Rethinking Underage Drinking

Historical context

Use of alcohol predates written history by several thousand years.

The earliest known writing samples are dated at 3500 B.C.[1] In 2004, a team of researchers discovered wine residue in clay vessels from Northern China dating back to 7000 B.C.[2]

Additional research suggests that both wine and beer were made and bottled as early as 5400 B.C. in what is now western Iran. Distillation was added around 1000 B.C., giving us the categories of beer, wine, and liquor.

American history, like the history of the colonists, is steeped in alcohol. In his historical overview of alcohol use in colonial America, Dr. David Hanson from SUNY Potsdam provides the following facts:[3,4]

- The Mayflower carried more beer than water on its voyage to the New World.
- There wasn't a single abstainer among the original signers of the Declaration of Independence.
- George Washington, Benjamin Franklin, and Thomas Jefferson made their own alcohol.
- Thomas Jefferson wrote the first draft of the Declaration of Independence in a Tavern.

In the few hundred years since establishing independence, America has enjoyed a love-hate relationship with alcohol.

Citizens were prohibited from drinking under the 18th amendment between 1919 and 1933. During these years, called Prohibition, the only way to obtain alcohol legally was by getting a prescription for distilled spirits filled at a pharmacy.

Despite small decreases in consumption, the amendment, and the movement behind it, failed to achieve its main objectives. Outlawing alcohol was intended to make society safer but did the opposite. Bathtub booze, speakeasies, robberies and mob violence resulted. Al Capone might have remained a bit player in the underworld had alcohol remained legal. In 1933, the amendment was repealed, and alcohol flowed freely again.

In the past 70 years, we have come a long way in our understanding of the health effects of alcohol — some good, some bad.

In the 1970s, data began to accumulate suggesting that drinking during pregnancy could alter the developing brains of unborn children. Those findings triggered important changes in attitudes toward drinking during pregnancy. (It is worth noting that much of that research was done with rats!)

At the time, the assumption among researchers and medical professionals was that the brain wires itself within the first decade after birth, if not earlier, and then becomes relatively fixed. To pediatricians in the 1970s, the suggestion that the brain actually undergoes two unique stages of development after birth — one during childhood and one during adolescence (very roughly corresponding to puberty) — would seem ludicrous. That has changed in the past decade, in large part due to work by Dr. Jay Giedd, Chief of Brain Imaging at the National Institute of Mental Health.[4]

Work by Dr. Giedd and others reveals that, far from being finished by the age of 10, the human brain enters a new, unique stage of change during adolescence.

Ongoing research in other labs, though still preliminary, and much of it with animals, raises the specter that brain development during the adolescent years, like brain development in the womb, could be compromised by repeated exposure to alcohol. How relevant the threshold is to the typical life of the typical teen is yet to be determined, but the percentage of kids affected negatively is probably not zero.

In the 20th century, as research regarding alcohol, the drug, advanced, so advanced the science of marketing. The basic approaches, like sticking a product next to something that people like and hoping they will associate the two, have not really changed. However, the ability of advertisers to reach potential consumers has, opening up new ways to persuade them to consume.[5]

Alcohol continues to be enjoyed by responsible adults — precluding people with abuse histories, etc. For those adults who can and do drink wisely, alcohol could actually prolong life.

As will be discussed in subsequent sections, for kids, including adolescents, science and common sense suggest that the potential harm outweighs (should outweigh) any imaginable benefits that drinking could provide.

Improving parent-teen communication and getting the industry to market more responsibly are important hurdles to overcome in the coming years.

For more information

[1] Google "BBC Earliest Writings Found"

[2] Google "Patrick McGovern MASCA"

[3] Google "Alcohol Problems Solutions"

[4] Dr. Hanson has strong opinions on the matter of underage drinking, but every view should be weighed in this debate.

[5] Search for "Mark Thornton" at www.cato.org for articles

[6] Google "Jay Giedd NIMH"

[7] Google "Richard Tedlow Answers.com"

NUMBERS — SOME GOOD, SOME BAD

Each year, alcohol use by teens contributes to ruined relationships, pregnancies, spread of STDs, wrecked cars, injuries, and death. The National Institute of Alcoholism and Alcohol Abuse (NIAAA) estimates that alcohol kills 6.5 times more kids under 21 than all other drugs combined.

The National Center on Addiction and Substance Abuse at Columbia University (CASA) estimates that roughly 1/4 of all underage drinkers (relative to 1/10 adults) meet the criteria for abuse or dependence.

CASA also estimates that, in 2005, alcohol abuse and addiction among Americans, young and old, cost tax payers roughly $220 billion. They contrast this value with the yearly cost of cancer ($196 billion) and obesity ($133 billion).

Researchers at the Pacific Institute for Research and Evaluation (PIRE) estimate that underage drinking alone costs taxpayers $62 billion annually (www.pire.org). By their estimate, each $1 that kids spend on booze ends up costing the country $3.

The costs of alcohol abuse and dependence are in addition to the money spent on alcohol itself each year — which is something over $120 billion. Researchers at CASA and PIRE place underage sales at roughly $20 billion.

That's a lot of money! Far more money than is available for alcohol abuse education and prevention efforts (see the text box below).

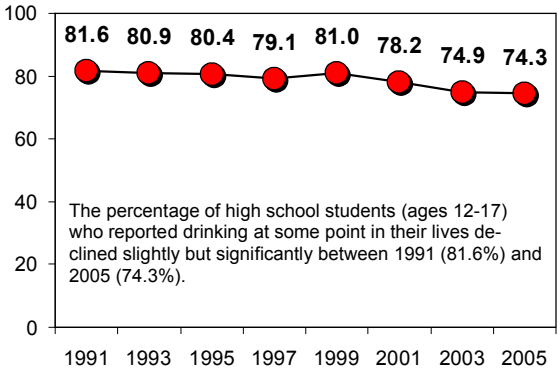
The disparity in funding for alcohol (and other drug) prevention initiatives relative to the funds marshaled by the industry each year to promote alcohol (est. $1.5 billion) clearly stacks the deck against those in the prevention field. I don't think the low pay brings any smiles either!

On a positive note, data from the most recent National Youth Risk Behavior Survey (YRBS), conducted by the Centers for Disease Control (CDC), shows some promising trends (see graphs at right). The YRBS is one of our primary sources of data regarding teen drinking and other risky behaviors. The survey is conducted every two years and samples students aged 12-17 from both public and private schools.

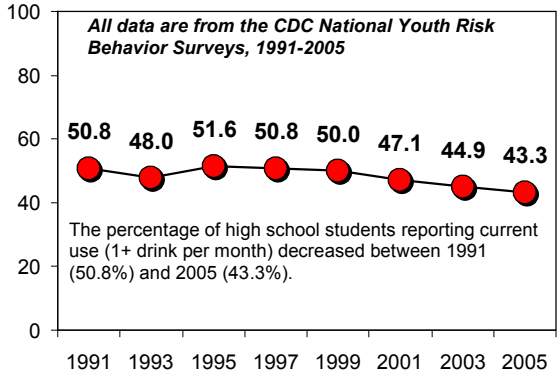
Significant changes in drinking levels and patterns were observed in the years leading up to the 2005 survey. Some of those data are summarized below. The full report is available for download from the CDC (www.cdc.gov).

In a nutshell, data from the YRBS suggests that the percentage of students that are actively drinking (one or more drink in the previous month), as well as the percentage engaging in heavy episodic drinking (five or more drinks in a row), has declined over the years.

THE 2006 CDC NYRBS REPORT CONTAINS PROMISING STATISTICS

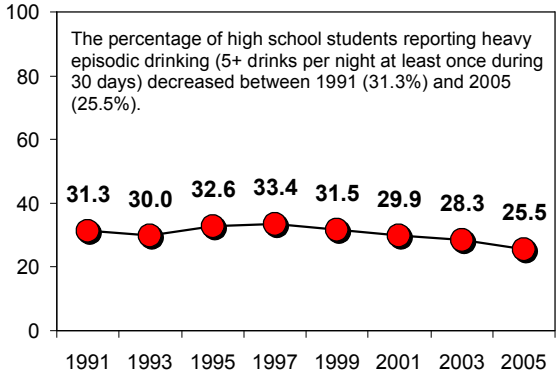


The percentage of high school students (ages 12-17) who reported drinking at some point in their lives declined slightly but significantly between 1991 (81.6%) and 2005 (74.3%).



All data are from the CDC National Youth Risk Behavior Surveys, 1991-2005

The percentage of high school students reporting current use (1+ drink per month) decreased between 1991 (50.8%) and 2005 (43.3%).



The percentage of high school students reporting heavy episodic drinking (5+ drinks per night at least once during 30 days) decreased between 1991 (31.3%) and 2005 (25.5%).

FUNDING WOES

The Department of Education (DOE) administers national and state funding for substance abuse (including alcohol abuse) education and prevention programs through the Safe and Drug-Free Schools and Communities Act (SDFSC). Their efforts represent the only federally funded education efforts to prevent substance abuse. According to the Office of National Drug Control Policy (ONDCP), the President's 2007 budget calls for the SDFSC State Grant Program to be **terminated**, thus reducing funding for DOE prevention efforts from $490 million in FY2006 to $166 million in FY2007. This includes a reduction of $32.4 million for the Alcohol Abuse Reduction Program. Why was it nixed? According to the official White House budget proposal, it was nixed because an evaluation (PART) performed in 2002 found — *The program failed to demonstrate effectiveness because it relied exclusively on national survey data that do not reflect program effectiveness. Grant funds are spread too thin to support quality interventions.* Rather than providing more funding, the White House abandoned it — and thus our kids! See www.ondcp.gov for the President's FY 2007 Drug Control Budget

"PROHIBITION FOSTERED INCREASING CONSUMPTION OF NONALCOHOLIC BEVERAGES, SUCH AS FRUIT JUICES AND CARBONATED DRINKS."

- Jack Blocker, PhD
American Journal of Public Health
Year 2006, Vol 96, Pages 233-243

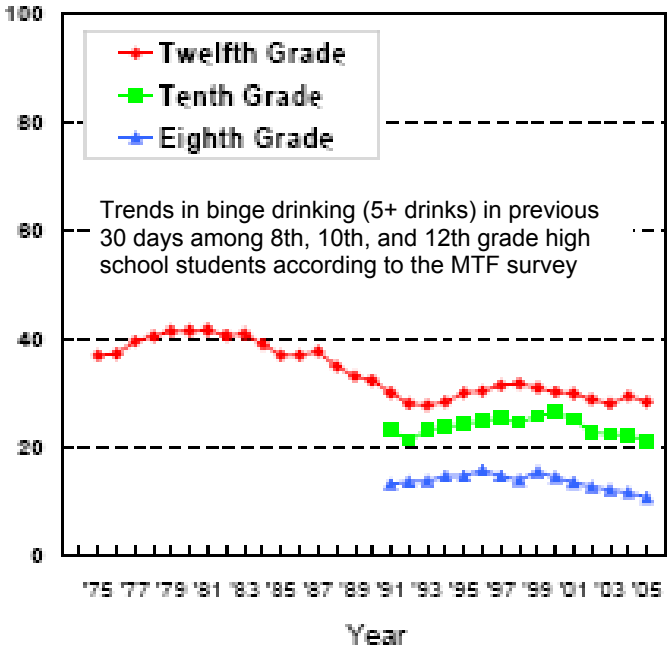
A WORD IN *DEFENSE* OF THE INDUSTRY

The alcohol industry is a complex entity comprised of manufacturers, liquor stores, even gas stations. (Visit the website — www.AlcoholPolicyMd.org — for an overview.) While it is both easy and justified to blame part of the problem of underage drinking on the "Industry", it is important to separate those elements of the industry that *do* cause us problems from those elements that are genuinely trying to help protect our kids while legally providing products to adults. The Century Council, a non-profit entity funded by distillers, has done noteworthy work toward this end. They created Alcohol 101, a widely used alcohol education program, at a time when such programs were nonexistent. They have also worked hard to promote communication between parents and teens about underage drinking. Visit their website — www.CenturyCouncil.org — to evaluate them for yourself .

Cont'd from Page 2.

When combined with data from other national surveys, like the one conducted as part of the ongoing Monitoring the Future study run by researchers at the University of Michigan, it appears that the apparent downward trend in risky drinking might be real. The graph at right suggests small declines in rates of "binge" drinking over the years.

For the 2005 report visit www.monitoringthefuture.org .



A FAILURE TO COMMUNICATE

Parents are the first line of defense in the protection of our kids. Unfortunately, the line does not always hold up so well. In the past century, the pace of change has quickened and adolescence has lengthened, causing a widening of generation gaps and making it more difficult to know how to talk to teens even if parents want to do so.

The Partnership for Drug-Free America (www.drugfree.org) estimates that more than 1/3 or of parents do not talk to their kids about alcohol. They also estimate that kids whose parents do talk to them about alcohol are 42% less likely to drink than other kids.

Organizations from the National Parent Teacher Association to the National Institute on Drug Abuse cite communication between parents and teens as pivotal in preventing negative behaviors and promoting positive behaviors.

Many parents are uncertain how to talk with their kids about alcohol and often have inaccurate perceptions about underage drinking and the risks involved. Many parents are unaware that their kids drink, underestimate how much alcohol their kid's peers drink, and also underestimate the importance of their contribution to preventing alcohol use and other risky behaviors by their kids.

Here are some tips that might make the process easier and more effective:

- Do your homework first (www.niaaa.nih.gov).
- Talk to kids as soon as you think they are capable of understanding
- Use TV commercials as an opportunity to bring up the topic and to discuss the tactics of advertisers.
- Establish clear expectations surrounding alcohol use. What is your family policy?
- Discuss teen drinking in the broader context of healthy decision making.
- If you drink, model *healthy* drinking practices. Kids follow our lead.
- State your willingness to pick them up, no questions asked until the next day if you can do it, if they are uncomfortable getting into a car with someone while they are out.

For more suggestions visit www.TalkWithKids.org.

BEYOND CONSUMPTION — LOOKING AT CONSEQUENCES

Each year, Americans consume over 60 billion servings of beer, 13 billion servings of wine, and 29 billion servings of distilled spirits (USDHHS 11th Report on Carcinogens)

As can be seen in the graph below, per capita consumption of alcohol among citizens aged 14 or 15+ (the cut-point changed in 1970) has decreased relative to 1970s levels. While such data tell us about overall levels of use, they do not tell us about the rates, and types, of consequences related to that use.

Quantifying and tracking levels of alcohol use is important, as it is with any other drug. Unfortunately, looking at those statistics is often where media stories on the topic stop. While Henry Wechlser from Harvard has collected invaluable data on the rates of alcohol-related consequences experienced by college students, media coverage is usually limited to his work on binge-drinking rates.

Let us take a look at some of potential consequences faced by young drinkers. The following yet-to-be-published (as of August, 2006) data were collected from roughly 4539 recent high school graduates during the summer between high school and college. Subjects represent the incoming classes of three universities. Data were collected prior to their participation in an online alcohol education program.

Of those who drank in the two weeks before the survey (52%), here is the incidence of various risky behaviors and consequences during that two week period :

- Had a hangover—36%
- Drove after drinking—12%
- Experienced a memory blackout—12%
- Vomited in public—6%
- Injured in some way—5%
- One night stand—6%

The above statistics included both male and female reports. A few additional, gender-specific variables are worth noting:

Drank on an empty stomach to save calories:

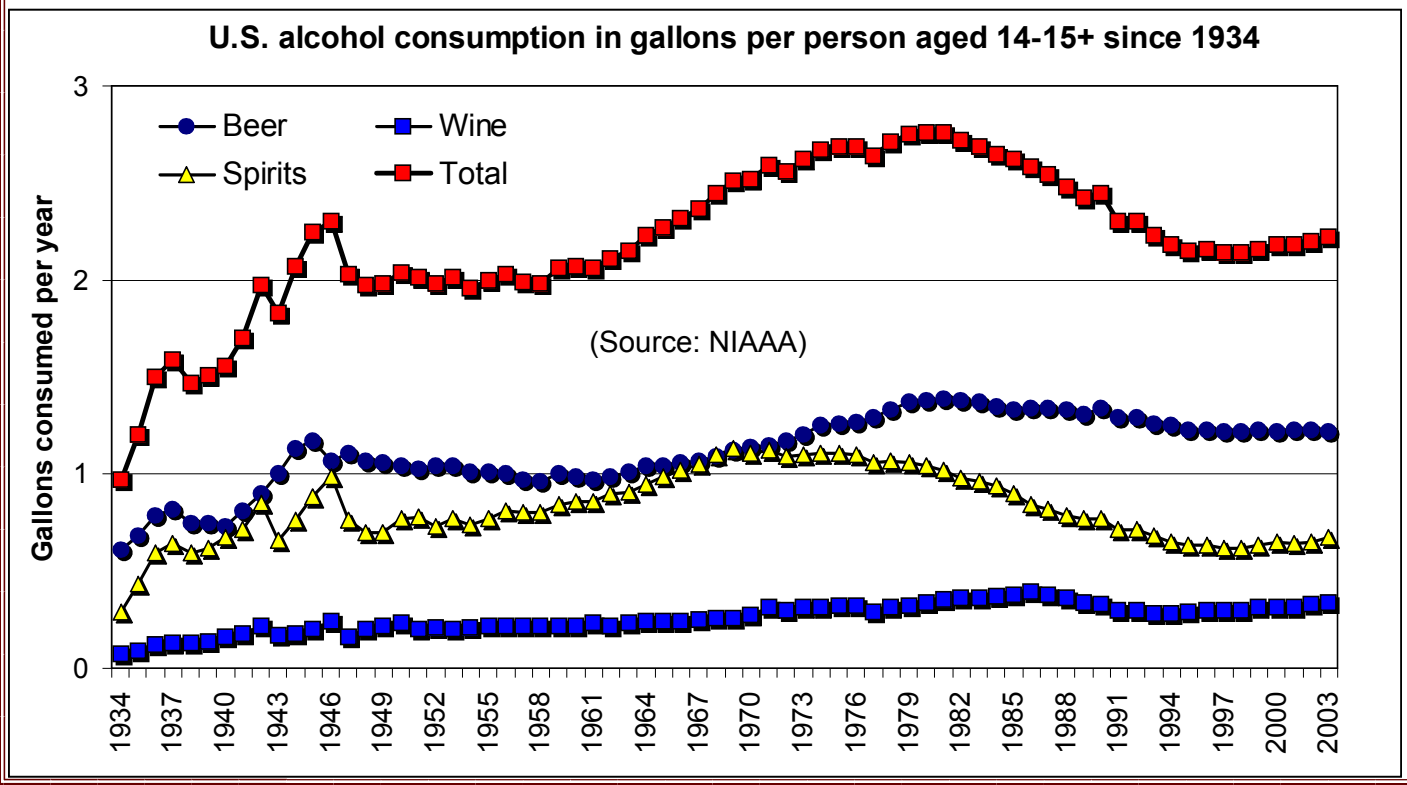
- Males — 2.9%
- Females — 12.8%

Drink on an empty stomach to get drunk faster:

- Males — 4.1%
- Females — 8.2%

The statistics highlight some of the potential risks inherent in drinking, and also reflect gender differences in drinking behaviors.

That 1/10 students experienced a memory blackout — amnesia for events that took place while drunk—is troubling. Blackouts are far more common among young drinkers than long thought. The amnesia can be partial or relatively complete and can encompass events ranging from bar fights to intercourse. No doubt many sexual assaults and other consequences go unreported due to a lack of clear memory for the event. These facts are not captured by consumption data per se.



ADOLESCENT BRAIN DEVELOPMENT AND ALCOHOL

During adolescence, brain organization and function enter a unique period of flux (Giedd, 2004). As an individual makes the transition from childhood to adulthood, from dependence to independence, changes in behavior are tumultuous (Dahl, 2004). Not surprisingly, so are the changes in brain function that give rise to these behaviors. Circuits that coordinate our behaviors, help us make good decisions and control our impulses, behave appropriately, govern our eating and sleeping habits, etc., are all being remodeled during the teen years. It is thought that much of this remodeling is influenced by an individual's interactions with the outside world, a fact that makes perfect sense given the nature of adolescence as a stage of intense personal evolution that prepares one to survive on their own outside of the nuclear family.

In recent years, it has become clear that, during adolescence, as in childhood, the brain is highly plastic and shaped by experience. A substantial number of synapses are eliminated, or pruned, in the cortex during adolescence, and this process is presumably influenced, at least in part, by interactions with the outside world (Spear, 2004).

It is tempting to conclude that adolescent brain development must simply be an extension of childhood brain development; that it represents a transition stage between childhood and adulthood in a manner similar to how adolescence itself has long been viewed. In actuality, it appears that many of the changes that take place during the second decade of life are novel and do not simply represent the trailing remnants of childhood plasticity.

Studies with both rats and humans suggest that the changes taking place in the brain during adolescence lead them to respond to alcohol differently, in some way, than adults. Below are a few examples with the species on which the work was based listed in parentheses:

- Brain circuitry involved in memory more vulnerable to alcohol in adolescence (rats)
- More brain damage following a four-day drinking binge in adolescents than adults (rats)
- Alcohol prevents cell birth in the brain more potently in adolescents than adults (rats)
- Alcohol impairs memory more in adolescents and young adults relative to adults (rats and humans)
- Alcohol produces less sedation in adolescents and young adults relative to adults (rats and personal experience!)
- Alcohol impairs balance less in adolescents and young adults relative to adults (rats and some human work)
- Repeated alcohol exposure during adolescence alters the way that people respond to alcohol later in life (rats and humans)

In addition to reacting differently to the acute, or initial, effects of alcohol, it appears that adolescents are also affected differently than adults by repeated, heavy drinking.

Many adolescents engage in a pattern of chronic intermittent exposure (CIE) sometimes referred to as binge drinking. Chronic intermittent exposure is a special case of chronic alcohol administration that involves discrete, repeated withdrawals.

There is compelling evidence, from rats, that it is the repeated withdrawals from alcohol that are responsible for many of the CNS effects of chronic alcohol exposure. For example, in laboratory animals, repeated withdrawals from alcohol result in a higher rate of seizures during withdrawal than are observed after *continuous* exposure of the same duration (Becker and Hale, 1993).

The association of repeated withdrawals with withdrawal seizure susceptibility is also indicated in humans. In studies of alcohol detoxification, patients with a history of previous detoxifications were more likely to exhibit seizures during withdrawal (Brown et al, 1988). Although these data from human studies are correlational, the convergence of these findings with those from animal models strongly suggests that discrete, repeated withdrawals from alcohol exposure presents a unique risk for subsequent neurobehavioral impairments.

The available evidence suggests that repeated exposure to alcohol during adolescence could lead to long-lasting deficits in cognitive abilities, including learning and memory, in humans. Much of this work has been pioneered by Drs. Susan Tapert and Sandra Brown, alcohol researchers at the University of California , San Diego (UCSD). Drs. Tapert and Brown have conducted a series of studies examining the impact of alcohol abuse on neuropsychological functioning in adolescents and young adults.

In one such study (Brown et al., 2000), adolescents in an in-patient substance abuse treatment program, at least three weeks sober, were compared to controls from the community on a battery of neuropsychological tests. Ages ranged from 15-16. Frequent drinkers (100 or more total drinking sessions), particularly those that had experienced alcohol withdrawal, performed more poorly than controls on several tests, including tests of learning, memory, and visuospatial functioning.

In a longitudinal study of subjects recruited from treatment programs (ages 13-19), Dr. Tapert and her colleagues observed that a return to drinking after the program led to further decline in cognitive abilities, particularly in tests of attention, over the next four years (Tapert et al., 1999). Once again, withdrawal from alcohol was a

(*cont'd from Page 5*) powerful predictor of such impairments. Similarly, Tapert and colleagues (2002) assessed neuropsychological functioning and substance use involvement at seven time points during an eight year period in subjects beginning, on average, at the age of 16 and ending at 24. Many of the subjects were initially assessed while in treatment and then tracked after their stay in the facility ended. Others were recruited from the community and then followed during the eight year period.

Cumulative levels of substance use, including alcohol use, were correlated with impairments in verbal learning and memory during the final assessment. That is, the heavier one was involved in substance use during adolescence, the lower their scores on tests of learning and memory at year eight, when subjects were in their early twenties. Heavier drinking alone was associated with lower scores on tests of attention, and experiencing withdrawal symptoms from alcohol predicted additional deficits in visuospatial abilities. These studies suggest that heavy use of alcohol and other drugs during the teenage years predicts lower scores on test of memory and attention when one is in their early-mid twenties.

Research by Dr. Tapert and her colleagues clearly suggests that alcohol use during the teen years, particularly when such use is heavy enough to result in withdrawal symptoms upon cessation of drinking, negatively impacts memory and attention, abilities necessary for negotiating the tasks of adolescence and successfully making the transition into adulthood.

These impairments presumably stem from changes in brain function, and that is exactly what additional projects by Tapert and Brown suggest. The authors have conducted several studies employing fMRI to investigate changes in brain activity following alcohol abuse during the teen years. While MRI is used to create images of the anatomy of the brain, fMRI is used to measure changes in oxygen levels in the brain over time, like while subjects perform different tasks. The changes in oxygen levels are used to measure, indirectly, changes in brain activity. In one study on this topic (Tapert et al., 2001), alcohol-dependent young women and healthy controls between the ages of 18-25 performed tests of working memory and vigilance (attention) while brain oxygen levels were measured using fMRI. The sample sizes were not quite big enough to detect significant impairments in working memory, though a clear trend toward such impairments was observed. However, alcohol-dependent subjects exhibited significantly less brain activity while performing the working memory task. Weaker activity was observed in several parts of the frontal lobes and in the parietal lobes. Alcohol-dependent subjects performed just fine during the vigilance task, and their brain activation during the task appeared normal. Such data suggest that the trend toward impaired working memory and the week brain activity that went with it can not simply be explained by lack of interest or motivation on the part of the subject.

A subsequent study with alcohol-dependent young women showed that alcohol-related cues (e.g., words associated with drinking) elicited craving and led to greater increases in brain activity in a variety of regions relative to controls (Tapert et al., 2004), thus establishing a link between craving for alcohol and brain function in key areas and indicating that the brains of alcohol-dependent young women function differently than their peers.

In summary, research with human adolescents clearly suggests that alcohol abuse during the teen years can have lasting deleterious effects beyond the scars of sexual assaults, injuries, violence, etc.

HOW RELEVANT IS THE RAT RESEARCH?

Much of the available data on the potential brain damage caused by exposure to alcohol during adolescence comes from studies done with rats. I am frequently asked how relevant such data could possibly be to the human condition. After all, rats and humans are not exactly the same.

The truth is that, most of what we know about how all drugs—prescription and illicit— affect the brain has been gleaned from research with rats.

Research on Fetal Alcohol Syndrome serves as a prime example of the sometimes beneficial interplay between human and rat research. We know that women who drink during pregnancy can give birth to children with physical and/or cognitive abnormalities. Yet, there is no *proof* from the human work that alcohol *causes* the symptoms seen in Fetal Alcohol Syndrome. However, rat research, in which pregnant rats are given alcohol and their offspring are studied, provides support for the teratogenic effects of alcohol.

It is true that rats are not humans, but our brains are similar enough that insights gleaned from rat research can be used to guide hypothesis-driven research with humans. As time goes by and technology advances, the stack of specifically human research will continue to grow.

Read — Spear LP (2004) Adolescent brain development and animal models. Annof NY Acad Sci 1021: 23-26 — for an excellent overview of issues.

ALCOHOL AND COLLEGE

Alcohol use among college students has been a topic of intense interest in recent years.

As is the case with high school students, college students face a litany of potential consequences if their drinking plans go awry. Alcohol increases the odds that college students will commit crimes, including vandalism and physical assault, and non-drinkers routinely suffer the consequences of other students' irresponsible drinking (Wechsler et al., 2000). The more a student drinks the lower their overall GPA is likely to be (White et al., 2002). More than ½ of students in one nationwide survey report having their studying or sleep disrupted by someone else's alcohol use (Wechsler et al., 1995; Wechsler et al., 2000). In addition, as in the larger population, drinking and driving is a problem on many campuses (Wechsler et al., 2003). Traffic crashes claim more lives than anything else among young adults, and alcohol is involved in a significant proportion of these crashes.

While the statistics mentioned above are stark, and clearly indicate that alcohol misuse continues to be a problem on college campuses, it is important to recognize that there is a tremendous amount of misinformation about college drinking floating unchallenged through the media.

Complicating matters, the same TV stations that draw in viewers with stories of alcohol-related tragedies on campuses make money from alcohol advertising.

Such factors make it difficult to get to the truth, which is that alcohol use on college campuses is certainly a problem, but hardly the epidemic it is made out to be.

There is no question that some college students drink irresponsibly and do great harm to themselves and/or others. However, while some students push the limits of alcohol consumption and put themselves and those around them at great risk, it is unfair to assume that all college students are drunkards. Indeed, the data tell a much different story.

The majority of college students either do not drink or do so without causing problems. However, based on media reports, it is easy to understand why so many people believe that all college students drink to excess. It is virtually impossible to read the paper or turn on the news these days without hearing ominous statistics about the supposed epidemic of alcohol abuse on college campuses.

Again, alcohol use on college campuses is a big problem— in many ways bigger than the problem of alcohol misuse among their non-college peers — but it is not apocalyptic!

THE TROUBLE WITH BINGE-DRINKING

When it comes to college drinking issues, media reports tend to focus on "binge-drinking". When used colloquially, the term binge-drinking implies consuming large amounts of alcohol in a relatively short period of time. In studies of college drinking, the term refers to a dichotomous variable defined by meeting or exceeding a threshold, such as four or more drinks (4+) for females and five or more drinks (5+) for males (Wechsler et al., 1994). Research by Henry Wechsler and colleagues (Wechsler et al, 2002) at the Harvard School of Public Health, the main proponents of the 4+/5+ measure of binge-drinking, suggests that roughly 45% of students nationwide meet or exceed this threshold at least once every two weeks.

A panel assembled by the NIAAA recently recommended modifying the Harvard CAS definition of binge drinking to take blood alcohol concentrations (BAC) into consideration (NIAAA, 2004). The modified definition simply specifies a time-frame — a two-hour period — during which 4+ or 5+ drinks are consumed. Theoretically, this pattern of consumption could lead the average male or female to achieve a peak BAC level of roughly 0.08%, though actual BACs could be much higher or lower.

Though the new definition represents a minor improvement over the Harvard CAS definition, it still suffers from most of the old weaknesses. Like the Harvard CAS definition, the NIAAA definition would still place all drinkers that reach a certain threshold into the same category. A student that barely reaches the legal limit for operating a motor vehicle would be classified the same as a student that dies from an alcohol overdose. The same level of risk is assigned to all students that cross the threshold regardless of how far beyond the threshold they go.

To study drinking levels beyond the standard binge-threshold, White et al. (2006) examined survey data from 10k first-semester college freshmen. Roughly 1/5 males actually consumed 10+ drinks and 1/10 females consumed 8+ drinks, twice the binge-threshold, at least once in the previous two weeks.

Using simple binge thresholds would lead all of the above students to be lumped into the same category. Thus, while extremely useful, binge-drinking measures simply cannot completely characterize the drinking

ALCOHOL AND COLLEGE SPORTS

A poorly understood relationship exists between alcohol and athletics. College athletes drink more heavily than non-athletes (Nelson and Wechsler, 2001) and sports fans drink more than non-fans (Nelson and Wechsler, 2003). The reasons for these relationships are not known. In this section, we will explore some possible explanations for the relationship between alcohol and athletics.

Humans seem to share a universal interest in sports and games (Hopkins and Wober, 1973). Participating in sports, either actively or passively, scratches an itch—particularly for men.

Humans are predators with an impressive ability to work together, strategically, to kill prey or destroy an enemy. Perhaps these abilities allowed humans to successfully ascend to the top of the food chain. While the majority of us no longer need to engage in the same types of predatory activities that helped us get here, this certainly does not mean that those drives are no longer present or that they no longer come in handy from time to time. We have simply learned to keep these drives in check and to reveal them only in situations deemed appropriate by the modern culture. The work force represents one context in which our predatory skills are still useful and often necessary. How many times have you heard sayings like, "making a killing", "hunting for a job", "price war", etc?

Sports represent another avenue for acceptable, typically healthy outlets for our predatory urges. As a team player, one is actually part of the battle and is involved in the strategic use of physical prowess, endurance, accuracy of throwing, and other skills to "dominate", "beat", "destroy", "kill", "eliminate", "crush", etc., the other team.

Clearly, sports fans are not involved in the battle on the same level as athletes. However, they are still part of the in-group (a broad alliance) that the athletes represent. They can share in the excitement as their team prepares for battle, spend time on strategy and debating the best plans of attack, hoot and cheer as they watch their team compete, and share in the victory celebrations or lick their wounds when the battle is over.

Nelson and Wechsler (2001) observed that college athletes engage in episodic, or binge, drinking at higher rates than non-athletes. Athletes tend to socialize more than non-athletes, place more importance on parties, have more friends that drink heavily, and watch more sports programming. Like college athletes, fans of collegiate sports tend to drink more heavily than non-fans (Nelson and Wechsler, 2003).

Why might the link between sports and alcohol exist? One can only speculate. For many people, alcohol seems to exert an anxyiolitic, or anti-anxiety, effect. This effect seems to make people more comfortable interacting with others socially. In general, intoxicated individuals are less concerned about the potential negative consequences of their actions — such as social rejection or failure. Colloquially, many people refer to the impact of alcohol on concern over the consequences of their actions as *reduced inhibitions*.

> "THERE IS SOMETHING ABOUT THE CULTURE OF COLLEGE ATHLETICS THAT REALLY PROMOTES HEAVY ALCOHOL ABUSE."
>
> – Toben Nelson, PhD
> Harvard School of Public Health

Serious sports fans are very concerned about the well being of their teams, as are the athletes. The prospect that their team could lose can be very anxiety provoking and watching the game itself, without being able to control its progression, can be very stressful. Alcohol might help dampen the anxiety and stress that go along with being a sports fan, thus making it more enjoyable. By reducing one's concerns about social rejection, alcohol might also facilitate participation and bonding among fans.

Exposure to alcohol advertising and marketing efforts is often cited as a potential contributor to the higher than normal levels of alcohol use among athletes and sports fans. For instance, Nelson and Wechsler (2001; 2003) note that both athletes and sports fans watch more television than their peers, presumably including more sports related programming, in which alcohol advertisements are common. According to the authors (Nelson and Wechsler, 2001), such ads could "prime viewers for heavy alcohol use". However, as we will see in the next section, the direct impact of advertisements on alcohol use appears to be minimal.

In short, a relationship exists between college athletics and alcohol, though the explanation for why this relationship exists remains elusive. For many people, alcohol reduces anxiety and makes them more comfortable in social situations. These effects might reduce some of the stress and anxiety that go along with rooting for one's favorite team, and might facilitate the bonding of fans in social settings. Some have suggested that exposure to alcohol advertisements during sporting events might also contribute. In the next section, we will examine the relationship between exposure to alcohol ads, alcohol consumption, and the use of ads during collegiate sporting events.

ALCOHOL, ADVERTISING AND COLLEGE SPORTS

Alcohol advertising is pervasive in college sporting events. According to a report in USA Today (March 15, 2004), "NCAA tournament games led all other sports events in alcohol-related TV advertising in 2002, with 939 ads costing $28 million. That compares with a combined 925 ads aired during the Super Bowl, World Series, college bowl games and the NFL's Monday Night Football."

Until recently, the men's basketball team at California State University, Fresno, entered the court through a silver tunnel provided by a Coor's Light distributor, and students at Northwestern were given magnetic calendars of the school's sports schedules complete with the Miller Brewing Company logo (Hawes, 1998). Coor's even created a special can commemorating the championship football season at the University of Nebraska, Lincoln (Hawes, 1998).

While alcohol ads during sporting events have angered plenty of people, the industry defends their right to advertise. As quoted in ESPN.com (November 12, 2003), Jeff Becker, president of a trade association known as the Beer Institute, stated "The fact is that the vast majority of those persons that watch and attend college sports, as well as the majority of students in college, are of legal drinking age, 21 or older." Further, many simply see advertising during college sporting events as smart marketing, given that many of those in their target market are sports fans.

Jeff Kaestner, vice president of consumer affairs for Anheuser-Busch Companies, summed it up as follows, "I think it's ethical and good business. We want to be where our customers are" (USA Today, March 15, 2004).

Many school officials vehemently disagree. According to University of Miami President, Donna Shalala:

"The time has come to sever the tie between college sports and drinking -- completely, absolutely and forever. Schools must consider voluntary guidelines that say 'No alcohol advertising on the premises of an intercollegiate athletics event, no bringing alcohol to the site of an event, no turning a blind eye to underage drinking at tailgate parties, and on campus, and no alcohol sponsorship of intercollegiate sporting events.'"

Many other officials and school representatives side with those like Donna Shalala. To them, accepting alcohol advertising money is completely inconsistent with the current focus of universities on curbing underage drinking. Andy Gieger, the Athletics Director at Ohio State, recently stated that "It's inconsistent to say you want to discourage underage drinking and turn around and huckster the stuff on your broadcasts."

Some, like Ohio State University, have banned alcohol ads from televised sporting events, despite the potential loss of hundreds of thousands of dollars per year (Cincinnati Post, November 22, 2003).

> "IF ASPIRIN WERE THE LEADING CAUSE OF DEATH ON COLLEGE CAMPUSES, DO YOU THINK CHANCELLORS, PRESIDENTS AND TRUSTEES WOULD ALLOW ASPIRIN COMMERCIALS ON BASKETBALL AND FOOTBALL TELECASTS?"
>
> - Coach Dean Smith

Dean Smith, retired basketball coach from the University of North Carolina at Chapel Hill, is also an outspoken critic of combining alcohol with college sports (see the quote from Dean Smith above). Smith recently leant his support to a new initiative by the Center for Science in the Public Interest to get schools to shun alcohol advertising during sporting events. The program, called The Campaign for Alcohol-Free Sports TV, requests schools to sign a pledge indicating that they will prohibit alcohol advertising on local sports programming, and that they will work within their athletic conference and within the National Collegiate Athletic Association (NCAA) to eliminate all alcohol advertising from televised college sports.

Interestingly, in all of the discussion surrounding alcohol advertising and college athletics, there has been very little emphasis on whether the ads actually influence college drinking! As we will see in the next section, it appears that such ads actually have little direct impact on alcohol *consumption* per se.

While local ads promoting cheap drinks and contests do attract drinkers, these are not the types of ads that appear during televised sporting events.

DO ALCOHOL ADS INCREASE CONSUMPTION?

The purpose of most advertisements is to convince us that the quality of our lives will improve if we use a particular product. My personal favorite these days is a Hummer ad that shows a humus eating thirtysomething male "reclaim his manhood" simply by buying a Hummer.

Other ads make us feel uncomfortable with our current lives in order to persuade us to change. Body odor? Speed stick can take care of that. More fat than we'd like? A billion different companies promise to solve that problem for us overnight.

Alcohol ads are notorious for their pairings of scantily clad, attractive young women with their products. The message is not hard to decipher here -- we are supposed to believe that average looking males (note that males between 21-35 represent the major target audience for beer ads) will be mobbed by attractive women the moment they crack open a particular brand of beer.

What exactly do these ads do? Do they actually cause people to drink more? Research has so far failed to reveal a clear-cut relationship between alcohol ads and alcohol use — though there are some troubling data like those suggesting that some alcohol ads are appealing and familiar to children. Recently, researchers at the University of Connecticut reported finding a correlation between the number of alcohol ads viewed by teens and their levels of consumption. A similar correlation was observed between industry advertising expenditures per state and drinking levels in those states. Again, though compelling, the data remain correlational.

Rather than recruiting new users, it makes more financial sense for a beverage manufacture to use ads in an effort to grab market share. Americans spend more than $120 billion on alcohol every year, between $50-$70 billion of which is spent on beer. A company stands to make far more profit by stealing a few percent of the market away from a competitor than by causing a few abstainers to start drinking. For instance, gaining 0.5% of a $50 billion dollar market would generate an extra $250 million dollars for a company.

If alcohol ads do not cause non-drinkers to start drinking alcohol, then what's the harm? Plenty. The constant stream of ads reinforces the false perception that everyone drinks and that alcohol is so safe that it is not even considered a drug (if it were, the ads would have to include information about side effects — including death!)

Companies promise our kids short-term scratches for their adolescent itches. Alcohol *and* hot women? What teenage male isn't at least going to seriously consider the possibilities? Such marketing tactics transmit and reinforce social messages that the world could do without. Beer commercials promote the expectation that alcohol and sex go together perfectly at a time when society is still figuring out how to deal with sexual assault, teen pregnancy, and the spread of sexually transmitted infections.

> "For all its many faults, relative freedom to advertise is an emblem of a more general economic and social freedom. Perhaps it is part of the price we pay for that freedom."
>
> — Richard S. Tedlow
>
> www.answers.com

While the commercials might not influence a student's overall drinking rate, the messages could certainly affect how male students view and treat women, or how female students view themselves. How many beer commercials have you seen that send the message that women should be treated with respect? In these ads, women are invariably shown as the prize that men will receive for drinking a particular brand of beer.

In my personal opinion, beverage manufacturers should get to advertise just like everyone else, but they have an unmet responsibility to consumers to list the potential side effects and the appropriate serving size information on their products.

ALCOHOL AND SEXUAL ASSAULT

Alcohol plays a significant role in sexual assaults, which happen far more often than many realize. Indeed, from my perspective, this is one of the real tragedies of alcohol misuse on America 's college campuses. Below is a summary statement from a recent manuscript from Mohler-Kuo and colleagues (2004):

> "Roughly one in 20 (4.7%) [college] women reported being raped. Nearly three quarters (72%) of the victims experienced rape while intoxicated. Women who were under 21, were white, resided in sorority houses, used illicit drugs, drank heavily in high school and attended colleges with high rates of heavy episodic drinking were at higher risk of rape while intoxicated."

NIAAA estimates that — each year — perhaps 70,000 college students are victims of sexual assault or acquaintance rape in which alcohol was involved (Hingson et al., 2002)

SHOULD PARENTS FOLLOW THE "EUROPEAN MODEL"?

Many parents struggle with the issue of whether to let their adolescents drink at home. This is a tricky subject — and one with potential legal ramifications (check your state laws).

For those in the "yes" camp, it often boils down to the perception that European countries, like France, have everything figured out.

The argument goes like this:

- Their teens can drink—ours cannot.
- Their teens exercise moderation —ours drink to get drunk.

Ergo, if we let our teens drink — at least at home — they will learn to drink in moderation like the European kids.

Even if the logic works in a weird way, the basic premise is flawed. The perception that European cultures, in general, have this problem under control is simply inaccurate.

The European Union (EU) recently commissioned a report on alcohol use among its 25 member states. The report was released last month — June, 2006.[1]

Among EU members as a collective, the average age of first drink was 12.5 and the average age of first drunkenness was 14.

In Denmark, 70% of 15 year olds were drunk *at least twice* in the year before the data were collected.

Our kids look like teetotalers by comparison. In the 2005 Monitoring the Future Study, 34% of 10th graders in America reported being drunk *at least once* in the previous year.[2]

What about binge drinking? Isn't it the case that their kids drink more often but our kids are more likely to binge (5+ drinks)? Nope! According to a 2005 report from the U.S. Department of Justice and the Pacific Institute for Research and Evaluation, American teens were less likely to binge in a 30 day period than teens in 34 out of 35 European countries.

Turkey was the only country out of 35 with lower rates of heavy drinking among teens than the U.S.[3]

Ultimately, each parent or guardian must decide whether they will allow their kids to drink at home. Correcting the misperception that the Europeans have figured out how to do things better might help in the decision making process.

[1] Google "European Union Alcohol Report"

[2] www.monitoringthefuture.org

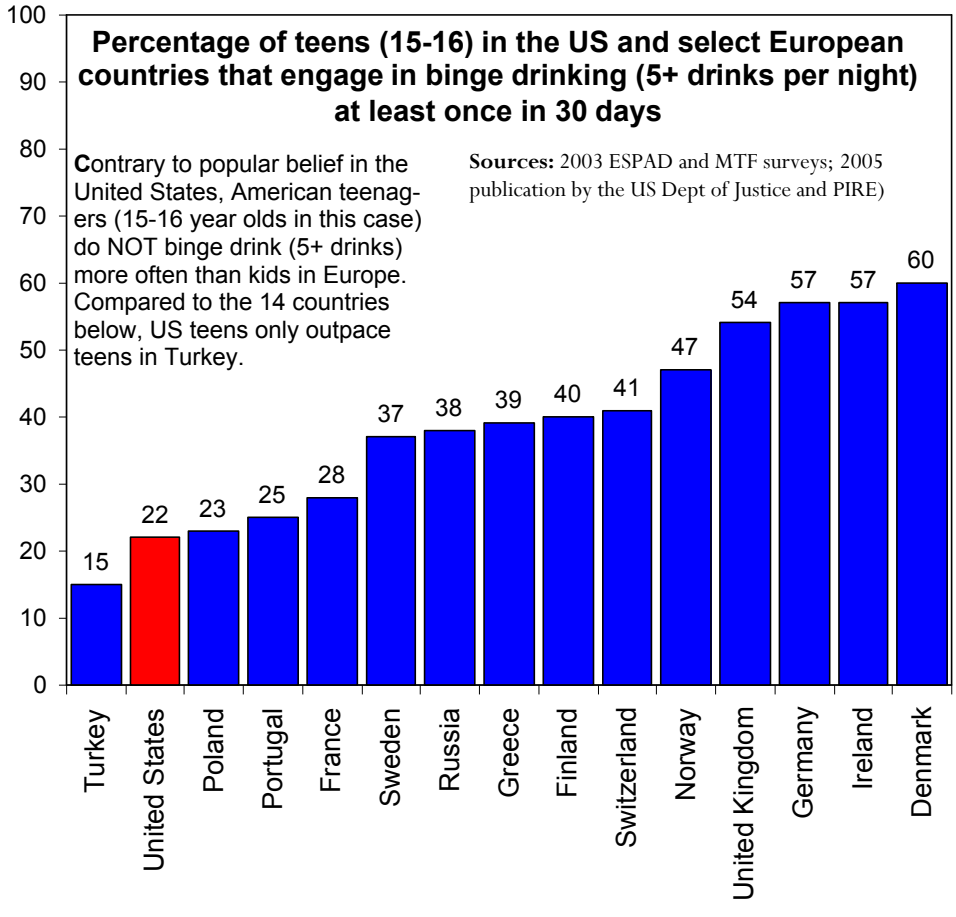
[3] Google "PIRE Europe Binge" Add "USDOJ" if needed

ONE EU ALCOHOL POLICY?

European Union member states produce 1/4 of the world's alcohol supply and 1/2 of all wine, in particular.

The EU represents a diverse group of countries and cultures. Preferred beverages and drinking habits differ from country to country. In France, for instance, overall drinking rates have gone down while, at the same time, rates have gone up in other EU countries.

While the aforementioned EU report recommends tighter regulation, one can only imagine how difficult this would be in such a loose confederation of countries.



IS THAT AN ICE CUBE IN YOUR GIN AND JUICE OR A TUMOR?

In 2000, alcohol was added to the government's list of substances known to cause cancer. Like chronic cigarette smoking and chronic marijuana use—but probably not the occasional puff of each — alcohol causes cancer.

In its profile of alcohol as a cancer causing agent in the 11th Report on Carcinogens, the US Department of Health and Human Services says,

"Consumption of alcoholic beverages is known to be a human carcinogen based on sufficient evidence of carcinogenicity in human studies that indicate a causal relationship between consumption of alcoholic beverages and cancer. [Alcohol consumption] is causally related to cancers of the mouth, pharynx, larynx, and esophagus… Evidence supports a weaker, but possibly causal, relation between alcohol beverage consumption and increased risk of cancers of the liver and breast."[1]

European researchers report that alcohol is more likely to cause cancers of the mouth and neck when it is consumed without meals.[2] I suppose that means the calories we often save by eating smaller dinners in order to drink our calories might cost us more than we thought in the end. In the dataset discussed on Page 4, 13% of female teenagers who drank in the two-weeks prior to the survey reported skipping meals to save room, calorie-wise, in order to drink. Yikes.

It should be noted that the incidence of mouth and neck cancers is not extremely high. While drinking might increase the odds, the odds are already pretty low. For those prone to cardiovascular disease, the benefits could outweigh the risks (see box below).

[1] Visit www.nih.gov and search for "11th Report Carcinogens"

[2] Search "Don't Drink Alone" at www.sciencenews.com

A SINGLE DRINK MIGHT BE SMALLER THAN YOU THINK!

How do researchers define one "drink"?

	BEER	WINE	SHOT	MIXED DRINK
The CORE survey	1 beer	1 glass	1 shot	1 mixed drink
Harvard CAS survey	12 oz.	4 oz.	1.25 oz liquor	1.25 oz liquor
National Institutes of Health (NIH)	12 oz 5%	5 oz. 12%	1.5 oz 40% (80p)	1.5 oz 40% (80p)

Accurately counting the number of drinks that people consume requires that people know what a drink is. It turns out that many Americans, including college students, really are not sure.

Over the years, we have conducted several studies in which college students were asked to pour drinks of different types into cups of different sizes. We also asked them to simply state serving sizes for beer, wine, and liquor. Regardless of the task, students tended to overestimate how big a drink should be

For instance, when asked how many ounces of liquor there should be in a standard mixed drink, the average answer was 4.5 oz rather than 1.5 oz.

Why does this matter? For one, if we send the message that a certain number of drinks is healthy or unhealthy, high risk or low risk, we should educate people about what that means.

Intentionally or accidentally consuming more than a drink or two per day increase one's risk a variety of disease states (see box at left).

Serving size information on beverage containers would help. Unfortunately, the United States does not require serving size information on alcoholic beverage containers — this despite the fact that it can be a highly dangerous, disease causing drug.

ALCOHOL AND THE HEART

Many adults say they drink for the cardio-protective effects. Is alcohol really good for the human heart? It appears so, but only under some circumstance for some people. If you are an otherwise healthy adult — you eat right, exercise, do not smoke — and are at risk of cardiovascular disease, alcohol can decrease the odds when consumed in medicinal amounts. Here is what the American Heart Association has to say about the situation:

> "If you drink alcohol, do so in moderation. This means an average of one to two drinks per day for men and one drink per day for women. (A drink is one 12 oz. beer, 4 oz. of wine, 1.5 oz. of 80-proof spirits, or 1 oz. of 100-proof spirits.) Drinking more alcohol increases such dangers as alcoholism, high blood pressure, obesity, stroke, breast cancer, suicide and accidents. Also, it's not possible to predict in which people alcoholism will become a problem. Given these and other risks, the American Heart Association cautions people NOT to start drinking ... if they do not already drink alcohol. Consult your doctor on the benefits and risks of consuming alcohol in moderation."
>
> - www.AmericanHeart.org

Why does the age of first drink matter?

Several, large-scale epidemiological studies suggest that, the earlier one starts drinking, the greater the likelihood that they will go on to have a problem with alcohol.

Such studies typically involve calling subjects, or mining data from surveys in which subjects had already been contacted, and asking them questions about their drinking history, including when they started. Those with abuse or dependence histories tend to start drinking much earlier than those without a problematic relationship with alcohol.

One such study — published in July, 2006 — is well worth summarizing here.[1]

Researchers at NIH, led by Ralph Hingson, examined data from 43,000 US adults agd 18 older. Data were from the 2001-2002 National Epidemiologic Survey of Alcohol and Related Conditions (NESARC).

Overall, kids who started drinking by the age of 14 were much more likely to become dependent on alcohol at some point (47%) compared to those who waited until they were 21 or older (9%).

The study also suggests that earlier drinking is associated with a broader range, and greater severity, of alcohol related problems. The prognosis is simply poorer for those that start drinking at an early age.

Such data are commonly used to argue that delaying the onset of drinking among kids is an important component of any strategy aimed at reducing alcohol abuse and dependence.

The pivotal question is whether these kids are driven to drink at a young age due to family history or some other genetic contribution, or if perhaps early exposure itself leads to a higher propensity for alcoholism?

A 2001 study by researchers at the University of Minnesota suggested that the early exposure is a *symptom* of underlying problems with behavioral regulation related to alcoholism rather than a cause of the alcoholism[2]

However, in Dr. Hingson's, age of onset was a significant predictor of alcohol dependence *even after* family history and several personality variables were statistically controlled.

In summary, there is a strong relationship between age of onset and the likelihood of becoming dependent. While the nature of the relationship remains unclear, there can be no doubt that delaying age of onset should be a major focus in our prevention initiatives.

[1] Google "NIH Hingson Age Onset"

2.Google "McGue Age Onset Drinking'

Booze in the barracks

Many soldiers, like their non-military peers, drink alcohol to excess. This fact simply evades public discourse about alcohol until something newsworthy happens, and then soldiers are often characterized unfairly as drunken brutes.

Soldiers represent an additional source of income for beverage manufacturers. As is the case with civilians, the cost of the damage done by alcohol abuse among soldiers is picked up by tax payers—not by the companies selling the products. Another externalized cost of the alcohol business.

How much does it cost? A 1997 report (cannot find more recent numbers) from the Office of the Inspector General of the Department of Defense concluded the following:

"In FY 2005, the military retail system generated alcoholic beverage sales of about $600 million and realized gross profits of about $164 million. However, DoD costs for health care associated with the detection, rehabilitation, and treatment of active duty, retiree, and dependent personnel with alcohol related diseases and injuries were about $557 million. The lost productivity costs for active duty personnel hospitalized for alcohol attributable disease was approximately $13 million for the same period. Non-DoD societal costs for alcohol related incidents attributable to active duty, retiree, and dependent personnel were roughly $396 million."

- Office of the Inspector General of the DoD, *Evaluation Report on the Economic Impact of Alcohol Misuse*, Report No. 97-150, June 2, 1997.

Note that the estimate of beverage sales does not include money spent on booze off base.

Additional research has shown that the stress of deployment, even for non-combat missions, leads many soldiers to increase their consumption in an effort to deal with the strain (Bell et al. ACER 28:1890-97, 2004).

In the past few years, I have had the sincere honor of visiting several military bases at home and overseas. Recreational drinking is a common means of escape and relaxation among soldiers, many of whom are fresh out of high school. This usually occurs without incident. However, as is the case in the civilian world, when rapes, murders, and other violent offenses occur, alcohol is often involved. This appears to be the case in a recent, highly publicized incident in which four soldiers drank whiskey and took pain pills before allegedly raping a 14 girl and killing her family. (AP, *Drinking, drugs tied to Iraq rape-murder*, Aug 9, 2006). It is important to remember that the actions of a few drunken, rogue troops do not reflect the behavior of all soldiers anymore than the actions of a few unruly college kids reflect the behavior of all college students.

"I must point out that my rule of life prescribed as an absolutely sacred rite smoking cigars and also the drinking of alcohol before, after, and if need be during all meals and in the intervals between them"

- Winston Churchill

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www.duke.edu/~amwhite

Acknowledgements

Current funding through NIAAA. This document summarizes work done dozens of researchers . Full references are not provided for every statement but are available on my website (see link at left) or by doing scholarly Google searches. If you discover an error in the text, please e-mail me so that I can correct it. Here is a partial list of researchers about whose work I really enjoy reading.

Jay Giedd, NIMH
Ron Dahl, University of Pittsburgh
Linda Spear, SUNY Binghamton
Susan Tapert, UCSD
Sandra Brown, UCSD
Fulton Crews, UNC-CH
Scott Swartzwelder, Duke University
Cheryl Kirstein, University of South Florida
Marisa Silveri, Harvard
Craig Slawecki, Scripps

…and many others

"No animal ever invented anything so bad as drunkenness – or so good as drink."

— G.K. Chesterton