO's white papers as a source of information for their continuing efforts.

TERMINOLOGY

Administrative Per Se Law - a law which provides for prompt administrative license suspension for drivers who fail a BAC test by registering above a specified limit or drivers who refuse to submit to a test.

Adult - a person age 21 or older

BAC (Blood Alcohol Concentration) - the proportion of alcohol to blood in the body expressed as a percent. All but two States have adopted laws that make it a criminal offense to drive with a BAC above a specified limit. The BAC limit is .10 (i.e., 0.10 grams per deciliter) in 31 states and .08 (i.e., 0.08 grams per deciliter) in 17 states and D.C. (For more details on BAC calculations, see p. iv.)

Breath Testing Device (Breathalyzer or Intoxilyzer) - an instrument that scientifically measures the amount of alcohol in the blood stream by chemical analysis of the breath.

Driving While Intoxicated (DWI) or Driving Under the Influence (DUI) - means driving a motor vehicle under the influence of alcohol or drugs. *Unless otherwise indicated, this report uses "DWI" as the generic term for alcohol-impaired driving.*

Drunk driving - still commonly used to refer to driving under the influence of alcohol. However, drunk driving is not used as a legal term because many drivers who are legally intoxicated do not exhibit outward signs of drunkenness.

Illegal Per Se Law - a law that makes it illegal to operate a motor vehicle at or above a specified BAC limit.

Implied Consent Law - a law that stipulates that any person who operates a motor vehicle on the highways is presumed to have consented to be chemically tested for alcohol upon request by police, or risk license suspension.

Impaired driving - means driving while the driver's abilities are impaired (diminished in quality) by alcohol or drugs.

Juvenile/Minor - a young person who has not yet reached the age at which he/she is treated as an adult for purposes of criminal law. In the majority of states, this age is 18, although in 10 states the age is 17, and in three it is 16.

Nolle Prosequi - a formal entry on the record in open court by the prosecutor that the case will not be prosecuted further at this time. The prosecutor must give a reason and the judge cannot interfere-- a case that has been disposed of by "nol pros" can be brought back to court by the filing of new charges.

Percent Change - is a measure of a "new" number calculated as a percent of an "old" number. When looking at percent change data, the base numbers are important to keep in mind. For example, if there were 10 traffic crashes in 1998 and 15 traffic crashes in 1999, then the percent change in crashes between 1998 and 1999 is a 50% increase. The formula for percent change is the change (new number minus old number) divided by the old number.

Percent Difference - is a measure of the difference between two separate percent calculations. If the recidivism rate in Group A was 6% and the recidivism rate in Group B was 12%, then a study could describe the difference in recidivism rates between the two groups as either: "there was a 6% difference in recidivism rates between Group A and Group B," or 'the recidivism rates in Group B were double the recidivism rates of Group A." Although both statements are correct, they give the reader very different impressions.

Plea Bargaining - the process by which a prosecutor and a defense attorney agree to reduce a number of charges or a specific charge in exchange for a guilty plea to a single or lesser charge.

Young adult - a person who is under age 21 but not considered a juvenile in his/her state, e.g., an 18-20 year old.

Youth/Underage - all persons, including juveniles, who are younger than age 21.

Zero tolerance law- a law that makes it illegal for drivers under the age of 21 to operate a motor vehicle with a BAC of .02 or less.

ACRONYMS

ALS - used generically to indicate Administrative License Revocation or Administrative License Suspension

BJS - Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice

FARS - Fatality Analysis Reporting System; a federal system that tracks, compiles, and reports data on all fatal traffic crashes.

NCADD - National Commission Against Drunk Driving

NHTSA - National Highway Traffic Safety Administration, U.S. Department of Transportation

NIAAA - National Institute on Alcohol Abuse and Alcoholism, National Institute of Health, U.S. Department of Health and Human Services

NIJ - National Institute of Justice, U.S. Department of Justice

The ABC's of BAC's

The proportion of alcohol to blood in the body is expressed as the blood alcohol concentration (BAC), which is determined by a person's drinking rate as well as the body's absorption, distribution, and metabolism of the alcohol. To follow is a brief introduction to BAC's and their consequences for driving.

Absorption and Distribution

When alcohol is consumed, it passes from the stomach and intestines into the bloodstream. As it circulates in the bloodstream, alcohol distributes itself evenly throughout all the water in the body's tissues and fluids. Thus, the alcohol level can be measured not only by testing the blood, but also by testing the urine, saliva, or water vapor in the breath.

In cases of traffic fatalities involving alcohol, blood testing must, of course, be used to estimate alcohol levels; otherwise, law enforcement agencies primarily use breath testing. Breath-test results are often converted to equivalent blood alcohol measurements, however, because early drunk driving laws set limits based on blood tests (National Highway Traffic Safety Administration [NHTSA] 1990).

In the United States, blood alcohol measurements are based on the amount of alcohol, by weight, in a set volume of blood. For example, a BAC of 0.10 percent—a level at which it is illegal to drive in the United States—is equivalent to 0.10 grams of alcohol per 100 milliliters of blood. This translates, by weight, to a proportion of just under 1 gram of alcohol for every 1,000 grams of blood in the body (Jones et al. 1998).

Breakdown in the Body

Within a few seconds after ingestion, alcohol reaches the liver, which begins to break it down, or metabolize it. Any BAC measurement therefore reflects not only a person's drinking rate but also his or her rate of metabolism.

Alcohol is metabolized much more slowly than it is absorbed, so the concentration of alcohol builds when additional drinks are consumed before prior drinks are metabolized.

How any one person absorbs and metabolizes alcohol varies depending on factors such as, age, gender, whether or not food is eaten with the alcoholic beverage, and the proportion of body mass that is fatty tissue.

Although individual rates can vary widely, on average, a 165-lb man who has four drinks in an hour on an empty stomach, or a 135-lb woman who has three drinks under similar conditions, would reach a BAC of 0.08 percent (NHTSA 1992). This is the legal limit for driving in 17 States; other States have a 0.10-percent BAC limit (See pp. 382–383 for further discussion on legal BAC limits).

Consequence: Crash Risk

Drinking even a little alcohol can change an individual's ability to respond to the demands of driving. For example, a driver's ability to divide attention between two or more sources of visual information can be impaired by BAC's of 0.02 percent or lower (Howat et al. 1991; Moskowitz 1985; Starmer 1989). Starting at BAC's of 0.05 percent or higher, consistent impairment occurs in eye movements, glare resistance, visual perception, reaction time, certain types of steering tasks, information processing, and other aspects of psychomotor performance (Finnigan et al. 1992; Hindmarch et al. 1992; Howat et al. 1991; Starmer 1989).

Research has documented that the risk of a motor vehicle crash increases as BAC increases (Howat et al. 1991; Starmer 1989; Zador 1991) and that the more demanding the driving task, the greater the impairment caused by low doses of alcohol (Starmer 1989). Increases in blood alcohol levels cause the risk of fatal crashes to rise dramatically (table 1). For drivers under 21 years of age, the fatal crash risk increases to an even greater degree as BAC rises (Zador 1991). Alcohol consumption enhances the dangers unique to young drivers, who have less driving experience and tend to take more risks.

Table 1: Compared With Drivers Who Have Not Consumed Alcohol—

If You Drive With Blood Alcohol Concentration (BAC) in This Range:	Then Your Chances of Being Killed in a Single-Vehicle Crash Increase by:
0.02–0.04 percent	1.4 times
0.05–0.09 percent	11 times
0.10–0.14 percent	48 times
0.15 percent and above	380 times

Source: Data are from Zador 1991.

Source: National Institute on Alcohol Abuse and Alcoholism, 10th Special Report to the U.S. Congress on Alcohol and Health, Highlights on Current Research, June 2000

I. FACTS

This chapter introduces the reader to some basic facts about alcohol-impaired driving and underage drinking in the United States. The chapter uses a question and answer format to present information in ten categories: the prevalence of the problem; deaths and injuries, characteristics of alcohol-related crashes, arrests, repeat offenders, underage drinking, underage drinking and driving, offenders under correctional supervision, speeding and alcohol-impaired driving, and costs.

Prevalence of Drinking and Driving

How many people in the United States drink and drive?

In an average year, between 28 and 46 million people in the United States drive after consuming some alcohol. Of this group, it is estimated that between 1.5 million and 4 million people drive after consuming enough alcohol to be impaired at the .08 BAC level. An additional 1.5 million to 14 million drive after consuming enough to produce at least some impairment. (NIAAA, Report to Congress, 2000)

Is the percent of people who drink and driver lower than it was 25 years ago?

Yes. The National Roadside Survey, conducted in 1973, 1986 and 1996, reports the percent of drivers who had measurable alcohol in their blood. The survey results show that drivers with measurable alcohol made up 36% of all drivers in 1973, 26% of all drivers in 1986, and 17% of all drivers in 1996.[1]

What percent of the people who are drinking and driving have a blood alcohol concentration (BAC) of .05 or higher?

The National Roadside Survey reports that drivers who had BACs of .05 or higher made up 13.7% of all drivers in 1973, 8.4% of all drivers in 1986, and 7.7 % of drivers in 1996.

[1] Each of the National Roadside Surveys involved interviews and voluntary breath tests (to determine BAC level) with over 6,000 drivers of noncommercial four-wheel vehicles. The information was gathered between 10PM and 3AM Friday and Saturday nights from drivers in 17 states. Interviewers randomly selected passing vehicles who are then flagged down by police officers. Over 95% of drivers agreed to participate in the study.

Deaths and Injuries from Alcohol-Related Traffic Crashes

How many people are killed each year in traffic crashes and how many of these are alcohol-related fatalities?

In 1999, 41,611 people were killed in motor vehicle crashes in the United States. Of those killed, 15,786 (38%) were alcohol-related fatalities. The federal government classifies a traffic death as an alcohol-related fatality if the person died in a crash in which at least one driver or non-occupant (e.g., pedestrian) registered any alcohol in their blood. The federal government defines "any alcohol" as a BAC reading of .01 or higher.

Table 1 (page 13a) from the National Center for Statistics and Analysis lists traffic fatalities and alcohol-related traffic fatalities by state and BAC levels for 1999.

What are the national trends in alcohol-related traffic fatalities over the last 20 years?

There were 9,379 fewer alcohol-related traffic fatalities in 1999 than 1982. In 1982, there were 25,165 alcohol-related traffic fatalities; this compares to 15,786 deaths in 1999. In 1982, alcohol-related traffic deaths represented 57.3% of all traffic fatalities, compared to 38% of all traffic deaths in 1999. This means alcohol-related traffic deaths, as a percent of all traffic deaths has decreased by almost 20 percentage points since 1982.

Dramatic declines that occurred in the 1980's and early 1990's have more recently leveled off. Table 2 (page 13b) lists the annual traffic fatalities (total fatalities and number/percent where "any alcohol" was registered) between 1982 and 1999.

How many alcohol-related traffic fatalities occurred in a "high alcohol" traffic crash?

The federal government classifies a crash as "high alcohol" if at least one driver or non-occupant had a BAC of .10 or higher. In 1999, 12,321 people died in "high alcohol" crashes; this represented 70% of all alcohol related traffic fatalities. The other 3,466 people died in a crash where at least one driver or non-occupant had a BAC of between .01 and .09; the federal government classifies these crashes as "low alcohol." (DOT, Traffic Safety Facts 1999)

Who are the victims in "high-alcohol" traffic crashes?[2]

In 1999, 62% of the 12,321 people who were killed in a "high alcohol" traffic crash were drivers; 20% were passengers; and 18% were pedestrians or pedalcyclists, e.g. "non-occupants." The federal government provides additional information on whether the drivers or non-occupants were intoxicated. Specifically:

- 6,960 or 90% of the 7,712 drivers killed were intoxicated (90%); and
- 1,691 or 78% of the 2,167 non-occupants killed were intoxicated (78%). (DOT, Traffic Safety Facts 1999)

How many people are injured each year in alcohol-related traffic accidents?

In 1999, an estimated 308,000 persons were injured in accidents where police reported alcohol was present. This represents an average of one person injured every two minutes. The federal government estimates that about three out of every ten Americans will be involved in an alcohol-related crash at some point in their lives. (DOT, Traffic Safety Facts, 1999)

Characteristics of Drivers in Alcohol Involved Fatal Crashes

How many drivers were in fatal crashes where there was a measurable amount of alcohol or an "alcohol-involved fatal accident"? Were the drivers more likely to be men or women?

There were 56,352 drivers in a fatal traffic accident where either the driver or a non-occupant had a positive BAC, i.e. a BAC of .01 or more, an "alcohol-involved fatal accident." More of these drivers were men; specifically 40,900 of the drivers were men and 14,792 were women.

How many drivers were killed in alcohol involved fatal traffic crashes in 1999? What percent of these drivers had a BAC of .10 or more?

25,210 drivers were killed in alcohol involved traffic crashes in 1999; 7,058 (28%) of these drivers had a BAC of .10 or higher.

[2] The federal government does not publish this information for "low-alcohol" traffic crashes.

How intoxicated were the drinking drivers in alcohol-involved fatal accidents?

The federal government started tracking alcohol-related traffic fatalities in 1974. Between 1974 and 1994 (20 years of data), among drinking drivers involved in fatal accidents:

- 84% had a BAC of .08 or higher;
- 75% had a BAC of .10 or higher, and
- 37.5% had a BAC of .20 or higher.

BAC Levels	Percent of Drinking Drivers in Fatal Accidents, 1974-1994
.05 or less	11.7%
0.06 -.07	4.8
0.08 – 0.09	6.0
0.10 – 0.19	39.9
O.20 - 0.29	29.9
.30 or higher	7.6

Source: US DOJ, Bureau of Justice Statistics, Alcohol and Crime 1998

For drivers in alcohol-involved fatal crashes, what age groups had the highest rate of drivers with BACs at or above .10?

In 1999, the highest rates of intoxicated drivers in fatal crashes were in the following age groups:

- 27% of all drivers who were 21-24 years old had a BAC of .10 or higher;
- 24% of all drivers who were 25-34 years old had a BAC of .10 or higher;
- 21% of all drivers who were 35-44 years old had a BAC of .10 or higher.

Table 3 (page 13c) shows data on drivers in fatal accidents and BAC levels by age for 1989 and 1999. (NHTSA 1999)

Characteristics of Alcohol-Involved Fatal Traffic Crashes

When do alcohol-involved fatal traffic crashes occur?

Alcohol-related crashes occur every day at all hours. In 1999, 29% of all fatal crashes during the week and 51% of all crashes on the weekends were alcohol-related. The table on the following page shows the percent of fatal accidents with a drinking driver by day of the week.

Day of the Week	Percent of Fatal Accidents with a Drinking Driver
Monday	8.7%
Tuesday	8.5
Wednesday	9.4
Thursday	11.0
Friday	16.2
Saturday	25.6
Sunday	20.4

Source: US Bureau of Justice Statistics, Alcohol and Crime 1998

How does the rate of alcohol-involved fatal crashes at night compare to the rate of alcohol involved fatal crashes during the day?

Approximately 60% of all nighttime fatal crashes are alcohol involved compared to 17% of all daytime fatal crashes. This means the rate of alcohol involvement in nighttime crashes in more than three times greater than the rate of alcohol involvement in daytime crashes.

What is the significance of data on nighttime single-vehicle crashes?

The number of nighttime single vehicle crashes is often used as a surrogate measure to analyze changes in alcohol-related highway crashes or fatalities. This is because 59% of fatally injured drivers involved in single vehicle crashes that occurred at night (6:00 p.m. to 6:00 a.m.), had a BAC of .10 or higher. Table 4 (page 13c) contains data on driver fatalities by crash type and time of day. (DOT, Traffic Safety Facts 1999)

Arrests

What is the probability of being arrested for alcohol-impaired driving?

Very low. The great majority of all alcohol-impaired trips are not detected by the legal system. The current probability estimates that an alcohol-impaired driver will be arrested range from 1 arrest for every 200 impaired trips to 1 arrest for every 1,000 impaired trips.

How many people are arrested each year for DWI?

In 1999, 1,549,500 people were arrested for driving under the influence of alcohol or narcotics. DUI arrests account for approximately one in ten arrests for all crimes nationwide. Driving under the influence has been the leading category of arrests for the past decade. In 1983, the highest recorded year for DUI arrests in the past 30 years, 1.9 million people were arrested. (FBI, Crime in the US, 1999)

What is the trend in arrests for DUI?

The number of arrests for DUI (alcohol or drugs) fluctuated between 1986 and 1989, declined steadily through 1994, and has increased since then. The overall rate of arrest rate per 100,000 drivers decreased from 1,124 arrests per 100,000 drivers in 1986 to 809 arrests per 100,000 drivers in 1997. Table 5 (page) shows the total number of arrests and the arrest rate for DUI between 1986 and 1997.

Note: As the number of DUI arrested decreased between 1986 and 1997, the number of DWI offenders under correctional supervision per 1,000 arrests increased. See section below re: DWI offenders in prison, in jail, or on probation.

How many young persons are arrested for DUI?

In 1995, law enforcement agencies made nearly 15,000 DUI arrests of persons under age 18. Juvenile arrests for DUI were disproportionately male (84%). (NIAAA 1999)

Arrest rates for both non-DUI and DUI alcohol offenses increased nationwide between 1993 and 1996 for persons ages 10-17, following a period of decline. It is not known whether the increase reflects changes in levels of enforcement activity, or levels of youth drinking and DUI.

How do DUI arrest rates by age compare to their share of licensed drivers?

DUI arrestees are over-represented at each age from 18 through 44 and underrepresented over 50.

- Drivers under 21 (the legal drinking age) account represent 6.9% of all licensed drivers but account for about 8.5% of all arrests.
- Drivers between the ages of 21 and 24 represent about 7% of all licensed drivers, but account for nearly 15% of all arrests.
- In contrast, drivers who are 50 or older represent approximately 33% of all licensed drivers, but account for only 9% of arrests.
  (US DOT, Highway Statstics and FBI, Crime in the US, 1996)

Repeat Offenders

What percent of people who are arrested for impaired driving have a prior conviction for a DWI offense?

Repeat offenders account for approximately one-third of all drivers arrested or convicted for DWI each year. The other two thirds of persons arrested or convicted for DWI have never been arrested before for an alcohol-related driving offense. (NHTSA 1995, Voas 1997)

What are the characteristics of repeat DWI offenders?

Repeat DWI offenders share many of the same characteristics of first offenders. Repeat DWI offenders are nearly always male, are typically under 40 years old, white, low income, unmarried, not college educated, and employed in non-white collar occupations. Their BAC at arrest is typically slightly higher than that of first offenders; they often have alcohol problems; and they commonly suffer from alcohol addiction. (Jones and Lacey 2000)

Research also shows that repeat DWI offenders prefer to drink beer and hard liquor in bars at multiple locations. (This behavior increases their likelihood of driving while impaired.) Because they tend to be such experienced drinkers, they often believe they are quite capable of driving after drinking and do so knowing that they may be arrested for DWI.

Finally, repeat DWI offenders tend to have a record of other, often non-major traffic infractions. In addition, they often have a record of criminal offenses that include serious crimes against persons as well as property.

What percent of drivers involved in fatal traffic crashes are repeat DWI offenders?

Most drivers in fatal traffic crashes are not repeat DWI offenders. The most recent estimates are that repeat DWI offenders comprise about 8% of all drivers involved in alcohol-related fatal crashes, and 2-3% of drivers in all fatal crashes. (Jones and Lacey, 2000)

Is there a difference in the recorded BAC levels of repeat DWI offenders compared to BAC levels for first-time DWI offenders?

An unexpected finding from a recent study of repeat DWI offenders is the relatively small difference in the mean BAC for repeat offenders compared to that of first offenders - 0.18 and 0.16 respectively. (Jones and Lacey 2000)

Underage Drinking

What is the prevalence of drinking among young people in the United States?

In 1999, 51% of high school seniors reported drinking in the previous month. This response represented a decline from 1980 when 72% of high school seniors had reported drinking in the previous month. (Monitoring the Future Study, Johnston et al, 1999) In a 1997 survey, 25% of 8th graders; 40% of 10th graders; and 53% of 12th graders reported drinking during the 30 days prior to being surveyed (University of Michigan 1997)

What is binge drinking?

Binge drinking is defined for males as having 5 or more drinks in one sitting and for females as having 4 or more drinks in one sitting. Binge drinking is reportedly widespread among young people. Survey research has found that binge drinking often begins around age 13, increases during adolescence, peaks between the ages of 18 and 22, and then gradually decreases.

In 1997, 15% of 8th graders, 25% of 10th graders, and 31% of 12th graders reported binge drinking in the two weeks before being surveyed. In a survey of college students, 44% reported binge drinking at least once during the two weeks before being surveyed, and 19% reported binge drinking three or more times during this time period. (NIAAA 1997)

How easily can underage buyers purchase alcohol from licensed establishments?

It is estimated that buyers who appear younger than 21 can successfully purchase alcohol from licensed establishments without showing age identification in at least 50% of their attempts. (Forster et al, 1995)

Underage Drinking and Driving

What is the prevalence of drinking and driving among young people?

In 1995, 15% of students in grades 9-12 (ages 15-18) reported drinking after driving during the month before being surveyed, and more than one-third reported riding with a driver who had been drinking. (Centers for Disease Control 1996)

Impaired driving is especially prevalent among college students who binge drink. Drinking and driving during the previous 30 days was reported by 60% of the male and almost 50% of the females who also reported being frequent binge drinkers. (NIAAA, 1999)

What is the trend in the number of young people killed in crashes where a young intoxicated driver is involved?

Between 1982 and 1998, the per year number of young people who died in a crash where an intoxicated young driver was involved declined by more than 63%, from 2,763 to 1,011. The proportion of young fatally injured drivers and young drivers involved in fatal crashes who were intoxicated (BAC of .10 or greater) similarly decreased during this time period (almost 65%), the largest decline of any age group. (NHTSA Youth Fatal crash and Alcohol Facts 1998)

How does the alcohol-related crash risk among youth compare to that of adults?

Youth are overrepresented in fatal crashes compared to the older population. The rate of involvement in greater for youth both for alcohol-related and non-alcohol-related crashes based on the total population, the licensed driver population, and on miles driven.

In non-alcohol related crashes, youth were overrepresented by a factor of 17 to 10 in 1998. In alcohol-related crashes, the gap was only 9 to 7. (The overrepresentation of youth was much higher in 1982, when it was almost 2 to 1.)

The greater crash risk among young drivers is attributed to a number of factors, including their relative lack of driving experience and the fact that young drivers who drink are more vulnerable to the effects of alcohol on driving ability. (NIAAA, 1996) At all BAC levels, the estimated crash risk for male drivers 16-20 years old is three times higher than the risk for male drivers age 25 and older.

When do youth alcohol-related traffic fatalities occur?

In 1998, the greatest number of youth traffic fatalities occurred in July and August. The data also show that more alcohol-related fatalities occurred in September, October, and November when compared to April, May, and June. This suggests that perhaps homecoming activities may be becoming more dangerous than prom and graduation events.

Approximately twice as many young people die in weekend crashes, per day, as on weekday. Approximately three times as many young people die in alcohol-related crashes, per day, on weekends than on weekdays. Almost 2/3 of youth motor vehicle fatalities occurs in rural areas. (NHTSA 1998)

DWI Offenders Under Correctional Supervision in the United States

How many offenders are in jail or in prison for DWI?

In 1997, an estimated 41,100 offenders were in jail and 17,600 in state prison for DWI. DWI offenders accounted for about 7% of jail inmates, and 2% of State prisoners. (BJS, Special Report, 1999)

How many offenders are on probation for DWI?

In 1997, an estimated 454,500 offenders were on probation for DWI. DWI offenders accounted for nearly 14% of all probationers. (BJS, 1999) Of DWI offenders on probation, 69% received a sentence that only included probation, while the remaining 31% received a split sentence and were incarcerated for a period for their current DWI offense. (BJS, Special Report, 1999)

What is the trend in the number of DWI offenders under correctional supervision?

In 1997, the 513,200 DWI offenders under correctional supervision (on probation or in jail or prison) was almost double the 270,1000 under correctional supervision in 1986, but down from the 593,000 in 1990. (See Table 6, page 13e.) The table below shows that during this time, the number of DWI offenders under correctional supervision per 1,000 arrests increased significantly.

Year	Number of DWI offenders under correctional supervision	Rate Per 1,000 Arrests
1997	513,200	347
1990	593,000	327
1986	270,100	151

Source: BJS, Special Report, 1999

What is the average sentence of DWI offenders serving time in jail?

In 1997, convicted DWI offenders in jail were sentenced to serve on average 11 months; half were sentenced to at least six months. Convicted DWI offenders in State prison were sentenced to serve an average of 49 months; half were sentenced to serve at least three years. (BJS, Special Report, 1999)

How long is the average probation sentence of DWI offenders?

Among DWI offenders on probation, the average sentence length was 26 months; half were sentenced to serve two years or more on probation. (BJS, Special Report, 1999)

What percent of DWI offenders on probation or in jail are repeat offenders?

In 1997, 33% of DWI offenders on probation, 61% of those in jail, and 62% of those in prison reported prior DWI sentences. In fact, 34% of those in jail, 17% of those in prison, and 8% of those on probation reported three or more prior DWIs. Of DWI offenders in jail, 52% were on probation, parole, or pretrial release when they committed the new offense for which they were incarcerated.

The table below shows that about 2/3 of DWI offenders on probation were first-time offenders; about 33% of those sentenced to jail for a DWI offense were first-time offenders, and 14% of those sentenced to prison for a DWI offense were first-time offenders.

Prior Sentences	Percent of DWI Offenders on Probation	Percent of DWI Offenders in Jail	Percent of DWI Offenders in Prison
First time offenders	62.7%	32.5%	14.3%
DWI priors only	18.5	18.7	19.2
DWI and other priors	14.7	42.7	42.7

BJS, Special Report, 1999

What are the demographic characteristics of DWI offenders who are under correctional supervision?

On average, DWI offenders under correctional supervision are older, better educated, and more commonly white and male when compared to offenders sentenced for other offenses. In 1997, their average age ranged from 36-38. 37% of DWI offenders on probation, 18% of those in jail, and 16% of those in prison had attended some college. Males account for 83% of DWI offenders on probation, 93% of those in jail, and 94% of those in prison. Over 2/3 of DWI offenders under correctional supervision were white and non-Hispanic. (BJS, Special Report, 1999)

What types of conditions are placed on DWI offenders on probation?

Almost all DWI offenders on probation (94%) had also been sentenced to pay a fee, fine, or court costs. About 25% were required to perform some type of community service. 13% were either confined or monitored, which includes house arrest and electronic monitoring.

An estimated 86% of DWI offenders on probation were required to get treatment for alcohol abuse; 27% were required to receive treatment for drug abuse. About 10% were given the condition that they remain alcohol/drug free, and about 28% had mandatory drug testing. (BJS, Special Report, 1999)

Speeding Related Traffic Fatalities and Connection to Alcohol

How many traffic fatalities and injuries are speeding-related in the United States?

In 1999, speeding (defined as exceeding the posted speed limit or driving too fast for conditions) was considered a contributing factor in 30% of all fatal traffic crashes. In 1999, speeding-related crashes accounted for 12,628 deaths. In addition, during 1999, 606,000 people received minor injuries in speeding-related crashes, an additional 73,000 received moderate injuries, and 40,000 received critical injuries.

What is the relationship between alcohol and speeding?

The National Center for Statistics and Analysis reports that "alcohol and speeding seem to go hand in hand." In 1999, 42% of intoxicated drivers (BAC of .10 or higher) involved in fatal crashes were speeding, compared with only 14% of sober drivers involved in fatal crashes. Between midnight and 3AM, 76% of speeding drivers involved in fatal accidents had been drinking.

In 1999, 23% of the speeding drivers under 21 years old who were involved in fatal accidents had BACs of at least 0.10. This compares to only 9% of nonspeeding drivers under 21 years old who were involved in fatal accidents.

For drivers between 21 and 24 years of age involved in fatal accidents in 1999, 44% of speeding drivers had BACs above .10, compared to 19% of nonspeeding drivers.

Estimated Costs

What are the costs of alcohol-impaired traffic crashes?

In December 1999, NHTSA estimated that alcohol-related crashes cost society more than $45 billion every year. This is based upon estimates that one alcohol-related fatality costs society $950,000, and that each alcohol-related injury averages $20,000. The costs include expenses related to:

- Emergency and acute health care;
- Long term care and rehabilitation;
- Police and judicial services;
- Insurance;
- Disability and workers' compensation;
- Lost productivity; and
- Social services for those who cannot return to work and support their families.

Table 6. Traffic Fatalities by State and Highest Blood Alcohol Concentration in the Crash, 1999

State	Total Fatalities	No Alcohol (BAC = 0.00 g/dl)		Low Alcohol (BAC = 0.01-0.09 g/dl)		High Alcohol (BAC ≥ 0.10 g/dl)		Any Alcohol (BAC ≥ 0.01 g/dl)	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Alabama	1,138	708	62	77	7	353	31	430	38
Alaska	76	36	47	8	10	32	43	40	53
Arizona	1,024	618	60	78	8	328	32	406	40
Arkansas	604	414	69	49	8	140	23	190	31
California	3,559	2,208	62	343	10	1,009	28	1,351	38
Colorado	626	406	65	49	8	171	27	220	35
Connecticut	301	167	55	33	11	101	34	134	45
Delaware	100	60	60	6	6	34	34	40	40
District of Columbia	41	19	47	6	14	16	39	22	53
Florida	2,918	1,875	64	214	7	829	28	1,043	36
Georgia	1,508	1,002	66	137	9	368	24	506	34
Hawaii	98	55	56	11	12	31	32	43	44
Idaho	278	176	63	26	9	76	28	102	37
Illinois	1,456	819	56	134	9	504	35	637	44
Indiana	1,013	671	66	77	8	265	26	342	34
Iowa	490	330	67	41	8	119	24	160	33
Kansas	537	351	65	43	8	143	27	186	35
Kentucky	814	533	65	51	6	229	28	281	35
Louisiana	924	497	54	101	11	326	35	427	46
Maine	181	122	68	8	5	51	28	59	32
Maryland	590	411	70	42	7	137	23	179	30
Massachusetts	414	211	51	63	15	140	34	203	49
Michigan	1,382	835	60	106	8	442	32	547	40
Minnesota	625	424	68	39	6	162	26	201	32
Mississippi	927	565	61	62	7	300	32	362	39
Missouri	1,094	653	60	116	11	325	30	441	40
Montana	220	117	53	16	7	87	40	103	47
Nebraska	295	170	58	38	13	87	30	125	42
Nevada	350	194	55	52	15	105	30	156	45
New Hampshire	141	75	53	24	17	42	30	66	47
New Jersey	727	436	60	79	11	211	29	291	40
New Mexico	460	254	55	37	8	169	37	206	45
New York	1,548	1,204	78	92	6	252	16	344	22
North Carolina	1,505	969	64	123	8	413	27	536	36
North Dakota	119	63	53	11	10	45	38	56	47
Ohio	1,430	972	68	78	5	380	27	458	32
Oklahoma	739	494	67	49	7	196	27	245	33
Oregon	414	244	59	29	7	141	34	170	41
Pennsylvania	1,549	944	61	111	7	494	32	605	39
Rhode Island	88	52	59	12	14	23	27	36	41
South Carolina	1,065	732	69	50	5	283	27	333	31
South Dakota	150	85	57	9	6	56	37	65	43
Tennessee	1,285	796	62	107	8	382	30	489	38
Texas	3,518	1,784	51	393	11	1,341	38	1,734	49
Utah	360	286	79	18	5	56	15	74	21
Vermont	90	56	62	9	10	25	28	34	38
Virginia	877	557	64	74	8	246	28	320	36
Washington	634	369	58	41	6	225	35	265	42
West Virginia	395	250	63	26	7	119	30	145	37
Wisconsin	745	436	59	53	7	256	34	309	41
Wyoming	189	119	63	15	8	56	29	70	37
U.S. Total	**41,611**	**25,825**	**62**	**3,466**	**8**	**12,321**	**30**	**15,786**	**38**
Puerto Rico	558	299	54	63	11	196	35	259	46

Note: Percentages are calculated from unrounded data. Totals may not equal sum of components due to independent rounding.

Table 2
Total and Alcohol Related Traffic Fatalities 1982-1999

Calendar Year	Number of Traffic Fatalities	Number of Alcohol-Related Traffic Fatalities*	Percent Alcohol Related*
1982	43,945	25,165	57.3%
1983	42,589	23,646	55.5%
1984	44,257	23,758	53.7%
1985	43,825	22,716	51.8
1986	46,087	24,045	52.2%
1987	46,390	23,641	51.0%
1988	47,087	23,626	50.2%
1989	45,582	22,404	49.2%
1990	44,599	22,084	49.5%
1991	41,508	19,887	47.9%
1992	39,250	17,858	45.5%
1993	40,150	17,473	43.5%
1994	40,716	16,580	40.7%
1995	41,817	17,247	41.2%
1996	42,065	17,218	40.9%
1997	42,013	16,189	38.6%
1998	41,471	16,020	38.6%
1999	41,611	15,786	37.9%

Source: National Highway Traffic Safety Administration

* Represents the number/percent of traffic fatalities that occurred in crashes in which at least one driver or non-occupant registered any alcohol in their blood BAC of 0.01 or higher.

Table 3
Alcohol Involvement for Drivers in Fatal Crashes, 1989 and 1999

Drivers Involved in Fatal Crashes	1989		1999		Change in Percent 1989-1999
	Number of Drivers	Percent with BAC 0.10 or Greater	Number of Drivers	Percent with BAC 0.10 or Greater	
Total Drivers					
Total *	60,435	24	56,352	17	-29%
Drivers by Age Group (Years)					
16-20	9,442	20	7,973	14	-30%
21-24	7,723	35	5,620	27	-23%
25-34	15,928	32	11,734	24	-25%
35-44	10,106	25	11,023	21	-16%
45-64	10,240	17	12,292	13	-24%
Over 64	5,431	7	6,559	5	-29%

*Numbers shown for groups of drivers do not add to the total number of drivers due to unknown or other data not included.
Source: National Highway Traffic Safety Administration, *Traffic Safety Facts 1999 - Alcohol*

Table 4
Alcohol Involvement for Drivers Killed in Fatal Crashes, 1989 and 1999

Drivers Fatalities	1989		1999		Change in Percent 1989-1999
	Number of Driver Fatalities	Percent with BAC 0.10 or Greater	Number of Driver Fatalities	Percent with BAC 0.10 or Greater	
Total Driver Fatalities					
Total	26,389	37	25,210	28	-24%
Driver Fatalities by Crash Type and Time of Day					
Single-Vehicle	12,999	53	12,118	43	-19%
Daytime*	4,393	27	4,896	19	-30%
Nighttime**	8,362	66	6,980	59	-11%
Multiple-Vehicle	13,390	22	13,092	14	-36%
Daytime*	7,747	9	8,435	6	-33%
Nighttime**	5,637	40	4,645	28	-30%

*6:00 AM to 6:00 PM
**6:00 PM to 6:00 AM
Source: National Highway Traffic Safety Administration, *Traffic Safety Facts 1999 – Alcohol*

Table 5
Number of Arrests for Driving Under the Influence of Alcohol or Drugs (DUI) and Rate of Arrest for DUI, 1986-97

Year	Arrests for DUI	Rate of Arrest for DUI per 100,000 Drivers
1986	1,793,300	1,124
1987	1,727,200	1,067
1988	1,792,500	1,101
1989	1,736,200	1,049
1990	1,810,800	1,084
1991	1,771,400	1,048
1992	1,624,500	938
1993	1,524,800	881
1994	1,384,600	789
1995	1,436,000	813
1996	1,467,300	817
1997	1,477,300	809
Percent change, 1986-97	-17.6%	-28.0%
Average Annual Change, 1986-97	-1.7%	-2.9%

Source: Bureau of Justice Statistics, *DWI Offenders under Correctional Supervision*, June 1999

Table 6
Number of DWI Offenders on Probation or in Jail or Prison

	DWI Offenders 1997		DWI Offenders 1986	
	Estimated Number	Percent	Estimated Number	Percent
Total	513,200	100.0%	270,100	100.0%
Probationers'	454,500	88.6%	248,200	91.9%
Felons	78,200	15.5%	---	---
Misdemeanants	376,300	73.3%	---	---
Jail Inmates	41,100	8.0%	18,600	6.9%
Convicted	33,600	6.5%	16,300	7.6%
Unconvicted	7,500	1.5%	2,300	1.1%
State Prisoners	17,600	3.4%	3,300	1.2%

Source: Bureau of Justice Statistics, *DWI Offenders under Correctional Supervision*, June 1999

II. HIGHLIGHTS OF THE RESEARCH ON WHAT WORKS

This chapter presents highlights of what the evaluation research tells us about what works to reduce alcohol-impaired driving and underage drinking. For a discussion of technical research methods and measurement issues, see chapter III (begins on page 25). For more detailed descriptions and research findings associated with specific laws and programs, see chapter IV (begins on page 34).

A wealth of research has been conducted on the implementation and effectiveness of laws and programs aimed at reducing alcohol-impaired driving and underage drinking. In the time allocated to this project, OLO reviewed dozens of evaluation studies and research articles. However, given the large volume of available material, we cannot claim to have performed an exhaustive review. As a result, we present these highlights with the caveat that they are based on the research we reviewed; the appendix contains a list of our resources.

This chapter organizes research highlights into three sections:

- Section A summarizes the research findings on improved highway safety:
- Section B summarizes the research findings on recidivism rates; and
- Section C summarizes other research findings on effectiveness by intervention area.

A. Research Findings on Improved Highway Safety

Traffic fatality statistics show that annual traffic deaths related to alcohol have dropped by more than one-third since the early 1980's. During this time, the per year number of young people who died in a crash where an intoxicated young driver was involved declined by more than 63%.

Multiple safety improvements occurred during this time period, including air bags and mandatory seat belt and child restraint laws. However, the highway safety research concludes that these general safety improvements alone do not explain the large reduction in alcohol-related fatalities.

Evaluation studies credit the following laws and programs for contributing to the decline in alcohol-related traffic fatalities between 1982 and 1999:

- **The adoption of state laws aimed at general and specific deterrence. This includes raising the minimum legal drinking age to 21, illegal BAC per se laws, zero tolerance laws for under 21 drivers, and administrative license suspension (ALS) laws.**

- **Enhanced state and local enforcement efforts including well-publicized sobriety checkpoints; and**

- **The implementation of comprehensive community programs that target a range of risky driving behaviors.**

Examples of specific research that supports these findings are listed below.

- A study of minimum drinking age laws found that states that raised the minimum drinking age to 21 in the early 1980's experienced a 10% to15% decline in alcohol-related deaths among youth, compared to states that adopted the law later. (Blincoe, 1996 cited in NIAAA, 2000)

- A study of the first 12 states to implement zero tolerance laws found that states adopting these laws experienced a 20% decline in single-vehicle nighttime crashes (crashes most likely to involve alcohol) among drivers under 21 compared with states that did not lower BACs for drivers under 21. (Hingson, 1994)

- A study of administrative license suspension (ALS) laws found a 6% decrease in alcohol-related crashes in 17 states. (Klein, 1989 cited in Transportation Research Board, 1995). Another study of ALS and vehicle impoundment laws in Canada found a 12% decrease in alcohol-related fatalities (Bierness, Simpson and Mayhew, 1997 cited in Jones and Lacey, 2000)

- A study of fatal crash experience in 11 states examined the effects of the .08 legislation before and after the laws were enacted. The study concluded that the .08 law change –in conjunction with ALS laws- was associated with significant declines in alcohol-related fatalities in seven states, by itself, .08 legislation was associated with significant declines in alcohol-related deaths in five states. (Apsler et al., April 1999)

- An evaluation of an extensive statewide sobriety checkpoint program in Tennessee showed a 20% reduction in fatal crashes involving at least one driver with a BAC of .10 or greater. Nighttime single vehicle crashes decreased almost 6%. The effects in Tennessee were apparent for up to two years following the end of the program. (Lacey et al., 1999)

- A study of a comprehensive community-based program in Massachusetts (the Saving Lives Program) reported a significant decline in alcohol-related crashes during the five years of program operations (Hingson, 1996)

Researchers estimate that 75% of drivers whose licenses are suspended drive anyway. However, they have also found that drivers with suspended licenses drive less often and more carefully to avoid detection. This effect helps to explain why research studies show that ALS laws are associated with general traffic safety benefits in addition to a reduction in alcohol-related traffic fatalities. (Hagen, 1980, Ross and Gonzales, 1988, cited in Voas et al., 1998)

- One study found that implementation of ALS laws was associated with a range of traffic safety benefits and that longer periods of license suspension were associated with significantly fewer alcohol-related crashes. The study reported during a three-year follow-up period that license suspensions were associated with reduced total crashes and reduced alcohol-related crashes for both first-time and multiple offenders. (Mann, Vingilis et al., 1991)

- Another study found a 9% reduction in the number of drivers involved in fatal nighttime crashes in eight states that enacted ALS laws. (Cited in Voas et al., 1998)

Research findings are inconclusive as to whether mandatory sentencing laws for DWI offenders have contributed to a decline in alcohol-related traffic fatalities. Some state-level studies report that the number of alcohol-related traffic fatalities declined following the adoption of mandatory sentencing laws, whereas other studies found no change. For example:

- A study of mandatory sentencing laws in Maine reported an immediate 33% reduction in fatal traffic crashes compared to fatal crashes in the control states. By the third year after the study, however, the rate of fatal crashes in Maine had returned to the pre-reform level. (Robin, 1991)

- A study of the impacts of a mandatory jail law in Tennessee reported that no decrease in alcohol-related fatal crashes could be found that could reasonably be attributed to the mandatory jail law, although there might have been a small favorable effect for a short time after the law was introduced. (Jones and Lacey, 1988)

A number of studies link the implementation of alcohol control measures to a reduction in alcohol-related traffic fatalities. However, these studies tend to be questioned on the grounds of flawed methodology. For example:

- One researcher estimated that increasing the beer tax to its real 1951 value would produce a 27% decrease in alcohol-related fatalities. (Chaloupka et al., 1993 cited in NIAAA, 2000) Other research, however, questions the reliability of the estimated relationship between taxes and traffic fatalities, and concludes that higher taxes do not raise the cost of beer prices sufficiently to act as a deterrent among any age group. (FSU Research 1998/1999)

- A study of mandated server training in Oregon found that single vehicle nighttime crashes declined after almost 40,000 servers and managers completed a state-mandated server training course. (The number of crashes declined 11% the first year, 18% the second year, and 23% the third year.)

The researchers, however, had no direct evidence of changes in server behavior so were unable to conclude how much of the crash reduction was due to the server training. (Holder and Wagenaar, 1994 cited in NIAAA, 2000)

B. Research Findings on DWI Recidivism

Many research studies measure the effectiveness of a DWI-related intervention by examining whether its implementation results in a lower recidivism rate for a test group of DWI offenders compared to a control group. Most researchers measure DWI recidivism by the number of times an offender is re-arrested (or re-convicted) for an alcohol-related traffic offense within a specified amount of time.[1]

The evidence on whether education and treatment programs reduce an offender's chances of re-arrest for DWI is mixed. A consistent finding is that combining treatment with more traditional sanctions is more effective than either intervention alone. Another consistent finding is that educational programs alone have a limited impact on repeat offenders and typically do not bring about any behavioral change in their drinking and driving behavior.

- A meta-analysis of treatment programs published in 1995 suggests that, on average, treatment and rehabilitation reduced the incidence of repeat DWI offenses by up to 9% compared to standard sanctions such as jail or fines. In addition, the study confirmed earlier research that treatment strategies that combine punishment, education, and therapy with follow-up monitoring and aftercare appear to be more effective both for first-time and repeat offenders than any single approach. (Wells-Parker et al., 1995)

- A recent study that reviewed 10 year outcome data on treated DWI offenders reported that many programs show positive short term results, but when outcomes are evaluated at two, three, four and five-year intervals, beneficial results have dissipated or even reversed – showing that treated subjects fare significantly worse than untreated controls. Alcohol education, 12-step programs, counseling approaches, and therapy have consistently shown that, after a minimum of five years post-treatment, treated subjects either show the same - or even higher - recidivism rates as controls. (Little, Robinson, Burnett and Swan, 2000)

- One study of drug courts reported that groups of DWI offenders participating in treatment had substantially lower rates of criminal behavior while in the program than groups of DWI offenders that followed the traditional criminal

[1] For a discussion of methodological issues related to measuring recidivism, see page 32.

justice process. (Belenko, 1998 cited in Breckenridge, 2000) An evaluation of a DWI Drug Court in New Mexico found that among offenders identified as alcoholics, the treatment group had significantly fewer re-convictions than the non-treatment group over a two year period. (Breckenridge, 2000)

Evaluation research reports that administrative license suspension (ALS) laws and vehicle impoundment laws are associated with lower recidivism rates. In some cases, these interventions have been implemented together; in other cases they have operated independently. For example:

- One study of license plate impoundment in Minnesota found three time offenders whose license plates were impounded by an officer at the scene of a DWI arrest had a 13% recidivism rate two years after their arrest date, compared to a 26% recidivism rate for the control group. The recidivism rates for four time offenders were 17% for the test group and 26% for the control group. (Rodgers, 1994 cited in Jones and Lacey, 2000)

- A study of a vehicle impoundment program in Portland, Oregon showed recidivism rates for drivers whose vehicles were seized were about half the recidivism rates of a similar group whose vehicles were not taken (Crosby, 1995)

Research findings suggest that an ignition interlock program reduces recidivism while the device is installed on the offender's vehicle. However, the research also shows that recidivism rates increase after the interlock device is removed. For example, one study found that five of the six ignition interlock programs examined reduced a DWI offender's recidivism rate while the interlock device was installed on the offender's car. Interlock participants had recidivism rates that were 16% to 69% lower than recidivism rates for control groups. One of the studies reviewed in this evaluation and other evaluation research studies found that recidivism rates returned to pre-program levels or higher after the interlock device was removed. (Coben and Larkin, 1999)

Research results are inconclusive as to whether diversion programs effectively lower recidivism rates. The body of evaluation studies on diversion programs report conflicting findings and conclusions. For example:

- A three-year study of District Court sentences in Maryland found that offenders who received probation before judgment (PBJ) had the lowest recidivism rates for all disposition types, when all defendants without prior convictions were isolated. (Boersema, 1990).

- A second Maryland study that examined the incremental effects of PBJs on recidivism rates over an eight-year study period concluded that PBJs contributed to an increase in recidivism. (Rauch, 2000)

- A ten-year evaluation of a diversion program in El Paso, Texas found individuals in the control group had a significantly greater risk of re-arrest than individuals who completed a pretrial intervention program. The study also reported that participants in the diversion program took much longer to be re-arrested. (Lucker et al., 1997)

Research studies of different probation strategies for DWI offenders report mixed results as to whether they effectively reduce recidivism rates while they are in place. One study of a day reporting center in Arizona found this program had the same recidivism rate (8%) after one year as the standard probation program. (Jones and Lacey, 1999) Another study found that offenders participating in an electronic monitoring program in California had a lower recidivism rate after a one-year period (5.6%), compared to offenders on traditional probation (10.7%). (Jones and Lacey, 1996) A third study of electronic monitoring in Palm Beach County, Florida found 6.5% of the offenders were referred back to court during the monitoring period, compared to 31.8% referred back to court after the electronic monitoring period ended. (Lilly et al., 1993)

Research studies that examined the effect of incarceration on DWI recidivism have found that jail terms are no more effective than other sanctions in reducing recidivism, for either first time or repeat offenders. Some studies suggest that offenders who serve time have higher recidivism rates than those who do not. Specifically:

- A study of randomly selected impaired driving offenders in Harris County, Texas found that jail terms were no more effective in reducing recidivism than were sentences of fines and probation. (Wheeler and Hissong, 1998)

- A study of sentences imposed for offenders charged with impaired driving in Maryland between 1985 and 1987 concluded that jail sentences appeared to have a negative impact on subsequent conviction rates. The average recidivism rate for an offender sentenced to jail was 18% compared to an average recidivism rate of 14% for all other types of sentences. The study also reported that first offenders sentenced to jail had a recidivism rate of 44% compared to a recidivism rate of 24% for those given suspended sentences. (Boersema, 1990)

- Two studies of mandatory jail laws found higher impaired driving recidivism rates for repeat offenders. One study compared the recidivism rates for repeat offenders to the recidivism rates of those sentenced under the previous law. Another study compared the recidivism rate for mandatory jail to the recidivism rate for those sentenced to residential confinement or for those who received a suspended sentence. (Salzberg and Paulsrude, 1983 and Siegal, 1985 cited in Morse and Elliott, 1992)

C. Other Research Highlights By Intervention Category

Identification and Enforcement

- Implied Consent Laws. Research shows that breath test refusals are common. One study, which looked at breath test data across all states, found that about one in five drivers refuses a proper police request to take a breath alcohol test. The study also noted that refusal rates varied significantly among states. For example, the refusal rate in Hawaii was 2% and the refusal rate in Rhode Island was 71%. (Jones et al., 1991)

  A 1995 study examined the effect of Minnesota's law that criminalized breath test refusal for drivers with prior incidents. Although the study found a minor reduction in the rate of test refusal, the researchers concluded that the effect of this law was disappointedly small.

- Sobriety Checkpoints. Multiple research studies have concluded that sobriety checkpoints, when combined with extensive publicity about their use, are an effective short-term strategy to deter alcohol-impaired individuals from driving. Occasional enforcement blitzes are shown to have only a minimal long-term deterrent effect.

  Sobriety checkpoints are deemed effective as a short-term deterrent even though it is well documented that the checkpoints themselves do not detect a significant proportion of drinking drivers. Field studies have found that because of the short interview time, officers at sobriety checkpoints fail to detect approximately half of all drivers with BACs over .10 who are stopped. Some of the reasons are that:

  - Some alcoholic beverages have little odor (e.g., vodka);
  - In some cases, a breath mint, heavy perfume, or car exhaust can block the ability of an officer to smell the odor of alcohol on a driver's breath; and
  - Some persons (especially hard core drinkers) with a high BAC do not display the behaviors typically associated with drinking.

- Passive Alcohol Sensors. Lab tests show that although a PAS is not as accurate as an evidentiary breath tester, a PAS is able to identify alcohol in exhaled breath with "sufficient accuracy" to identify people with a high BAC. Field tests on the use of PASs at sobriety checkpoints find that when officers used PAS devices, the detection rates of impaired drivers at all BAC levels increased. For example, one study found that the detection rates for drivers with a low BAC increased from 10% to 39%, and that the detection rates of drivers with a high BAC increased from 55% to 71%. (Ferguson et al., 1995 cited in Insurance Institute for Highway Safety, June 2000)

Law enforcement officers hold mixed opinions about the benefits and drawbacks of using PASs. Some officers find that using a PAS makes checkpoints more efficient. Some officers, however, have concerns about how close the devices require the officer to be to the subject, that the PAS represents one more item to be held, and that a PAS requires the officer to divert at least part of his/her attention to the sensor readings. (Leaf, 1996; Foss 1993)

Sentencing and Adjudicatory Strategies

- Sentencing in General. Studies of DWI sentencing practices indicate that current sentences contain a mix of traditional sanctions (fines, license suspension, and jail time) and alternative sanctions (probation, ignition interlock). The studies also suggest that judges generally impose minimum sanctions for misdemeanor DWI offenses, with an emphasis on treatment and probation.

  One study that examined the relationship between sentence severity, post conviction accidents, and drinking driving convictions concluded the impact of sentence severity on the future driving behavior of offenders remains unclear. The study found that license suspensions were consistently associated with traffic safety benefits; however, an increase in the severity of other aspects of punishment either seemed unrelated to outcomes or was associated with increased traffic safety problems. (Mann, Vingilis et al., 1991)

- Mandatory Sentencing. A National Institute of Justice (NIJ) research review concluded that, in general, mandatory sentencing laws do not achieve certainty and predictability because officials circumvent them if they believe the results are unduly harsh. In addition, NIJ concluded that mandatory sentences are arbitrary for minor cases, and may occasionally result in an unduly harsh punishment for a marginal offender. Other research on the impact of mandatory sentencing for DWI offenders parallels the findings and conclusions of the NIJ's study.

- Drug Courts. A recurring theme of the research on drug courts is that offender groups that received treatment had substantially lower rates of criminal behavior while in the program than groups of offenders that followed the traditional criminal justice process. An evaluation of the Miami Drug Court found that re-arrest rates for those who completed the program were 49% lower than those who did not complete the program.

- Court Watch Programs. The research on the effectiveness of court watch programs is limited. The few studies suggest that the presence of a court watch program may lead to somewhat stricter penalties for DWI offenders, especially for first-time offenders whose BAC level was only slightly above the legal limit.

Alcohol Control Policies

- Server Liability Laws. There is some evidence that active enforcement of server liability laws affects server behavior, at least in the short-run. One study found that refusals of alcohol service to researchers simulating intoxication increased from 18% to 54% directly following an enforcement effort that included visits and warnings by law enforcement. The rate of service refusal decreased again several months later. (McKnight and Streff, 1994 cited in NIAAA, 2000).

- Alcohol outlet density. A well-known study conducted in the 1980's found that higher outlet density in Tennessee was associated with increased motor vehicle mortality. (Dull and Giacopassi, 1988) Other research suggests that greater physical availability of alcohol is related to higher arrest rates for drunken driving and public drunkenness. (Rush et al., 1986; Watts and Rabow 1983 cited in Transportation Research Board, 1995).

Underage Drinking

- Research studies on trends in underage drinking and driving consistently identify the passage of minimum drinking age laws and zero tolerance laws as contributing greatly to the overall reduction in alcohol-related fatalities among young people, and reduction in consumption of alcohol among young people. (NIAAA, 2000)

- These laws are also credited with contributing to a reduction in the proportion of high school seniors who reported drinking in the previous month. In 1999, 51% of seniors reported drinking in the previous month, compared to 72% in 1980. (Monitoring the Future Study, 1999 cited in OJJDP, 1999)

- Underage drinking laws are not consistently enforced across the country. One research study concluded that buyers who appear to be younger than 21 can successfully purchase alcohol without showing age identification more than half of the time. (Forster et al., 1994, 1995 cited in NIAAA, 2000) Another team of researchers estimated that only two in 1,000 occasions of underage drinking result in arrest, and that only five of every 100,000 occasions of youth drinking result in a sanction against an alcohol outlet. (Wagenaar and Wolfson, 1994 cited in NIAAA, 2000)

- The literature on the effectiveness of different countermeasures targeted at reducing underage drinking cites the following challenges to enforcing the laws aimed at reducing underage drinking.

    - Underage drinkers tend to drink in homes, parks, or other remote locations. Police on special patrol for drunk drivers in general often concentrate on roadways leading to and from establishments that sell alcohol.

    - Young people tend to drink on weekend nights when police officers are in high demand for other activities.

    - Enforcement of zero tolerance laws are difficult because underage drinkers with low BACs may not exhibit the obvious impaired behavior that typically provides officers with probable cause for an initial traffic stop.

    - Even after stopping an underage driver, an officer may have difficulty identifying a driver who has a low BAC. A driver with a BAC of .02 for example is much less likely to have the odor of alcohol on his/her breath or bloodshot eyes.

    - Underage drivers who are impaired often display behaviors at low BACs that are different than those in older drivers. For example, signs of youthful impaired driving include speeding, aggressive driving, and hard weaving.

- Comprehensive Community Programs - There is little quantitative data that documents a direct link between comprehensive community programs and a reduction in underage drinking. However, a number of studies conclude that a characteristic shared by some of the most "successful" programs is the existence of a community-based policy group that includes representatives from public agencies and the community.

- Graduated licensing programs - Evaluations of graduated licensing programs in Maryland, California, and Oregon have found an association between the introduction of these programs and reductions in crash rates and traffic violations among young drivers. Nighttime curfews are identified as a critical component of an effective graduated licensing program.

- License Suspension/Revocation - Studies of licensing actions have demonstrated the effectiveness of administrative licensing revocation among adults. It is believed that license suspension and revocation practices (use and lose laws) serve as a powerful deterrent among young drivers because a driver's license is such a prized possession for young people.

CLOSING OBSERVATIONS

A review of the research underscores the complexity of the problems associated with alcohol-impaired driving and underage drinking. The many research findings make it clear that there is no single strategy guaranteed to reduce alcohol-related traffic fatalities, offender recidivism, or the incidence of underage drinking.

Different DWI-related interventions have multiple goals that sometimes conflict. This fact, combined with the problems faced in accurately measuring the individual or collective effects of specific strategies, makes it nearly impossible to reach definitive conclusions about the relative effectiveness of one strategy versus another.

Nonetheless, the wealth of quantitative and qualitative research that has been conducted is a valuable source of lessons learned. Knowing what strategies have been evaluated, and knowing that a particular law or program "worked" or "did not work" or "worked differently than anticipated" under certain conditions can help policymakers decide how and where to direct future efforts to reduce alcohol-impaired driving and underage drinking.

III. RESEARCH METHOD AND MEASUREMENT ISSUES

Chapter IV of this report presents more than two dozen strategies currently being used across the country to address problems related to alcohol-impaired driving and/or underage drinking. For each strategy, this report describes how the intervention works and summarizes the results of evaluation research on its effectiveness.

Accurate interpretation of the research results calls upon the reader to be aware of some methodological issues. These methodological issues are the subject of this chapter, which addresses:

- The multiple and sometimes conflicting definitions of "effectiveness;"
- The different types of evaluation studies;
- The various measures and sources of data used to quantify the effects of specific strategies; and
- Reporting percentage changes.

THE DIFFERENT MEANINGS OF "EFFECTIVE"

The many different laws and programs aimed at reducing alcohol-impaired driving and/or underage drinking do not share an identical set of goals. The specific purpose(s) of a particular intervention may include one or more of the following goals:

- Improved roadway safety – reducing the number of fatalities and accidents caused by alcohol-impaired driving.
- Education – teaching individuals about the risks associated with alcohol and driving.
- General deterrence – discouraging the general population from drinking and driving by creating the perception of severe, quick and certain punishment.
- Specific deterrence – discouraging a subset of the driving population from re-offending by creating the perception of severe, quick and certain punishment.
- Rehabilitation – changing the behavior of an offender, usually through some type of treatment, so that he/she does not re-offend.
- Incapacitation – restricting an offender's ability to commit a new violation regardless of whether he/she is "cured" or not.
- Restitution – compensating a victim for an injury or inflicted harm.
- Punishment – inflicting a penalty on an individual as retribution for an offense.

When an evaluation study concludes that a particular strategy or intervention is "effective," it is important to understand exactly what the study does or does not mean. In other words, the reader must be mindful of what results the researcher is citing as evidence that the law or program is a success.

The research published on administrative license suspension (ALS) provides a good example of why it is critical to understand a study's definition of success. Numerous evaluations conclude that using ALS is "effective." At first blush, one might think this means that ALS is effective because it takes an offender's driver's license away and thereby restricts an offender's ability to commit a new DWI offense. However, the fact is that, in practice, ALS is very ineffective at incapacitating a driver because 75% of drivers whose licenses are suspended continue to drive anyway. Instead, researchers have concluded that ALS is effective because: (1) the threat of license suspension has been found to work with many drivers as an effective deterrent to drinking and driving, and (2) ALS improves roadway safety because drivers whose licenses are revoked actually drive more carefully to avoid detection.

Readers should also keep in mind that different people can legitimately view the effectiveness of the same intervention differently because they do not agree on the desired outcome. For example, citizen groups in favor of severe punishment for DWI offenders support incarceration and mandatory sentencing because these sanctions punish an offender. However, others who define success as lower recidivism of offenders (measured in terms of DWI offenders being re-arrested for alcohol-impaired driving) may not deem incarceration effective because of research that shows DWI offenders who serve time in jail have higher recidivism rates than those who do not.

TYPES OF EVALUATION STUDIES

Researchers use different types of evaluation designs to describe a specific program or test the quantitative impact of an intervention. The case study design tends to be a qualitative research approach whereas the quasi-experimental design and time series design are quantitative research approaches.

- A **case study design** describes a program or system and may evaluate the effects of a specific intervention. Researchers may prepare case studies of multiple sites and look for similarities and differences among the sites. For a case study evaluating a specific program, a researcher will often supplement a case study with measures of the target behavior at one point before the intervention and one point after the intervention.

- A **quasi-experimental design** compares outcome data for two similar groups or communities. A quasi-experimental design could evaluate the effects of a specific law or the effects of a particular treatment or probation program. The test group refers to the community that has enacted the law or the group of individuals that have participated in a program. The control group must be similar to the test community or group but will not have enacted the law or participated in the program.

- A **time series design** is a before and after study that compares outcome data from the same community for two time periods: before the intervention occurs and after the intervention takes place. Like the quasi-experimental design, a time series design could evaluate the effect of adopting a law in a community or the effects of a specific program on a group of individuals.

- A **laboratory test** evaluates the operation of equipment in a controlled environment.

- A **field test** evaluates the operation of equipment in an everyday working environment. Compared to a lab test, a field test will subject equipment to more rugged conditions and more unpredictable situations.

Challenges Inherent to Social Science Research

The quasi-experimental design and the time series design are both quantitative approaches that analyze data using statistical tests. The results of these studies are most reliable when:

- They are conducted over long periods of time with large, randomly assigned control and test groups;
- The researcher can isolate the effect of the countermeasure; and
- The data being analyzed is a direct and accurate measure of the activity or behavior of the group.

Unfortunately, these ideal conditions do not exist for most evaluation research of DWI countermeasures.

In the real world, it is not feasible to randomly assign laws to certain states or communities or to randomly assign offenders to certain sentences. As a result, a research study that uses a quasi-experimental design must attempt to match the test and control sites, especially with respect to variables that are likely to affect the study's outcome. For example, an evaluation of the effects of a mandatory sentencing law in Tennessee devoted considerable effort to identifying a control site by identifying neighboring state(s) that had a traffic crash data series that most closely matched Tennessee's

One of the biggest obstacles to reliable DWI-related evaluation work is that, in practice, jurisdictions often enact packages of laws and programs aimed at reducing alcohol-impaired driving. When this happens, it becomes difficult (often impossible) to disentangle the specific impact of one particular law or program.

Another challenge facing criminal justice researchers is known as the "dark figure problem." This refers to the fact that a large number of crimes are not reported, which means that statistics compiled from government records undercounts the true number of crimes committed. In the DWI-research world, for example, the number of DWI arrests

is not the same as the number of alcohol-impaired drivers. In fact, it is estimated that for every one DWI arrest, there are between 200 and 1000 alcohol-impaired drivers who are not arrested.

The data that researchers use to measure the impact of a program are often a mix of actual counts and estimates, and/or surrogate measures. The next section looks in more detail at measures and sources of data.

MEASURES AND DATA SOURCES

Research that evaluates the effectiveness of strategies to curb impaired driving typically examines whether the intervention had an impact on roadway safety and/or driver behavior. Measures of changes in roadway safety include data on traffic accidents, both crashes and fatalities. Measures of changes in driver behavior include the results of roadway surveys, changes in the number of DWI arrests, or changes in the recidivism rate of offenders based on arrests or convictions.

Measuring Changes in Roadway Safety

Researches examine accident data to determine the effect of a particular intervention on roadway safety. The sources of accident data include police reports, traffic fatality estimates reported by NHTSA, and traffic crash data.

The evaluation literature states that half of all accidents are not reported to police and that police under-reporting of alcohol-involvement in crashes is well documented. Some researchers use estimates of alcohol involvement in traffic accidents using regression techniques and secondary data sources. However, most evaluation studies that look at effectiveness in terms of changes in roadway safety rely on accident data collected and reported by the National Highway and Traffic Safety Administration. (NHTSA)

NHTSA Data. The DWI research literature relies heavily on NHTSA's definitions and data. According to NHTSA:

- A *traffic fatality* is a death due to a traffic accident or crash.
- A *fatal crash* is a traffic accident that results in one or more deaths.
- An *alcohol-related traffic fatality* is a death due to a police-reported traffic crash where any driver or non-occupant involved in the crash had a measurable amount of alcohol in their blood (BAC .01 or greater).
- A *driver in a fatal crash* is considered *an alcohol involved driver* if he/she and exhibits a BAC of .01 or greater.

NHTSA uses actual data on alcohol-related crashes supplied by each state to develop *estimates* for alcohol involvement in fatal crashes. Each state is responsible for administering blood alcohol concentration (BAC) tests for both dead and injured drivers. NIAAA reports that the national testing rate for drivers killed was 73% in 1997. (This represented a large increased from the 55% tested in 1977.) According to NIAAA, as of January 1997, 31 states had legislation mandating BAC testing of dead drivers. In practice, 17 of the 31 tested fewer than 80% of all drivers killed.

Although the nationwide testing rate has improved in the last twenty years, testing rates continue to vary widely by state. Testing rates are lower for surviving drivers than for dead drivers because many states prohibit mandatory testing of surviving drivers. Among surviving drivers, the rate increased from 16% in 1977 to 30% in 1997. In 1997, no state tested more than 80% of its surviving drivers.

Alcohol-related traffic fatality estimates

NHTSA's procedure for estimating alcohol traffic fatalities analyzes the crash characteristics of each fatal accident involving alcohol and uses a statistical model to estimate whether a driver or non-occupant in a fatal crash where test results were not available was sober (BAC=0), had some alcohol (BAC .01-.09) or was intoxicated (BAC .10 or greater).

The data on fatal crashes comes from the Fatality Analysis Reporting System (FARS), a data system developed and maintained by National Center for Statistics and Analysis. FARS includes motor vehicle traffic crashes that result in fatality to a vehicle occupant or non-occupant. Death from injuries can occur up to 30 days after a crash. The sources of data for FARS include police accident reports, state vehicle registration files, state driver licensing files, state highway department data, vital statistics, death certificates, medical examiner reports, hospital medical records, emergency medical service records,

NHTSA reports a nationwide estimate of alcohol traffic fatalities as well as individual estimates for the 50 states, the District of Columbia and Puerto Rico. NHTSA reports both the data based on actual tests and the estimated data in its reports of alcohol involvement in fatal crashes. NHTSA cautions researchers to be careful in comparing levels of alcohol involvement among states because of the different rates of actual testing. NHTSA notes differences in the incidence of alcohol-related traffic fatalities could be due to many factors that are not related to the effectiveness of a state's alcohol traffic safety program. Some of these unrelated factors are:

- Population demographics and economic employment, e.g., older drivers and female drives have lower levels of alcohol involvement.

- The degree of urbanization in a region, e.g., alcohol involvement in single and multi vehicle crashes is greater in urban fatal crashes; alcohol involvement in non-occupant fatal crashes is higher in rural area.

- The types of vehicles, e.g., motorcycle drivers have higher levels of alcohol involvement followed by drivers of light trucks/vans; drivers of medium and heavy trucks have the lowest level of alcohol involvement.

The evaluation research literature notes that the imprecision introduced by the estimating process is magnified in studies that analyze data for short time periods or for smaller geographic areas.

Surrogate measures - crash series data

An alternative to using NHTSA estimates of alcohol-related fatalities is to compile data on the number of fatalities in all traffic crashes, with an emphasis on those crashes where a high percentage of the drivers were legally impaired. These data, which are also compiled and reported by NHTSA, can be reported according to the time of crash and/or the number of vehicles involved.

DWI-related evaluation studies frequently analyze driver fatalities resulting from single vehicle crashes occurring late at night ("nighttime single vehicle crashes") because research has shown these crashes are more likely to involve alcohol than multi-vehicle crashes in daylight hours. For example, in 1999, 59% of the 6,980 drivers killed in single vehicle nighttime fatal crashes were legally impaired, compared to only 19% of the 4,896 drivers killed in single vehicle daytime fatal crashes.

While the use of driver fatalities from fatal crash data may address the imprecision inherent in NHTSA's alcohol-related fatality estimates, this approach still presents limitations for scientific evaluations of DWI interventions. Specifically:

- A large number of serious crashes are NOT alcohol-related and cannot be expected to change as a function of laws or programs targeted at reducing alcohol-impaired driving.
- The more specific the series and the smaller the database, the greater the random variability will be. This makes it more difficult to find statistical significance in the changes associated with a specific countermeasure.
- Identifying those drivers with a BAC of .10 or greater does not capture all drivers who are impaired. Presumably, driver fatalities with a BAC below .10 are counted in the total number of driver fatalities but not among those that are legally impaired.

Measuring Changes in Driver Behavior

Research studies that measure changes in driver behavior may focus on the behavior of an individual (specific deterrence) or the general driving population (general deterrence). Roadside surveys, changes in traffic fatality measures (discussed above) and changes in the number of arrests are the most common measures of whether an intervention creates a general deterrent effect. A recidivism rate, based on arrests or convictions, is the most common measure to determine whether an intervention achieves specific deterrence.

Roadside driver surveys. Roadside surveys stop cars at a checkpoint and ask the driver to take a sample breath test for research purposes. It is found that a high percent (95%) of drivers cooperate with researchers conducting these surveys, which are conducted in cooperation with law enforcement agencies.

Roadside surveys provide a reliable method to measure the number of drivers who are impaired during times when the most drinking and driver occurs. The surveys are expensive to conduct but provide important data about the general deterrent impact of an enforcement program or other intervention strategy.

Number of Arrests. Some evaluation studies use changes in the number of DWI arrests to measure the general deterrent effect of an enforcement strategy. However, it is also argued that the use of arrest data is an inadequate measure because changes in the arrest rate in either direction can be interpreted differently. On the one hand, a larger number of DWI arrests can be cited as evidence that intensified enforcement is working because more impaired drivers are being detected. On the other hand, a decrease in the number of DWI arrests can be cited as evidence of success because it shows there are fewer impaired drivers on the road.

Other evaluation studies track individual arrest data to assess whether an intervention is effective as a specific deterrent. These studies use arrest data to calculate a recidivism rate for a group of offenders. The researchers must usually decide what types of arrest to count as a re-arrest. Some studies require the new arrest to carry the same charge as the original charge; others count a new arrest for any alcohol-related charge. Other studies report re-arrests for alcohol related charges and also calculate a recidivism rate for re-arrests for other traffic offenses. Still other studies calculate a recidivism rate based on a re-arrests for any misdemeanor crime. (Note – Researchers do not agree on whether arrests or convictions are the more appropriate method for calculating recidivism. See the discussion under recidivism below.)

Some research studies also use arrest data to differentiate between a first offender and a second offender. A first offender is defined as an individual with no prior arrests; a second (or repeat) offender is defined as an individual with one or more prior arrests. In

light of the dark figure problem that a large amount of impaired driving goes undetected, it is important to remember that the labels of "first offender" and "second offender" can only refer to the number of times an individual has been apprehended, not the number of times he or she has actually committed the offense.

Conviction Rates. Some evaluation studies use conviction rates as the basis for calculating a recidivism rate and measuring the effectiveness of an intervention as a specific deterrent. This rate is commonly thought to represent the number of arrested individuals who are actually convicted of a crime.

In practice, a research study that examined how conviction rates are calculated found many jurisdictions do not have data systems to track or report this number and that it was difficult to relate convictions to arrests within a specified time period. The study a more common approach is to calculate the conviction rate as the number of convictions divided by the number of disposed cases. This approach does not account for cases that are dismissed for failure to appear or for cases that are diverted before trial. Because the methods for calculating conviction rates vary, researchers are cautioned against comparing conviction rates across jurisdictions. (Jones et al, 1999)

A cautionary note about first offenders and repeat offenders also applies to studies that make this distinction based on conviction rates. Many jurisdictions have pretrial diversion programs that will offer to expunge a conviction if an individual agrees to enter a treatment program. The record of this diversion is typically segregated from the general record keeping system. Research studies that distinguish between first offenders and repeat offenders based on the number of convictions should address if a diversion program exists. If so, the study should clarify whether diverted participants were categorized as first offenders or repeat offenders for research purposes.

Recidivism Rates. Recidivism is defined as a re-occurrence of or a return to a criminal act. Recidivism rates in DWI research are usually measured through criminal traffic records. In some cases, recidivism is also measured (unreliably) through self-reports.

When a study reports recidivism rates of DWI offenders, it is critical to know how long the time period being reported on is. Especially because DWI recidivism tend to increase over time, the recidivism rate at a one or two year intervals is likely to be significantly lower than the recidivism rate at a five or 10 year interval.

According to one study, researchers differ on whether arrests or convictions provide the best measure of recidivism. On one hand, some argue that arrests are a closer estimate of actual law-violating behavior since convictions underestimate the amount of crime. (Blumstein and Cohen, 1978; Wooldredge, 1988 cited in Breckenridge, 2000)

On the other hand, others argue arrest data change throughout the justice system and may indicate a higher level of criminality than is accurate because arrestees may not have engaged in any illegal behavior. (Champion, 1998 cited in Breckenridge)

Researchers who support using convictions state that conviction data represent the final level of criminality for a person as determined by a court of law. Thus, other indicators may lead to false conclusions about a program's effectiveness (Champion, 1998 cited in Breckenridge, 2000)

For evaluation research on impaired driving, a criminal act may be defined narrowly to include a new impaired driving charge, or more broadly to include any new traffic offense or misdemeanor crime.

- Reconviction for any subsequent driving offense – Some studies use this measure because it is often being stopped for non-DWI driving offenses and not DWI checkpoints that results in the apprehension of alcohol-impaired drivers.

- Reconviction for all alcohol or drug related charges – Some studies use this measure because research has shown a correlation between charges for impaired driving and other alcohol or misdemeanor crimes. These studies may count as a re-offense any new conviction for aggravated and simple DWI offenses, public intoxication, selling or otherwise providing alcoholic beverages to minors and all other "serious offenses" heard by original sentencing court, e.g., contempt of court, misdemeanor larceny and theft charges and misdemeanor assault

In some evaluation studies, the validity of recidivism rates based on a new conviction may be compromised because the study examines convictions from only one court even though an arrest could be tried in more than one court.