Preventing Alcohol-Related Problems Through Health Policy Research

Robert B. Voas, Ph.D., and James C. Fell, M.S.

Alcohol-related health policy research is responsible for guiding the implementation of laws and public health policies that have reduced alcohol-related highway injuries and deaths, as well as other alcohol-related problems over the last 40 years. This research, which tests theories about potential policy changes and responds to specific problems, has examined a vast array of prevention programs. This article briefly identifies 10 program categories and highlights four programs to illustrate the scope and complexity of the individual health policy areas within the categories. *KEY WORDS: Problematic alcohol and other drug (AOD) use; AOD misuse; policy; public health policies; laws; regulations; environmental-level prevention; prevention through policy change*

The founding in 1970 of the National Institute on Alcohol Abuse and Alcoholism (NIAAA) coincided with a large increase in Federal research funds for studies of alcohol policies related to highway deaths and injuries, as well as injuries flowing from alcohol-related crime and health problems resulting from heavy alcohol consumption. Alcohol-related highway fatalities were at an all-time high in 1970, and there were an estimated 100,000 alcohol-attributable deaths in the United States (Modad et al. 2004; NIAAA 1997). In the 40 years since the founding of NIAAA, those losses have been substantially reduced through the implementation of laws and public health policies growing out of research that has been summarized in *Alcohol Research & Health* (*ARⅅ*). By 2001, alcohol-attributable deaths declined to 75,766 (Centers for Disease Control and Prevention [CDC] 2004).

Health policy research lies at the nexus of the science-to-practice continuum. At the point where science is incorporated into policy or law, theory is tested by reality and programs growing out of research are challenged by the need to respond to specific events embodying previously unmeasured conditions. Moreover, novel and untested concepts bubble up from practitioners, legislators, and advocates vying for attention in forming health and safety programs. Policies develop where there is a need for action not currently identified in any law. Programs may build on those policies, providing an opportunity for researchers to evaluate the concepts embodied in the policies that, given convincing positive results, will lead to the institutionalization of the policy in law.

For example, research and practice became intertwined in the movement leading up to the passage of the Federal minimum drinking-age law. A number of States followed the lowering of the voting age from 21 to 18 during the 1970s by lowering their drinking age to 18 (U.S. General Accounting Office 1987). When research demonstrated that lowering the drinking age increased impaired-driving crashes of the affected age-groups, the trend was reversed and States began to raise their minimum drinking age. When the benefits of this action were confirmed by researchers (Wagenaar 1983; Womble 1989), the Federal Government passed legislation providing a strong incentive for all States to raise the minimum drinking age to 21 (23USC158 1984). Thus, the policy and research groups both reacted to information provided by the other group, building toward a final status that was embodied into Federal law.

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Between 1970 and 2010, there was a substantial expansion in the number of laws introduced in State legislatures directed at reducing problems related to the misuse of alcohol, particularly bills related to impaired driving (Dang 2008, p. 9). Impaired driving received special consideration because of the major role that alcohol plays in fatal crashes and because that relationship makes impaired driving and crash records a useful outcome measure for studies of other alcohol policies. The growth in computer technology and evolving analytical methods over the last 40 years has permitted more sophisticated analyses of laws and programs (Fell et al. 2009; Wagenaar et al. 2009).

Although scientific data frequently has less influence than anecdotes and opinions from the voting public, the traffic safety effort benefited from the foundation and growth of community activist groups led by the Mothers Against Drunk Driving (MADD) organization. Initially focused on punishing the impaired driver, MADD developed a sophisticated public policy approach dedicated to supporting only evidence-based programs (Fell and Voas 2006). Thus, in addition to presenting statements from victims, MADD held seminars for legislators and other officials involving presentations from researchers, a practice more recently sponsored by the National Highway Traffic Safety Administration (NHTSA). As a consequence, in many States, decision makers have been giving increased attention to research reports. Much of the research has involved field studies of new laws, policies, and local ordinances that have had an early effect on public health outcomes and traffic safety in the United States.

Hundreds of laws and policies in a broad range of areas might merit description in an article such as this. Many policies fall into several different categories (see the recent overviews of alcohol policies by Babor et al. 2003, pp. 95–222. For a review of the prevention of alcohol problems, see *AR&H*, Vol. 26, No. 1, 2002.) To provide some indication of the extent of the alcohol law and policy area as it applies to public health and traffic safety, this article briefly identifies 10 program categories. This list of examples does not cover all of the programs that fall into the public health area. Treatment programs and college programs are not included here because they are covered in another segment of this issue of *AR&H*. Inevitably, there are sure to be several areas of importance to some researchers that could be added to the list provided here. Following the descriptions of the 10 categories, four specific programs are highlighted to provide a better appreciation of the scope of the individual health policy areas within the categories listed. Two are principally based on legislation: the minimum legal drinking age (MLDA) and graduated driver-licensing (GDL) programs. Two are primarily based on policy: responsible beverage service (RBS) programs and brief intervention programs designed to identify and treat high-risk drinkers. These examples have not been selected because of their effect on alcohol problems but rather as illustrations of the complexity of each of the individual program areas.

Programs Primarily Based on Laws

The programs outlined below include measures to prevent impaired driving and underage alcohol use, limit alcohol availability, raise alcohol taxes, prevent alcohol service to intoxicated patrons, and mandate treatment for people convicted for impaired driving.

Laws and Policies Designed to Curb Impaired Driving

Based on work by Widmark (1932) in Sweden in the early 20th century demonstrating the relationship between alcohol consumption and blood alcohol concentration (BAC) as well as on the development of breath alcohol testing methods by Borkenstein and Smith (1961), the basic impaired-driving laws (such as making it illegal for a driver to exceed a specified BAC, allowing administrative license revocation upon arrest for drivers over the BAC limit, and suspending a license and mandating treatment programs upon conviction) were adopted during the last quarter of the 20th century and produced an estimated 10 to 20 percent reduction in alcohol-related fatalities (Dang 2008; Voas et al. 2000).

Laws and Policies Designed to Protect People Younger Than Age 21

The two major examples of laws to reduce alcohol-related injuries and deaths among young people are the MLDA law and the zero-tolerance law for drivers younger than 21, which makes it an offense to drive with any measurable amount of alcohol in their bodies. The GDL laws also apply primarily to drivers younger than 18. These laws are described in detail later in this article. Aside from being a particular research interest to the authors, these laws also were selected for this article because the MLDA law currently is being challenged (Wasley 2007) and States recently have been active in adopting legislation to strengthen their GDL laws.

Laws and Policies Designed to Limit Alcohol Availability

It is logical to expect that limiting the availability of alcohol would reduce drinking, which in turn should reduce alcohol problems. Extensive literature generally supports that assumption (see, for example, Babor et al. 2003, pp. 1–11). Although Prohibition has been repealed, States retain the right to regulate the sale of alcohol. Aside from outlawing all sales, which no State currently does, States have the means of curtailing sales through several policies, including State monopoly laws, in which certain types of alcohol (usually spirits) can only be purchased at a State store (Miller et al. 2006), and prohibiting sales of liquor by the drink, thus limiting sales to off-premise outlets and curtailing sales at bars and restaurants (Blose and Holder 1987). The effectiveness of these two policies was demonstrated inversely by measuring the increase in consumption and problems as the States repealed these laws, which had been in place since Prohibition. Alcohol

consumption and the associated problems also can be reduced by State regulation of the hours or days of the week during which alcohol can be sold (Chikritzhs and Stockwell 2006; Vingilis et al. 2006; Voas et al. 2006).

Excise Tax Laws That Limit Alcohol Consumption

Most research indicates that alcohol price and consumption and alcohol-related problems are inversely related; that is, as the prices of beer, wine, and liquor increase, alcohol consumption and associated problems decrease. This sensitivity to price opens the opportunity for governments to influence consumption through excise taxes. Lower alcohol prices have been linked to heavy drinking (Wagenaar et al. 2009) and to increased risk for alcohol-related harm. Elder and colleagues (2010) conducted a meta-analysis of 78 studies under the CDC Guide to Community Services program and concluded, "The results (showing reductions in consumption or alcohol problems with price increases) were robust across different countries, time periods, study designs, analytic approaches and outcomes." (Elder et al. 2010, p. 226) Despite their apparent effectiveness, tax hikes have not been widely used as a public health measure to influence drinking in the United States. Chaloupka and colleagues (2002) reported that alcohol prices have remained stable (which, given inflation, actually reduced prices) in the United States during the last quarter of the 20th century.

Laws and Policies Regulating the Sale and Service of Alcohol

This group of policies includes those established by bar and restaurant owners covering the sale of alcohol and the training of alcohol servers. It also includes the laws imposed on alcohol servers, including those that make it illegal to serve underage and obviously intoxicated patrons and laws that require server training to recognize impaired patrons and deny them service. This area also includes common tort laws and State dram shop laws that allow and regulate third-party lawsuits of outlets for damages and injuries caused by obviously intoxicated drivers who had their last drink at a bar or restaurant. One item from this category, RBS, is described in more detail because it is an example of an effort to implement a national voluntary policy with some encouragement from supporting laws.

Criminal Justice Policies Designed to Identify and Treat People With Drinking Problems

Each year, 1.4 million U.S. motorists are arrested for impaired driving (Federal Bureau of Investigation 2007). Estimates vary (Cavaiola and Wuth 2002, pp. 61–63), but it is generally accepted that a third of the first offenders and at least two-thirds of the multiple offenders can be classified as either alcohol dependent or alcohol abusers. As a result, court-mandated treatment programs have become a ubiquitous feature of driving-while-intoxicated (DWI) sanction programs (Voas and Fisher 2001; Dill and Wells-Parker 2006). Because of the great variety of treatment programs and variations in the resources of communities, it has been difficult to determine their effectiveness in promoting the recovery of offenders with alcohol problems. A meta-analysis of studies evaluating the effectiveness of such interventions (Wells-Parker et al. 1995) reported a 7 to 9 percent reduction in recidivism based on the best-designed studies. A significant limitation in the effectiveness of the court programs is that they are not well integrated with other sanction programs, and offenders can frequently delay or entirely avoid attending them (Voas and Fisher 2001). A recent development has been the founding of DWI courts, based on drug court models, where offenders can volunteer for an intensive supervision program in which their drinking is monitored to ensure abstinence and their attendance and progress at treatment programs is closely followed by the court with monthly appearances before the judge who can either reduce or lengthen their jail sentence based on their performance in the treatment program (Marlowe et al. 2009). Recent technological developments for preventing impaired driving with vehicle alcohol interlocks (Marques et al. 2003) and for monitoring abstinence through transdermal sensors attached to the leg (Flango and Cheesman 2009; Marques and McKnight 2009) have encouraged the use of monitoring systems in place of jail or license suspension as a way to control the risk to the driving public presented by convicted impaired drivers (Voas 2010, in press).

Programs Primarily Based on Policies

The programs outlined below include measures to limit advertising of alcoholic beverages, limit alcohol availability, involve a cross-section of community groups in alcohol prevention, and identify and treat people with alcohol problems.

Policies and Laws Limiting the Advertising of Alcoholic Beverages

Between $2 billion (measured media) (Nielson ADviews 2005) and $6 billion (total promotion expenditures) (Federal Trade Commission 2008) are invested in advertising and promoting alcohol products each year in the United States. The extent to which advertising increases consumption and alcohol problems has been difficult to determine (Giesbrecht and Greenfield 2003), but there is strong evidence that it can influence attitudes toward drinking by underage youth (Grube 1993). Evidence from European countries also suggests that laws restricting alcohol advertising can influence consumption and impaired driving (Saffer 1998).

Advertising directed at nonuse also has some effect. In a meta-analysis of 72 evaluations of media campaigns designed to discourage adolescent substance use, Lipsey and Derzon (2002) estimated modest effect sizes on alcohol use (53 to 51 percent). The First Amendment to the U.S. Constitution limits the Federal Government's authority to control alcohol advertising. However, the Federal Communications Commission has the authority to limit health claims for alcohol and encourage advertisers to adopt self-regulation policies, such as avoiding alcohol

advertising aimed at youth or advertising in media in which more than 30 percent of the audience is younger than age 21. Evaluations of these policies are equivocal (CDC 2006). The Federal and State Governments also have the authority to require alcohol warnings on labels of alcohol containers (Agostinelli and Grube 2002) and, in some States such as California, warning signs at alcohol sales outlets. There is evidence that warning labels have increased public knowledge of problems associated with alcohol, but evidence for a reduction in alcohol consumption or alcohol problems has not yet been demonstrated (Greenfield and Kaskutas 1998). (For general reviews of research in this area, see Agostinelli and Grube 2002; Babor et al. 2003, pp. 189–208)

Environmental Policies Designed to Limit Alcohol Availability and Consumption

Several longitudinal studies have demonstrated that a change in the number of alcohol outlets is related to a change in alcohol use (Gruenewald et al. 1993). Local, State, or Federal laws may limit the location of alcohol sales outlets. For instance, an outlet typically cannot be located in violation of local zoning ordinances that limit the outlet locations to particular kinds of commercial sites. Another common provision used by many States and counties forbids location of an alcohol sales outlet near a school or place of worship. Further, the density of outlets may be limited by requiring a minimum distance between them or limiting the rate of outlets per capita. Alcohol sales also may be forbidden at high-risk locations, such as highway rest stops. Local ordinances may limit drinking in parks, at beaches, and at certain civic-sponsored events (Gruenewald et al. 2002).

Community Policies and Programs Directed at Reducing Alcohol Problems

The recognition that the community is the basic locus of impaired-driving and other alcohol problem prevention has led to broad support by Federal agencies (such as the NHTSA and NIAAA) and private foundations (such as the Robert Wood Johnson Foundation) for multifaceted alcohol problem–reduction programs in communities where an effort is made to organize local agencies and citizen volunteers to support one or more local health and safety action programs. Relatively few of the many community alcohol and other drug problem reduction efforts have been adequately evaluated. The following four comprehensive programs are directed at drinking and at drinking and driving within the community and have received relatively extensive evaluations: the Saving Lives Program (Hingson et al. 1996), the Communities Mobilizing for Change Program (Wagenaar et al. 2000), the Community Trials Program (Holder et al. 2000), and the Fighting Back Community Program (Hingson et al. 2005). In addition, three community efforts in specialized settings have been evaluated, two of which relate to community/college campus programs—the Matter of Degree Program (Nelson et al. 2005) and the College Community Environmental Prevention Program (Clapp et al. 2005)—and a third related to a border community—Operation Safe Crossing (Voas et al. 2002). These programs have demonstrated the feasibility of a number of different models for community action that have been embodied in government program guides (e.g., Center for Substance Abuse Prevention 2002).

Public Health Policies Designed to Identify and Treat People With Drinking Problems

Opportunities exist in many life contexts for interventions with people or groups that have, or are developing, unhealthy drinking practices. National surveys estimate that 15.5 million Americans may have an alcohol use disorder (AUD) (Center for Substance Abuse Prevention 2002). However, only 15 percent of those hospitalized for alcohol-related injuries receive treatment for their AUD (NIAAA 1998). Despite extensive findings that alcohol treatment is effective (Solberg et al. 2008), it is evident a large portion of those with problems are not receiving treatment. Physicians in primary health care settings (Fleming et al. 2002), as well as hospital trauma centers and emergency rooms, have an opportunity to intervene with their patients who show signs of possible alcohol problems or who have been injured in alcohol-related crashes (D'Onofrio and Degutis 2002). Programs also exist to identify college students with potential drinking problems (Larimer and Cronce 2002). Intervention programs often use rapid screening and brief intervention procedures featuring nonconfrontational motivational enhancement techniques (Dyehouse and Sommers 1995). These programs are covered in more detail below.

Four Examples of Alcohol-Related Public Health Policies

From the 10 types of programs listed above, four examples are described in more detail below to illustrate the complexity of even individual policy issues. The selections are not based on their importance, although the MLDA law (outside of the basic impaired-driving BAC limit legislation) has been demonstrated to be perhaps the most effective alcohol safety program of the last quarter of the 20th century. Rather, two examples were selected based on extending longstanding alcohol control and driver's licensing laws: the MLDA and GDL. The last two examples, RBS programs, and screening and brief intervention in hospital emergency departments are based on policies to be implemented by private entities: alcohol outlet owners and public health organizations and physicians.

MLDA Laws

After the repeal of Prohibition in 1933 (21st Amendment to the U.S. Constitution), each State retained the authority to establish its own alcohol control laws. Many States enacted or maintained an MLDA of 21. Shortly after the voting age was lowered from 21 to 18 in 1971 (26th Amendment to the U.S. Constitution), many States lowered their drinking age to 18 or 19.

By 1983, only 16 States had maintained or raised their drinking age to 21. Studies of the crash involvements of the age-groups affected by the MLDA law demonstrated that allowing people aged 20 and younger to purchase alcohol increased their involvement in impaired-driving crashes (Brown and Maghsoodloo 1981; Cook and Tauchen 1984; Wagenaar 1983). To reduce drinking and alcohol-related problems among youth, several States reinstated an MLDA of 21, and by 1984, the Federal Government adopted legislation that provided a strong incentive—a significant loss of Federal highway construction funds—for States that did not adopt a uniform MLDA of 21. By 1988, each State had raised its minimum legal age to 21 or maintained the age of 21 for both the purchase and the public possession of alcohol (the two core MLDA laws). In addition, all States and the District of Columbia enacted supporting laws prohibiting the furnishing or selling of alcohol to those younger than age 21. Many States adopted this law at the same time as the two core MLDA laws. These two core MLDA laws (prohibiting possession and purchase by youth) have been studied extensively over the past 25 years, and considerable evidence shows that such laws can influence underage drinking-and-driving fatalities (Shults et al. 2001; Wagenaar and Toomey 2002). Between 1988 and 1995, alcohol-related traffic fatalities for people aged 15–20 declined 47 percent, from 4,187 to 2,212, with considerable variability in these declines among the States (NHTSA 2007*b*). Raising the minimum drinking age has been associated with this decrease.

To support the two core MLDA laws and further enhance their underage alcohol prevention programs, States have enacted additional legislation targeting access to alcohol by youth, adults who provide alcohol to youth, and the prevention of impaired driving by youth. For example, many States have adopted laws that address keg registration, the use of fake identification, and the minimum age for alcohol servers/sellers. These laws make it more difficult for youth to obtain alcohol from licensed alcohol outlets. The passage of other laws, such as zero tolerance and GDL, has built on the foundation provided by the MLDA.

Although some progress in reducing the harm from underage drinking has been made (Wagenaar and Toomey 2002), drinking by young people still remains a significant public safety problem. Variability in the strengths and limitations of the States' MLDA laws, as well as variation in the resources dedicated to their enforcement, produces different levels of deterrence. Thus, the extent to which States should devote resources to controlling alcohol sales and consumption by young people remains an underresearched but important policy question, at least at the State and local levels. A recent study (Fell et al. 2008) documented the distribution of 16 underage drinking laws across States and assessed their relative strengths in each State. After controlling for various potentially confounding factors, the strength of the law making it illegal to use a fake identification to purchase alcohol was associated with reductions in the percentage of underage drinking drivers in fatal crashes. In a follow-up study that controlled for many other factors that could have accounted for the decrease, Fell and colleagues (2009) found that four of six underage drinking laws examined were effective in reducing the rate of drinking drivers aged 20 and younger in fatal crashes. Collectively, four laws—those making alcohol illegal to possess, illegal to purchase, the "use-and-lose" law that applies a driver's license sanction for an underage drinking violation, and the zero-tolerance law that prohibits any alcohol in an underage driver—save an estimated 864 lives each year because of their effectiveness. This study confirmed past research while providing a stronger design. It showed that raising the drinking age to 21 in all States was, and continues to be, an effective measure despite limited enforcement in most States. The MLDA law could have an even greater effect if parents and police increased enforcement of the law.

These findings point out the importance for States to enact the major elements of the laws derived from and supporting the MLDA. For example, the 14 States that do not have use-and-lose laws should seriously consider adopting them. Use-and-lose laws were associated with a significant 5 percent decrease in the rate of underage drinking drivers in fatal crashes and are currently saving an estimated 132 lives each year in the 36 States and the District of Columbia that have adopted them.

GDL Laws

Motor vehicle crashes are the leading cause of death for people aged 15–20 in the United States, accounting for approximately 36 percent of their deaths (Subramanian 2005). Although drivers aged 15–20 make up between 8 and 9 percent of the U.S. population and only about 6 to 7 percent of licensed drivers, they are involved in between 13 and 14 percent of the fatal traffic crashes each year (NHTSA 2009*a*, *b*). In recent years, between 6,000 and 7,000 young drivers and passengers aged 15–20 have been fatally injured in motor vehicle crashes, accounting for more than one-third of their total deaths (NHTSA 2009). Crashes involving drivers aged 15–20 cost the U.S. economy an estimated $42.3 billion each year (Blincoe et al. 2002). About 23 to 24 percent of young drivers (aged 15–20) involved in fatal crashes are estimated to be drinking before their crash (NHTSA 2008*a*). Sixteen-year-old drivers have crash rates three times greater than 17-year-olds, five times greater than 18-year-olds, and even twice those of drivers aged 85 (McCartt et al. 2003).

Research has indicated that three factors play a prominent role in crashes involving teenagers: inexperience, immaturity and risk taking, and greater exposure to risk (Masten 2004; Senserrick and Haworth 2004). Young drivers start out with very little knowledge or understanding of the complexities of driving a motor vehicle. Many young drivers act impulsively, use poor judgment, and participate in high-risk behaviors (Beirness et al. 2004). Teens often drive at night with other teens in the vehicle, which

substantially increases their risk of a crash (Chen et al. 2000). When these factors are combined with inadequate driving skills, excessive speeds, drinking and driving, distractions from teenaged passengers, and a low rate of safety belt use, crash injury rates accelerate rapidly (Masten 2004; Masten and Chapman 2004).

States initially responded to this problem by mandating driver education as a prerequisite to licensing. However, when States established this requirement and provided free training through the public high schools, it encouraged teenagers who would have delayed licensing to obtain their licenses at a younger age, which increased their exposure to crashes. The value of the education program could not overcome the increased crash involvements attributed to increased exposure. Over the last decade, the more effective alternative of extending the period of adult-supervised driving and limiting the novice's exposure to higher-risk conditions, such as nighttime driving, has effectively reduced crash involvements (Williams and Ferguson 2002).

The first few months of licensure for young novice drivers entail the highest crash risk (see figure) (Mayhew et al. 2003; McCartt et al. 2003). This suggests that restricting driving in situations known to be risky during this initial licensure period is one option for dealing with this vulnerability. To address this issue, many States have recently adopted GDL systems requiring that progression to full license privileges occur in stages (NHTSA 2008*b*). GDL systems in the United States vary widely, but typically there is a required supervised learning stage of 6 months or more, followed by an intermediate or provisional license stage of at least several months with restrictions on high-risk (nighttime or with teen passengers) driving before qualifying for full license privileges. NHTSA, the Insurance Institute for Highway Safety (IIHS), the National Safety Council, and the National Transportation Safety Board all have endorsed such a three-stage national model for GDL. Under these systems, novice drivers are required to demonstrate citation-free driving after qualifying for independent driving. Most GDL systems restrict nighttime driving and carrying teenage passengers, among other provisions, until the novice driver is fully licensed.

Evaluations of State programs clearly show the benefits of adopting GDL systems. The Florida law resulted in a 9 percent reduction in crashes for 16- and 17-year-old drivers (Ulmer et al. 2000). Recent evaluations in North Carolina (Foss and Goodwin 2003; Foss et al. 2001) and Michigan (Shope and Molnar 2004; Shope et al. 2001) indicated reductions of 26 to 27 percent in crashes for 16-year-old drivers in the GDL systems. Earlier independent studies have shown that nighttime restrictions for teenage drivers are effective in reducing crashes (Williams and Preusser 1997), as are teen passenger restrictions (Chen et al. 2000; Preusser et al. 1998)—two key components of the second stage in GDL systems. In a national evaluation of GDL programs, Chen and colleagues (2006) found that the presence of GDL programs was associated with an 11 percent decrease in the fatal crash rate involving 16-year-old drivers.

Although this evidence suggests that GDL systems can be effective, the IIHS (2004) surveyed various GDL systems in the States and found that only 16 States could be rated as having "good" GDL systems. Chen and colleagues (2006), in their evaluation of the effect of GDL on the fatal crash involvement rates of 16-year-old drivers, confirmed that good (complete) systems were the most effective and noted the substantial number of gaps and weaknesses of existing legislation in some States that needs to be addressed. Williams and colleagues (2010) found that New Jersey's combination of a GDL system and a 17-year-old minimum full licensing age has resulted in significant reductions in the crash rates of 17-year-olds (14 percent for injury crashes and 25 percent for fatal crashes).

One key component of GDL during the intermediate stage is the nighttime restriction that requires the presence of an adult while driving. This restriction is designed to reduce the risk of late-night driving, when alcohol-related crash rates are particularly common (NHTSA 2009). The nighttime restriction may reduce underage drinking itself because the beginning driver cannot drive to the locations, such as keg parties, where alcohol is available to them. Research on the effect of nighttime restrictions has demonstrated that they are associ-

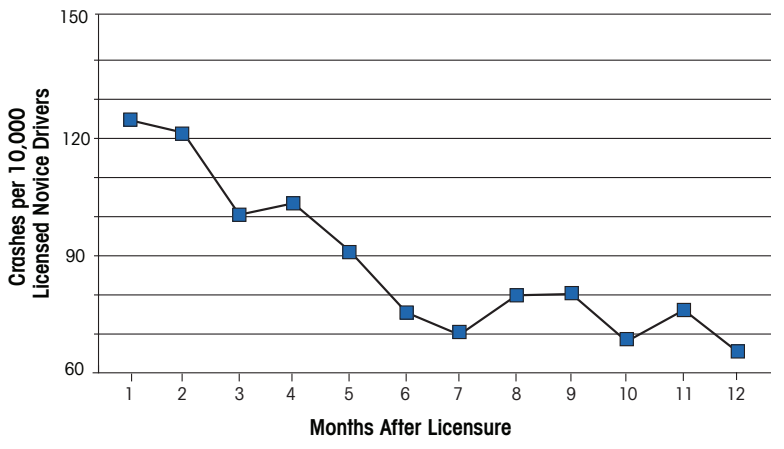

Figure Novice drivers' crash risk begins to drop with experience.

SOURCE: Adapted from Mayhew et al. 2003.

ated with a reduction in highway crashes involving beginning drivers (Mayhew et al. 2003; Williams and Preusser 1997). However, many States set the nighttime restriction at midnight or later. States that have restrictions beginning at 10:00 P.M. or earlier have the potential to reduce novice-driver fatal crashes even more (only nine States have these earlier restrictions as of this writing).

RBS Programs

In the mid-1980s, research attention was drawn to the overservice problem by the proportion of arrested and crash-involved drinking drivers who had consumed their last drink at a bar, restaurant, or other licensed establishment. O'Donnell (1985) estimated that 50 percent of impaired drivers had their last drink at a licensed establishment. Stockwell and colleagues (1993) studied risk factors associated with heavy drinking resulting from promotion and serving practices that led to a wide range of harmful incidents (e.g., violence, injury, illness). They concluded that the most significant risk factors were the amount of alcohol consumed and whether visibly intoxicated customers continued to be served. Studies using pseudopatrons who emulated intoxication (McKnight 1991) confirmed that the majority of licensed establishments sold alcohol to customers who appeared obviously intoxicated. More recently, researchers found that 76 percent and 65 percent of on-premise outlets sold to apparently intoxicated pseudopatrons, confirming that the problem continues (Lenk et al. 2006; Toomey et al. 2004).

The evidence that overservice at licensed establishments was associated with impaired driving and other criminal behavior launched a major effort to encourage alcohol outlet owners and managers to adopt policies directed at avoiding overservice of alcohol. Generally referred to as RBS programs, these efforts have been most comprehensively described by Mosher and Jernigan (1989). RBS programs involve the adoption by management of two general policies: (1) avoiding service procedures and drink promotions that encourage intoxication (i.e., serving beer in pitchers and serving oversized drinks and avoiding other price promotions such as happy hours) and (2) adopting serving practices designed to minimize the possibility that the customer will become an impaired driver. These include providing food and controlling service to slow the drinking rate of the patrons, refusing service to visually intoxicated patrons, and attempting to prevent intoxicated patrons from driving after leaving the premises by offering safe (free) rides or promoting the use of designated drivers.

Evidence that overservice at licensed establishments was associated with impaired driving launched a major effort to adopt policies directed at avoiding overservice of alcohol.

In addition to establishing management policies, RBS programs have involved the training of servers on (1) the significance of overservice to alcohol problems, (2) State laws related to alcohol service, (3) signs of intoxication of patrons, (4) methods for slowing the drinking rate of patrons, and (5) methods for increasing skills in refusing service to obviously intoxicated customers. In practice, the greatest attention has been given to training servers because research has demonstrated that they can be taught to recognize intoxication and are in a position to deny service (McKnight 1991). A number of studies of server training have been conducted (Graham, 2000), and two meta-analyses (Shults et al. 2001; Ker and Chinnock 2008) have attempted to summarize their effectiveness with mixed results. Shults and colleagues (2001) analyzed five reports and concluded that there was evidence that server training was effective in reducing patron intoxication levels when strongly supported by management. Ker and Chinnock (2008) conducted an evaluation of 20 reports that met Cochrane Collaboration standards for meta-analytic studies. They described individual studies that found effects on server knowledge and patron behavior but concluded that there was no evidence that server training reduced highway injuries.

As Shults and colleagues (and others, e.g., Stockwell 2001) have noted, strong management support is required for effective server-training programs. One source motivating managers to implement RBS is tort liability, which puts owners at risk if an overserved customer injures a third party. Perhaps more significant, all States have alcohol beverage control (ABC) agencies that have authority over the licensing of alcohol outlets and can establish policies prohibiting service to the obviously intoxicated enforced by the threat of suspending the outlet license. In addition, 47 States and the District of Columbia prohibit sales to obviously intoxicated people (Florida, Nevada, and Wyoming are the only exceptions) (NHTSA 2007*a*). Finally, a number of States have passed laws directly supporting server training. Mosher and colleagues (2002) conducted a qualitative analysis of 23 State laws designed to support RBS by either mandating server training or supporting server training by providing some tort liability protection to outlet owners. They found that RBS legislation was weak across all States overall. Enforcement of ABC laws against service to the obviously intoxicated also is limited, as indicated by the limited number of ABC enforcement agents relative to alcohol outlets (e.g., from one agent per 38 outlets in Hawaii to one agent per 3,000 outlets in Minnesota) (Ramirez and Fell 2002). The one clearly successful enforcement program against service to the obviously intoxicated was evaluated by McKnight and Streff

(1994), who found that enforcement increased denials of service from 18 to 41 percent and reduced the proportion of drivers arrested for DWI who reported that they had their last drink in a bar by 25 percent.

The most highly developed program directed at overservice to the intoxicated is being implemented in the Alcohol Linking Program (ALP) in New South Wales, Australia, where police are charged with determining whether offenders arrested for any crime have been drinking and, if so, rating the level of their intoxication and determining the location at which the offenders had their last drink. Records of these reports are fed back to the outlets concerned, and officers visit the site to audit the premises' RBS programs and follow up with another visit to make recommendations for RBS improvements. An efficacy study, conducted in 2002–2003, found that officers filled out the required reports 87 to 100 percent of the time, that 10 percent of the outlets accounted for 50 percent of the intoxicated offenders, and, finally, that alcohol-related crime rates were reduced by 22 percent because of the program (Faulks and Irwin 2010; Wiggers et al. 2004). If the ALP program proves to be effective in Australia, there is no reason that a similar effort cannot be implemented in the United States.

Screening and Brief Interventions in Emergency Rooms

Research suggests that 30 to 50 percent of injured, crash-involved drivers admitted to emergency departments or trauma centers have blood alcohol levels higher than the 0.08 BAC limit for driving (NHTSA and ACEP 2002). Many of these drivers are never charged, however, because they are taken to the hospital before a police officer has an opportunity to examine them for impairment, and hospital staff rarely notifies the police when they receive a high-BAC driver. An estimated 27 percent of injured patients admitted to emergency departments or trauma centers test positive for alcohol abuse or dependence (Gentilello et al. 2005). This suggests a large reservoir of people impaired by alcohol who are potential DWI offenders.

These situations represent significant lost opportunities to intervene with high-risk drinkers who need treatment for alcohol problems. Screening and brief interventions have been found effective among people who have not directly sought treatment, such as emergency department patients (Ballesteros et al. 2004; Dinh-Zarr et al. 2004; Moyer et al. 2002).

Brief interventions are time-limited treatments that generally consist of one to four sessions ranging from 5 to 50 minutes. Typically, program leaders assess drinking levels, provide normative feedback, address and enhance the client's motivation to change, and negotiate goals regarding drinking rates. They frequently use motivational enhancement therapy based on the transtheoretical stages of change theory (Prochaska et al. 1992; Velicer et al. 1996), provide a menu of change options, are empathetic, and are nonconfrontational (Miller et al. 1992). Although brief interventions can be successful, both in the short and in the long term, effects on alcohol consumption seem to diminish over time, whereas effects on reducing alcohol-related injuries, crashes, and driving violations appear to continue over longer periods (Dill et al. 2004). This may indicate that many recipients of brief intervention use strategies to avoid being injured while they are drinking, such as using a designated driver or not participating in high-risk activities.

Emergency departments and trauma centers using screening and brief interventions benefit from patients having fewer subsequent emergency room visits and fewer days in the hospital (Fleming et al. 2002) and fewer new injuries (Monti et al. 1999). Most importantly, however, people who receive the brief interventions (Fleming et al. 2002) reduce their driving-related problems, such as traffic violations (Gentilello et al. 1999), other arrests, or general legal involvements (Fleming et al. 2002); drinking-and-driving violations (Schermer et al. 2006); and injuries and fatalities from motor vehicle crashes.

In the fall of 2006, the American College of Emergency Physicians began to require that all level I trauma centers have a procedure to screen and provide brief interventions to problem drinkers (Kirn 2006). Despite the lack of mandatory requirements in the past, screening and brief interventions for AUDs are becoming the standard of care in trauma centers because of their proven effectiveness in reducing hazardous and harmful drinking practices, particularly as they relate to motor vehicle injuries.

Future Opportunities for Alcohol Policy Research

This brief sketch of what is only a partial set of the full range of public health programs for reducing alcohol problems provides, at best, a very limited introduction to the extent and significance of the programs being pursued by researchers working in the public health policy area. The brief descriptions herein only highlight the potential in each of the areas for important improvements, extensions, and innovations that could lead to substantial public health benefits in the future. Hopefully, the brief descriptions of program areas have made clear that the last quarter of the 20th century has laid the groundwork for effective action to reduce alcohol problems in a large number of areas. Over the last 40 years, where the public strongly supported legislation and enforcement (such as with drinking-and-driving laws), remarkable benefits have been achieved. Conversely, where public or official support has been more limited, or outcomes more difficult to measure, proven benefits have been more limited. But opportunities remain for further exploitation when support and funding materialize. The first decade of the 21st century has been marked by technological advances, such as transdermal alcohol sensing for monitoring drinking (Marques and McKnight 2009) that may transform the management of DWI offenders

and contribute an important tool for all alcohol treatment programs. The stage appears to be set for important progress in dealing with alcohol problems during the decade leading up to the 50th anniversary of NIAAA. ■

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