Real Peacework eAkademie
- Department "Education / Information for a new society" -

Modern warfare

How to destroy a country, its future and its people without weapons, bombs or military means:

The underestimated role of alcohol, energy drinks and the legalisation of drugs

Part 1 of 3

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Part I:

Alcoholism – Economic Effects, Social Effects … its Effects on Worker and Employees

The Economic Impact of Alcohol Abuse and Alcoholism

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Synopsis

The economic effects of alcohol abuse are as damaging to the nation as the health effects, affecting the family, the community, and persons of all ages. Underaged drinking is interfering with children's development, affecting the nation's ability to respond to economic challenge in the future. The college aged may be the most difficult to educate about alcohol abuse because of drinking patterns established at an early age and susceptibility to advertising inducements.

Health care costs for families with an alcoholic member are twice those for families without one, and up to half of all emergency room admissions are alcohol related. Fetal alcohol syndrome is one of the top three known causes of birth defects, and is totally preventable. Alcohol abuse and alcoholism are estimated to have cost the nation $117 billion in 1983, while nonalcoholic drug abuse that year cost $60 billion. Costs of alcohol abuse are expected to be $136 billion a year by 1990, mostly from lost productivity and employment. Between 6 and 7 million workers are alcoholic, with an undetermined loss of productivity, profits, and competitiveness of American business. Alcohol abuse contributes to the high health care costs of the elderly beneficiaries of Federal health financing programs. Heavily affected minorities include blacks, Hispanics, and Native Americans.

Society tends to treat the medical and social consequences of alcohol abuse, rather than its causes. Although our experience with the consequences of alcohol abuse is greater than that for any other drug, public concern for its prevention and treatment is less than for other major illnesses or abuse of other drugs. Alcohol abuse is a problem being given high priority within the Department in an effort to create a national agenda on the issue and to try to impart a greater sense of urgency about the problems. Ways are being explored to integrate alcoholism activities into more Departmental programs. Employee assistance programs for alcohol abuse have been established in about 90 percent of major companies, and Federal employees' access to treatment is being expanded through health insurance coverage. Collective public efforts are required to encourage prevention and treatment efforts, and to begin to reduce the economic effects of alcohol abuse that the country can no longer afford.

ALCOHOL is the foremost drug of abuse in the United States today. The consequences of alcohol abuse, including the disease of alcoholism, exact a far greater toll on our health and on our social well-being than the abuse of any other substance. Because of my training as an economist, I tend to evaluate the economic aspect of issues. In my view, the effects of alcohol abuse and alcoholism are as damaging to our nation's economy as they are to our nation's health.

No single segment of our society is untouched by this phenomenon—not the young, not the middle-aged, not the elderly. Alcohol abuse affects the entire family; it troubles every community. Time and again, we have seen how it tears at the very fabric of American life.

Studies show that the consumption of alcohol can begin very early. It is not uncommon these days for children to begin drinking before they have reached the age of 12 years. Elsewhere in this journal, medical experts attest to the harm that alcohol can do to young minds and bodies—indeed, to the emotional and physical health of people of any age.

Let's look, again, at the children who are drinking, including those who are drinking wine coolers when their beverage of choice ought to be fruit juices, milk, and soft drinks.

Underage Drinking

Children of any age—from toddlers to teenag-

ers—should not have their minds clouded by alcohol—or any other drug for that matter.

Our children are our hope for the future; it is they who are going to keep our country strong. If we are to maintain our high wage-based economy, today's children are going to have to be prepared to face some of the most difficult challenges in the future. We currently compete in a tough international marketplace for goods and services. That marketplace will become even more competitive as the global market expands. As this new generation reaches adulthood, it will need to have more flexible skills and an increased ability to sustain peak performance levels in order to roll with the high technology punches and to successfully compete in the international marketplace with countries like Japan. This was not true with earlier generations, raised during and immediately after WW II, when the United States was the most highly industrialized nation in the world, and international competition was virtually nonexistent.

Another stratum of our society that concerns us greatly lies between the high-school-age population and the adult working-aged population. I refer, of course, to the nation's college students. I suspect that they may be the most difficult group to reach with the facts about alcohol abuse. They are important because it is quite literally true that they will be tomorrow's leaders. They can be difficult to reach, or to educate, because they are at a time of great change in their lives. While often viewed as adults by society, they are not always equipped, when they reach the minimum drinking age, to make informed choices about drinking. Too often, they are easy prey for the beer, wine and liquor industries, with their slick marketing programs and skillful advertising techniques, such as promotional nights, drinking contests, and sports and club sponsorships. In addition they have established drinking patterns and attitudes from their early teens which may be difficult to extinguish.

In this connection, athletic participation is an important part of growing up for millions of young men and women in this country. But 50 percent of all high school coaches surveyed in a recent USA Today poll said that alcohol use by their young athletes is very serious and getting worse. The most often cited causes of the problem were social acceptance of alcohol, a glut of TV advertising, and the ease with which alcohol can be purchased. Drinking is made to seem like a "glamorous and grownup thing to do," one coach remarked.

It is small wonder, when you stop to think about it, that some 4.6 million adolescents in America experience serious alcohol problems each year. And should we be surprised to learn that more than 1 out of 2 teenage deaths in auto accidents involve the use of alcohol?

Direct Costs

In 1983, health care costs alone for illness and trauma related to alcohol abuse totaled $15 billion. Studies show that the average monthly health care bill for families in which there is an alcoholic member is twice that of families without an alcoholic member. It is estimated that 20 to 40 percent of all inpatient hospital admissions and up to 50 percent of all emergency room admissions are alcohol related. On the brighter side, there is considerable evidence that treating alcohol-related problems reduces expenditures for overall health care costs, not only for the alcohol abusers and alcoholics, but for their families, as well.

While the illness costs figures are shocking, even sadder is the fact that alcohol abuse and alcoholism destroy families, the very foundation of our society. They work their destruction in many ways. Alcohol is involved in one-quarter to one-half of all marital violence cases, in one-third of all child molestation cases and in about 13 percent of child abuse cases reported to police.

To talk about families is to talk about pregnancy and birth. Studies show that for one-half of all teenage pregnancies, one or both parents had been drinking alcohol at the time of conception. Drinking while pregnant makes a prospective mother much less likely to give birth to a healthy baby at full term, yet many mothers-to-be continue to drink (and smoke, unfortunately) during their pregnancies. In so doing, they are taking a real chance that their baby will be born with physical, mental, or behavioral abnormalities or with fetal alcohol syndrome. Fetal alcohol syndrome is one of the top three known causes of birth defects in the United States today, and the only one that is totally preventable.

Indirect Costs

We have looked at some of the direct costs of alcoholism and alcohol abuse, with particular reference to children and young people. Many experts say that the direct costs pale when compared to the indirect effects and costs to society. Consider the use and abuse of alcohol in the working-aged population, where the costs are enormous but more difficult to break out.

'No single element of our society is untouched by this phenomenon—not the young, not the middle-aged, not the elderly. Alcohol abuse affects the entire family; it troubles every community.'

It was estimated in 1983 that alcohol abuse and alcoholism were costing our economy $117 billion a year. In comparison, nonalcoholic drug abuse that year cost $60 billion. Costs of alcohol abuse are projected to rise to $136 billion by 1990 and to $150 billion in 1995.

Of the $117 billion, the greatest portion—$92.8 billion—came from reduced worker productivity and lost employment. Put another way, $92.8 billion was the price tag for the products, goods, and services that were never produced or delivered that year because alcoholic workers were less productive, because they lost their lives prematurely to alcohol-induced illness and accidents, and because society incurred the costs of incarcerating so many of them for their criminal activities.

At present, between 6 and 7 million employed American workers are alcoholics. Their affliction affects American business adversely, first and foremost in the form of increased production cost and decreased profits and, second, in its effect on the competitiveness of American business in the international marketplace.

Everyone is worried about the foreign trade deficit. Have you ever heard alcohol abuse or alcoholism mentioned in connection with this problem? Probably not. Yet many of the goods produced in this country are defective from the start, and need replacement or fixing. The result, of course, is increased prices, which reduce the attractiveness of our products on the world market and, ultimately, cut profits and jobs from the economy. Alcohol is a productivity problem we can't afford.

The situation in the Federal Government is no different. Productivity is the concern, and alcohol abuse and alcoholism have a direct and substantial impact on it.

Most of us are at least passingly familiar with the medical consequences of alcohol abuse—heart and other cardiovascular diseases, hypertension, cirrhosis of the liver, and cancer, and the list goes on. For an elderly person on medication for treatment of these and other illnesses, the combination of alcohol and medication can render the medication ineffective or lethal.

Alcohol abuse and alcoholism hit hard in the elderly segment of the population, contributing to extraordinarily high health care expenditures. These costs are paid by you and by me and by every other taxpayer in the United States through Federal health financing programs such as Medicare and Medicaid. Suffice it to say that the drain on the Federal Treasury for these and other government financing mechanisms, such as funds for the homeless and family support programs, is enormous.

A recent study estimated that as many as one-half of all our homeless in America suffer from alcohol abuse and alcoholism. Alcohol is one of the chief causes of illness and death among Black, Hispanic, and Native American populations. The incidence of alcohol-related medical problems, particularly liver cirrhosis and cancer of the esophagus, is very high among blacks. Cirrhosis mortality rates for blacks are twice as high as the rates for whites. Even though many tribes remain almost totally abstinent, alcohol-related illness and injury among American Indians is three times the rate of the general population. Accidents, most of them alcohol-related, are the second most common cause of death and account for nearly one-fourth of deaths among American Indian men. Hispanic men in this country have a higher rate of alcohol use and abuse and a higher rate of cirrhosis mortality.

Better Health and Reduced Costs

I share with Secretary Bowen the view that we, as a society, could ameliorate many of our health care problems by preventing and treating alcohol abuse and alcoholism. I believe, too, that if we could just get a handle on our alcohol problem we could, in addition to improving the health and quality of life of millions of Americans, cut our expenditures for health care dramatically.

An amazing phenomenon, in view of the ever-escalating costs of health care and welfare, is that we continue to treat the medical and social consequences of alcohol abuse and alcoholism, rather than the cause. We focus on the homelessness of street people, on their lack of shelter and food and warm clothing. For nearly half of them, homelessness is just a symptom; the disease is alcoholism.

Our experience with the consequences of alcohol abuse in America is greater by far than our experience with any other drug. Yet, we have not seen the kind of public concern over the problem

and public pressure to prevent it and treat it that we have seen with other major illnesses or the abuse of other drugs. Part of the explanation may have to do with the fact that alcohol is a legal drug. But so is tobacco, and we've made great progress in reducing its use. Indeed, people today are more aware of the health effects of passive smoking than they are of abusing alcohol, even though alcohol abuse is a far graver problem.

We hear and read daily about the threat that illicit drugs pose to our nation. Without meaning to belittle that threat in any way, for it is real, it is serious, and it is deserving of all the efforts that are being made to overcome it. I note that the costs of alcohol abuse and alcoholism, which amounted to roughly $120 billion last year, far exceeded the costs of all other drugs of abuse combined.

A Top HHS Priority

We need to raise the visibility of alcohol abuse and alcoholism in our nation, just as we have for the hazards of smoking. Dr. Bowen has a long-standing interest in the problems of alcohol abuse and alcoholism. He is very concerned about the apparent lack of attention the public pays them. That is one of the chief reasons for his announcement, early last year, that for the remainder of his term as the Secretary of Health and Human Services, he is making alcohol abuse and alcoholism one of his top priorities. His aim, he made clear, is to use the high visibility of his office to create a national agenda for the prevention and reduction of alcohol abuse and alcoholism, and to impart to the American public a sense of urgency about these problems.

There are programs in HHS that focus some of their efforts (or all their efforts, in the case of the National Institute of Alcohol Abuse and Alcoholism) on alcohol-related problems. We are now exploring ways of integrating alcohol abuse and alcoholism activities into the on-going work of many other HHS programs whose missions are naturally compatible with the objectives of our alcohol initiative.

We are looking for ways to use public education more effectively, perhaps by employing as national spokespersons nationally prominent persons who are recovering alcoholics, and by obtaining major public service advertising and the help of professional advertisers for alcohol-related media campaigns. Our "Be Smart! Don't start!—Just Say No!" campaign is an example of this kind of activity.

We are exploring ways to counter the impact of alcoholic beverage advertising and promotion, particularly those campaigns that fail to discourage underage drinking, or drinking by individuals who are at high risk for negative health consequences, such as pregnant women and persons who should not drink because of medications they are taking.

Our concern, at base, is that TV commercials that "sell" alcoholic beverages to viewers of all ages—and perhaps especially commercials that use well-known sports figures and other celebrities—are slick, pervasive, and persuasive. We believe we need some countervailing forces, some equal time on TV, to show the other side of the story.

This summer and into the fall, HHS is sponsoring a number of alcohol research and treatment conferences and symposia. One that deserves mention is a workshop, sponsored by NIAAA and the National Center for Health Services Research, the purpose of which is to develop an agenda for health research economics related to preventing and treating alcohol-related problems.

Employee Assistance Programs

This year, some 2.2 million Federal employees will have access to alcohol treatment, if they need it, as a result of expanded insurance coverage in their employee benefit plans. We worked with the Office of Personnel Management to make this health insurance coverage available, and we are assisting in publicizing its existence throughout government. As we have seen, alcoholism has direct and substantial consequences for the productivity of any organization, including the Federal Government. We also know that the use and cost of health care services decline once treatment for alcoholism is begun.

We are taking these facts and the lessons we have learned with the Federal work force to the private sector. Lest this assertion sound presumptuous, I should note that roughly 90 percent of the Fortune 500 companies already have established employee assistance programs (EAPs). Our main target is the nation's small businesses—those that employ 250 persons or less and that, by and large, have not established EAPs. Because small businesses comprise approximately 65 percent of the nation's work force, reaching employers in this segment of the working population is clearly essential if we are to stem the growing tide of alcohol abuse in America and reclaim the billions of dollars in worker productivity now lost to the effects of alcohol abuse and alcoholism.

'At present, between 6 and 7 million employed American workers are alcoholics. Their affliction affects American business adversely, first and foremost in the form of increased production costs and decreased profits and, second, in its effect on the competitiveness of American business in the international market place.'

Conclusion

Alcohol abuse is a problem that affects us all. It is a national health problem of the highest order. In recent years, Americans have gained a better understanding of the complexity of our alcohol problems, but they still do not know all they should. Many just don't realize how extensive alcohol abuse and alcoholism are, and how these problems affect not just individuals, but families, schools, workplaces, health care systems, and, ultimately, our entire economy.

I believe that our Department—in particular, the National Institute of Alcohol Abuse and Alcoholism of the Public Health Service—has done a fine job of accumulating knowledge about alcoholism and of making this knowledge available to the public. I believe, too, however—indeed, I know for a fact—that we must do more.

Last year, as I noted, America's bill for alcohol abuse and alcoholism came to more than $120 billion. Forecasters familiar with this country's alcohol problem have predicted that these costs will increase to $136 billion in a little over a year from now and to $150 billion by 1995.

Are these increases inevitable? The question is not easily answered, but my own view is optimistic. I believe we can turn this trend around, and someday prove the forecasters wrong, if we work hard and together to raise public awareness of the costs and consequences of our alcohol-related problems and if we channel this awareness, this heightened concern, into programs of research, prevention, and treatment that leave no room for anyone to doubt the seriousness of our intentions. Our economy simply cannot continue to absorb an annual expense that runs to 12 digits, is on the rise, and is largely preventable. Alcohol abuse and alcoholism, we must all come to understand, are problems we can no longer afford, or ignore. The time for effective intervention is now.

Have I got a problem?
www.haveigotaproblem.com

Social and economic problems linked to alcohol use

Alcohol consumption can have adverse social and economic effects on the individual drinker, the drinker's immediate environment and society as a whole. Indeed, individuals other than the drinker can be affected, for example, by traffic accidents or violence. It has an impact on society as a whole in terms of resources required for criminal justice, health care and other social institutions.

How can work performance be affected by alcohol consumption?

Alcohol consumption can affect work performance in several ways:

- **Absences** - There is ample evidence that people with alcohol dependence and drinking problems are on sick leave more frequently than other employees, with a significant cost to employees, employers, and social security systems. In Costa Rica, an estimated 30% of absenteeism may be due to alcohol. In Australia, a survey showed that workers with drinking problems are nearly 3 times more likely than others to have injury-related absences from work.
- **Work accidents** - In Great Britain, up to 25% of workplace accidents and around 60% of fatal accidents at work may be linked to alcohol. In India about 40% of work accidents have been attributed to alcohol use.
- **Productivity** - Heavy drinking at work may reduce productivity. In Latvia, 10% of productivity losses are attributed to alcohol. Performance at work may be affected both by the volume and pattern of drinking. Co-workers perceive that heavy drinkers have lower performance, problems in personal relationships and lack of self-direction, though drinkers themselves do not necessarily perceive effects on their work performance
- **Unemployment**- Heavy drinking or alcohol abuse may lead to unemployment and unemployment may lead to increased drinking.

How can the family be affected by alcohol consumption?

Drinking can impair how a person performs as a parent, a partner as well as how (s)he contributes to the functioning of the household. It can have lasting effects on their partner and children, for instance through home accidents and violence.

Children can suffer Fetal Alcohol Spectrum Disorders (FASD), when mothers drink during pregnancy. After birth, parental drinking can lead to child abuse and numerous other impacts on the child's social, psychological and economic environment.

The impact of drinking on family life can include substantial mental health problems for other family members, such as anxiety, fear and depression.

Drinking outside the home can mean less time spent at home. The financial costs of alcohol purchase and medical treatment, as well as lost wages can leave other family members destitute. When men drink it often primarily affects their mothers or partners who may need to contribute more to the income of the household and who run an increased risk of violence or HIV infection.

What is the link between alcohol and poverty?

The economic consequences of alcohol consumption can be severe, particularly for the poor.

Apart from money spent on drinks, heavy drinkers may suffer other economic problems such as lower wages and lost employment opportunities, increased medical and legal expenses, and decreased eligibility for loans. A survey in Sri Lanka indicated that for 7% of men, the amount spent on alcohol exceeded their income.

What is the link between alcohol and violence between partners?

Alcohol plays a role in a substantial number of domestic violence incidents, especially in the case of abusing husbands. Often both the offender and the victim have been drinking.

The relationship between alcohol and domestic violence is complex and the precise role of alcohol remains unclear. Heavy drinking has been strongly linked to violence between partners and to a lesser extent to violence towards others, possibly because proximity increases the opportunities for violence.

Studies conducted for instance in Nigeria, South Africa, Uganda, India, and Colombia show that a large fraction of reported domestic violence incidents is related to alcohol use by the male partner. For instance, in Uganda, 52% of the women who recently experienced domestic violence reported that their partner had consumed alcohol, and in India, 33% of abusing husbands were using alcohol. There is a need to better understand the possible role of alcohol intoxication or dependence in the processes through which incidents escalate into violence.

There is little doubt that alcohol consumption has many social consequences, but more quantifiable data is needed to enable meaningful comparisons between countries.

What are the estimated economic and social costs?

Strong efforts are made in many countries to estimate the overall economic and social costs of alcohol use.

Social and economic costs cover the negative economic impacts of alcohol consumption on the material welfare of the society as a whole. They comprise both direct costs - the value of goods and services delivered to address the harmful effects of alcohol, and indirect costs - the value of personal productive services that are not delivered as a consequence of drinking.

In industrialized countries, estimates of social and economic costs of alcohol use can reach several percent of the Gross Domestic Product (GDP), ranging for instance from 1.1% in Canada to 5-6% in the case of Italy.

Estimates of social and economic costs can help:

- make the case for public policies on alcohol,
- target policies and public expenditure on the most important problems (e.g. the costs of alcohol versus other psychoactive drugs such as tobacco),
- identify information gaps,
- assess the effectiveness of policies and programmes against alcohol abuse.

Estimating the costs of the impact of alcohol on the material welfare of society is often difficult and requires estimates of the social costs of treatment, prevention, research, law enforcement, lost productivity and some measure of years and quality of life lost.

The Economic Costs of Alcohol Abuse

The burden imposed by a disease can be measured in many ways. These measures include the number of deaths attributed to a particular disorder, the total number of cases at a given time, the number of new cases that occur in a given year, hospitalization rates, potential years of life lost to a disease, and more comprehensive measures that combine mortality and quality-of-life information.

Another approach to assessing the burden of disease is to estimate the associated "cost of illness" (COI). Studies of COI provide a framework for expressing in dollar terms the multidimensional impact of a health problem. Typically, a COI study of a particular health problem includes estimates of the costs of health care services, losses in productivity from illness and premature death, and other expenditures and resource losses that can be attributed to the health condition. For many diseases, the COI estimates run well into the billions of dollars. Estimates for different diseases often are not directly comparable to one another, however, because of variations in methods, data sources, and underlying assumptions (National Institutes of Health 1997).

Over the past two decades, five major studies have used the COI framework to estimate the economic costs of alcohol abuse in the United States (Berry et al. 1977; Cruze et al. 1981; Harwood et al. 1984, 1998; Rice et al. 1990). These studies present estimates of the costs of alcohol abuse on the basis of analyses of health care costs, productivity losses, and various additional costs, such as those associated with alcohol-related crime and motor vehicle crashes. In this context, the term "alcohol abuse" refers to any cost-generating aspect of alcohol consumption. This differs from the clinical definition of the term, which involves specific diagnostic criteria. Thus, the costs associated with a single occasion of drunk driving that leads to injury or property damage would be counted in this framework, even though this behavior would not, by itself, meet the clinical criteria for a diagnosis of alcohol abuse.

In the most recent of these COI studies, the research group estimated the overall economic cost of alcohol abuse at $148 billion for 1992, the most recent year for which adequate data were available at the time the study was undertaken (Harwood et al. 1998). Making adjustments for population growth and inflation, the authors also projected their estimates forward to 1995, for which the overall estimated cost was $166.6 billion. A subsequent update further projected the estimates to 1998, for which the overall estimated cost was $184.6 billion (Harwood 2000). This 1998 estimate amounted to roughly $683 for every man, woman, and child living in the United States in 1998. Unless otherwise noted, cost figures reported in this section are drawn from the update for 1998.

More than 70 percent of the estimated costs of alcohol abuse were attributed to lost productivity ($134.2 billion), most of which resulted from alcohol-related illness or premature death. Most of the remaining estimated costs were expenditures for health care services to treat alcohol use disorders and the medical consequences of alcohol consumption ($26.3 billion, or 14.3 percent of the total), property and administrative costs of alcohol-related motor vehicle crashes ($15.7 billion, or 8.5 percent), and various criminal justice system costs of alcohol-related crime ($6.3 billion, or 3.4 percent). A breakout of the estimated costs for 1992 and the associated projections for 1998 is shown in table 1; the percentage distribution is shown in figure 1.

The new estimates and projections are the latest since a 1990 report that estimated the economic costs of alcohol abuse by using data for 1985 (Rice et al. 1990). The estimate by Harwood

Table 1: Estimated economic costs of alcohol abuse in the United States, 1992 and 1998*

Economic Cost	1992 ($ millions)	1998 (Projected) ($ millions)
Health care expenditures		
Alcohol use disorders: treatment, prevention, and support	5,573	7,466
Medical consequences of alcohol consumption	13,247	18,872
Total	18,820	26,338
Productivity impacts		
Lost productivity due to alcohol-related illness	69,209	87,622
Lost future earnings due to premature deaths†	31,327	36,499
Lost productivity due to alcohol-related crime	6,461	10,085
Total	106,997	134,206
Other impacts on society		
Motor vehicle crashes	13,619	15,744
Crime	6,312	6,328
Fire destruction	1,590	1,537
Social welfare administration	683	484
Total	22,204	24,093
Total costs	**148,021**	**184,636**

*The authors estimated the economic costs of alcohol abuse for 1992 and projected those estimates forward to 1998, adjusting for inflation, population growth, and other factors.

†Present discounted value of future earnings calculated using a 6-percent discount rate.

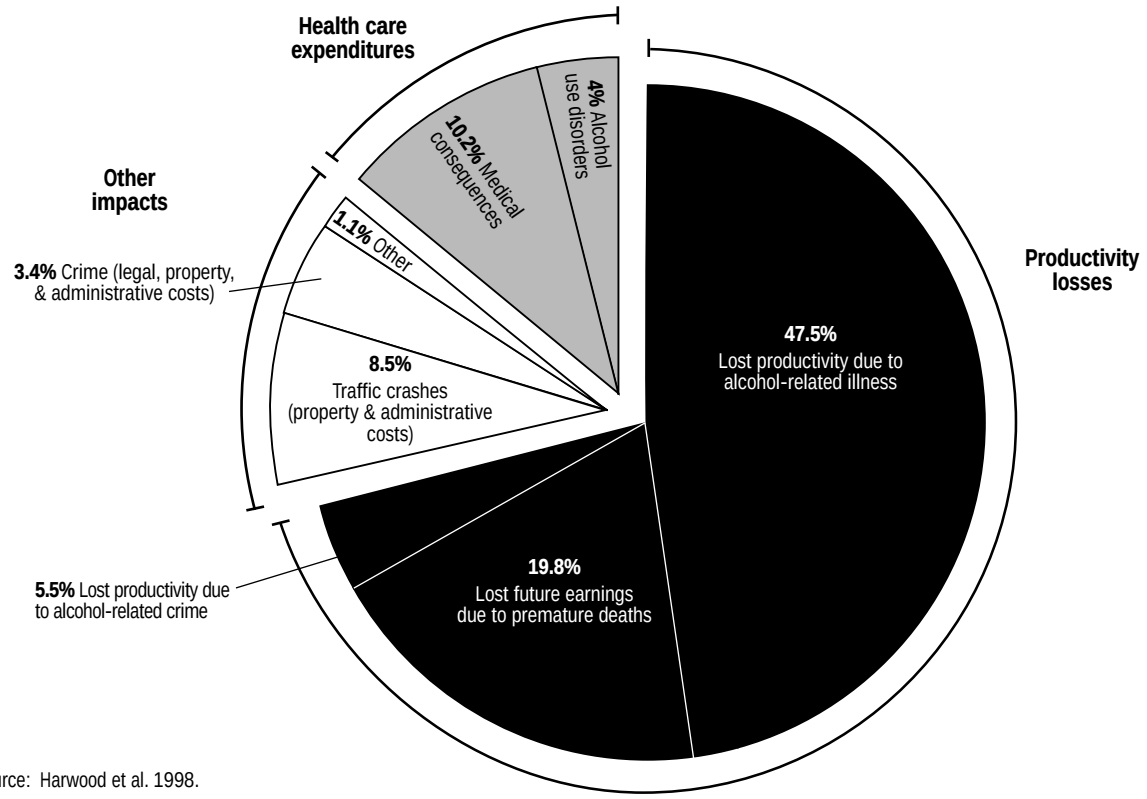
Sources: Harwood 2000; Harwood et al. 1998.

and colleagues for 1992 is 42 percent greater than the estimate by Rice and colleagues, even after accounting for increases that would be expected due to inflation and population growth. However, the estimate for 1992 is almost exactly equal to the average of the estimates from four other major studies, the Rice study included, dating back to 1977 (adjusting each of the earlier estimates for inflation and population growth). Although the estimates for 1985 and 1992 were developed using generally similar approaches, Harwood estimated that more than 80 percent of the increase reported in the newer study could be attributed to differences in data and methodology rather than to real increases in alcohol abuse or its consequences. Methodological and data factors were particularly important in contributing to higher estimates of productivity losses associated with alcohol-related illness and with health care costs for treating the medical consequences of alcohol misuse.

Distribution of the Burden of Costs

An innovative section in the 1998 study by Harwood and colleagues estimated how the burden of the costs of alcohol abuse is distributed across various segments of society (figure 2). This analysis, based on the data for 1992, found that much of the economic burden of alcohol abuse falls on segments of the population other than the alcohol abusers themselves. About 45 percent of the estimated total cost was borne by alcohol abusers and their families, almost all of which was due to lost or reduced earnings. About 20 percent of the total estimated cost of alcohol

Figure 1: Economic costs of alcohol abuse, United States, 1998
(Total estimated cost: $184.6 billion)



Source: Harwood et al. 1998.

abuse was borne by the Federal government and 18 percent by State and local governments. Nearly three-fourths of the costs borne by the Federal government were in the form of reduced tax revenues resulting from alcohol-related productivity losses, and most of the remaining Federal burden was for health care costs. Of the burden on State and local governments, reductions in tax revenue resulting from productivity losses accounted for just over half, while 38 percent was for criminal justice and motor vehicle-related costs. Private insurance arrangements (including life, health, auto, fire, and other kinds of insurance) shouldered the burden for 10 percent of the total estimated cost, primarily in the areas of health care costs and motor vehicle crashes. Six percent of the total cost was borne by victims of alcohol-related crimes (including homicide) and by the non-drinking victims of alcohol-related motor vehicle crashes.

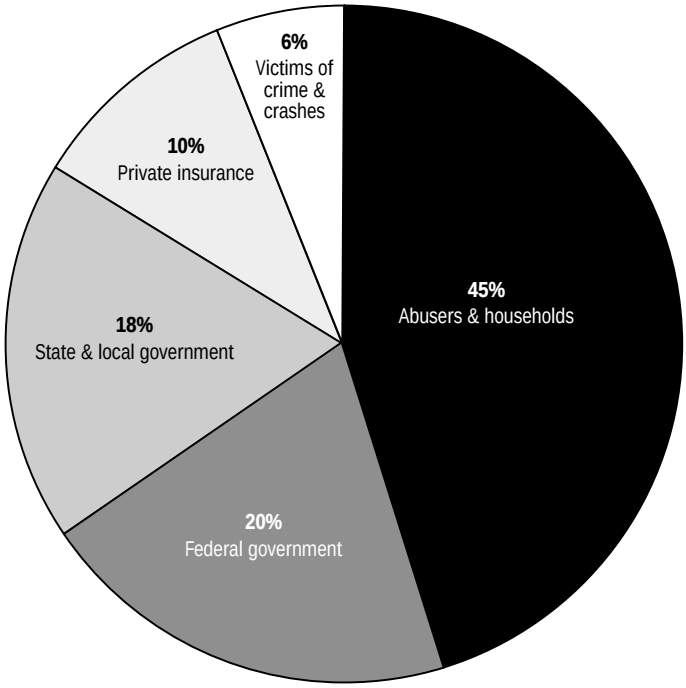
Components of the Costs of Alcohol Abuse

The estimated cost of alcohol abuse was constructed from estimates of numerous smaller categories and subcategories of costs, which were based on a wide variety of methods and data sources. These smaller categories, in turn, fall in three general groups: health care costs, productivity losses, and other impacts. The main issues and findings associated with each of these broad areas are described below, followed by a discussion of some key caveats and limitations associated with the estimates.

Health Care Costs

Health care costs of alcohol abuse were estimated at $26.3 billion for 1998, representing a relatively modest fraction (14.3 percent) of the total estimated cost of alcohol abuse. This category includes both the costs of treating alcohol abuse

Figure 2: Distribution of the costs of alcohol abuse



Source: Harwood et al. 1998.

and dependence, estimated at $7.5 billion, and the considerably greater costs of treating the adverse medical consequences of alcohol consumption, estimated at $18.9 billion. Each of these subcategories comprises a number of components, such as costs incurred in different treatment settings or for different categories of providers, reflecting both the pervasive health consequences of alcohol consumption and the complexity of the Nation's health care system.

The costs associated with treating alcohol use disorders (alcohol abuse and alcohol dependence) include costs incurred in a variety of community-based settings (such as hospitals, residential treatment facilities, outpatient clinics, and physicians' offices), costs incurred in other settings (primarily in facilities operated by the U.S. Department of Veterans Affairs), and expenditures for alcohol abuse prevention efforts. Also included in this category are various support costs, such as training for counselors and other professionals in alcohol abuse prevention and treatment, costs of research on alcohol abuse (estimated as the budget for the National Institute on Alcohol Abuse and Alcoholism), and administrative costs for health insurance associated with these treatment expenses. Collectively, these support costs represented 2.1 percent of the estimated health care costs, or 0.3 percent of the overall estimated cost.

The costs of treating the medical consequences of alcohol consumption—as distinct from the alcohol problems themselves—reflect the variety and seriousness of the health conditions for which alcohol consumption can be an underlying cause. Prominent examples of these conditions include liver disease, various cancers, stroke, and trauma. Because alcohol causes some but not all of the cases for many of these health problems, Harwood and colleagues adjusted the number of hospitalizations for each condition by applying factors called "alcohol-attributable fractions" (AAF's). These AAF's represent the proportion of deaths from various causes that are considered attributed to alcohol (Stinson et al. 1993). For example, AAF's range from 5 percent for diabetes

mellitus, to 20 percent for stomach cancer, to 75 percent for esophageal cancer, to 100 percent for alcoholic liver cirrhosis.

The researchers used the AAF's as a proxy for the proportion of hospitalizations attributable to alcohol for various diagnoses. They recognized that this approximation generated some imprecision in the estimate of hospital costs, because the proportion of hospitalizations for a given condition resulting from alcohol consumption might not equal the proportion of deaths from that condition that are attributable to alcohol. Although admittedly imperfect, this approach was adopted in an effort to reduce the systematic underestimation of these costs inherent in the methodology employed in the 1990 study.

Hospital costs represented about 44 percent of the estimated $18.9 billion spent in 1998 on health care for the medical consequences of alcohol consumption. The remaining costs in this category were associated with Fetal Alcohol Syndrome (FAS) (15 percent), outpatient care (13 percent), nursing homes (5 percent), pharmaceuticals (12 percent), other (nonphysician) health professionals (7 percent), and health insurance administration (5 percent).

Because of public and research interest in FAS, the various health care costs associated with this condition were estimated separately. FAS is a characteristic pattern of birth defects resulting from prenatal alcohol exposure. Symptoms of FAS include pre- and postnatal growth retardation and central nervous system anomalies, such as developmental delays, mental retardation, and skull or brain malformations. Overall costs for FAS include both health care costs and productivity losses attributable to FAS. Of the $2.8 billion in estimated health care costs of FAS in 1998, more than 90 percent was accounted for by the costs of providing home and residential care to adults with moderate to severe mental retardation associated with FAS, and by the costs of special education for children and adolescents with the range of mental impairments associated with FAS.

Productivity Losses

Productivity losses were estimated at $134.2 billion (72.7 percent of the total) for 1998, including losses due to premature deaths, alcohol-related illness, and alcohol-related crime. Estimating these costs presents a particular challenge because they are fundamentally unobservable: there is no direct way to measure the value of goods and services that go unproduced as a result of alcohol problems. Instead, analysts rely on the economic theory of competitive labor markets, which holds that workers' earnings reflect the value of their productive contributions. Following this line of reasoning, lower productivity will result in lower earnings, and the magnitude of the productivity loss may be approximated by the lost or foregone earnings. For example, alcohol-related premature deaths represent a loss of productive potential, and the amount that these individuals would have earned during the remainder of their lives provides an estimate of this loss. Similarly, alcohol use disorders can impair productivity, and the magnitude of this loss is represented by the reductions in earnings sustained by individuals as a result of their alcohol use disorders.

Losses From Illness. Productivity losses resulting from alcohol-related illness were estimated at $87.6 billion for 1998 (65.3 percent of estimated productivity losses and 47.5 percent of the estimated total cost). Nearly all of this estimate ($84.5 billion) represents impaired workplace and household productivity of individuals with a history of alcohol dependence. Of the remainder, lost work time for residential treatment of alcohol use disorders accounted for $1.9 billion, and productivity losses suffered by adults with FAS were estimated at $1.3 billion.

The estimate of impaired workplace productivity was developed using data from the 1992 National Longitudinal Alcohol Epidemiologic Survey (NLAES), a nationally representative data set designed to measure the incidence and prevalence of alcohol abuse and dependence according to well-defined clinical criteria. The researchers applied statistical models to the NLAES data to

estimate lost earnings and excess unemployment among individuals with a history of alcohol dependence. After adjusting the results to account for demographic differences between those with and without a history of alcohol dependence, the researchers found that the only statistically significant losses were for males. Moreover, these losses stemmed only from reduced earnings, not from excess unemployment. A key finding of interest was that earnings reductions among males with a history of alcohol dependence were much larger for those who began drinking before age 15 than for those who began drinking later.

Losses From Premature Deaths. Premature deaths attributed to alcohol consumption resulted in productivity losses estimated at $36.5 billion in 1998 (27.2 percent of estimated productivity losses and 19.8 percent of the estimated total cost). This was based on an underlying estimate of 107,360 deaths attributable to alcohol consumption in 1992. The productivity losses resulting from these deaths were estimated using data on the average expected additional years of life for men and women of different ages, had they not succumbed to an alcohol-related death, and the average expected value of their future earnings and contributions to household productivity.

Expected future earnings were expressed in "present discounted value" terms, a standard technique for expressing values that accrue at different times in comparable terms. Economists frequently disagree about the appropriate discount rate to use in specific applications; a recent expert panel report recommended that cost-effectiveness studies of health interventions use a discount rate of 3 percent (Gold et al. 1996). For the latest estimates, the researchers used a 6-percent discount rate for consistency with earlier studies. If they had used 3 percent instead, it would have increased the estimate of productivity losses due to premature deaths by about 46 percent.

Crime-Related Productivity Losses. Additional productivity losses due to alcohol-related crime were estimated at $10.1 billion (7.5 percent of productivity losses and 5.5 percent of the total). Perpetrators of these crimes who are incarcerated forfeit their productive potential; this loss was estimated at $9.1 billion for 1998. Also, victims of alcohol-related crimes often lose work time as a result of their victimization; these losses were estimated at $1.0 billion for 1998.

Other Impacts

Other impacts of alcohol abuse generated costs in two particularly important categories. Alcohol-related motor vehicle crashes generate various administrative and property damage costs in addition to their enormous costs in terms of deaths and injuries. The estimate for these property and administrative (insurance and legal) costs was $15.7 billion for 1998 (8.5 percent of the total cost estimate). In addition to its effects on productivity, alcohol-related crime burdens the criminal justice system, consuming police, legal, and corrections services. Based on estimates from a variety of sources that alcohol plays a causal role in 25 to 30 percent of violent crimes and 3 to 4 percent of property crimes, these additional costs of alcohol-related crime were estimated to be $6.3 billion for 1998 (3.4 percent of the total).

Limitations and Caveats

As with earlier studies of economic costs, the latest research in this area confirms that alcohol abuse imposes a heavy burden on society. Although estimates of the economic costs of alcohol abuse attempt to be as comprehensive as possible, and although the magnitude of costs revealed in these estimates is undeniably enormous, there are several important caveats that apply to the interpretation of these estimates.

First, the estimates should not be considered precise. For many of the areas in which costs are incurred, good data are not readily available. Some components—most notably the productivity losses—reflect quantities that are fundamentally unobservable. In these cases, the magnitude of costs must be based on theoretical reasoning and statistical inference. Many components of the total cost were estimated quite roughly using convenient approaches to

approximating costs. In addition, the estimation procedures employed do not permit the usual indicators of statistical precision for most of the components. These considerations suggest that the cost estimates—the total as well as the various components—are best thought of as indicators of the general magnitude of these costs and not as precise measures.

Second, there are several significant aspects of the burden of alcohol problems that are not captured in these estimates. Perhaps most important, alcohol problems exact a heavy toll in terms of human suffering. Failed marriages, anguished families, stalled careers, criminal records, and the pain of loved ones killed or disabled from alcohol-related causes are aspects of this suffering that cannot be accounted fully in a COI framework. In addition, secondary effects of alcohol problems on economic market outcomes are not reflected in estimates of the economic cost of alcohol abuse. For example, worries about alcohol-related crime and motor vehicle crashes may induce people to spend more on security and safety measures than they otherwise would, and these costs are not counted in the COI framework. Similarly, alcohol problems are known to contribute to workplace accidents and absenteeism, thereby increasing the cost of labor to businesses, with potential effects on total employment and production over and above the effects on individuals' productivity. The overall magnitude of such secondary economic consequences of alcohol problems is unknown, but the aggregate effect could be substantial.

Third, estimates of the economic costs of alcohol abuse reflect only adverse consequences. However, in addition to generating the large costs described above, alcohol consumption also confers some benefits. Most obviously, many people value the enjoyment they obtain from consuming alcoholic beverages. Evidence for this includes purchasers' decisions to spend $94.5 billion on alcoholic beverages in 1997 (Putnam and Allshouse 1999), in the process generating $18.2 billion in Federal, State, and local tax revenues (Distilled Spirits Council of the United States 1999). In addition, evidence is accumulating that moderate consumption of alcoholic beverages is associated with certain health benefits (see the section "Measuring the Health Risks and Benefits of Alcohol" in the first chapter of this report). In part because COI studies do not consider any benefits associated with alcohol consumption, estimates of the economic costs of alcohol abuse, such as those presented in the recent report by Harwood and colleagues, should not be interpreted as indicators of the net loss to society resulting from use of alcoholic beverages.

Finally, estimates of the economic costs of alcohol abuse—however large they may be—do not provide sufficient information by themselves to justify the use of any particular policies that might be suggested as ways to reduce those costs. Any specific policy intended to reduce the adverse consequences of alcohol consumption must be evaluated in terms of the costs and benefits associated with that particular policy. The tools of cost-benefit analysis and cost-effectiveness analysis can be used as frameworks to evaluate the impact that a particular policy might have on reducing the costs of alcohol abuse, and how expensive it would be to achieve that impact.

In light of these limitations, COI studies may be most useful at the initial stage of the policy development process. Estimates of the various components of the economic costs of alcohol abuse can help direct attention to the most costly adverse consequences of alcohol consumption. Scientists, clinicians, and policy makers can use this information in their search for strategies to address these problems.

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Economic Costs of Excessive Alcohol Consumption in the U.S., 2006

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Background: Excessive alcohol consumption causes premature death (average of 79,000 deaths annually); increased disease and injury; property damage from fire and motor vehicle crashes; alcohol-related crime; and lost productivity. However, its economic cost has not been assessed for the U.S. since 1998.

Purpose: To update prior national estimates of the economic costs of excessive drinking.

Methods: This study (conducted 2009–2010) followed U.S. Public Health Service Guidelines to assess the economic cost of excessive alcohol consumption in 2006. Costs for health care, productivity losses, and other effects (e.g., property damage) in 2006 were obtained from national databases. Alcohol-attributable fractions were obtained from multiple sources and used to assess the proportion of costs that could be attributed to excessive alcohol consumption.

Results: The estimated economic cost of excessive drinking was $223.5 billion in 2006 (72.2% from lost productivity, 11.0% from healthcare costs, 9.4% from criminal justice costs, and 7.5% from other effects) or approximately $1.90 per alcoholic drink. Binge drinking resulted in costs of $170.7 billion (76.4% of the total); underage drinking $27.0 billion; and drinking during pregnancy $5.2 billion. The cost of alcohol-attributable crime was $73.3 billion. The cost to government was $94.2 billion (42.1% of the total cost), which corresponds to about $0.80 per alcoholic drink consumed in 2006 (categories are not mutually exclusive and may overlap).

Conclusions: On a per capita basis, the economic impact of excessive alcohol consumption in the U.S. is approximately $746 per person, most of which is attributable to binge drinking. Evidence-based strategies for reducing excessive drinking should be widely implemented.

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Introduction

Excessive alcohol consumption is responsible for an average of 79,000 deaths and 2.3 million years of potential life lost in the U.S. each year,[1] making it the third-leading preventable cause of death in this country.[2] Excessive alcohol consumption is associated with multiple adverse health and social consequences, including liver cirrhosis, certain cancers, unintentional injuries, violence, and fetal alcohol spectrum disorder. Excessive alcohol consumption also causes premature death, increased healthcare costs, property damage from fire and motor vehicle crashes, increased crime and criminal justice system costs, and lost worker productivity in the form of missed work, diminished output, and reduced earnings potential.

A comprehensive analysis[3] estimated the 1992 economic cost of alcohol abuse at $148 billion; a 1998 update[4] put the figure at $184.6 billion. Since then, there have been no comprehensive national estimates of the costs of excessive alcohol consumption.[5] Current estimates are needed to more fully assess the public health impact of excessive drinking. Accordingly, the purpose of the present study (conducted 2009–2010) was to update prior national estimates of the economic costs of excessive drinking.

The 2006 estimates reported here employ updated data, as well as new data sources and take advantage of new scientific findings and measurement tools (e.g., Al-

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cohol-Related Disease Impact [ARDI] software created by the CDC)[6] that can more effectively assess the relationship between excessive drinking and various health and social outcomes. Addressing the benefits of excessive alcohol consumption was beyond the scope of the current study. Studies such as this one focus solely on identifying and quantifying the societal costs of excessive drinking.

Methods

General Approach

The present study follows the approach in *Guidelines for Cost of Illness Studies in the Public Health Service.*[7] In brief, this approach estimates the proportion of national costs for health care; crime; mortality- and morbidity-associated productivity; and other expenses that can be reasonably attributed to a particular behavior or health problem. This same approach was used by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to assess the economic cost of alcohol misuse in 1992 and 1998.[3,4] This methodology focuses on the direct and indirect costs associated with risk factors and health outcomes and does not consider intangible costs, such as pain and suffering. Thus, such estimates tend to be substantially lower than those that include intangible costs. Estimates were developed for 2006, because this is the most recent year for which cost and outcome data were generally available.

To be as consistent as possible with prior estimates, the same general methods and cost centers as the NIAAA studies[3,4] were used. The current study did, however, make use of the best currently available science for assessing the economic costs of alcohol-attributable health and social outcomes, and as a result, some of the specific conditions or approaches used to obtain alcohol-attributable fractions (AAFs) (e.g., AAFs for crime) differed somewhat from those that were used previously.

See Commentary by Naimi in this issue.

Definition of Excessive Alcohol Consumption

Excessive alcohol consumption was defined as follows: binge drinking (≥4 drinks per occasion for a woman, and ≥5 drinks per occasion for a man); heavy drinking (>1 drink per day on average for a woman, and >2 drinks per day on average for a man); any alcohol consumption by youth aged <21 years; and any alcohol consumption by pregnant women. Depending on the data source, these drinking patterns were generally ascertained for the past 30 days. This definition is consistent with CDC and NIAAA standards used to identify harmful patterns of alcohol consumption. Because most excessive drinkers are not alcohol dependent and the diagnoses of alcohol dependence/alcohol abuse generally involves a history of excessive drinking over an extended period of time, these diagnoses were considered an outcome of excessive drinking and not the primary basis for assessing economic costs. However, a history of alcohol dependence or abuse was used as a specific indicator of excessive drinking in some analyses (e.g., productivity losses based on lost earnings).

Alcohol-Attributable Fractions

Several analytic components used AAFs to quantify what proportion of costs were attributable to excessive alcohol consumption (Appendix A, available online at www.ajpmonline.org). The CDC's ARDI system[6] was used as the basis for selecting the specific alcohol-attributable conditions that were included in the analysis of health-related costs, including deaths and healthcare expenditures related to excessive drinking. The ARDI system produces national and state estimates of alcohol-attributable deaths and Years of Potential Life Lost due to excessive alcohol consumption.

The selection of the alcohol-attributable conditions included in ARDI, as well as the methods used in ARDI to obtain attribution factors for these conditions, was made by a panel of public health experts. For some conditions (e.g., those with an acute onset [such as injuries]), ARDI uses direct AAF estimates based on studies assessing the proportion of deaths from a condition that occurred at a blood alcohol concentration (BAC) of ≥0.10 g/dL. For the majority of the chronic conditions in ARDI, AAFs are calculated using pooled estimates of relative risk obtained from meta-analyses and prevalence data on specified alcohol-consumption levels using data from the Behavioral Risk Factor Surveillance System.

The AAFs from ARDI[6] were used for fatalities and for nonfatal chronic conditions. A meta-analysis assessing alcohol involvement among people treated in emergency departments[8] provided AAFs for nonfatal violent injuries (0.267) and unintentional injuries other than those related to traffic crashes (0.058). For nonfatal traffic injuries, an AAF of 0.061 was derived from a National Highway Traffic Safety Administration study of injury-producing crashes involving BACs of ≥0.10 g/dL.[9] For fire-related outcomes, an AAF of 0.05 was used based on a National Fire Protection Association study.[10]

For crime, the AAF for homicide from ARDI[6] was used because this AAF considers drinking by the perpetrator and not just drinking by the victim. Alcohol-related crimes such as driving under the influence of alcohol, public drunkenness, and liquor law violations were fully attributed to alcohol. For other offenses, attribution was estimated as the percentage of offenders intoxicated at the time of their offense based on self-reported alcohol-consumption data from surveys of jail inmates and state and federal prison inmates, respectively[11,12] (Appendix B, footnote e, available online at www.ajpmonline.org). AAFs for state and federal inmates were used to attribute costs for those incarcerations only. AAFs for jail inmates were used to attribute costs for jail detentions, as well as for arrests and victim costs by offense.

Cost Calculations

Costs were estimated for a variety of impacts and consequences (Appendix B, available online at www.ajpmonline.org). The general approach was to identify a valid and reliable source of national costs for a particular consequence (e.g., hospitalizations), or alternatively, identify the mean cost per individual or event; calculate the number of individuals affected or the number of alcohol-related events; and then estimate the proportion attributable to excessive alcohol consumption.

Healthcare costs. Healthcare costs included the costs of specialty treatment for alcohol dependence and alcohol abuse; treatment costs for the 54 health conditions in ARDI, or their nonfatal equivalent, that were fully or partially attributable to alcohol (Appendix A, available online at www.ajpmonline.org);

costs associated with fetal alcohol syndrome (FAS); research and prevention costs; health insurance administration costs; and costs of training substance abuse and mental health professionals. For hospitalizations and ambulatory care, the study calculated only those costs associated with the primary (first-listed) diagnosis. With the exception of FAS, prematurity, low birth weight, intrauterine growth retardation, motor vehicle traffic crashes, and child maltreatment, conditions that were less than 100% attributable to alcohol were attributed only to individuals aged ≥15 years for acute conditions and ≥20 years for chronic conditions. Where research and prevention programs addressed both alcohol and drug abuse, the share attributed to alcohol was based on the share of specialty substance abuse treatment spending for alcohol (48.1%).[13]

Productivity losses. Productivity losses related to excessive drinking included losses associated with premature mortality; impaired productivity (at work, at home, and while institutionalized); work-related absenteeism; crime (lost work days among victims and lost productivity from incarcerations); and fetal alcohol syndrome. When alcohol-related sickness, disability, death, or incarceration prevents an individual from engaging in his or her normal expected productive activities, this represents a loss of potential productivity—work that could and would have been done, but wasn't because of excessive drinking.

Estimation methods were based on human capital theory, and lost productive time was valued at estimated earnings levels (i.e., estimated average earnings and benefits in the U.S.), including employer payroll taxes. This approach to valuing the loss follows the *Guidelines for Cost of Illness Studies in the Public Health* Service[7]; however, it should be noted that alternative methods for valuing productivity loss, such as "willingness to pay," exist and these would tend to generate much larger losses that those estimated in the present study.

Other effects. Other effects include costs associated with property damage due to crimes, criminal justice system, motor vehicle crashes, fire damage, and FAS-related special education. Criminal justice system costs include costs for police protection, the court system, correctional institutions, private legal costs, and alcohol crimes (e.g., driving under the influence [DUI]; liquor law violations; and public drunkenness).

Treatment costs, productivity losses, and special education costs for fetal alcohol syndrome were taken from a 2004 study.[14] Results from the current study were trended to 2006 based on increases in the U.S. population and price inflation. Treatment costs, productivity losses, and special education costs were trended for price inflation based on the consumer price index (CPI) for Medical Care Services, the employment cost index for U.S. civilian employees, and the CPI for all goods and services, respectively.

Subgroup Analyses

Costs were broken down to provide estimates related to specific types of excessive consumption or adverse consequences (Appendix C, available online at www.ajpmonline.org). These subgroups are not mutually exclusive and may overlap.

Binge drinkers. Binge drinking was defined as a woman consuming ≥4 drinks or a man consuming ≥5 drinks within a 2-hour period (commonly reported as the amount consumed per occasion). This pattern of rapid alcohol consumption typically results in legal intoxication (i.e., a blood alcohol level of ≥0.08 g/dL). Accordingly, the cost of treating alcohol-attributable acute conditions was fully attributed to binge drinking because the AAFs for those conditions were based on intoxication. Because estimated crime costs were also based on intoxication, they were all attributed to binge drinking, as were motor vehicle and fire costs.

For costs of treatment for alcohol dependence or abuse and for costs of impaired productivity due to lost earnings among people with a history of alcohol dependence, the percentage of individuals with alcohol dependence or alcohol abuse who reported binge drinking in the past 30 days in the National Epidemiologic Survey on Alcohol and Related Conditions (68.5%)[15] was used to estimate the proportion of costs related to these conditions that were due to binge drinking to ensure that these costs related only to the proportion of people with these conditions who also had a recent history of binge drinking. For productivity losses due to premature mortality, costs attributable to acute causes of death and 68.5% of deaths from alcohol abuse or alcohol dependence were attributed to binge drinking.

Underage drinkers. Where data included the age of affected individuals, results were estimated separately for those aged <21 years. For those cost categories for which it was not possible to directly estimate costs for those aged <21 years, the share of costs attributed to underage drinking was estimated based on the share of the associated population that was underage as determined in the 2006 National Survey on Drug Use and Health[16] (e.g., the share of FAS costs attributed to underage drinking was estimated based on the share of women of child-bearing age who were excessive drinkers and were aged <21 years).

Drinking while pregnant. Costs associated with fetal alcohol syndrome, spontaneous abortion, and adverse birth outcomes (prematurity, low birth weight, intrauterine growth retardation) were attributed to drinking during pregnancy.

Crime. Estimates of crime-related costs included victim costs (medical, lost productivity, property damage, and homicide losses); criminal justice system costs (police protection, legal adjudication, corrections, private legal defense, and productivity loss among those incarcerated); and the cost of alcohol-attributable motor vehicle traffic crashes. Victim costs were estimated based on the 2006 National Crime Victimization Survey.

Who Bears the Cost

Costs related to excessive alcohol consumption may be borne by many others than those who excessively drink and their families. Those bearing costs were grouped into three categories based on who directly bore the costs: (1) government; (2) excessive drinkers and their families; and (3) others, which included private health insurers, employers, crime victims, and others.

Results

The estimated total economic cost of excessive drinking was $223.5 billion in 2006. On a per capita basis, this cost was approximately $746 for each man, woman, and child in the U.S. in 2006.[17] Of the total cost, $161.3 billion (72.2%) came from lost productivity; $24.6 billion (11.0%) came from increased healthcare costs; $21.0 billion (9.4%)

Table 1. Estimated costs in millions ($) of excessive drinking, by type of cost and population, U.S., 2006

Cost item	Group-specific cost estimates ($, in millions)				
	Total cost	Binge drinking[a]	Underage drinking[a]	Drinking while pregnant[a]	Crime-related[a]
Health care	24,555.6	14,028.6	3,706.5	2612.4	—
Specialty care for abuse/dependence	10,668.5	7,303.2	2,056.9	Not estimated	—
Hospitalization	5,115.6	1,726.4	212.2	44.8	479.4
Fetal alcohol syndrome	2,538.0	1,071.0	461.9	2538.0	—
Health insurance administration	1,585.7	909.7	187.1	6.2	60.2
Drugs/services	1,212.4	851.6	156.2	6.5	115.0
Prevention and research	1,207.1	570.7	470.7	9.9	—
Ambulatory care	1,195.9	840.0	154.1	6.5	139.5
Nursing homes	1,002.9	742.1	2.3	0.5	—
Crime victims	—	—	—	—	295.6
Training	29.5	14.0	5.3	Not estimated	—
Lost productivity	161,286.1	119,743.3	16,579.6	2221.83	—
Impaired productivity—work	74,101.8	50,727.0	2,020.8	Not estimated	—
Mortality	65,062.2	50,501.0	6,777.2	165.6	28,672.7[b]
Incarceration of perpetrators	6,328.9	6,328.9	3,587.0	Not estimated	6,328.9
Impaired productivity—home	5,355.6	3,666.2	211.0	Not estimated	—
Absenteeism	4,237.6	4,237.6	186.5	Not estimated	—
Crime victims	2,092.9	2,092.9	641.8	Not estimated	2,092.9
Fetal alcohol syndrome	2,053.7	866.7	373.8	2053.7	—
Impaired productivity—institution	2,053.3	1,323.0	363.2	2.5	11.9
Other effects	37,636.9	36,928.0	6,703.0	368.8	—
Criminal justice	20,972.7[c]	20,476.9	4,700.5	Not estimated	20,972.7
Motor vehicle crashes	13,718.4	13,718.4	1,378.6	Not estimated	13,718.4
Fire losses	2,137.3	2,137.3	Not estimated	Not estimated	—
Crime victim property damage	439.8	439.8	169.9	Not estimated	439.8
Fetal alcohol syndrome—special education	368.8	155.6	67.1	368.8	—
Total	223,478.6	170,699.9	26,989.1	5203.0	73,327.0

[a]These categories are not mutually exclusive and may overlap.
[b]Homicide = $11,050.9 million; DUI-associated deaths = $17,621.8 million
[c]$4408.1 million for police protection, $3747.8 million for legal and adjudication, $12,587.4 million for corrections, and $229.4 million for private legal defense
DUI, driving under the influence

came from criminal justice costs; and $16.7 billion (7.5%) came from other effects (Table 1). The cost associated with binge drinking was $170.7 billion, underage drinking $27.0 billion, drinking during pregnancy $5.2 billion, and crime $73.3 billion (note that these subcategories are not mutually exclusive and may overlap; Table 1).

Cost Categories

Healthcare costs. Of the $24.6 billion in health expenditures attributable to alcohol, 43.4% was from specialty treatment for alcohol abuse and dependence and another 20.8% from hospitalizations for other medical conditions

stemming from excessive drinking (Table 1). There were 360,785 alcohol-attributable hospitalizations (0.9% of all hospitalizations) in community hospitals; 2.785 million physician office visits (0.31% of all such visits); 0.329 million hospital outpatient department visits (0.32% of total); and 1.272 million emergency department visits (1.07% of emergency department visits) for a total of 4.386 million outpatient visits (0.39% of all outpatient visits) attributable to excessive drinking. In addition, there were 11,976 (0.80%) nursing home admissions that were attributable to excessive drinking.

Productivity costs. The two largest productivity losses were from impaired productivity at work (45.9%) and lost productivity (40.3%) resulting from the 83,180 alcohol-attributable deaths (46,825 from acute conditions and 36,355 from chronic conditions) that occurred in 2006 (Table 1). For men with alcohol dependence (a subset of excessive drinkers), there was a reduction in both labor force participation (2.5%) and earnings given labor force participation (5.0%). There was also an estimated 19.269 million days spent institutionalized or hospitalized for care resulting from excessive drinking and, depending on age group, 0.4–0.9 days lost to absenteeism per year for female binge drinkers and 0.5–1.2 days for male binge drinkers.

Costs from other effects. The two largest costs were criminal justice system costs (55.7%) and motor vehicle crashes (36.4%) (Table 1). Of the $21.0 billion in criminal justice system costs, 76.8% came from crimes that would not be thought of as solely alcohol-attributable (e.g., assault) as opposed to obviously alcohol-attributable crimes like driving under the influence of alcohol.

Cost Allocations by Drinking Pattern, Risk Group, and Outcome

Binge drinking. Overall, $170.7 billion (76.4%) of the total costs were attributed to binge drinking (Table 1). When assessed by cost category, the share of the total cost of excessive alcohol consumption that was allocated to binge drinking was lower for health system direct costs (57.1%); than for productivity losses (74.2%); and other costs (98.1%).

Underage drinking. Overall, 12.1% of the economic costs of excessive alcohol consumption were related to underage drinking (Table 1). Lost productivity accounted for 61.4% of the costs. The largest share of the productivity losses was related to premature mortality representing 25.1% of all costs associated with underage drinking.

Drinking while pregnant. A total of $5.2 billion (2.3%) of the total economic cost of excessive drinking was attributable to drinking while pregnant (Table 1). Of this $5.2 billion, 95.3% was related to FAS.

Costs of crime. Of the total $73.3 billion cost of alcohol-attributable crime, 43.8% came from crash-related costs from driving under the influence, 17.2% came from corrections costs, and 15.1% came from lost productivity associated with homicide (Table 1).

Who Bears the Cost

Overall, $94.2 billion (42.1%) of the total economic cost of excessive alcohol use was borne by government, including federal, state, and local government agencies, while almost as much $92.9 billion (41.5%) was borne by excessive drinkers and their family members (Table 2). By cost category, the excessive drinker and their household bore 10.3% of the $24.6 billion in total healthcare expenditures related to excessive alcohol consumption. In contrast, government entities bore most (60.9%) of these costs, which is larger than the proportion of total healthcare spending that is covered by government (46.1%).[18] In contrast, slightly more than half (54.6%) of productivity losses were borne by the excessive drinker and their household; 35.1% by government; and the remainder by others in society.

Costs per Alcoholic Drink

According to the NIAAA, 550,761,000 gallons of ethanol in the form of 7,538,026,000 total gallons of beer, wine, and spirits were consumed in the U.S. in 2006,[19] or 117.4 billion standard drinks ([gallons consumed multiplied by the specific gravity of ethanol, the weight of 1 gallon of water, and the number of grams in 1 lb] divided by the grams of ethanol in a standard drink [i.e., 14.0]),[20] Thus, the total economic cost of excessive alcohol use in 2006 was about $1.90 per standard drink. Considering the $94.196 billion paid by government for excessive alcohol consumption, this government expense equated to about $0.80 per standard drink consumed in 2006.

Discussion

The estimated $223.5 billion cost of excessive drinking in 2006 is on a par with the costs of other major health-risk behaviors. For example, smoking currently costs the U.S. about $193 billion annually—$97 billion from lost productivity and about $96 billion in healthcare costs.[21,22] The total direct and indirect cost of physical inactivity was estimated to be in excess of $150 billion in 2000.[23]

Comparing the 2006 estimates to those from 1992 and 1998[3,4] is problematic because there were several methodologic differences among the studies (e.g., different attribution factors, data sources, categories of expense [new ones such as absenteeism and old ones that were

Table 2. Payer-specific percentages of costs of excessive drinking, 2006

Cost item	Total cost ($, in millions)	Government			Heavy drinker and family	Others in society
		Total	Federal	State/local		
Health care	24,555.6	60.9	33.1	27.9	10.3	28.8
Specialty care for abuse/dependence	10,668.5	75.0	24.6	50.4	7.7	17.3
Hospitalization	5,115.6	47.5	41.5	6.0	11.1	41.4
Fetal alcohol syndrome	2,538.0	46.1	33.5	12.6	12.1	41.9
Health insurance administration	1,585.7	52.3	23.7	28.6	0	47.7
Drugs/services	1,212.4	25.0	21.7	3.3	30.5	44.5
Prevention and research	1,207.1	100	94.7	5.3	0	0
Ambulatory care	1,195.9	34.4	26.8	7.6	16.9	48.8
Nursing homes	1,002.9	60.0	41.2	18.7	26.1	13.9
Training	29.5	36.3	20.7	15.6	0	63.7
Lost productivity	161,286.1	35.1	20.0	15.1	54.6	10.4
Impaired productivity—work	74,101.8	36.3	20.7	15.6	63.7	0.0
Mortality	65,062.2	36.3	20.7	15.6	44.2	19.5
Incarceration of perpetrators	6,328.9	36.3	20.7	15.6	63.7	0
Impaired productivity—home	5,355.6	0.0	0.0	0.0	100.0	0.0
Absenteeism	4,237.6	36.3	20.7	15.6	0	63.7
Crime victims	2,092.9	36.3	20.7	15.6	0	63.7
Fetal alcohol syndrome	2,053.7	36.3	20.7	15.6	63.7	0
Impaired productivity—institution	2,053.3	36.3	20.7	15.6	63.7	0
Other effects	37,636.9	60.3	0.8	59.5	6.2	33.6
Criminal justice	20,972.7	98.9	1.4	97.5	1.1	0
Motor vehicle crashes	13,718.4	0	0	0	14.2	85.8
Fire losses	2,137.3	73.5	0	73.5	6.6	19.8
Crime victim property damage	439.8	0	0	0	0	100
Fetal alcohol syndrome—special education	368.8	100	0	100	0	0
Total cost ($, in millions)	223,478.6	94,195.8	40,692.5	53,503.2	92,854.3	36,428.6
Percentage of total	100.0	42.1	18.2	23.9	41.5	16.3

removed such as social welfare], disease conditions considered, approach to comorbidity, FAS prevalence, valuing of inmate time, and discount rate). In fact, if the 1998 estimate had simply been inflated to 2006 based on population and relevant price increases, the estimated 2006 cost would have been $265 billion (productivity losses $192 billion, health losses $40 billion, and other costs $34 billion) versus the $223.5 billion estimated. Nonetheless, comparing the 2006 estimate of $223.5 billion to those from 1992 and 1998[3,4] shows an annualized increase of 3.0%. This 3% increase is far below what would be expected based on population and wage growth and cost index trends and is testament to the conservative approach used in the current study to calculate the 2006 estimate.

Although the $223.5 billion figure is the best currently available estimate of the cost of excessive drinking for 2006, the authors believe it is a substantial underestimate. First, the econometric models found that there was no reduction in workplace or household productivity for alcohol-dependent women. This zero estimate defies biologic plausibility and is more likely due to imprecise

Table 3. Sources of underestimation of the costs of excessive drinking, 2006

AAFs
Self-reported consumption (used to define some AAFs) is under-reported in surveys[26,27] and former drinkers are not included in survey estimates of excessive drinking.
AAF estimates based on Medical Examiner data for deaths from acute conditions may be conservative because of alcohol metabolism and interventions (e.g., fluid replacement) administered prior to death. The BAC cut-point used in this study to define fatal alcohol-attributable acute conditions (i.e., a BAC >0.10 g/dL) was conservative compared to the legal blood alcohol limit (0.08 g/dL) used in all states.
AAF estimates based on ED data may be conservative because of delays in seeking treatment and incomplete or under-reporting of alcohol involvement. ED data may also underestimate alcohol involvement for people hospitalized for injuries because alcohol involvement tends to increase with injury severity.
The AAFs for nonfatal injuries that were used in this study were lower than those reported in other studies.[28–30]
Healthcare costs
Alcohol-attributable conditions are generally under-recognized and under-reported in the healthcare system.
As in ARDI, many potentially alcohol-related conditions (e.g., pneumonia, tuberculosis, influenza, hepatitis C, sudden infant death syndrome, and sexually transmitted diseases) were not included.
Using only the primary (first-listed) diagnosis to assess alcohol-attributable healthcare costs likely resulted in the exclusion of many alcohol-attributable encounters (e.g., hospitalizations with a non-alcohol-related primary diagnosis such as bleeding) but with an alcohol-attributable root cause (e.g., alcoholic cirrhosis of the liver).
Long-term care costs did not include the costs of care at home or in institutions other than nursing homes, or the cost of long-term care or sequelae from very expensive alcohol-attributable traumatic injuries (i.e., spinal cord injury and traumatic brain injury).[31]
Alcohol-related training costs for physicians, nurses, clergy, and law enforcement personnel and transportation costs for treatment of alcohol-attributable conditions were not included in cost estimates.
Productivity
Productivity losses due to lost work time resulting from alcohol-attributable nonfatal injuries or alcohol-attributable diseases (e.g., work time lost for outpatient care or decreased productivity from long-term sequelae), some DUI conviction-associated costs (e.g., loss of driving privileges, difficulty finding or keeping a job, increased insurance costs), and economic costs of having family members care for excessive drinkers recovering from alcohol-attributable conditions were not included in cost estimates.
Costs resulting from reduced presenteeism (i.e., reduced workplace productivity due to excessive drinking were not included).
The $4.4 billion cost of absenteeism for excessive drinkers who were alcohol dependent was not included to avoid potential overlap with estimated earnings losses.
Crime
Alcohol involvement in crime was likely to have been under-reported. For example, only 34.8%–63.3% of offenders incarcerated for DUI reported consuming enough alcohol to be intoxicated, and 18% denied drinking at all.
Cost estimates were based on 10 "index" crimes that were included in this study. However, 12%–15% of inmates incarcerated for non-index crimes reported having drunk enough to be intoxicated at the time of the crime.
Alcohol-attributable violence (i.e., intimate partner violence, sexual violence, and child sexual abuse) is likely to have been under-reported in the National Crime Victimization Survey. Victims of such violence incur higher healthcare costs related to more-frequent visits to care providers, including visits for mental health services, and more intensive use of these services (e.g., longer length of stay when hospitalized) than their non-abused counterparts.

AAF, alcohol-attributable fraction; ARDI, alcohol-related disease impact; BAC, blood alcohol content; DUI, driving under the influence; ED, emergency department

estimation resulting from several common problems and data gaps that plague attempts to estimate women's wages (e.g., breaks in the earnings histories of women because of childbirth). Further, the surveys that were used to assess the impact of alcohol dependence on earnings included a relatively small number of women, which made it difficult to accurately assess the impact of alcohol dependence on earnings history.

Second, mortality and morbidity direct costs and lost productivity cost estimates were based on the primary cause of death or illness only; thus, contributing causes of death or disease that were related to alcohol were not considered. For example, direct costs associated with increased length of hospital stay from comorbid alcohol problems were not included—Harwood[3] had estimated this cost at $881 million (4.8% of healthcare costs) in

1992. Third, using conservative cost estimates where presented with choices likely resulted in underestimation. For example, the distribution of healthcare costs is highly skewed toward large values. In the current study, reported cost distributions were truncated at the 95th percentile to reduce the impact of outliers on costs related to average expenditures for emergency department visits, hospital outpatient department visits, and office visits. Without truncation, the average costs would have increased 13%, 28%, and 44%, respectively.

Fourth, the estimates for absenteeism were based on data from the National Survey on Drug Use and Health, which does not use a gender-specific definition of binge drinking (i.e., it uses five or more drinks on a single occasion to define binge drinking for both genders). Research[24] has shown this underestimates binge drinking among women by about 35%. Fifth, for the analysis of lost productivity due to alcohol-associated incarceration, inmates' time was valued at minimum wage rather than at the average worker's wage. Had average wage been used, the loss due to incarceration would have increased to $20.8 billion from $6.3 billion (a 330% increase).

Finally, the current study did not estimate intangible costs like pain, suffering, and bereavement. A study[25] of the costs of underage drinking included these costs and estimated that 67% of the total economic impact of underage drinking was due to intangible costs. Should a similar relationship apply here, the costs of excessive alcohol consumption estimated in the present study would have been substantially higher. Additional sources of underestimation are described in Table 3.

Subgroup estimates are similarly underestimated. In addition, although many experts would argue that binge drinking is part and parcel of all dependent drinking, only 68.5% of specialty treatment costs for the abuse/dependent population were included in binge drinking estimates. For underage drinking, AAFs for nonfatal injuries are probably higher than those the current study used.[32] Also, although early-onset drinking and heavy alcohol consumption at an early age have been associated with increased negative outcomes and long-term costs, these costs were not included. For drinking during pregnancy, FAS costs were based on a prevalence of 1 per 1000 which was lower than estimates used in many other studies.[33] Moreover, many subclinical cases are not recognized and their costs are not estimated.

Despite these limitations, this study shows that the economic impact of excessive alcohol consumption is quite comparable to the economic impact of other leading health-risk behaviors, such as smoking and physical inactivity. The $5.368 billion in 2006 state and local tax revenues from alcohol[34] and $9.194 billion in federal excise taxes on alcohol in 2006[35] do not begin to cover the economic costs. Effective interventions to reduce excessive alcohol consumption—including increasing alcohol excise taxes, limiting alcohol outlet density, maintaining and enforcing the minimum legal drinking age of 21 years, screening and counseling for alcohol misuse, and specific countermeasures for alcohol-impaired driving such as sobriety checkpoints—are available[36–39] to reduce the health, social, and economic impacts of excessive drinking.

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Appendix

Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.amepre.2011.06.045.

A pubcast created by the authors of this paper can be viewed at http://www.ajpmonline.org/content/video_pubcasts_collection.

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Economic impacts of alcohol Factsheet

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Economic impacts: Introduction

The economic impacts of alcohol can usually be split into 2 categories; benefits and costs. The economic benefits alcohol brings to society can be measured by the revenues generated in both the on and off-trade from the sales of alcoholic beverages locally, which in turn the Treasury receives a proportion of by taxation of company profits. They are also represented in the number of jobs created within any region where alcoholic beverages are produced and also indirectly for those who distribute alcohol as a commodity.

These benefits may be more straightforward to calculate than some of the costs. There are uncertainties and disagreements about what should be included as a cost and how costs are to be measured. There are a number of different methodologies that can be employed in estimating economic costs, and these can have different implications for policy.

In alcohol policy, costs are typically framed in terms of harm to the individual and the wider society. This allows policymakers to focus on the tangible factors that justify government intervention in order to be remedied, such as the costs to the health service of treating alcohol-related disease, and to the criminal justice system of dealing with alcohol related crime and disorder. However, the lack of a definitive set of 'costs' criteria means that there is no single figure representing the cost of alcohol consumption to the UK.

Economic benefits

The economic benefits of alcohol consumption are measurable on 3 counts:

1. The monetary value of industry sales in UK and global markets
2. The taxation revenues received by HM Treasury from industry sales
3. The number of workers employed in the production of alcoholic beverages

Industry sales and profits

According to market intelligence research group Mintel, the alcohol industry sold £38.1 billion worth of alcoholic beverages in the UK in 2011 **(please see the price of a drink section of the price factsheet for more information)**. Globally, UK alcohol producers exported/dispatched £6.4bn of alcohol products in 2012, according to HM Revenue & Customs (see Figure 1 below). Historically, this figure marks the doubling in value of alcoholic beverages sold overseas in the last 10 years. During that period, the value of EU alcohol 'dispatches' increased by £1bn, and the value of non-EU alcohol 'exports' increased by over twice that amount (£2.1bn).

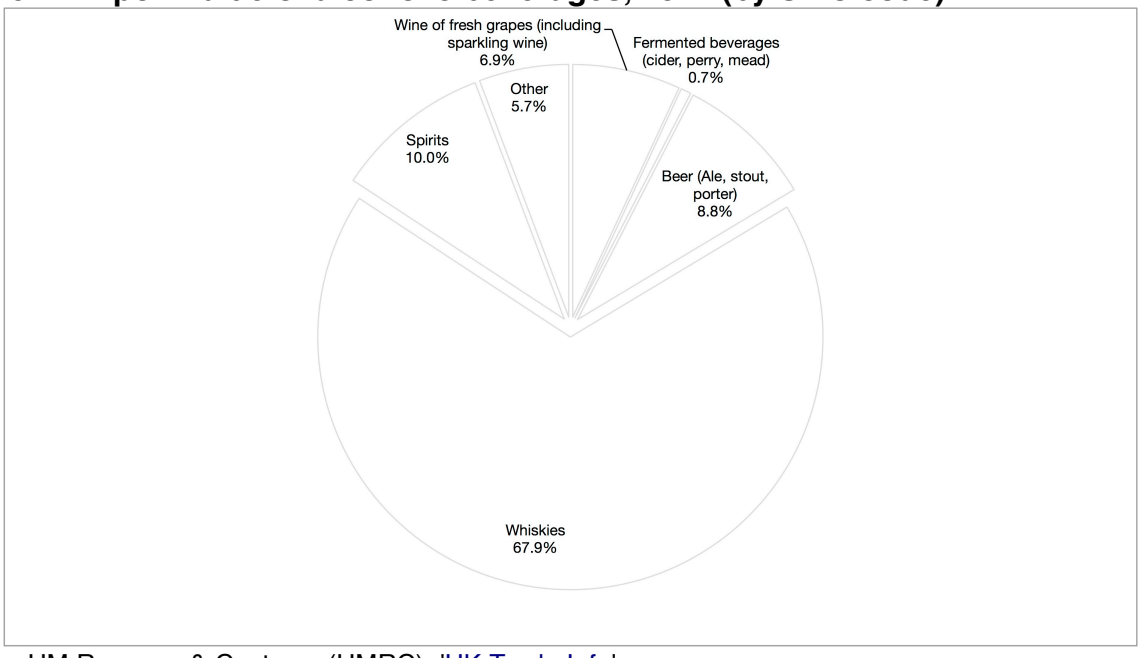
Figure 1: The value of UK alcoholic beverage exports, 2002 to 2012

	Annual value (£ billions)										
	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
EU alcohol 'dispatches'	2.3	2.5	2.2	2	1.9	1.7	1.4	1.3	1.4	1.4	1.3
Non-EU alcohol 'exports'	4.1	3.9	3	2.6	2.4	2.2	2.1	2	1.8	1.9	1.9
Total	6.4	6.4	5.2	4.6	4.3	3.9	3.5	3.3	3.2	3.3	3.2

Source: HM Revenue & Customs (HMRC), 'UK Trade Info'

Figure 2 depicts the value of dispatches and exports by alcohol type in 2012, based on UK Trade Info data.

Figure 2: Export value of alcoholic beverages, 2012 (by SITC code)*



Source: HM Revenue & Customs (HMRC), 'UK Trade Info'

* SITC = Standard International Trade Classification

The 2012 UK Food and Drink Federation performance report states that including alcoholic drinks, total food and drink exports were £18.7bn, 0.3% up on 2011 with the whisky sector up 1.1%.[1] The previous year's report noted that whisky now makes up 63% of all beverage exports and 23% of all food and drink exports (by value).[2]

UK based drinks company Diageo – producers of Johnnie Walker whiskies, Smirnoff vodkas, Baileys, and Guinness – is the leading global distilled spirits producer, with 15.3% of market share as of 2006 (Figure 3).

Figure 3: Ten largest global distilled spirits marketers (by volume), 2006

		Global market share (rank)	
Corporation	*Headquarters*	*1991*	*2006*
Diageo	UK	10.5% (1)	15.3% (1)
Pernod Ricard	France	5.7% (4)	11.6% (2)
United Spirits Ltd	India	3.7% (8)	9.4% (3)
Bacardi	Bermuda	7.7% (3)	5.2% (4)
Beam Global Spirits and Wine	USA	4.8% (6)	5.1% (5)
Suntory	Japan	4% (7)	2.6% (6)
V&S Group	Sweden	*	2.5% (7)
Brown-Forman Beverages Worldwide	USA	*	2.5% (8)
Gruppo Campari	Italy	*	2.4% (9)
Constellation Spirits	USA	2.5% (10)	2.4% (10)
Total market share of top 10 companies		57.0%	59.0

*Not in the top 10 in 1991.

Source: Jernigan, D., 'The global alcohol industry: an overview'

Diageo sell alcoholic beverages in approximately 180 markets, generating a pre-tax profit of approximately £3.5bn in the financial year ended 30 June 2013.[3] Net sales grew 6% over the year to £11.4bn, while operating profits grew 10% (Figure 4).[4] In 2012, Diageo strengthened its dominant market position with a series of acquisitions, including the world's largest tequila producer Jose Cuervo and a majority stake in USL, India's biggest maker of spirits.[5]

Figure 4: Diageo Performance Overview

Group performance	2013	2012	Organic growth	Reported growth
Volume in millions of equivalent units	165	156.5	1%	5%
£ million				
Net sales	11,433	10,762	5%	6%
Operating profit before exceptional items	3,530	3,198	8%	10%
Operating profit	3,431	3,158	-	9%
Profit attributable to parent company's equity shareholders	2,485	1,942	-	28%
Basic eps	**99.3p**	**77.8p**		**28%**

Source: Diageo, 'Performance Overview'

Diageo are positioned just outside the top 10 global alcohol producers, according to Impact Databank estimates, with 1.3% of global market share. SABMiller, another UK based company, is the second biggest brewery producer in the world, according to the most recent market sales estimates.[6] As of 2010, the company held almost 13% of global market share (Figure 5).

Figure 5: Top global alcohol producers

Rank	Brewer	Headquarters	Market share (%)
1	Anheuser-Busch InBev	Belgium	20
2	SABMiller plc	United Kingdom	12.9
3	Heineken NV	Netherlands	8.3
4	Carlsberg Breweries A/S	Denmark	6.5
5	China Resources Enterprise Ltd	China	5.3
6	Tsingtao Brewer Co., Ltd	China	3.6
7	Kirin Brewery Co., Ltd	Japan	3.1
8	Grupo Modelo	Mexico	3
9	Beijing Yanjing Beer Group Corp.	China	2.8
10	Molson Coors Brewing Co.	United States	2.8
13	Guinness Brewing Worldwide Ltd. (Diageo)	United Kingdom	1.3

Source: Impact Databank

SABMiller's operating profit for the financial year ended 31 March 2013 was reported to be US$4.2bn (£2.7bn).[7] Between March and September 2012, the business reported a rise in

beer volumes of 5% in the UK – led by strong sales of products such as Peroni Nastro Azzurro and Kozel – against the backdrop of a declining UK beer market.[8] This financial year (2013) SABMiller reported a 7% growth in volume of produce sold (hectolitres).[9]

BBPA figures state that the beer and pub industry contributed an estimated total of £19.5bn to the UK economy in 2010/11.[10]

Taxation revenue

Alcohol duties make a substantial contribution to state revenues. HMRC received approximately £10 billion from alcohol duties in the financial year 2012/13, 2% of total tax receipts **(please refer to the Price factsheet in the Alcohol Knowledge Centre for more information)**.[11]

Jobs in industry

According to official HM Treasury and Government Cabinet sources, there are approximately 900 brewers, 110 distillers and 250 wine and cider producers in the UK.[12] Wine & Spirits Trade Association figures state that the UK alcohol industry directly employs more than 650,000 people in the production and retailing of alcohol and supports a further 1.1 million jobs in the wider economy',[13] although the steady decline in the number of pubs in the UK in recent years (from 69,000 in 1980 to 52,000 in 2010) implies that fewer employees are occupied in the on-trade.[14]

According to the website, Diageo currently employs 25,000 people globally, of which 4,000 staff work in around 50 distilling sites throughout Scotland.[15] In June 2012, Diageo pledged its intention to 'invest over £1bn in Scotch whisky production over the next 5 years to meet growing global demand for its brands', creating an extra 100 jobs in the region.[16] In contrast, despite employing 70,000 people in over 75 countries, UK based SABMiller does not currently own any breweries natively.[17]

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2 Food and Drink Federation (March 2012), 'UK Food & Drink Export Performance; Full Year 2011', p. 2
3 Diageo (August 2012), 'Annual Report 2012', pp. 118–119
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6 Sheen, David (August 2012), 'British Beer & Pub Association (BBPA) Statistical Handbook', London: Brewing Publications Limited, Table K9, p. 101
7 SABMiller (June 2012), 'Annual Report 2012', p. 178
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9 SABMiller (May 2013), 'SABMiller drives strong revenue and earnings growth'
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11 Office for National Statistics (April 2013), 'HMRC TAX & NIC RECEIPTS (2012/13)'
12 Secretary of State for the Home Department (November 2012), 'Impact Assessment: A MINIMUM UNIT PRICE FOR ALCOHOL', p. 15
13 The Wine & Spirit Trade Association, 'Facts & Figures'
14 Rogers, Simon (April 2010), 'Labour's manifesto: where have all the pubs gone?', The Guardian
15 Diageo, 'Diageo Scotland'
16 Diageo (June 2012), 'Diageo sets out £1billion Scotch whisky investment plan'; Huffington Post UK, 'Diageo Invests £1bn In Scotch Whisky Amid Growing Global Demand'
17 SABMiller, 'Company Snapshot'; 'FAQs'

Economic costs

The economic cost of alcohol consumption to the UK is difficult to calculate accurately. In one sense, costs can be seen simply as the level of expenditure on alcohol. According to national statistics, alcoholic drinks set the average household back £7.20 a week in 2010 **(please refer to the Price factsheet in the Alcohol Knowledge Centre for more information)**.

But in alcohol policy, costs are typically framed in terms of harm to the individual and the wider society. This may involve calculating factors such as the treatment and prevention of injuries and fatal accidents in the healthcare sector, the loss of productivity and earnings through illness, and the policing of criminal and antisocial behaviour, all caused by alcohol misuse. The lack of a definitive set of 'costs' criteria means that there is no single figure representing the cost of alcohol consumption to the UK.

For instance, the Government Alcohol Strategy claims alcohol-related harm is now estimated to cost society (England) £21 billion annually.[1] This is broken down as:

- NHS costs, at about £3.5 billion per year (at 2009–10 costs)
- Alcohol-related crime, at £11 billion per year (at 2010–11 costs)
- Lost productivity due to alcohol, at about £7.3 billion per year (at 2009–10 costs, UK estimate)

This does not include any estimate for the economic costs of alcohol misuse to families and social networks.[2]

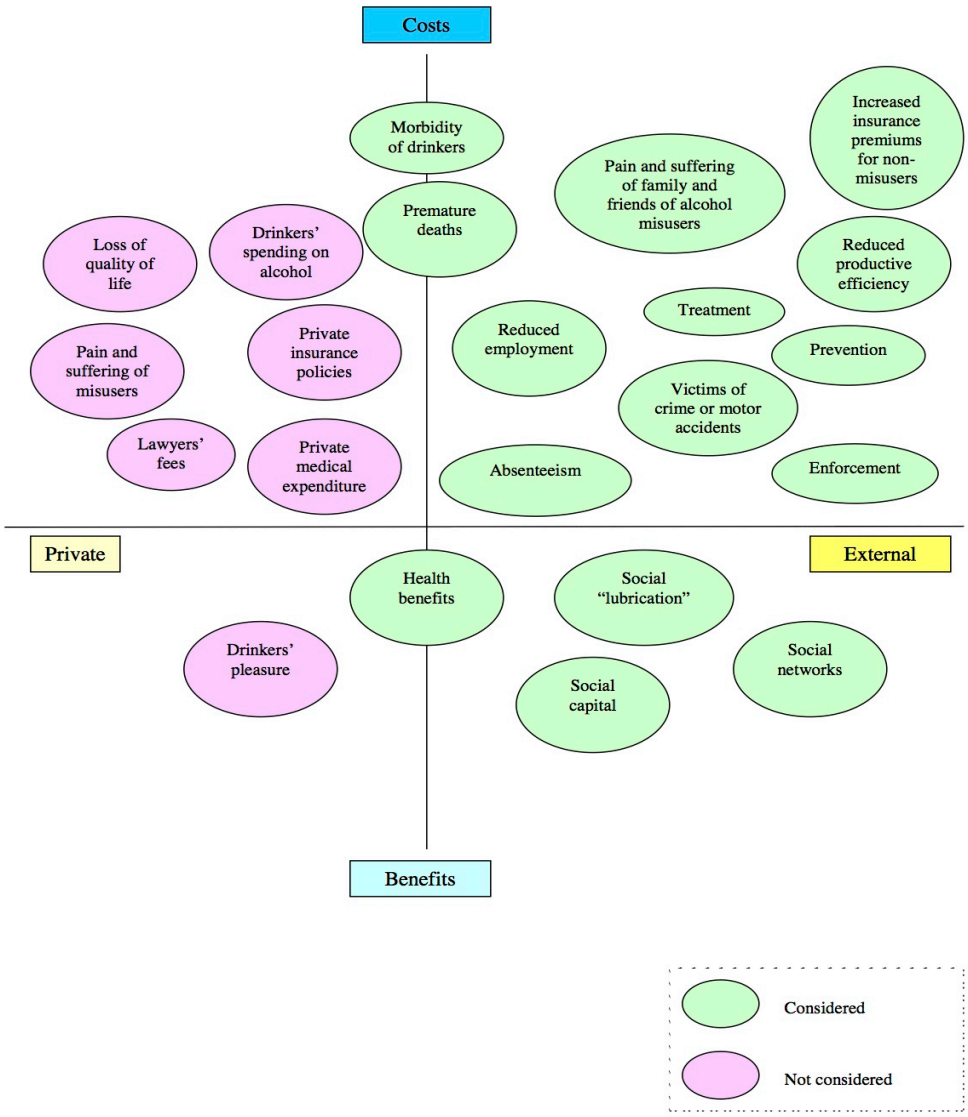
In terms of healthcare provision alone, results from one peer-reviewed paper published in 2011 suggested that as a behavioural risk factor, alcohol-related ill health is as costly to the NHS as smoking:

> **Of the behavioural risk factors, £5.8 billion was spent on poor diet-related ill health, £3.3 billion on alcohol-related ill health, £3.3 billion on smoking-related ill health and £0.9 billion on physical inactivity-related ill health.[3]**

Yet other reports estimate the annual burden of alcohol-related harm in England alone to range from £20 billion to £55 billion, taking into account a variety of non-medical factors.[4]

The now defunct Government Cabinet Office Strategy Unit attempted to capture a comprehensive list of these harms (and benefits) in a cost-benefit diagram (Figure 6).

Figure 6: Private and external costs and benefits of alcohol use/misuse



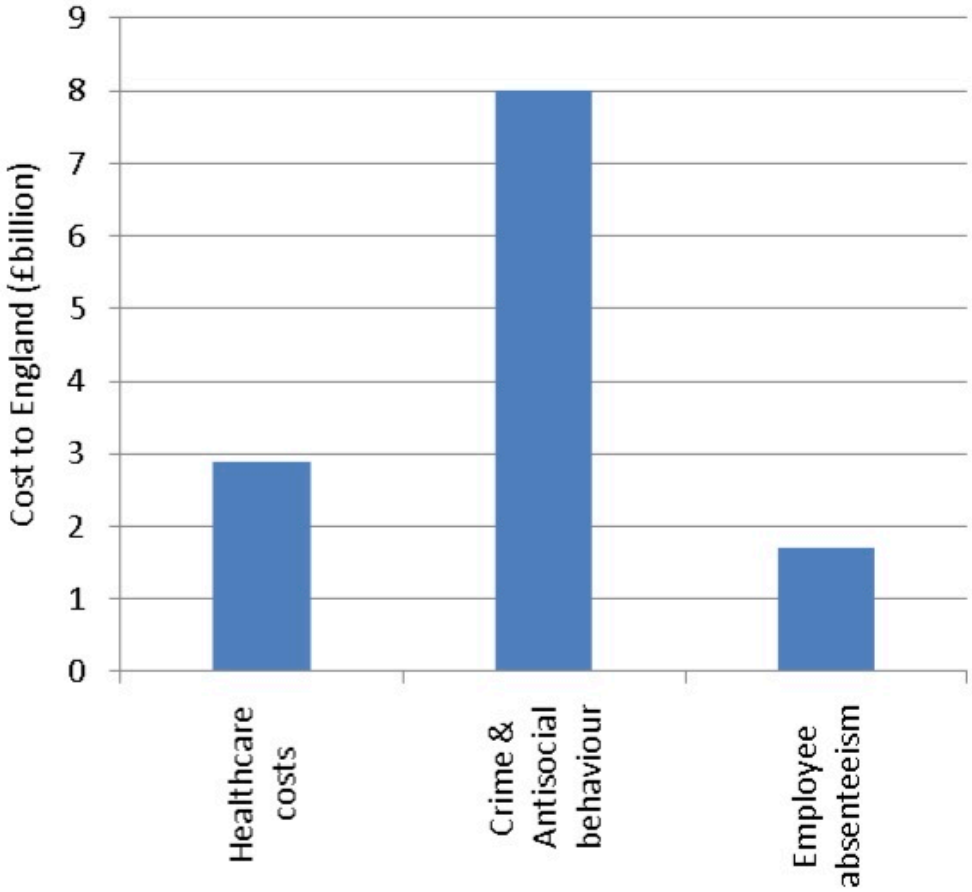
Source: Cabinet Office Strategy Unit, 'Alcohol misuse: How much does it cost?', Chart 7

The diagram key above shows those costs which were considered (and those which were not) in the final calculations. The Government decided not to include private costs in the final estimates of the costs of alcohol-related harm, as they 'do not generally justify government action because individuals are assumed to take into account both the private benefits and costs of an activity when making decisions to undertake this activity'.[5] However, other organisations may take these and other less tangible costs of alcohol misuse into consideration when devising their own estimates.

The cost of alcohol in England

The Health & Social Care Information Centre (HSCIC) estimates the direct costs of alcohol-related harm in England to be £12.6 billion at 2008/09 prices (Figure 7).[6]

Figure 7: Estimated annual costs of alcohol-related harm in England



Source: NICE, 'Alcohol-use disorders: preventing harmful drinking, Costing report', p. 14, Figure 1

The graph above illustrates the sum total of the direct costs of alcohol-related harm to English citizens, categorised as follows: healthcare (£2.9 billion); crime and antisocial behaviour (£8 billion); employee absenteeism (£1.7 billion). The figure of £12.6 billion does not include the estimated costs to the economy of alcohol-related deaths and unemployment associated with alcohol-related harm. This figure has since been revised (see note 2 for Home Office Impact Assessment figures).

Alcohol Concern has created an alcohol harm map for England, which provides information on the costs of alcohol misuse by local authority. By exposing the costs of dealing with alcohol to each and every specific region of the country, the charity aims to 'reveal the real harm and cost of alcohol at a local level'.[7]

The cost of alcohol in Wales

The Welsh Government found the total cost of excess alcohol to the NHS in Wales amounted to between £69.9 million and £73.3 million in 2008/09. Between £1.34 million and £1.41 million spent each week treating diseases caused by excess alcohol, and amounting to between £23.47 and £24.60 per person in Wales and between 1.27% and 1.33% of total healthcare expenditure.[8]

The cost of alcohol in Scotland

The Scottish Government values the economic costs of alcohol misuse at £2.25 billion (2006/7 prices).[9] This is broken down into the following:

Figure 8: Cost to society of alcohol misuse, 2006/7 prices

Sector	Cost
Productivity / Economic	£820m
NHS Scotland	£405m
Social work	£170m
Criminal justice + emergency services	£385m
Human costs	£470m
Total cost	**£2,250m**

Source: The Scottish Government (June 2008), 'Changing Scotland's relationship with alcohol: a discussion paper on our strategic approach', Table 1

The wider societal costs were estimated to be around £3.6 billion, or £706 per person.[10]

The cost of alcohol in Northern Ireland

A firm estimate from the Northern Ireland Statistics and Research Agency calculated the overall social costs of alcohol misuse to be £679.8 million per annum at 2008/09 prices, from which roughly £122m is spent on healthcare, £48.5m on social work, £223.6m on the fire and police services, £83.8m on courts and prison services and £201.7m on the wider economy.[11] At the launch of the latest Health Strategy to tackle the issue of alcohol and drug misuse, Northern Ireland Health Minister Edwin Poots was quoted as declaring a higher figure for the annual cost to the country of alcohol misuse; £900 million.[12]

1 Secretary of State for the Home Department (March 2012), 'The Government's Alcohol Strategy', HM Government, p. 3
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4 Lister, G (September 2007)., 'Evaluating social marketing for health – the need for consensus. Proceedings of the National Social Marketing Centre'; Prime Minister's Strategy Unit (2004), 'Alcohol harm reduction strategy for England', London: Prime Minister's Strategy Unit
5 Strategy Unit (September 2003), 'Alcohol misuse: How much does it cost?', Cabinet Office, p. 10
6 NHS National Institute for Health and Clinical Excellence (NICE) (2010), 'Alcohol-use disorders: preventing harmful drinking, Costing report', pp. 4, 10
7 Alcohol Concern, 'Alcohol Harm Map'
8 Phillips, Ceri J., Harper, Christie, Rance, Jaynie, Farr, Angela (2011), 'Assessing the costs to the NHS associated with alcohol and obesity in Wales', Welsh Assembly Government Social Research and Swansea University, p. 9
9 The Scottish Government (June 2008), 'Changing Scotland's relationship with alcohol: a discussion paper on our strategic approach'
10 The Scottish Government (2010), 'The Societal Cost of Alcohol Misuse in Scotland for 2007'
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12 Northern Ireland Executive (January 2012), 'Health Minister launches new Strategy to address Alcohol and Drug Misuse'

CADCA® Research *into* Action

January/February 2012

The Economic Costs of Excessive Alcohol Consumption

In the United States annually, excessive alcohol consumption accounts for an average of 79,000 deaths and 2.3 million years of potential life lost, making it the third-leading preventable cause of death in the country. This serious public health problem carries a heavy economic burden and causes a number of adverse health and social consequences, including premature death, increases in disease and injury, property damage from fire and motor vehicle crashes, alcohol-related crime, and lost productivity.

In 1998, researchers estimated that excessive alcohol consumption cost the United States $184.6 billion each year. According to a recent study in the *American Journal of Preventive Medicine*, the cost of excessive alcohol consumption grew to 223.5 billion in 2006, with binge drinking accounting for over 75% of the total economic cost of excessive drinking.

What did they do?

Researchers Ellen E. Bouchery, Henrick J. Harwood, Jeffery J. Sacks, Carol J. Simon, and Robert D. Brewer followed the United States Public Health Service Guidelines to calculate the economic cost of excessive alcohol consumption in 2006. This method approximates the amount of direct and indirect national costs for health care, crime, mortality, morbidity-related productivity, and other expenses that can be associated with a specific behavior or health problem. Since this method does not include costs related to pain and suffering, researchers believe the estimates may be significantly lower than they would be if these intangible costs were taken into consideration.

To estimate the economic costs of a selection of impacts and consequences related to excessive alcohol consumption, researchers gathered information from a variety of effective and consistent national databases. Data included the costs of health care, productivity losses, property damage due to crimes, motor vehicle crashes and fire damage, the criminal justice system, Fetal Alcohol Syndrome (FAS)-related special education, and numerous other consequences.

After identifying the total costs, they explored what percentage of these costs could be attributed to particular alcohol consumption behaviors, such as binge drinking, underage drinking, and drinking while pregnant. In addition, they identified the most costly alcohol-attributable crimes, calculated the average economic cost for each alcohol drink consumed, and determined who in society bears the most cost as it relates to excessive drinking.

What did they find?

In 2006, the estimated total economic cost of excessive alcohol consumption in the United States amounted to $223.5 billion or $1.90 per drink, which equals about $746 for each man, woman, and child on a per capita basis. Of the $223.5 billion, $161.3 billion (72.3%) represent costs from lost productivity. Of this $161.3 billion, the two greatest losses came from impaired productivity at work (45.9%) and lost productivity due to the 83,180 alcohol-related deaths (40.3%).

Within the $24.6 billion (11.0%) estimate due to increased healthcare costs, the largest expenditures came from specialty treatment for alcohol abuse and dependence (43.4%) and hospitalizations from excessive drinking medical conditions (20.8%). The biggest cost from other effects comes from criminal justice system costs, totaling $21 billion, due to crimes that are not considered mainly alcohol-attributable, such as assault versus drinking and driving. The cost of motor vehicle crashes also accounted for a significant percentage of the total cost related to other effects ($14 billion in total).

Of the total economic costs of excessive drinking, binge drinking amounts to $170.7 billion (76.4%), underage drinking equals $27.0 billion (12.1%), drinking while pregnant represents $5.2 billion, or 2.3% (mostly related to FAS), and the costs of crime come to $73.3 billion (9.2%). The federal, state, and local government bear these economic costs ($94.2 billion) along with excessive drinkers and their families ($92.9 billion), with the government bearing most of the costs for healthcare expenditures and excessive drinkers and their families covering productivity losses.

What Coalitions Can Do

- ✓ **Implement effective interventions** In order to reduce excessive alcohol consumption, coalitions need to ensure they are combining policies with interventions targeting individual behaviors. Coalitions should implement a comprehensive set of interventions addressing the seven behavior change strategies, such as increasing alcohol excise taxes, limiting alcohol outlet density, enforcing the minimum legal drinking age, screening and counseling for alcohol misuse, and sobriety checkpoints for alcohol-impaired driving.
- ✓ **Target specific drinking patterns and risk groups** According to the research, binge drinking accounted for almost three-quarters of the economic costs. Coalitions should continuously keep a current pulse on their local data and what it tells them about the specific groups in their community engaging in excessive drinking and the associated behaviors and costs to the community. With this information, as well as information on root causes and local conditions associated with the behaviors, coalitions can develop an effective and efficient strategic plan of action.
- ✓ **Demonstrate to policymakers the economic costs to the community** To gain support from policymakers for environmental policies that fit your local conditions, coalitions will need to demonstrate the economic burden of excessive alcohol drinking on their community. Coalitions should adapt the data presented in this article to their own community. For instance, one can easily figure the total economic cost by multiplying the population of a community by the $746 of excessive alcohol consumption per capita basis for every man, woman, and child.

To review the original source, please refer to:

Bouchery, E.E., Harwood, H.J., Sacks, J.J., Simon, C.J., & Brewer, R.D. (2011). Economic costs of excessive alcohol consumption in the U.S., 2006. *American Journal of Preventive Medicine*. 41:516-524.

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Implementation Step	Responsible DHHS Agencies	Year to be Initiated
of the quitting methods used by those who succeed in self-directed efforts; (3) a comparison of the effects of quitting via "cold turkey" versus gradual withdrawal; (4) the identification of methods to reduce or prevent smoking recidivism; (5) the development and testing of effective motivational programs for self-quitting; (6) the identification of environmental factors that influence formal cessation program success; and (7) an evaluation of the smoking intervention programs offered by self-help groups, public service clinics and proprietary programs.		
Support evaluations of prevention and intervention demonstration programs targeted at teenagers and adults.	CDC–CHPE	Ongoing
Study the factors that influence whether a woman smokes during pregnancy.	ADAMHA–NIDA; OASH–NCHS; NIH–NICHD	Ongoing
Determine the relative reinforcing effects of constituents of cigarette smoke and other tobacco products.	ADAMHA–NIDA	Ongoing
Monitor changes in the forms and frequency of tobacco use with age and with time.	NIH–NICHD	Ongoing
Define the extent to which and duration for which smokers who switch to lower tar and nicotine cigarettes compensate by changing their smoking patterns; assess the change in individual smoker's dosage of various constituents.	ADAMHA–NIDA	Ongoing
Evaluate the behavioral and physiological effects, misuse liability, and effectiveness of nicotine gum and other pharmacological interventions when used as adjuncts in smoking programs.	ADAMHA–NIDA	Ongoing
Assess the accuracy of present analytical procedures for measuring tar and nicotine yields of ultra low-yield cigarettes; develop and validate feasible analytical procedures for other smoke constituents; and compare the constituent composition of mainstream and sidestream smoke for the range of commercially availabale cigarettes.	NIH–NCI	Ongoing
Establish clinical testing facilities to provide uniform biochemical and pharmacologic analyses of assays for plasma nicotine, and carboxyhemoglobin and salivary thiocyanate.	NIH–NCI	Ongoing
Implement routine surveillance of current and new cigarettes for the chemical constituents known to exert adverse biological effects.	NIH–NCI	Ongoing

Alcohol and Drug Misuse Prevention

SUMMARY OF THE PROBLEM .....

Currently, average apparent consumption of alcohol for all persons older than 14 is 10 percent higher than 10 years ago, and is equivalent to about 2.75 gallons of ethanol per person per year. Approximately 10 million adult Americans (i.e., 7 percent of those 18 or older) can be considered problem drinkers. Youthful problem drinkers, aged 14 to 17, are estimated to number more than 3 million and comprise 19 percent of this age group.

In addition to the social costs, the economic costs to society as a result of alcohol misuse are substantial—an estimated $49.4 billion in 1977. Ten percent of all deaths in the United States are alcohol-related. Cirrhosis, which is largely attributable to alcohol consumption, ranks among the 10 leading causes of death. Alcohol use also is associated with cancer of the liver, pancreas, esophagus, and mouth. Alcohol consumption during pregnancy is associated with a wide range of possible harmful effects to the fetus—among them

decreased birth weight, spontaneous abortion, and physical and mental birth defects.

Drug misuse is also an expanding problem. There are some 16 million current marijuana users. The popularity of cocaine continues to increase—over 10 million Americans have tried cocaine at least once and there are an estimated 1 to 2 million current users. Misuse of barbiturates remains a significant problem with at least 1 million persons believed to misuse these drugs and the 30,000 estimated to be addicted to them. In addition, heroin addiction is still considered by many to be the most serious drug problem in the United States.

Drug misuse leads to a number of social and health problems. Excessive doses of depressants can result in both physical and psychological dependence. The toll from heroin includes premature death and severe disability, family disruption, and crime committed to maintain the habit. Misuse of hallucinogens often results in emergency room visits. A special problem is the relationship of marijuana to automobile accidents, especially when used in combination with alcohol.

While these events are disconcerting, progress has been made. National surveys indicate no changes in peak quantity consumed by teenagers 12 to 17 or in regularity of their drinking, between 1974 and 1978. Alcoholism mortality rates and alcoholic psychosis rates have shown little overall increase between 1950 and 1975. And similar encouraging trends have occurred in drug misuse. Several drug abuse data sources simultaneously have begun to reflect a downturn in use rates. These early indicators must be monitored over time before conclusions as to their true significance can be evaluated.

Nonetheless, the daily use of marijuana by high school seniors dropped from a peak of 10.7 percent in 1978 to 7.0 percent in 1981. Daily regular cigarette smoking among seniors also declined dramatically—from 28 percent to 10 percent in the same period. The use of the hallucinogenic drug PCP also dropped markedly. Cocaine, heroin and sedative use among high school seniors remained relatively stable in terms of annual and lifetime prevalence, although the use of stimulants rose markedly. Of the 16 categories of drug use analyzed in the recent High School Senior Drug Use Survey, drug use in 15 categories was either stable or was decreasing (the second year of decline since the survey began in 1975).

Priority objectives

To provide a measure of progress, national objectives have been established as quantifiable goals designed to improve health, reduce risk factors, increase awareness, and improve protection and surveillance. Of the 19 alcohol and drug prevention/treatment goals listed in "Objectives for the Nation," the 13 identified as priorities for the Federal effort are listed below:

Improved health status

- By 1990, fatalities from motor vehicle accidents involving drivers with blood alcohol levels of .10 percent or more should be reduced to less than 9.5 per 100,000 population per year. (In 1977, there were 11.5 per 100,000 population.)

- By 1990, the cirrhosis mortality rate should be reduced to 12 per 100,000 per year. (In 1978, the rate was 13.8 per 100,000 per year.)

- By 1990, the incidence of infants born with the Fetal Alcohol Syndrome should be reduced by 25 percent. (In 1977, the rate was 1 per 2,000 births, or approximately 1,650 cases.)

- By 1990, other drug-related mortality should be reduced to 2 per 100,000 per year. (In 1978, the rate was about 2.8 per 100,000.)

Reduced risk factors

- By 1990, per capita consumption of alcohol should not exceed current levels. (In 1978, about 2.82 gallons of absolute alcohol were consumed per year per person age 14 years and over.)

- By 1990, the proportion of adolescents 12 to 17 years old who abstain from using alcohol or other drugs should not fall below 1977 levels. (In 1977, the proportion of abstainers was: 46.5 percent for alcohol; for other drugs, it ranged from 83.9 percent for marijuana to 99.9 percent for heroin.)

- By 1990, the proportion of adolescents 14 to 17 years old who report acute drinking-related problems during the past year should be reduced to below 17 percent. (In

1978, it was estimated to be 19 percent based on 1974 survey data.)

- By 1990, the proportion of young adults 18 to 25 years old reporting frequent use of other drugs should not exceed 1977 levels. (In 1977, it was less than 1 percent for drugs other than marijuana and 18.7 percent for marijuana.)

- By 1990, the proportion of adolescents 12 to 17 years old reporting frequent use of other drugs should not exceed 1977 levels. (In 1977, the proportion of adolescents 12 to 17 years old using marijuana was 8.7 percent, and 1 percent for drugs other than marijuana.)

Increased public-professional awareness

- By 1990, the proportion of women of childbearing age aware of risks associated with pregnancy and drinking, in particular, the Fetal Alcohol Syndrome, should be greater than 90 percent. (In 1979, it was 73 percent.)

- By 1990, the proportion of adults who are aware of the added risk of head and neck cancers for people with excessive alcohol consumption should exceed 75 percent. (Baseline data unavailable.)

- By 1990, 80 percent of high school seniors should state that they perceive great risk associated with frequent regular cigarette smoking, marijuana use, barbiturate use, or achohol intoxication. (In 1979, 63 percent of high school seniors perceived "great risk" to be associated with 1 or 2 packs of cigarettes smoked daily, 42 percent with regular marijuana use, 72 percent with regular barbiturate use, and only 35 percent with having 5 or more drinks per occasion once or twice each weekend.)

Improved services-protection

- By 1990, the proportion of workers in major firms whose employers provide a substance abuse prevention and referral program (employee assistance) should be greater than 70 percent. (In 1976, 50 percent of a sample of the Fortune 500 firms offered some type of employee assistance program.)

Improved surveillance-evaluation systems

- By 1990, a comprehensive data capability should be established to monitor and evaluate the status and impact of misuse of alcohol and drugs on: health status; motor vehicle accidents; accidental injuries in addition to those from motor vehicles; interpersonal aggression and violence; sexual assault; vandalism and property damage; pregnancy outcomes; and emotional and physical development of infants and children.

The objectives identified as priorities for the Federal effort are those which are most clearly related to the occurence of psychological, physiological, or social problems. The remaining priority objectives were deemed more difficult to assess. Further, some of the alcohol and drug objectives have been addressed in the implementation plans of other prevention areas, e.g., accident prevention and injury control.

Role of the Federal Government

A pluralistic process involving public and private participants from many sectors and backgrounds is necessary if the alcohol and drug abuse prevention objectives are to be achieved by 1990. The role of the Federal Government in this process is to lead, catalyze, and provide strategic support. In assuming this role the DHHS will:

- Develop and disseminate factual literature on alcohol and drugs;

- Support mass media campaigns on alcohol and drug abuse;

- Provide technical assistance to States, business and industry, and schools on developing prevention, intervention, and treatment programs;

- Support drug and alcohol abuse prevention demonstration projects;

- Support research on the social, psychological, and biochemical factors underlying drug and alcohol dependence; and

- Support activities to monitor the drug and alcohol usage patterns.

The tables on the following pages identify, by objective, the activities supported by the Department of Health and Human Services that contribute toward achievement of the drug and alcohol abuse prevention priority objectives. Included within the tables are activities undertaken jointly by Federal agencies, State and local governments, and private sector organizations. Continuation activities and those planned for Fiscal Year 1982 and beyond are listed in the tables.

Coordination

Achievement of the objectives will require the development of activities which supplement and complement those of the Federal Government. Local drug programs could assist schools in developing alcohol and drug education programs. Similarly, State and local health agencies could develop education and intervention programs designed to reduce the number of fatalities from fires or drownings which are indirectly attributable to alcohol use. And activities which affect high risk populations are necessary, e.g. education-treatment programs could be designed for persons convicted of driving while intoxicated.

A range of possible activities contributing toward achievement of the drug and alcohol abuse prevention objectives was described in "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention" and "Promoting Health/Preventing Disease: Objectives for the Nation." The Department of Health and Human Services will support those activities that are consistent with the Federal role of leading, catalyzing, and providing strategic support. State, local, and private organizations will supplement this effort through activities that are compatible with their organizational mandate and available resources.

Summary of Federal efforts

The DHHS efforts listed below are necessary but not sufficient for the achievement of the drug and alcohol use prevention objectives by 1990. Most are already underway and it is anticipated that some will extend through 1990. Those yet to be initiated but anticipated for Fiscal Years 1982 and 1983 are noted with an asterisk (*). The ability to engage in these efforts is contingent upon the availability of Federal fiscal and manpower resources. Federal efforts ascertained to produce the most progress toward achievement of the drug and alcohol use prevention objectives will receive high priority in allocation of resources.

Education and information measures

- Establishment of a Presidential Commission on Drunk Driving;

- Sponsoring a media campaign aimed at reducing the incidence of alcohol misuse and the occurrence of alcohol-related problems;

- Funds for a centralized information development, analysis, and dissemination mechanism to provide the public and professionals with information on alcohol;

- Development of a public education effort focusing on the physical risks associated with alcohol abuse;

- Dissemination of an educational package to health care providers on the fetal alcohol syndrome (FAS) and its effects;

- Development and dissemination of factual literature on drugs;

- Development of a monograph on drug abuse prevention in the workplace;

- Development of a sleep disorder curriculum for medical, pharmacy, and nursing schools, including information on the benefits and risks of sleeping pills; and

- Development and distribution of aids and publications for use in school-based drug and alcohol education programs.

Grants to States and service delivery measures

- *Support for family resource centers which sponsor the development of parent and family groups concerned about drug abuse; and

- Provision of funding for States, via the Mental Health and Prevention Block Grant Programs, to support information, education, alternatives and early intervention programs.

Technical assistance-cooperative measures

- Provision of technical assistance and program materials to business and industry, single State agencies (SSAs), and local programs interested in developing worksite and community prevention programs;

- *Support for an initiative to involve private sector organizations and State agencies in sponsoring drug and alcohol information programs;

- *Dissemination of prevention program information and provision of program development assistance through regional training networks;

- Assistance to parent groups in developing strategies to influence local school, law enforcement, and government officials to intitiate actions to reduce the availability of drugs and alcohol, and to increase youth resistance to drug and alcohol misuse;

- Development of intervention strategies involving the criminal justice system that are designed to reduce the incidence of drug misuse; and

- Support for State efforts to provide referral and treatment services for emergency drug cases.

Economic and other incentive measures

- *Convening of a task force of Federal agencies to explore possible administration policies on labor, tax incentives, and other promotional methods for starting and maintaining worksite alcohol and drug use prevention and assistance programs.

Research and surveillance measures

- Support for research directed at analyzing the relationship between alcohol consumption levels and various policy issues such as ABC laws, availability, and taxation; the relationship between general alcohol consumption and its impact on other 1990 objectives, e.g., cirrhosis mortality;

- Conduct of basic and epidemiologic research on the biological mechanisms associated with alcoholism;

- Support for research and demonstration in such areas as: increasing referrals of company executives, minority programs, risk factors associated with occupations, new approaches for small businesses, barriers to development of programs, and improved techniques of program design and evaluation;

- Support for the Alcohol Prevention Model Replication Program, which assesses the effectiveness of demonstration programs and aids in their dissemination;

- Support for research efforts to develop and pilot test new prevention and early intervention models and strategies;

- Conduct of the annual National High School Senior Drug Use Survey;

- Provision of technical assistance to States in the collection and analysis of drug and alcohol related data; and

- Support for the Drug Abuse Warning Network (DAWN), which collects and assembles information on drug-related deaths.

DHHS Cooperating Agencies

Office of Assistant Secretary for Health (OASH)
- National Center for Health Statistics (NCHS)
- Office of Disease Prevention and Health Promotion (ODPHP)
- Office on Smoking and Health (OSH)

Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) (*DHHS Lead Agency*)
- National Institute on Alcohol Abuse and Alcoholism (NIAAA)
- National Institute on Drug Abuse (NIDA)
- National Institute of Mental Health (NIMH)

Centers for Disease Control (CDC)
- Center for Health Promotion and Education (CHPE)
- Center for Environmental Health (CEH)
- Epidemiology Program Office (EPO)
- National Institute for Occupational Safety and Health (NIOSH)

Food and Drug Administration (FDA)
- National Center for Drugs and Biologics (NCDB)

National Institutes of Health (NIH)
- National Institute on Aging (NIA)
- Division of Research Resources (DRR)

Health Resources and Services Administration (HRSA)
- Bureau of Health Care Delivery and Assistance (BHCDA)

Non-DHHS Cooperating Agencies (Partial List)

Federal agencies

Department of Commerce (DOC)
Department of Education (ED)
Department of Justice (DOJ)
- Drug Enforcement Administration (DEA)

Department of Labor (DOL)
Department of the Treasury (TD)
- Bureau of Alcohol, Tobacco and Firearms (BATF)

Department of Transportation (DOT)
- National Highway Traffic Safety Administration (NHTSA)

Non-Federal agencies

Mothers Against Drunk Drivers (MADD)
National Council on Alcoholism (NCA)
State health departments (SHD)
Single State agencies (SSAs)

Alcohol and Drug Misuse Prevention Priority Objectives Implementation Plan

Objective: By 1990, fatalities from motor vehicle accidents involving drivers with blood alcohol levels of .10 percent percent or more should be reduced to less than 9.5 per 100,000 population per year.

Priority: High.

Baseline data: In 1977, there were 11.5 fatalities per 100,000 population from motor vehicle accidents involving drivers with blood alcohol levels of .10 or more.

Data source: National Highway Traffic Safety Administration Data (DOT).

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Facilitate with DOT and NHTSA the establishment of a Presidential Commission on Drunk Driving.	ADAMHA–NIAAA	FY 1982
Sponsor media campaign aimed at reducing the incidence of alcohol misuse and the occurrence of alcohol-related problems.	ADAMHA–NIAAA	Ongoing
Fund a centralized information development, analysis and dissemination mechanism to provide the public and professionals with information on alcohol.	ADAMHA–NIAAA	Ongoing
Distribute educational materials representing the themes of alcohol-related media campaigns.	ADAMHA–NIAAA	Ongoing
Grants to States and Service Delivery Measures		
Encourage support for risk reduction and injury control projects through the Prevention Block Grant.	CDC–CHPE, CEH	FY 1982
Provide funding via the Mental Health Block Grant to support alcohol-related information, education, alternatives and early intervention programs.	ADAMHA	FY 1982
Technical Assistance/Cooperative Measures		
Work with professional and voluntary organizations sponsoring community-based risk-reduction efforts.	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Provide program information to private sector organizations interested in developing educational and community action projects.	ADAMHA–NIAAA	Ongoing
Provide programmatic assistance to States to develop community injury control programs.	CDC–CEH	FY 1983
Economic and Other Incentives		
Provide information to States seeking to raise the drinking age above 18.	ADAMHA–NIAAA	Ongoing
Provide States with information on the impact of enforcing drunk driving laws.	ADAMHA–NIAAA	Ongoing
Research and Surveillance Measures		
Fund the Research/Demonstration Grants Program (projects focus on alcohol-related policy research and analysis questions).	ADAMHA–NIAAA	Ongoing

Objective: By 1990, the cirrhosis mortality rate should be reduced to 12 per 100,000 per year; the proportion of adults who are aware of the added risk of head and neck cancers for people with excessive alcohol consumption should exceed 75 percent.

Priority: High (for cancers); Medium (for cirrhosis).

Baseline data: In 1978, the cirrhosis mortality rate was 13.8 per 100,000; data not currently available for cancer awareness.

Data source: National Mortality Statistics (NCHS), Periodic surveys (NIAAA).

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Develop a public education effort on the physical risks associated with alcohol abuse.	ADAMHA–NIAAA	FY 1982
Work with health care organizations to stimulate secondary dissemination of public information materials.	ADAMHA–NIAAA	FY 1985
Grants to States and Service Delivery Measures		
Provide funding via the Mental Health Block Grant to support alcohol-related information, education, alternatives and early intervention programs.	ADAMHA	FY 1985
Technical Assistance and Cooperative Measures		
Work with professional and voluntary organizations sponsoring community-based risk reduction efforts.	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Provide program information to private sector organizations interested in developing educational and community action projects.	ADAMHA–NIAAA	Ongoing
Research and Surveillance Measures		
Conduct biomedical research on the relationship between alcohol consumption and cirrhosis and alcohol consumption and cancer.	ADAMHA–NIAAA	Ongoing
Develop means of accessing existing data systems in order to retrieve baseline data required to establish trends and measure progress/impact.	ADAMHA–NIAAA	FY 1985

Objective: By 1990, the incidence of infants born with the Fetal Alcohol Syndrome should be reduced by 25 percent; the proportion of women of childbearing age aware of risks associated with pregnancy and drinking, in particular, the Fetal Alcohol Syndrome, should be greater than 90 percent.

Priority: High.

Baseline data: In 1977 the rate for Fetal Alcohol Syndrome was 1 per 2,000 births; in 1979, 73 percent of women were aware of risks of drinking while pregnant.

Data source: National Hospital Discharge Survey (NCHS), Periodic surveys (NIAAA).

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Sponsor the Healthy Mothers, Healthy Babies public information campaign on the controllable risks of pregnancy.	ADAMHA–NIAAA; HRSA–BHCDA; OASH–OPA, ODPHP	FY 1982

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Develop a Public Education Media Campaign on the physical risks associated with alcohol abuse.	ADAMHA–NIAAA	Ongoing
Disseminate an educational package to health care providers on the fetal alcohol syndrome (FAS) and its effects.	ADAMHA–NIAAA	Ongoing
Distribute visual and print educational materials on the FAS.	ADAMHA–NIAAA; CDC–CHPE; FDA–NCDB	Ongoing
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school board policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982
Grants to States and Service Delivery Measures		
Provide funding via the Mental Health Block Grant to support alcohol-related information, education, alternatives and early intervention programs.	ADAMHA	Ongoing
Encourage support for risk reduction projects through the Prevention Block Grant.	CDC–CHPE	Ongoing
Technical Assistance/Cooperative Measures		
Work with professional and voluntary organizations sponsoring community-based risk reduction efforts.	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Provide program information to private sector organizations interested in developing educational and community action projects.	ADAMHA–NIAAA	Ongoing
Research and Surveillance Measures		
Fund the Research Grants Program (supports projects directed at prevention and treatment of the FAS).	ADAMHA–NIAAA	Ongoing
Conduct research and surveillance on factors associated with birth defects.	CDC–CEH; NIH–NICHD, DRR	Ongoing

Objective: By 1990, other drug-related mortality should be reduced to 2 per 100,000 per year.

Priority: Medium.

Baseline data: In 1978, the rate for other drug-related mortality was about 2.8 per 100,000.

Data source: National Hospital Discharge Survey (NCHS), National Mortality Statistics (NCHS).

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Education and Information Measures		
Develop and disseminate factual literature on drugs.	ADAMHA–NIDA	Ongoing
Develop a sleep disorder curriculum including information on costs and benefits of sleeping pills for medical, pharmacy and nursing schools.	ADAMHA–NIDA	Ongoing
Distribute a state-of-the-art document and physician handbook on sleep disorders.	ADAMHA–NIDA	Ongoing
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school board policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Grants to States and Service Delivery Measures		
Provide funding via the Mental Health Block Grant to support alcohol-related information, education, alternatives and early intervention programs.	ADAMHA	Ongoing
Encourage support for risk reduction projects through the Prevention Block Grant.	CDC–CHPE	Ongoing
Technical Assistance/Cooperative Measures		
Collect information about new types of drug abuse and distribute results to the States and localities.	ADAMHA–NIDA	Ongoing
Support State efforts to provide referral and treatment services for emergency drug cases.	ADAMHA–NIDA	Ongoing
Work with professional and voluntary organizations sponsoring community-based risk reduction efforts.	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Research and Surveillance Measures		
Fund research projects which examine the abuse potential of licit and illicit drugs.	ADAMHA–NIDA	Ongoing
Support a research project to increase understanding and treatment of sleep disorders.	ADAMHA–NIDA	Ongoing
Fund the Drug Abuse Warning Network (DAWN).	ADAMHA–NIDA	Ongoing

Objective: By 1990, per capita consumption of alcohol should not exceed current levels.

Priority: Medium.

Baseline data: In 1978, about 2.82 gallons of absolute alcohol were consumed per year per person age 14 years and over.

Data source: Periodic surveys (NIAAA)

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Education and Information Measures		
Fund a centralized information development, analysis and dissemination mechanism to provide the public and professionals with information on alcohol.	ADAMHA–NIAAA	Ongoing
Develop a public education effort on the physical risks associated with alcohol abuse.	ADAMHA–NIAAA	Ongoing
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school board policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982
Grants to States and Service Delivery Measures		
Provide funding via the Mental Health Block Grant to support alcohol-related information, education, alternatives and early intervention programs.	ADAMHA	Ongoing
Encourage support for risk reduction projects through the Prevention Block Grant.	CDC–CHPE	Ongoing

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Technical Assistance/Cooperative Measures		
Provide technical assistance to health agencies implementing Health Risk Appraisals that include alcohol as a risk factor.	CDC–CHPE	Ongoing
Work with professional and voluntary organizations sponsoring community-based risk reduction efforts.	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Provide program information to private sector organizations interested in developing educational and community action projects.	ADAMHA–NIAAA	Ongoing
Economic and Other Incentives		
Provide information to States on the impact of raising the drinking age above 18.	ADAMHA–NIAAA	Ongoing
Provide information to States on the impact of enforcing drunk driving laws.	ADAMHA–NIAAA	Ongoing
Reseach and Surveillance Measures		
Fund the Research Grant Program (supports projects directed at prevention and treatment of alcoholism).	ADAMHA–NIAAA	Ongoing
Support research directed at analyzing the relationship between alcohol consumption levels and various policy issues such as ABC laws, availability and taxation.	ADAMHA–NIAAA	Ongoing

Objective: By 1990, the proportion of adolescents 12 to 17 years old who abstain from using alcohol or other drugs should not fall below 1977 levels.

Priority: High.

Baseline data: In 1977, the proportion of abstainers was: 46.5 percent for alcohol; for other drugs, it ranged from 83.9 percent for marijuana to 99.9 percent for heroin.

Data source: National Survey on Drug Abuse (NIDA), Special National Survey of Alcohol Use (NIAAA).

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Education and Information Measures		
Develop and disseminate factual information on drugs.	ADAMHA–NIDA	Ongoing
Develop a public education effort on the physical risks associated with alcohol abuse.	ADAMHA–NIAAA	Ongoing
Fund a centralized information development, analysis and dissemination mechanism to provide the public and professionals with information on alcohol.	ADAMHA–NIAAA	Ongoing
Develop and distribute aids and publications for use in school-based drug and alcohol education programs.	ADAMHA–NIAAA, NIDA	Ongoing
Develop public service messages directed at teenage drinking behavior.	ADAMHA–NIAAA	Ongoing
Refine and encourage adoption of school health education curricula including modules on drugs and alcohol	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school-based policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Grants to States and Service Delivery Measures		
Provide funding for States, via the Mental Health and Prevention Block Grant Programs, to support information, education, alternatives and early intervention programs.	ADAMHA; CDC–CHPE	Ongoing
Support family resource centers which sponsor the development of parent and family groups concerned about drug abuse.	ADAMHA–NIDA	FY 1982
Technical Assistance/Cooperative Measures		
Provide technical information and consultation to public and private sector groups attempting to develop prevention and intervention programs.	ADAMHA–NIAAA, NIDA	Ongoing
Work with the Department of Education to encourage, and assist in, the development of drug and alcohol education programs.	ADAMHA–NIDA	Ongoing
Provide funding for the Channel One project, which involves collaboration with private industry, State government and local leaders to establish constructive community projects.	ADAMHA–NIDA	Ongoing
Provide informational assistance and supportive leadership for Parents Organizations.	ADAMHA–NIDA	Ongoing
Work with national youth organizations to disseminate prevention materials.	ADAMHA–NIAAA, NIDA	Ongoing
Economic and Other Incentives		
Provide information to States on the impact of raising the drinking age above 18.	ADAMHA–NIAAA	Ongoing
Research and Surveillance Measures		
Fund the National Survey on Drug Abuse.	ADAMHA–NIDA	Ongoing
Support knowledge building activities, e.g., adolescent prevention research centers.	ADAMHA–NIDA	Ongoing
Expand evaluation research projects which examine the effectiveness of prevention strategies.	ADAMHA–NIDA	Ongoing

Objective: By 1990, the proportion of adolescents 14 to 17 years old who report acute drinking-related problems during the past year should be reduced to below 17 percent.

Priority: High.

Baseline data: In 1978, it was estimated to be 19 percent based on 1974 survey data.

Data source: Periodic National Survey on Alcohol and Drug Abuse.

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Education and Information Measures		
Fund a centralized information development, analysis and dissemination mechanism to provide the public and professionals with information on alcohol.	ADAMHA–NIAAA	Ongoing
Sponsor a media campaign aimed at reducing the incidence of alcohol misuse and the occurence of alcohol-related problems.	ADAMHA–NIAAA	Ongoing

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Develop materials relative to the prevention of accidents associated with episodic teenage drinking.	ADAMHA–NIAAA	Ongoing
Develop media messages specifically aimed at the teenage population.	ADAMHA–NIAAA	Ongoing
Refine and encourage adoption of school health education curricula including modules on alcohol use.	ADAMHA–NIAAA; CDC–CHPE	Ongoing
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school board policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982
Grants to States and Service Delivery Measures		
Provide funding via the Mental Health Block Grant to support alcohol-related information, education, alternatives, and early intervention programs.	ADAMHA	Ongoing
Encourage support for risk reduction projects through the Prevention Block Grant.	CDC–CHPE	Ongoing
Technical Assistance/Cooperative Measures		
Provide technical assistance to health agencies implementing Health Risk Appraisals that include alcohol as a risk factor.	CDC–CHPE	Ongoing
Work with professional and voluntary organizations sponsoring community-based risk reduction efforts.	ADAMHA–NIAAA; CDC–CHPE; OASH–ODPHP	Ongoing
Provide program information to private sector organizations interested in developing educational and community action projects.	ADAMHA–NIAAA;	Ongoing
Economic and Other Incentives		
Provide information to States on the impact of raising the drinking age above 18.	ADAMHA–NIAAA	Ongoing
Research and Surveillance Measures		
Fund the Research/Demonstration Grant Program (projects are directed at the development of effective prevention strategies).	ADAMHA–NIAAA	Ongoing
In collaboration with Schools of Public Health, assist States to develop the capacity to survey the prevalence of alcohol and other risk factors.	CDC–CHPE	FY 1982
Conduct research on genetic factors related to alcoholism and alcohol metabolism.	ADAMHA–NIAA; CDC–EPO; NIH–NICHD, DRR	Ongoing

Objective: By 1990, the proportion of young adults 18 to 25 years old reporting frequent use of other drugs should not exceed 1977 levels.

Priority: High.

Baseline data: In 1977, the proportion of young adults 18 to 25 years old using marijuana was 18.7 percent and less than 1 percent for drugs other than marijuana.

Data source: National Survey on Drug Abuse.

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Develop and disseminate factual information on drugs.	ADAMHA–NIDA	Ongoing
Develop educational materials targeted at high risk groups of young adults.	ADAMHA–NIDA, NIAAA	FY 1982
Grants to States and Service Delivery Measures		
Provide funding for States, via the Mental Health Block Grant Program, to support information, education, alternatives and early intervention programs against drug abuse.	ADAMHA–NIDA	Ongoing
Encourage States to support health education/risk reduction programs that address drug abuse and other risk factors through their Prevention Block Grant.	CDC–CHPE	FY 1982
Technical Assistance/Cooperative Measures		
Work with the criminal justice systems to promote early identification and referral to treatment of offenders who are drug dependent.	ADAMHA–NIDA	Ongoing
Provide technical assistance and materials to State agencies, local programs and voluntary associations on prevention, intervention and treatment services.	ADAMHA–NIDA	Ongoing
Expand the technical assistance capability to respond to the increased responsibility of State and local entities to administer and conduct treatment and prevention services.	ADAMHA–NIDA	Ongoing
Provide technical assistance and materials to business and industry, States and local programs interested in developing worksite prevention programs.	ADAMHA–NIDA, NIAAA	FY 1982
Research and Surveillance Measures		
Support studies to increase understanding of the nature and methods of effective intervention in drug abuse problems.	ADAMHA–NIDA, DRR	Ongoing
Support research efforts to develop and pilot test new prevention and treatment models and strategies.	ADAMHA–NIDA	Ongoing
Fund the Annual National Survey on Drug Abuse.	ADAMHA–NIDA	Ongoing

Objective: By 1990, the proportion of adolescents 12 to 17 years old reporting frequent use of other drugs should not exceed 1977 levels.

Priority: High.

Baseline data: In 1977, the proportion of adolescents 12 to 17 years old using marijuana was 8.7 percent, and 1 percent for drugs other than marijuana.

Data source: National Survey on Drug Abuse.

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Develop and disseminate factual information on drugs.	ADAMHA–NIDA	Ongoing

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Refine and encourage adoption of school health education curricula including modules on alcohol and drugs.	ADAMHA–NIAAA, NIDA; CDC–CHPE	Ongoing
Develop and distribute aids and publications for use in school-based drug and alcohol education programs.	ADAMHA–NIDA, NIAAA	FY 1982
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school board policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982
Grants to States and Service Delivery Measures		
Provide funding for States, via the Mental Health Block Grant Program, to support information, education, alternatives and early intervention programs.	ADAMHA	Ongoing
Support family resource centers which sponsor the development of parent groups concerned about drug abuse.	ADAMHA–NIDA	FY 1982
Encourage States to support health education/risk reduction programs that address drug abuse and other risk factors through the Prevention Block Grant.	CDC–CHPE	FY 1982
Technical Assistance/Cooperative Measures		
Provide technical assistance and materials to State agencies, local programs, voluntary associations on prevention, intervention and treatment services.	ADAMHA–NIDA	Ongoing
Assist parent groups to develop strategies to influence local school, law enforcement and government officials to initiate actions to reduce the availability of drugs.	ADAMHA–NIDA	Ongoing
Develop intervention strategies involving the criminal justice system designed to reduce the incidence of drug misuse.	ADAMHA–NIDA	Ongoing
Collaborate with the Drug Enforcement Agency to encourage greater use of school drug policies to reduce drug misuse.	ADAMHA–NIDA	Ongoing
Research and Surveillance Measures		
Conduct evaluation research on factors relating to the prevention of drug taking behavior among youth.	ADAMHA–NIDA	Ongoing
Increase the knowledge base needed to improve the prevention and intervention technology.	ADAMHA–NIDA; DRR	Ongoing
Support the Annual National Survey on Drug Abuse.	ADAMHA–NIDA	Ongoing

Objective: By 1990, 80 percent of high school seniors should state that they perceive great risk associated with frequent regular cigarette smoking, marijuana use, barbiturate use or alcohol intoxication.

Priority: High.

Baseline data: In 1979, 63 percent of high school seniors perceived "great risk" to be associated with 1 or 2 packs of cigarettes smoked daily, 42 percent with regular marijuana use, and only 35 percent with having 5 or more drinks per occasion once or twice each weekend.

Data source: NIDA National High School Senior Drug Use Survey.

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Develop and disseminate factual literature on drugs and alcohol use and misuse.	ADAMHA–NIDA	Ongoing
Refine and encourage adoption of school health curricula on alcohol, drug, and tobacco use.	ADAMHA–NIDA, NIAAA; CDC–CHPE; OASH–OSH, ODPHP	Ongoing
Develop a public education effort on the physical risks associated with alcohol abuse.	ADAMHA–NIAAA	Ongoing
Develop and distribute aids and publications for use in school-based drug and alcohol education programs.	ADAMHA–NIDA, NIAAA	FY 1982
Distribute alcohol- and drug-related educational materials to the general public.	ADAMHA–NIDA, NIAAA	Ongoing
Provide assistance to national professional and lay education associations in the preparation of guidelines for the development of school board policy on alcohol and drug education.	ADAMHA–NIAAA, NIDA	FY 1982
Grants to States and Service Delivery Measures		
Encourage States to support health education/risk reduction programs through their Prevention Block Grant.	CDC–CHPE; SHD	FY 1982
Provide funding for States, via the Mental Health Block Grant Program, to support information, education, alternatives and early intervention programs.	ADAMHA	FY 1982
Support family resource centers which sponsor the development of parent and family groups concerned about drug abuse.	ADAMHA–NIDA	Ongoing
Technical Assistance/Cooperative Measures		
Assist national youth organizations in the dissemination of alcohol- and drug-related messages.	ADAMHA–NIDA, NIAAA	Ongoing
Provide technical information and consultation to public and private sector groups attempting to develop prevention and intervention programs.	ADAMHA–NIAAA, NIDA	Ongoing
Work with States to support an initiative to involve private sector organizations and State agencies in sponsoring drug information programs.	ADAMHA–NIDA	FY 1982
Work with States in disseminating prevention program information and provide program development assistance through regional training networks.	ADAMHA–NIAAA	FY 1982
Provide information to States on the impact of raising the drinking age above 18.	ADAMHA–NIAAA	Ongoing
Research and Surveillance Measures		
Support the Alcohol Prevention Model Replication Program which assesses the effectiveness of demonstration programs.	ADAMHA–NIAAA	Ongoing
Support the Research/Demonstration Grant Program.	ADAMHA–NIAAA	Ongoing
Support knowledge building activities, e.g., adoloescent prevention research centers, evaluation research projects.	ADAMHA–NIDA	Ongoing
Fund the Annual National High School Senior Drug Use Survey.	ADAMHA–NIDA	Ongoing

Objective: By 1990, the proportion of workers in major firms whose employers provide a substance abuse prevention and referral program (employee assistance) should be greater than 70 percent.

Priority: Medium.

Baseline data: In 1976, 50 percent of a sample of the Fortune 500 firms offered some type of employee assistance program.

Data source: Survey of Private Industry (NIAAA and NIDA).

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Education and Information Measures		
Develop a monograph on drug abuse prevention in the workplace.	ADAMHA–NIDA	Ongoing
Technical Assistance/Cooperative Measures		
Provide technical assistance and materials to business and industry, SSAs, and local programs interested in developing worksite prevention programs.	ADAMHA–NIDA, NIAAA	Ongoing
Provide technical assistance and support to States for projects including employee assistance programs.	ADAMHA–NIDA	Ongoing
Develop and market a training program on worksite prevention programs.	ADMAHA–NIDA	FY 1982
Economic and Other Incentive Measures		
Convene a task force of Federal agencies to explore possible administration policies on labor, tax incentives, and other promotional methods for starting and maintaining worksite prevention and assistance programs.	ADAMHA–NIAAA, NIDA; OASH–ODPHP; CDC–CHPE	FY 1982
Research and Surveillance Measures		
Work with OPM to support a demonstration employee assistance program for DHHS employees.	ADAMHA–NIAAA	Ongoing
Support research and demonstration of employee assistance programs in such areas as: methods of increasing referrals of company executives; developing minority programs; identification of risk factors associated with occupations; new approaches for small businesses; barriers to development of programs, and improved techniques of program design and evaluation.	ADAMHA–NIAAA	FY 1982

Objective: By 1990, a comprehensive data capability should be established to monitor and evaluate the status and impact of misuse of alcohol and drugs on: health status; motor vehicle accidents; accidental injuries in addition to those from motor vehicles; interpersonal aggression and violence; sexual assault; vandalism and property damage; pregnancy outcomes; and emotional and physical development of infants and children.

Priority: Medium.

Data source: Various agencies.

Implementation Step	*Responsible DHHS Agencies*	*Year to be Initiated*
Technical Assistance/Cooperative Measures		
Participate in the DHHS initiative to develop a monitoring strategy for the prevention objectives.	ADAMHA–NIDA, NIAAA	FY 1982

Implementation Step	Responsible DHHS Agencies	Year to be Initiated
Provide technical assistance to States for the collection and analysis of drug and alcohol related data.	ADAMHA–NIDA, NIAAA	FY 1982
Research and Surveillance Measures		
Collect data on the status and impact of alcohol and drug misuse.	ADAMHA–NIAAA, NIDA, NIMH; FDA–NCDB; OASH–NCHS	Ongoing
Collect data on alcohol-related motor vehicle fatalities.	DOT–NHTSA; ADAMHA–NIAAA	Ongoing
Collect data on alcohol and drug-related criminal justice problems.	DOJ–OJARS	Ongoing
Support the Drug Abuse Warning Network which collects and analyzes information on drug-related deaths.	ADAMHA–NIDA	Ongoing
In collaboration with Schools of Public Health, assist States to develop the capacity to survey the prevalence of various risk factors.	CDC–CHPE	Ongoing

Improved Nutrition

SUMMARY OF THE PROBLEM .....

Appropriate nutrition is necessary for optimal growth and development, physical activity, reproduction, lactation, recovery from illness and injury, and maintenance of health throughout the life cycle. A variety of health problems can occur when persons have deficits of essential nutrients or have excessive or inappropriate consumption of some nutrients. While the role of nutrition in health problems is not fully understood, epidemiologic and laboratory studies offer important insights which may help people in making food choices to enhance their prospects of attaining or maintaining health.

Current data indicate an inappropriate nutritional status for a substantial proportion of the American public. For example, for people aged 20 to 74 about 14 percent of men and 24 percent of women are classified as obese. The rates are significantly higher for women regardless of their economic status. Iron and folic acid deficiencies are common among pregnant or lactating women. It has been estimated that between 10 to 15 percent of infants and children among migratory workers and certain rural poor populations suffer growth retardation due to dietary inadequacies. And the average daily sodium ingestion is substantially higher for the U.S. population generally than the recommended intake levels.

But some progress has been made over the last decade. Studies indicate that people have begun to consume less total fat, saturated fat, and cholesterol. Prevalence of breast feeding has increased to a point where it is the mode of feeding for 45 percent of newborns in the country. And a number of recent surveys indicate that more people are interested in nutrition, are more aware of the actions they can take to maintain health through their daily eating patterns, and have initiated changes in their nutritional practices.

Priority objectives

To provide a measure of progress, national objectives have been established as quantifiable goals designed to improve health, reduce risk factors, increase awareness, and improve protection and surveillance. Of the 17 nutrition-related goals listed in "Objectives for the Nation," the 15 initially identified as priorities for the Federal effort are listed below.

Improved health status

- By 1990, the proportion of pregnant women with iron deficiency anemia (as estimated by hemoglobin

Alcohol and drinking

What is alcohol?

Alcohol is derived from the fermentation of sugar by yeast. It is a drug. The main psychoactive ingredient in alcoholic drinks is ethanol, or ethyl alcohol.

Ethanol dissolves quickly in water and is quickly absorbed into the bloodstream. In the short term, in small doses, it acts on receptors in the brain to make people feel uninhibited and provides a general sense of well-being. Drinking more alcohol starts to affect the balance and the speech centre of the brain. If you drink regularly, the brain's receptors adapt to the alcohol and higher doses are needed to cause the same effect.

Alcohol is a depressant. Rather than acting as a stimulant, alcohol is likely to have the opposite effect on people who drink heavily.

What happens when you drink alcohol?

Alcohol is quickly soaked up through the lining of the stomach and the upper part of the gut (intestine) and into your blood stream. The higher the concentration of alcohol, the faster it will be absorbed (whisky will be faster than beer, for example).

From there, the alcohol is carried to your liver as well as other organs and body tissue. Your brain will be affected by the flow of alcohol which acts on the central nervous system to alter your physical coordination and mental judgement.

Your liver cannot store alcohol. It metabolises (processes) about 90 per cent of the alcohol you drink to eliminate it from your body. It breaks down the alcohol into water, gas (carbon dioxide) and fat.

What happens to the liver if you drink too much?

Along with the central nervous system, the liver suffers the most from alcohol consumption.

Your liver can only handle a certain amount of alcohol in any given time (one unit an hour). If you are drinking quickly, your liver cells will have to work overtime to process the alcohol. When this is more than the liver can deal with, the excess is transported to the rest of your organs.

Your liver needs water to do its job. As alcohol acts as a diuretic (makes you pass urine), it dehydrates you and forces the liver to divert water from elsewhere.

When the liver is processing alcohol it produces a substance called acetaldehyde. This has a toxic effect on the liver itself, as well as the brain and stomach lining. This is what causes your hangover.

Acetaldehyde is subsequently broken down into a chemical called acetate, which is broken down further into carbon dioxide and water outside the liver.

Regular and heavy drinking over time can strain or disrupt this process, leading to alcoholic liver disease.

The first stage of disease may not seem all that significant but must be acted upon. The later stages are very serious and can threaten your life.

British Liver Trust

GreenFacts
Facts on Health and the Environment

Scientific Facts on

Alcohol

Source document:
WHO (2004)

Summary & Details:
GreenFacts

Level 2 - Details on Alcohol

This Digest is a faithful summary of the leading scientific consensus report produced in 2004 by the World Health Organization (WHO):
"Global Status Report on Alcohol 2004"

The full Digest is available at: http://www.greenfacts.org/en/alcohol/

This PDF Document is the Level 2 of a GreenFacts Digest. GreenFacts Digests are published in several languages as questions and answers, in a copyrighted user-friendly Three-Level Structure of increasing detail:

- Each question is answered in Level 1 with a short summary.
- These answers are developed in more detail in Level 2.
- Level 3 consists of the Source document, the internationally recognised scientific consensus report which is faithfully summarised in Level 2 and further in Level 1.

All GreenFacts Digests are available at: http://www.greenfacts.org/

1. Introduction - How many people are affected by alcohol?


Half a pint of beer on bar table

About 2 billion people worldwide consume alcoholic drinks, which can have immediate and long term consequences on health and social life. Over 76 million people are currently affected by alcohol use disorders, such as alcohol dependence and abuse. Depending on the amount of alcohol consumed and the pattern of drinking, alcohol consumption can lead to drunkenness and alcohol dependence. It can result in disablement or death from accidents or contribute to depression and suicide. Moreover, it can cause chronic illnesses such as cancer and liver disease in those who drink heavily for many years.

Alcohol causes 1.8 million deaths a year, which represents 3.2% of all deaths worldwide. Unintenional injuries account for about a third of the deaths from alcohol. Alcohol is the third most common cause of death in developed countries. In the limited number of developing countries where overall mortality is low, alcohol is the leading cause of illness and disease.

Damage to human life is often described in terms of loss of "disability-adjusted life years" (DALYs). This measure takes into account the number of years lost due to premature deaths as well as the years spent living with disability.

Worldwide, alcohol causes a loss of 58.3 million DALYs annually, which represents 4% of the total loss of DALYs from all causes. Mental disorders and diseases of the nervous system account for about 40% of DALYs lost because of alcohol.

Drinking patterns vary greatly from country to country and so do health impacts and policy responses.

For country specific information, see the Global Alcohol Database: www.who.int/topics/alcohol_drinking/en/ [see http://www.who.int/topics/alcohol_drinking/en/]

This text is a summary of: WHO Global Status Report on Alcohol 2004
Introduction, p.1-2 [see http://www.who.int/substance_abuse/publications/globalstatusreportalcohol2004_introduction.pdf]

2. What are the general patterns of alcohol consumption?

2.1 How much alcohol is consumed?

Since the early 60's the average consumption of alcohol of adults[1] [see Annex 20, p. 28] worldwide, expressed as litres of pure alcohol from beer, wine and spirits, has ranged from 4 to 6 litres per person per year. Consumption increased from 1961 until the early 1980s and then decreased to a stable level of around 5 litres per person per year.

Alcohol consumption in Europe, Africa, and the Americas peaked around the same time, in the early 1980s. Consumption in Europe has been much higher than in any other region, ranging from about 17 litres per person per year during the peak years down to a little more than 10 litres per person per year in the late 90's.

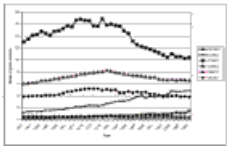


Figure 3
[see Annex 16, p. 25] :
Mean per capita consumption in WHO Regions 1961-1999

The Americas show the second highest level of consumption, followed by Africa and the Western Pacific regions, while the South-East Asian and Eastern Mediterranean regions show the lowest level of consumption. Alcohol consumption has increased steadily in the South-East Asian and Western Pacific regions, but is stable or falling in all other regions.

Alcohol consumption levels across the world tend to converge, except for the low-consuming Eastern Mediterranean region, where the alcohol consumption remains very low because the majority of the population is Muslim. Alcohol intake is generally increasing with increasing economic development. However, it should be noted that regional averages may hide large differences between individual countries within these regions.

Table 3: Total recorded alcohol per capita consumption (15+) [see Annex 32, p. 38]

This text is a summary of: WHO Global Status Report on Alcohol 2004
Global Overviews, Alcohol consumption, p.9-12 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_alcconsumpt.pdf]

2.2 What are the preferred beverages in different countries?

Wine barrels

Countries can often be categorized as mainly beer, wine or spirits countries.

- Beer is preferred in some countries of Europe and Africa.
- Wine is preferred in the wine producing countries of Europe.
- Spirits are preferred in Eastern Europe, Asia and some island states.

Table 4: Top 20 countries with highest bewerage specific adult per capita consumption [see Annex 33, p. 43]

However, beverage preferences are changing. In Europe, consumption of beer is increasing and consumption of wine is decreasing. This is due to increasing imports of beverages other than those normally produced in the country. For example, in high wine producing and consuming countries, such as France, Greece, Italy, Portugal and Spain, consumption of wine is decreasing, while in non-producing countries, such as the Netherlands, the United Kingdom, Ireland and Belgium, consumption of wine is increasing.

Other fermented beverages that do not strictly fall into the usual beer, wine and spirits categories are also consumed.

Within individual countries, dramatic changes in alcohol consumption rarely occur unless there are large natural disasters or conflicts. Apparent large changes are more likely to be due to a change in the way the information is collected or to shifts between legal and illegal alcohol production

Global Overviews, Beverage preferences, p.13-14 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_alcconsumpt.pdf]

2.3 What consumption is not reflected in national statistics?

Not all alcohol consumption is reflected in official national records or surveys. Unrecorded sources of alcohol include:

- home production (especially spirits),
- alcohol intended for industrial, technical and medical uses, and
- beverages with alcohol levels below the legal definition.

Moreover, some consumptions by nationals of one country are recorded in other countries, for instance as a result of

- travelers' imports, cross-border shopping,
- smuggling, and
- consumption by tourists abroad

This imperfect recording leads to underestimates of the actual national consumption in most countries and overestimates in some such as Luxemburg where visitors and tourists account for a sizeable proportion of total alcohol consumption. This may also explain why Luxembourg has the highest recorded alcohol consumption per person in Europe.

In contrast, there are countries, for instance in East Africa, in Eastern Europe and in the former Soviet Union, where a large share of alcohol consumption goes unrecorded.

Unrecorded alcohol consumption is estimated to be at least two-thirds of all alcohol consumption in the Indian subcontinent, about half of the consumption in Africa and about one-third in Eastern Europe and Latin America.

In Europe, the estimated unrecorded alcohol consumption varies from country to country ranging from about half a litre to several litres per person per year. Unrecorded consumption is highest in the Nordic countries, particularly Norway, Sweden and Lithuania, with estimates of unrecorded alcohol consumption ranging from 25% to 65% of total alcohol consumption.

Assessing unrecorded alcohol consumption at national or local level is important for alcohol policy studies and particularly for studying the relationship between policy, consumption and alcohol-related problems.

Table 5: Estimated volume of unrecorded consumption [see Annex 34, p. 44]

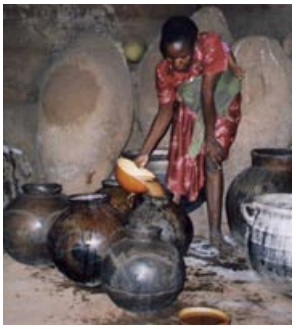
This text is a summary of: WHO Global Status Report on Alcohol 2004
Unrecorded alcohol consumption, p.15-17 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_alcconsumpt.pdf]

2.4 What is specific to locally made beverages?

In many countries, particularly in Africa, beverages are made traditionally in villages or homes through fermentation of seeds, grains, fruits, vegetables and palm trees. They are often not high in alcohol and spoil quickly.

Home-made beverages are likely to be cheaper than factory-made "branded" beverages, thus ensuring their continuing popularity, especially among poorer population groups. In some countries, such as Namibia, home-brewed beverages are the main source of alcohol

and contribute to improving the economic livelihood of their producers which are often women.

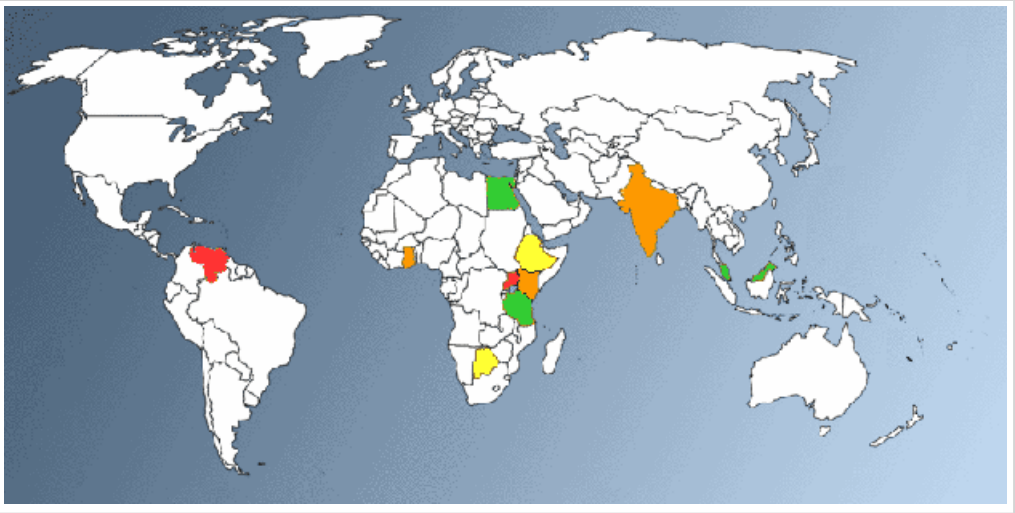

Pito beer in Ghana

Traditional forms of alcohol are usually not adequately controlled for quality or strength and can contain harmful substances. They can cause death, blindness or illness, from methanol, high alcohol content, or the deliberate addition of substances such as car battery acid or formalin. Such cases have been reported in Kenya, Zimbabwe, Bangladesh, India, and Somalia. In order to address these health problems, it is important for the state to gain control over informal production and distribition of alcoholic drinks.

Industrially produced lager-style beer is gaining in popularity in developing countries perhaps because of advertising and prestige attached to international brands. Although industrially-produced alcohol may be healthier in terms of the purity of the product, traditionally-produced beverages may be lower in alcohol, provide local employment, and preserve local culture.

Examples of the social context in which local and traditional alcoholic beverages are produced in:
India [see Annex 3, p. 19] , Venezuela [see Annex 5, p. 20] , Malaysia [see Annex 7, p. 21] , Uganda [see Annex 9, p. 22] , Botswana [see Annex 10, p. 22] , Ethiopia [see Annex 12, p. 23] , Egypt [see Annex 13, p. 23] , Ghana [see Annex 14, p. 24] , Kenya [see Annex 15, p. 24] , Tanzania [see Annex 1, p. 19]

Clickable world map providing access to local case examples:



This text is a summary of: WHO Global Status Report on Alcohol 2004
Traditional or local alcoholic beverages, p.18-21 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_alcconsumpt.pdf]

3. What are the drinking habits in various countries?

3.1 How can drinking habits be measured?

Alcohol consumption in a population can be measured in two main ways: by analyzing production and sales statistics or by asking people about their drinking habits through surveys.

Production and sales statistics can provide gross figures for a population that can be broken down geographically, but such statistics only take into account officical data.

In surveys, however, each respondent's drinking patterns are recorded separately and can be related to personal characteristics and behaviours. Different facets of drinking patterns can thus be surveyed for all kinds of population subgroups

Moreover, surveys can reveal:

- alcohol consumption that is not recorded in official statistics,
- alcohol-related problems at home or at work that do not show up in official statistics,
- how patterns of drinking relate to social and health problems at the level of the individual and sub-populations
- time-trends and effects of policy initiatives

Information on individual drinking patterns can highlight variability over short time periods. For example, heavy episodic drinking might not be revealed by the average number of drinks consumed per day. While long-term consequences of heavy drinking depend mainly on the overall amount of alcohol consumed, accidents and social consequences depend more on individual episodes of heavy drinking.

Some developed countries have established repeated surveys that allow trends in drinking patterns to be monitored in the population as a whole and in subgroups of the population, for example, by sex, age and income. In developing countries, research into drinking patterns is much less common.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Global overviews, Drinking patterns p.22-24 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_drinkpatterns.pdf]

3.2 Who are the abstainers?

Abstainers are defined as people who abstain from drinking alcohol, either over the year preceeding the survey (last year abstainers) or throughout their life (lifetime abstainers). The figures vary considerably from country to country.

The share of "last year abstainers" in different countries ranges from 2.5% in Luxembourg to 99.5% in Egypt, and the share of "lifetime abstainers" from 9.4% in Latvia to 98.4% in the Comoros. Differences between countries and between sub-populations or regions of a country can largely be explained by the different social roles that alcohol plays. Religion can play an important role in the drinking habits of populations. Predominantly Muslim countries, for example, almost always have a higher level of abstinence. Across cultures, more women abstain from alcohol than men.

Table 6: Rate of last year abstainers among the adult population (per country) [see Annex 35, p. 47]

This text is a summary of: WHO Global Status Report on Alcohol 2004 Global overviews, Drinking patterns p.24-26 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_drinkpatterns.pdf]

3.3 Who are the heavy drinkers?

Heavy drinking is a pattern of drinking that exceeds certain standards that are considered moderate or socially acceptable. It can be defined in various ways, for example:

- more than a certain amount per day (e.g. more than three drinks per day),
- more than a certain quantity per occasion (e.g. five drinks on one occasion, at least once a week), or
- drinking every day.

Surveys from different countries cannot easily be compared, because definitions of heavy drinking vary and because different age groups have been surveyed.

In certain countries, heavy drinkers represent a large share of the drinking population, for instance in Colombia and Georgia, where up to about 50% of male drinkers are considered heavy drinkers. In the UK, about 40% of both female and male drinkers are considered heavy drinkers.

Table 7: Heavy drinkers among the adult population [see Annex 36, p. 50]

This text is a summary of: WHO Global Status Report on Alcohol 2004 Global overviews, Drinking patterns p.26-27 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_drinkpatterns.pdf]

3.4 Who are the heavy episodic drinkers?

The term "heavy episodic drinking", also referred to as "binge drinking", tends to be used in different ways in different surveys.

In this study, "heavy episodic drinking" refers to drinking occasions leading to intoxication, often measured as having more than a certain number of drinks on one occasion.

In some countries, such as Ireland and the Republic of Korea, "heavy episodic drinking" is common among both men and women but generally it is more frequent among men. Figures vary greatly between countries, ranging from below 1% in Chinese women to 52% in Nigerian male drinkers. But country figures are difficult to compare because of the different ways in which information is gathered.

Table 8: Heavy episodic drinkers among the adult population (per country) [see Annex 37, p. 52]

This text is a summary of: WHO Global Status Report on Alcohol 2004 Global overviews, Drinking patterns p.28-29 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_drinkpatterns.pdf]

3.5 Who is affected by alcohol dependence?

"Alcohol dependence" is defined internationally as:

"a cluster of physiological, behavioural, and cognitive phenomena in which the use of alcohol takes on a much higher priority for a given individual than other behaviours that once had a greater value."

Alcohol dependence is characterised by a strong desire or sense of compulsion to take alcohol.

Figures for alcohol dependence vary between countries but differences in the measures used to diagnose alcohol dependence make them more difficult to interpret and compare.

Alcohol dependence is consistently higher among men than among women. In some countries, alcohol dependence affects more than 10% of the whole population (men and women combined).

Table 9: Alcohol dependence among adult population (per country) *[see Annex 38, p. 54]*

This text is a summary of: WHO Global Status Report on Alcohol 2004
Global overviews, Alcohol dependence, p.29-30 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_drinkpatterns.pdf]

3.6 Who are the young drinkers?

Health and well-being of many young people is now seriously threatened by the use of alcohol. There appear to be increasing international trends among the young towards consuming alcoholic drinks for their pleasurable effects and thus towards binge drinking. This trend is even observed in countries such as France and Spain where such drinking patterns were formerly unusual and where the overall level of alcohol consumption is declining substantially. Getting drunk has assumed a disproportionate cultural importance amongst the young. A comparative study carried out in six EU contries showed that the frequency of drunkenness among the young is greater than that of their elders except in Italy. The emergence of alcopops – sweetened, carbonated alcoholic drinks – is also of concern since many are targeted at young people and may act as a bridge to other, stronger alcoholic drinks.

Figures for heavy episodic drinking among young people in different countries vary greatly but cannot readily be compared because age group samples and definitions of heavy episodic drinkers differ between countries, and because the information is gathered in different ways.

Yet, it appears that some countries have a very high proportion of heavy drinkers under the age of 20. For example, in Denmark, up to 62% of all boys and 54% of all girls between 11 and 15 years of age had five or more drinks in one day at least once in the month preceeding the survey.

As for young adults aged 18 to 24, the percentage of young binge drinkers appears to be systematically greater for men than for women.

Table 10: Heavy episodic drinkers among youths (per country) *[see Annex 21, p. 28]*

Table 11: Heavy episodic drinkers among young adults aged 18-24 years old *[see Annex 22, p. 29]*

(per country)

This text is a summary of: WHO Global Status Report on Alcohol 2004
Global overviews, Youth drinking, p.31-34 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_drinkpatterns.pdf]

4. What are the health effects of alcohol consumption?

Alcohol can cause social effects and health effects (both physical and mental).

Social effects are for instance those that affect the behaviour of individuals, or how they interact with others. Although mainly health effects of alcohol are discussed here, it is important to note that social harm has a major impact on well-being, even if it cannot be easily quantified.

Health effects of alcohol have been observed in nearly every organ of the body. Indeed alcohol consumption has been linked to more than 60 diseases.

The effects of alcohol on health and well-being can manifest themselves as chronic disease, accidents and injuries, as well as short-term and long-term social consequences. Both the amount of alcohol consumed and the pattern of drinking determine whether there will be:

- biochemical effects on cells and organs in the body,
- intoxication, and/or
- alcohol dependence.

Biochemical effects of moderate consumption can be **beneficial**, such as protection against coronary heart disease, but more usually **harmful**, leading for instance to damage to the pancreas.

Intoxication is strongly linked to accidents, injuries, deaths, domestic conflict and violence.

Alcohol dependence is a powerful mechanism that sustains alcohol consumption and its short-term and long-term consequences.

Figure 4 [see Annex 17, p. 26] : Model of alcohol consumption, mediating variables, and short-term and long-term consequences

Some diseases, such as alcohol dependence, are clearly fully attributable to alcohol. Others, such as cirrhosis of the liver are mainly attributable to alcohol, while others, such as breast cancer, are only partly attributable to alcohol. The extent to which alcohol contributes to a disease is expressed in "alcohol attributable fractions" (AAFs). In a similar way, it is possible to establish the AAF for road traffic accidents, based on the alcohol concentration in the driver's blood.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Consequences of alcohol use, Health effects and global burden of disease, p.35-57 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

4.1 What diseases are due to alcohol consumption?

A number of disease conditions are **wholly attributable to alcohol**. These include alcoholic psychoses, alcohol-dependence syndrome, as well as some diseases affecting the nerves (alcoholic polyneuropathy), the heart (alcoholic cardiomyopathy), the stomach (alcoholic gastritis), and the liver (alcoholic liver cirrhosis).

Alcohol can cause a number of different **cancers**:

- The risks of developing lip, tongue, throat, oesophagus and liver cancer increases proportionally with the amount of alcohol consumed.
- Even moderate alcohol consumption can cause breast cancer, according to recent research, and a series of studies confirm that the risk increases with the amount consumed.
- Evidence of a possible link with alcohol consumption is weaker for cancers of the stomach, prostate, colon, rectum and ovaries
- There is no established relationship between alcohol consumption and cancer of the salivary glands, uterus or bladder.

Alcohol can have both a damaging role and a protective role in the development of **cardiovascular disease**. Alcohol consumption, particularly heavy drinking occasions, can contribute to high blood pressure, abnormal heart rhythms, heart failure, and strokes. At low levels of consumption (less than 40g of pure alcohol per day) without heavy drinking occasions alcohol may protect against strokes, at least in women. This is equivalent to 3 small glasses of wine or 1 litre of beer per day. Above this limit, the risks of cardiovascular disease increase dramatically.

Alcohol is the main cause of **liver cirrhosis** in developed countries. However, in China and India, for instance, liver cirrhosis is mainly caused by other factors such as viral infections. The fraction of liver cirrhosis attributable to alcohol ranges from as low as 10% in China, up to 90% in Finland. It is very difficult to determine whether an individual's cirrhosis is induced by alcohol or by other unspecified causes, and a considerable proportion of deaths from cirrhosis in which alcohol is not mentioned may in fact be attributable to alcohol. Apparently the risk of liver cirrhosis mainly depends on the volume of alcohol consumed, but possibly also on heavy drinking occasions.

Alcohol appears to contribute to causing depression. Moreover, alcohol dependence and other **mental conditions** often go hand in hand, though the role of alcohol in these conditions remains unclear.

To what extent different drinking habits can affect the risk of developing major chronic disease has been estimated for men and women.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Harmful effects of alcohol consumption excluding depression and coronary heart disease, p.37-40 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

4.2 What are the effects of alcohol on the unborn child/fetus?

The **fetus** is at risk when the mother consumes alcohol during pregnancy.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The risks include overt birth defects and a less obvious group of effects known as Fetal Alcohol Spectrum Disorders (FASD). Disorders may range from minor anomalies, for example of the face, through to adverse effects on brain development, including mental retardation.

Alcohol consumption during pregnancy can also cause spontaneous abortion, slower fetal growth in the womb, premature birth and low birth weight.

This text is a summary of: WHO Global Status Report on Alcohol 2004

Effects of prenatal alcohol exposure, p.39 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

4.3 What are the health benefits of alcohol consumption?

Moderate alcohol consumption has been shown to lower some specific health risks.

Strokes occur when brain cells die because of inadequate blood flow, most commonly:

- when insufficient blood reaches a part of the brain, for example, because of a blood clot blocking an artery (ischaemic stroke) or
- when there is bleeding into the brain tissue (haemorrhagic stroke).

On the one hand, low to moderate alcohol consumption may offer some protection against ischaemic stroke. On the other hand, alcohol consumption increases the risk of haemorrhagic stroke.

Large studies on human populations show that moderate alcohol consumption may offer some protection against **diabetes**. The protective effect is probably due to the known actions of alcohol on glucose tolerance and insulin resistance, both of which are factors involved in the development of diabetes. Nevertheless, high levels of alcohol consumption may actually increase the risk.

There is also some evidence from large-scale studies that alcohol may offer some protection against the formation of **gallsrones**.

Table 13: Relative risks for beneficial alcohol-related health effects for different drinking categories (compared to abstainers) *[see Annex 23, p. 30]*

Low to moderate levels of alcohol consumption can reduce the risk of coronary heart disease, one of the leading causes of death in the world. Most of the protective effect is gained by consumption of as little as one drink every other day. However, when people consume higher levels of alcohol, the risk of **coronary heart disease** is greater than when they abstain from drinking altogether. The protective effect is thought to be mainly due to changes in blood fats, especially increases in benefical high-density lipoproteins, but also to beneficial effects on blood clotting, dilation of blood vessels, insulin resistance, hormones such as estrogen, and inflammatory processes. Most of these protective effects are attributed to alcohol itself but possibly also to other substances contained especially in wine.

Low to moderate alcohol consumption appears to be more protective when consumption is predominantly with meals, as opposed to outside meals. This may be due to the reduction in blood pressure that follows eating, a beneficial effect on clotting, slower absorption of alcohol or faster elimination of alcohol.


Meal with wine

In contrast, irregular heavy drinking occasions, such as consumption of more than 8 drinks in one sitting, have an adverse effect on coronary heart disease and are linked to sudden deaths from heart attack. This is thought to be related to the tendency for high amounts of alcohol to increase blood clotting and to impair the beating of the muscles of the heart that pumps the blood around the body. Irregular heavy drinking occasions also increase the amount of non-beneficial, low-density lipoproteins in the blood and increase the likelihood of adverse changes to the heart muscle and the nerves supplying the heart muscles. Thus, irregular heavy drinking appears to have opposite effects from low to moderate drinking.

This text is a summary of: WHO Global Status Report on Alcohol 2004
CHD as a chronic condition where alcohol has harmful and beneficial consequences, p.40-43 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

4.4 How are depression and alcohol consumption linked?

The relationship between alcohol and mental disorders was not well studied until recently. However, there is sufficient evidence to assume that alcohol plays a role in causing depression.

Alcohol dependence and major depression occur together, both within short time periods, such as a year, and over a lifetime. The higher the amount consumed, the greater the number of symptoms of depression. Compared to the general population, depression is seen more frequently in patients being treated for alcohol abuse or dependence. Similarly, a higher frequency of alcohol-related disorders is seen in patients being treated for depression.

Individuals often suffer from alcohol problems in combination with depression

In individual cases, it is often not clear if alcohol caused depression, if depression caused alcohol problems, or if both might have been caused by a third factor. Yet, many countries show a certain proportion of cases of depression in which excessive alcohol use precedes the depression, which suggests alcohol may be the cause. Moreover, depression symptoms tend to decrease or disappear during alcohol abstinence, confirming that alcohol may be the cause.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Consequences of alcohol use, Health effects and global burden of disease, Depression, p.43-45 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

4.5 In what ways can alcohol consumtion lead to physical injuries?

Alcohol goes along with increased risk of physical injury from road accidents, falls, fires, sports and recreation, self-inflicted injuries and violence. The presence of alcohol in the body may also aggravate injuries.

Alcohol causes unintentional injuries, mainly through traffic accidents, because it affects reaction times, thought processing, coordination and vigilance. A large review has shown that tasks involving coordination between the brain and muscular action start to be affected above a blood alcohol level of 40 to 50 mg% (0.04%-0.05%).

The risk of unintentional injury increases with the level of alcohol consumption, even at relatively low levels. The risk of injury is greatest when individuals consume much more than they normally do. In summary, the amount of alcohol consumed, and more specifically the actual blood alcohol content, determines the likelihood of unintentional injury.

Alcohol consumption is also strongly associated with intentional injuries caused by aggressive behaviour leading to violent crime. Drinking frequently precedes violent incidents and the severity of the violence is related to the amount of drinking beforehand.

Different effects of alcohol contribute to increased likelihood of aggressive behaviour. Effects of alcohol on the brain can reduce the anxiety about the consequences of one’s actions. They also impair thinking and problem solving ability in situations of conflict and result in

overly emotional responses. Other effects of alcohol on behaviour include a resolute focus on the present (alcohol myopia) and a need to affirm personal power, at least for men.

Table 15: Attributable fractions of acute alcohol-related health effects in the adult general population [see Annex 24, p. 31]

This text is a summary of: WHO Global Status Report on Alcohol 2004 Consequences of alcohol use, Health effects and global burden of disease, Depression, p.46-48 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

4.6 What is the overall health burden of alcohol consumption?

In terms of lives lost, the benefits of alcohol consumption may outweigh its detrimental effects in some countries. Indeed, the number of deaths "prevented" by alcohol in some age groups may be greater than the deaths caused by alcohol. This is mainly due to the beneficial effect of low and moderate alcohol consumption on diseases of the heart and blood vessels. It applies mainly to developed countries with high life expectancy where moderate amounts of alcohol are regularly taken with meals.

However, in terms of life years lost, a different picture emerges. Indeed, fewer years are gained by preventing heart disease in the elderly than are lost because of premature death at an early age, say from traffic accidents.

The global health burden of alcohol consumption is even more negative when it takes into account years spent living in disability. In terms of "disability adjusted life years" (DALYs) lost, 4% of all years lost in 2000 are attributed to alcohol consumption, compared to only 3.5% in 1990.

There are regional differences in the relative importance of the overall disease burden from alcohol, because of different patterns of consumption and risk factors other than alcohol.

- The disease burden is highest in developed countries (9.2% in 2000), where it is only exceeded by the burden attributable to tobacco and high blood pressure.
- It is lower in developing countries with relatively low adult and infant mortality, where it is the main contributor to disease burden (6.2%),
- It is lowest in developing countries with high mortality rates (1.6% in 2000), where undernutrition, unsafe sex, and unsafe water, sanitation and hygiene are more important risk factors.

Globally, the burden of alcohol-attributable diseases is greater among men than among women.

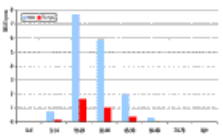


Figure 5: Global disease burden in 2001 from alcohol use disorders [see Annex 18, p. 27]

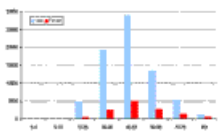


Figure 6: Global deaths in 2001 from alcohol use disorders [see Annex 19, p. 27]

Table 16: Global burden of disease in 2000 attributable to alcohol [see Annex 25, p. 31] according to major disease categories

Table 17: Burden of disease in 2000 attributable to tobacco, alcohol and drugs [see Annex 26, p. 32] by developing status and sex

Table 18: Characteristics of adult alcohol consumption in different regions of the world [see Annex 27, p. 33]

Table 19: Alcohol-related harm in different regions of the world [see Annex 28, p. 34]

Table 20: Selected population alcohol-attributable fractions [see Annex 29, p. 35] by disease category, sex and level of development

Table 21: Mortality rates for acute and chronic disease and injury [see Annex 31, p. 37] by WHO regional subgroupings

This text is a summary of: WHO Global Status Report on Alcohol 2004
Consequences of alcohol use, Health effects and global burden of disease, Depression, p.50-58 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

5. What social and economic problems are linked to alcohol use?

Alcohol consumption can have adverse social and economic effects on the individual drinker, the drinker's immediate environment and society as a whole. Indeed, individuals other than the drinker can be affected, for example, by traffic accidents or violence. It has an impact on society as a whole in terms of resources required for criminal justice, health care and other social institutions.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Social problems associated with alcohol use. P.59 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_healtheffects.pdf]

5.1 How can work performance be affected by alcohol consumption?

Alcohol consumption can affect work performance in several ways:

- **Absences** - There is ample evidence that people with alcohol dependence and drinking problems are on sick leave more frequently than other employees, with a significant cost to employees, employers, and social security systems. In Costa Rica, an estimated 30% of absenteeism may be due to alcohol. In Australia, a survey showed that workers with drinking problems are nearly 3 times more likely than others to have injury-related absences from work.
- **Work accidents** - In Great Britain, up to 25% of workplace accidents and around 60% of fatal accidents at work may be linked to alcohol. In India about 40% of work accidents have been attributed to alcohol use.
- **Productivity** - Heavy drinking at work may reduce productivity. In Latvia, 10% of productivity losses are attributed to alcohol. Performance at work may be affected both by the volume and pattern of drinking. Co-workers perceive that heavy drinkers have lower performance, problems in personal relationships and lack of self-direction, though drinkers themselves do not necessarily perceive effects on their work performance
- **Unemployment**- Heavy drinking or alcohol abuse may lead to unemployment and unemployment may lead to increased drinking.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Social Problems associated with alcohol use, Alcohol consumption and the workplace, p.59-60 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_socproblems.pdf]

5.2 How can the familly be affected by alcohol consumption?

Drinking can impair how a person performs as a parent, a partner as well as how (s)he contributes to the functioning of the household. It can have lasting effects on their partner and children, for instance through home accidents and violence.

Children can suffer Fetal Alcohol Spectrum Disorders (FASD), when mothers drink during pregnancy. After birth, parental drinking can lead to child abuse and numerous other impacts on the child's social, psychological and economic environment.

The impact of drinking on family life can include substantial mental health problems for other family members, such as anxiety, fear and depression.

Drinking outside the home can mean less time spent at home. The financial costs of alcohol purchase and medical treatment, as well as lost wages can leave other family members destitute. When men drink it often primarily affects their mothers or partners who may need to contribute more to the income of the household and who run an increased risk of violence or HIV infection.

Case example 1: Botswana – debt and child neglect [see Annex 2, p. 19]

Case example 2: Nepal – impacts perceived by family members [see Annex 4, p. 20]

This text is a summary of: WHO Global Status Report on Alcohol 2004
Social Problems associated with alcohol use, Alcohol consumption and the family, p.60-62 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_socproblems.pdf]

5.3 What is the link between alcohol and poverty?

The economic consequences of alcohol consumption can be severe, particularly for the poor.

Apart from money spent on drinks, heavy drinkers may suffer other economic problems such as lower wages and lost employment opportunities, increased medical and legal expenses, and decreased eligibility for loans. A survey in Sri Lanka indicated that for 7% of men, the amount spent on alcohol exceeded their income.

Case example 3: Cameroon – cost of one beer represents a large share of daily wage [see Annex 6, p. 21]

Case example 4: India – families affected by debt, illnesses, or injuries [see Annex 8, p. 21]

Case example 5: Malaysia – exacerbation of poverty and burden on women [see Annex 11, p. 23]

This text is a summary of: WHO Global Status Report on Alcohol 2004
Social Problems associated with alcohol use, Alcohol and poverty, p.62-63 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_socproblems.pdf]

5.4 What is the link between alcohol and violence between partners?

Alcohol plays a role in a substantial number of domestic violence incidents, especially in the case of abusing husbands. Often both the offender and the victim have been drinking.

The relationship between alcohol and domestic violence is complex and the precise role of alcohol remains unclear. Heavy drinking has been strongly linked to violence between partners and to a lesser extent to violence towards others, possibly because proximity increases the opportunities for violence.

Studies conducted for instance in Nigeria, South Africa, Uganda, India, and Colombia show that a large fraction of reported domestic violence incidents is related to alcohol use by the male partner. For instance, in Uganda, 52% of the women who recently experienced domestic violence reported that their partner had consumed alcohol, and in India, 33% of abusing husbands were using alcohol. There is a need to better understand the possible role of alcohol intoxication or dependence in the processes through which incidents escalate into violence.

There is little doubt that alcohol consumption has many social consequences, but more quantifiable data is needed to enable meaningful comparisons between countries.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Social Problems associated with alcohol use, Alcohol and domestic violence, p.63-64 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_socproblems.pdf]

5.5 What are the estimated economic and social costs?

Strong efforts are made in many countries to estimate the overall economic and social costs of alcohol use.

Social and economic costs cover the negative economic impacts of alcohol consumption on the material welfare of the society as a whole.They comprise both direct costs - the value of goods and services delivered to address the harmful effects of alcohol, and indirect costs - the value of personal productive services that are not delivered as a consequence of drinking.


Alcohol abuse can cause social and economic problems

In industrialized countries, estimates of social and economic costs of alcohol use can reach several percent of the Gross Domestic Product (GDP), ranging for instance from 1.1% in Canada to 5-6% in the case of Italy.

Estimates of social and economic costs can help:

- make the case for public policies on alcohol,
- target policies and public expenditure on the most important problems (e.g. the costs of alcohol versus other psychoactive drugs such as tobacco),
- identify information gaps,
- assess the effectiveness of policies and programmes against alcohol abuse.

Estimating the costs of the impact of alcohol on the material welfare of society is often difficult and requires estimates of the social costs of treatment, prevention, research, law enforcement, lost productivity and some measure of years and quality of life lost.

Table 21 [bis]: Social and economic costs of alcohol abuse for selected countries
[see Annex 30, p. 36]

This text is a summary of: WHO Global Status Report on Alcohol 2004
Economic and social costs of alcohol use, p.65-66 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_economic.pdf]

6. Conclusion

Alcohol is not an ordinary commodity. While it carries connotations of pleasure and sociability in the minds of many, harmful consequences of its use are diverse and widespread

From a global perspective, in order to reduce the harm caused by alcohol, policies need to take into account specific situations in different societies. Average volumes consumed and patterns of drinking are two dimensions of alcohol consumption that need to be considered in efforts to reduce the burden of alcohol-related problems. Avoiding the combination of drinking and driving is an example of measures that can reduce the health burden of alcohol.

Worlwide, alcohol takes an enormous toll on lives and communities, especially in developing countries and its contribution to the overall burden of disease is expected to increase in the future. Particularly worrying trends are the increases in the average amount of alcohol consumed per person in countries such as China and India and the more harmful and risky drinking patterns among young people.

National monitoring systems need to be developed to keep track of alcohol consumption and its consequences, and to raise awareness amongst the public and policy-makers. It is up to both governments and concerned citizens to encourage debate and formulate effective public health policies that minimize the harm caused by alcohol.

This text is a summary of: WHO Global Status Report on Alcohol 2004
Conclusion, p.67 [see http://www.who.int/entity/substance_abuse/publications/globalstatusreportalcohol2004_conclusion.pdf]

Annex

Annex 1:

Case example 10: United Republic of Tanzania

"A study that collected and analysed 15 homemade but commercially available alcoholic beverages in Dar es Salaam found that ethanol concentrations of the brewed samples ranged from 2.2 to 8.5% w/v whilst the two distilled samples contained 24.2% and 29.3% ethanol w/v. Aflatoxin B1 was found in nine brewed beverages, suggesting the use of contaminated grains or fruit for their production. The amount of zinc in four samples was double the World Health Organization recommended maximum for drinking water (5 mg/litre). One brewed beverage contained toxic amounts of manganese (12.8 mg/litre). Both distilled spirits were rich in fusel alcohols and one was fortified by caffeine. The results suggested that impurities and contaminants possibly associated with severe health risks, including carcinogens, are often found in traditional alcoholic beverages. Continuous daily drinking of these beverages is certain to increase health risks.

Source: Nikander et al. (1991)"

Source & © WHO Global Status Report on Alcohol 2004, p.21 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 2:

Case example 1: Botswana

"The economic consequences of chronic alcohol use are devastating and can seriously hinder any sense of development. In a study of alcohol use among the Basarwa of the Kgalagadi and Ghanzi districts in Botswana, informants stated that since a significant proportion of household income was spent on liquor, less cash was available for food, clothing and other essential items. As one informant succinctly stated 'alcohol makes poor people poorer'. A person who is regularly under the influence of alcohol will have little motivation or interest in working, unless it is to obtain money to buy more alcohol. One particular problem is that a regular drinker can easily become economically tied and indebted to alcohol vendors who are only too pleased to provide alcohol'on credit'.

Child neglect is an increasing problem when parents are intoxicated so early in the day that they are not able to prepare food for their children, even if there is food available. A concern is that some parents will sell food to buy alcohol while others will give alcohol to their children as a food substitute and to stave off hunger. Generally, the neglect of young children due to alcohol abuse means that these children are under-socialized as well as malnourished, leading to a refusal to attend school, begging and stealing for food, and other delinquent activities.

Source: Molamu & MacDonald (1996)"

Source & © WHO Global Status Report on Alcohol 2004, p.61 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 3:

Case example 1: India

"Country liquor is a distilled alcoholic beverage made from locally available cheap raw material such as sugar- cane, rice, palm, coconut and cheap grains, with an alcohol content between 25% and 45%. Common varieties of country liquor are arrack (from paddy or wheat), desi sharab and tari. Illicit liquor is mostly produced clandestinely in small production units with raw materials similar to that used for country liquor. With no legal quality control checks on them, alcohol concentration of illicit liquor varies (up to 56%). Adulteration is quite frequent, industrial methylated spirit being a common adulterant, which occasionally causes incidents like mass poisoning with consumers losing their lives or suffering irreversible damage to the eyes. Cheaper than licensed country liquor, illicit liquor is popular among the poorer sections of the population. In many parts of India, illicit production of liquor and its marketing is a cottage industry with each village having one or two units operating illegally.

Source: Mohan et al. (2001)"

Source & © WHO Global Status Report on Alcohol 2004, p.19 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 4:
Case example 2: Nepal

"In a large-scale study covering about 2400 households in 16 of Nepal's 70 districts, the adult respondents perceived the impact of family members use of alcohol and drugs on children as violence and physical abuse (33.4%), neglect and mental abuse (28.5%), deprivation from education (20.2%) and push factor for children to use intoxicants (11.1%), malnutrition and running away from home. 35.9% of children interviewed felt that there was an impact of parental drinking on the family. The impact included domestic violence (40%), loss of wealth and indebtedness (27.8%), loss of social prestige and bad relationship with neighbours.

Source: Dhital et al. (2001)"

Source & © WHO Global Status Report on Alcohol 2004, p.62 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 5:
Case example 2: Venezuela

"Corn liquor is consumed by an indigenous tribe in Venezuela. Several times each year, especially during the corn harvest season, the trunk of a large tree would be hollowed out and filled with corn mash by an individual specially chosen by the community. The corn mash would be allowed to ferment to create an alcoholic beverage with a high enough alcohol content to cause intoxication after consumption of only two glasses or gourdfuls. When the corn liquor is ready, a village festival would be held in which all adults would drink to the point of falling down. Men would typically bring their bows and arrows and fight to settle grudges. Festivals would end after two or three days, when the corn liquor ran out. There were rarely individuals who consumed alcoholic beverages at times other than festival celebrations.

Source: Seale et al. (2002)"

Source & © WHO Global Status Report on Alcohol 2004, p.19 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 6:
Case example 3: Cameroon

"What is problematic in Cameroon is the high cost of purchasing even one beer a week given the income of an average rural family. When comparing the price of two major beers sold in a rural village in 1983 as a percentage of male and female wages, it was found that the cost of one beer represented 60–84% of women's and 36–50% of men's daily wages. Drinking even in these small amounts means that one day's wages is quickly consumed. The danger is when individuals start forsaking paying children's school fees because their money is spent on beer. Such individuals are considered disruptive of community life because their negligence impedes others from doing their work or meeting obligations towards friends, association members and kin.

Source: Diduk (1993)"

Source & © WHO Global Status Report on Alcohol 2004, p.62 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 7:
Case example 3: Malaysia

"In the East Malaysian states of Sabah and Sarawak on the island of Borneo, indigenous people traditionally drink a homemade rice wine called tuak or tapai in conjunction with harvest celebrations and social or communal gatherings. This rice wine is reportedly very potent. At such important functions, especially the harvest festival, which is of much significance for these agrarian folk, almost all are required to drink. Refusal by guests to partake of these drinks is a breach of etiquette. Such drinking is an integral part of the culture of these tribes.

Source: Arokiasamy (1995)"

Source & © WHO Global Status Report on Alcohol 2004, p.20 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 8:

Case example 4: India

"In a 1997 study comparing two groups of families within the same community in Delhi, India (Group A having at least one adult consuming alcoholic drinks at least three times per week in the last month and Group B having no adult consuming more than one drink in the last month), it was found that Group A, on an average, spent almost 14 times more on alcohol per month compared with Group B. A larger proportion of families in Group A had significant debt compared with Group B. The implications of this are towards fewer financial resources for food and education of children and fewer resources for purchasing daily living consumables. The more heavily drinking Group A was more likely to report major illnesses or injuries during the past one year and was more likely to require medical treatment.

Source: Saxena, Sharma & Maulik (2003)"

Source & © WHO Global Status Report on Alcohol 2004, p.62 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 9:

Case example 4: Uganda

"Tonto is a traditional brew produced from juice obtained from special varieties of bananas. The common local banana varieties used in making tonto are kisubi, ndizi, musa, kivuru, kabula and mbidde. Another common name used for the brew in central Uganda is mwenge bigere. It is mostly consumed in central and western Uganda, where banana growing is a major agricultural activity, and in urban areas all around the country at social gatherings and in bars. In various parts of the country, it is a source of income for many families. The production of tonto is as follows: Green bananas are ripened for 3–5 days in a covered, previously warmed, pit lined with banana leaves to ensure uniform temperature. The juice is extracted from the ripe banana by squeezing, by a group of men using their feet after mixing with spear grass. The juice is then filtered through grass held in a calabash funnel and diluted with water in known ratios. Roasted and ground sorghum is added to the diluted banana juice in a canoe-shaped wood container. The fermentation broth is then covered with banana leaves and split banana stems in a warmed pit and incubated for 2–4 days. The alcohol content in tonto ranges between 6 and 11% v/v and is consumed from small gourds using straws.

Source: Mwesigye & Okurut (1995)"

Source & © WHO Global Status Report on Alcohol 2004, p.20 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 10:

Case example 5: Botswana

"Bojalwa (sorghum beer) and khadi are both home-brewed beer-like drinks that vary greatly in terms of taste, consistency and alcohol content depending on availability of ingredients and methods of fermentation. Indeed khadi could almost be described as a 'designer alcohol' often brewed to the consumer's needs and tastes. It is made from a base or 'mash' that can consist of a combination of any of the following ingredients: wild berries, wild pumpkins, wild roots, oranges, sorghum and maize. Yeast, black tobacco or other unspecified substances are sometimes added to this base to give it 'strength', and there have been rumours around Ghanzi of car battery acid also being added.

Source: Molamu & Macdonald (1996)"

Source & © WHO Global Status Report on Alcohol 2004, p.20 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 11:
Case example 5: Malaysia

"Alcohol is a major factor in exacerbating poverty. In a month a rural labourer can spend about RM 300 (US$ 80) on alcohol which is about how much he earns. The alcohol menace ruins families and contributes to the breakdown of the basic social fabric of society. Often it is the women who bear the brunt of this problem – wife battery, discord in the home, abused and deprived children, non-working or chronically ill husbands who become a burden to both the family and society. Besides loss in family income, the burden on the family is worsened when the drinker falls ill, cannot work and requires medical attention.

Source: Assunta (2001–2002)"

Source & © WHO Global Status Report on Alcohol 2004, p.63 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 12:
Case example 6: Ethiopia

"Talla is an Ethiopian home-brewed beer which differs from the others in some respects. First it is brewed with barley or wheat, hops, or spices. Secondly, it has a smoky flavour due to the addition of bread darkened by baking and use of a fermentation vessel which has been smoked by inversion over smoldering wood. Talla is not processed under government regulations hence the alcohol content varies but is usually around 2% to 4%. Filtered tella has a higher alcohol content ranging from 5% to 6%.

Source: Selinus (2004)"

Source & © WHO Global Status Report on Alcohol 2004, p.20 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 13:

Case example 7: Egypt

"Bouza (traditional beer) is a fermented alcoholic beverage produced from wheat in Egypt, and has been known by the Egyptians since the days of the Pharaohs. It is a thick, pasty yellow beverage and produces a sensation of heat when consumed. Like other opaque beers, bouza has a very short shelf life and is expected to be consumed within a day. It has an alcoholic content of between 3.8% and 4.2%.

Source: Haard (1999)"

Source & © WHO Global Status Report on Alcohol 2004, p.21 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 14:
Case example 8: Ghana

"Pito (local brew made from millet) is widely consumed in Ghana. The brewing of pito is traditionally associated with the people in the northern part of the country, but migration has led to its production throughout the country. The industry is mostly controlled by women between the ages of 18 and 67 years old. Pito is golden yellow to dark brown in colour with taste varying from slightly sweet to very sour. It contains lactic acid, sugars, amino acids, 2% to 3% alcohol and some vitamins and proteins. There are four types of pito in Ghana – nandom, kokmba, togo and dagarti. The peculiar characteristics of each lies in the differences in their wort extraction and fermentation methods.

Source: Akyeampong (1995); Sefa-Dedeh (1999)"

Source & © WHO Global Status Report on Alcohol 2004, p.21 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 15:
Case example 9: Kenya

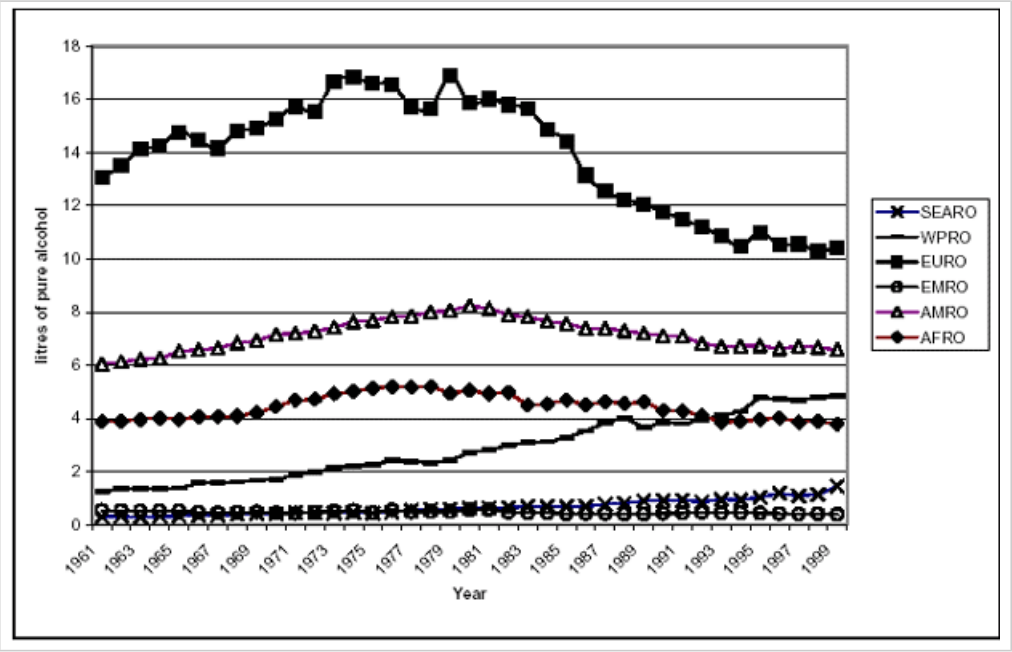
"Muratina is an alcoholic drink made from sugar-cane and muratina fruit in Kenya. The fruit is cut in half, sun- dried and boiled in water. The water is removed and the fruit sun-dried again. The fruit is added to a small amount of sugar-cane juice and incubated in a warm place. The fruit is removed from the juice after 24 hours and sun-dried. The fruit is now added to a barrel of sugar-cane juice which is allowed to ferment for between one and four days. The final product has a sour alcoholic taste.

Source: The Schumacher Centre for Technology & Development (2004)"

Source & © WHO Global Status Report on Alcohol 2004, p.21 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 16:

Figure 3: Population weighted means of the recorded adult per capita consumption in the WHO Regions 1961-1999



[Note: All WHO member states are classified into the following geographical regions:

AFRO - African Region

EMRO - Eastern Mediterranean Region

EURO - European Region

AMRO - Region of the Americas

SEARO - South-East Asian Region

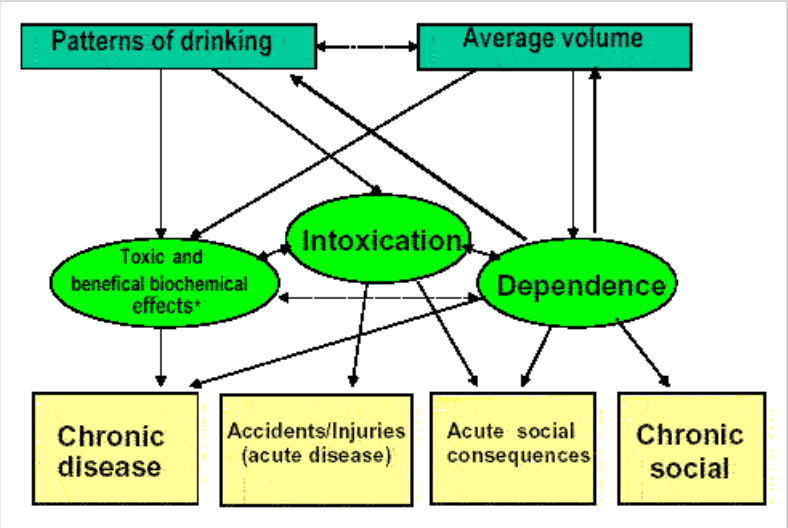
WPRO - Western Pacific Region

For more information on the different regions, see www.who.int/choice/demography/regions/en/index.html [see http://www.who.int/choice/demography/regions/en/index.html]]

Source: WHO Global Status Report on Alcohol 2004, p.9 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 17:

Figure 4: Model of alcohol consumption, mediating variables, and short-term and longterm consequences



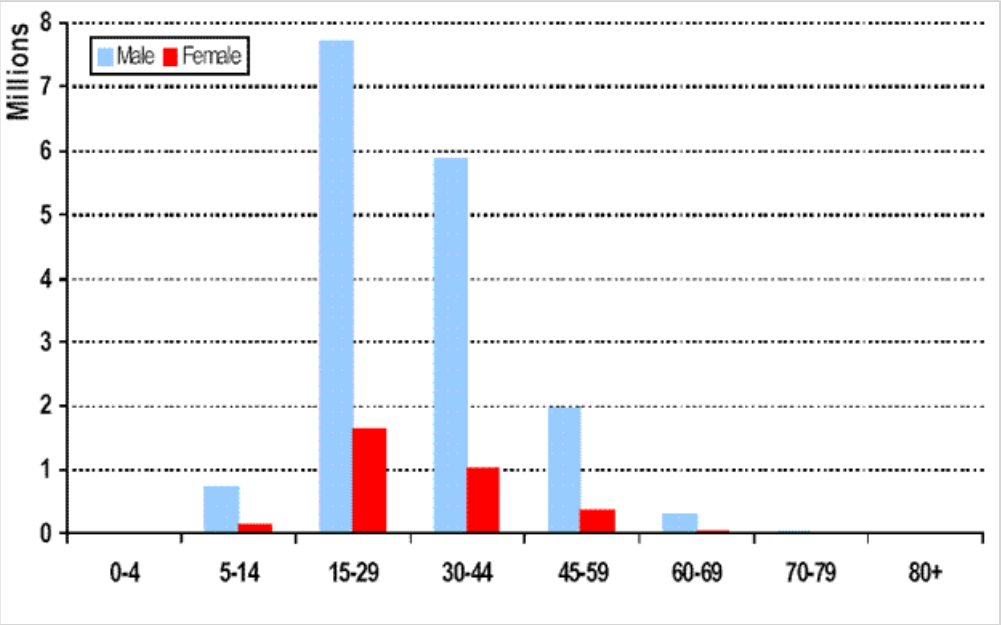
* Independent of intoxication or dependence

Source: Rehm et al. (2003c)

Source: WHO Global Status Report on Alcohol 2004, p.35 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 18:

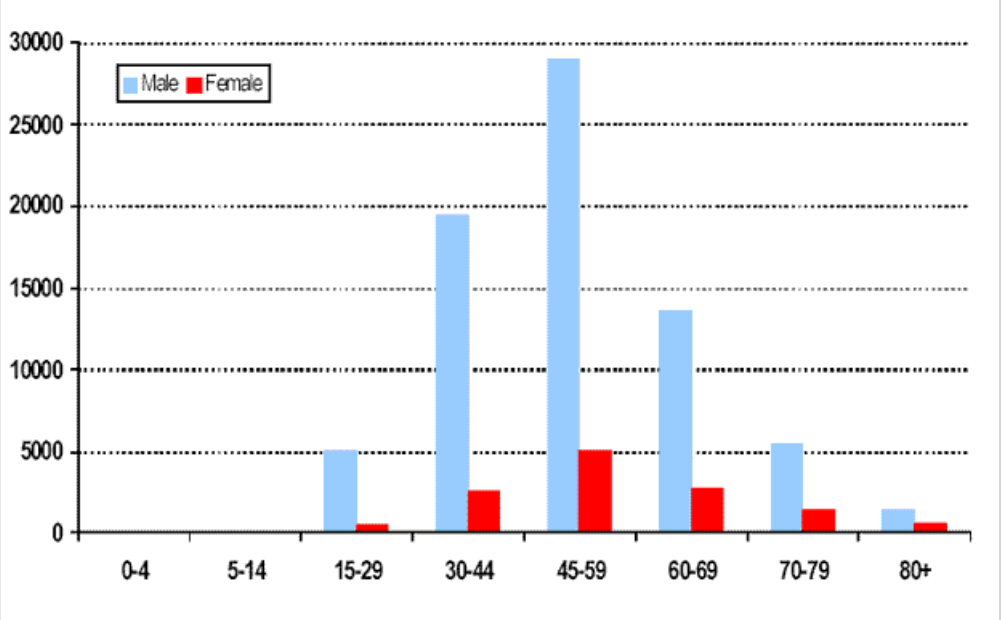
Figure 5: Global disease burden (in DALYs) in 2001 from alcohol use disorders, by age group and sex



Source: WHO Global Status Report on Alcohol 2004, p.49 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 19:

Figure 6: Global deaths in 2001 from alcohol use disorders, by age group and sex



Source: WHO Global Status Report on Alcohol 2004, p.50 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 20:
Footnote on the meaning of "adults"

The WHO source document generally uses "adults" to refer to people 15 years and older.

Annex 21:
Table 10: Heavy episodic drinkers among youths

Country	Year	Total (%)	Male (%)	Female (%)	Age group
Australia [a]	2001	10.7	9.6	11.8	14-19
Bulgaria [b]	1999	11.0	15.0	6.0	15-16
Canada [c]	2000-2001	15.3	26.3	5.2	15-19
China [d]	2000-2001	1.3	2.5	0.0	15-19
Colombia [c]	2000-2001	7.8	14.5	4.1	15-19
Cyprus [b]	1999	12.0	18.0	6.0	15-16
Denmark [e]	2002		62.0	54.0	11-15
Finland [b]	1999	18.0	21.0	15.0	15-16
France [b]	1999	12.0	16.0	7.0	15-16
Georgia [d]	2000-2001	2.7	4.4	1.3	15-19
Greece [b]	1999	9.0	13.0	5.0	15-16
Hungary [f]	2003	27.5	39.2	22.2	15-16
Iceland [b]	1999	17.0	18.0	15.0	15-16
Ireland [b]	1999	31.0	32.0	32.0	15-16
India [d]	2000-2001	0.5	1.2	0.0	15-19
Indonesia [d]	2000-2001	1.1	1.1	1.1	15-19
Lithuania [b]	1999	9.0	12.0	18.0	15-16
Malta [b]	1999	22.0	25.0	23.0	15-16
Mexico [d]	2000-2001	2.5	0.8	1.5	15-19
Nigeria [d]	2000-2001	1.2	1.0	1.3	15-19
Norway [b]	2003	15.0	17.0	14.0	15-16
Poland [b]	1999	31.0	41.0	23.0	15-16
Sweden [b]	1999	17.0	22.0	13.0	15-16
Syrian Arab Republic (the) [d]	2000-2001	0.4	0.0	0.2	15-19
Turkey [d]	2000-2001	1.4	0.5	1.1	15-19
The United Kingdom [b]	1999	30.0	33.0	27.0	15-16
United States of America (the) [f]	2002	10.7	11.4	9.9	12-17

[a] *Consumption of seven or more standard drinks on any one drinking occasion for males and five or more standard drinks on any one drinking occasion for females (at least weekly).*
[b] *Consumption of five or more drinks in a row three times or more in the last 30 days.*
[c] *Consumption of five or more drinks on one occasion, twelve or more times in the last year (among drinkers only).*
[d] *At least once a week consumption of six or more standard drinks in one sitting.*
[e] *Consumption of five or more standard drinks in one day at least once in the last month.*
[f] *Consumption of five or more drinks on one occasion at least once in the past month.*
***Note**: Countries in bold indicate that surveys were not national. Please refer to individual country profiles for details of references/sources used.*

Source: WHO Global Status Report on Alcohol 2004, p.33 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 22:

Table 11: Heavy episodic drinkers among young adults aged 18-24 years old

Country	Year	Total (%)	Male (%)	Female (%)
Bosnia and Herzegovina [a]	2003	0.8	1.8	0.0
Brazil [a]	2003	15.3	26.3	5.2
Burkina Faso [a]	2003	6.4	8.4	5.1
Chad [a]	2003	9.3	13.7	5.6
China [b]	2000-2001	2.1	3.9	0.3
Colombia [b]	2000-2001	7.8	14.5	4.1
Comoros [a]	2003	0.3	0.6	0.0
Congo (the) [a]	2003	3.9	6.4	2.2
Côte d'Ivoire [a]	2003	3.9	6.9	0.3
Croatia [a]	2003	4.6	9.6	0.0
Czech Republic (the)	2003	20.1	32.7	9.0
Dominican Republic [a]	2003	12.0	17.9	7.4
Ecuador [a]	2003	5.1	11.2	0.5
Estonia [a]	2003	6.0	10.4	3.5
Ethiopia [a]	2003	2.0	4.2	0.2
Georgia [a]	2003	10.1	19.6	2.1
Ghana [a]	2003	0.6	1.0	0.3
Guatemala [a]	2003	1.7	4.8	0.0
Hungary [a]	2003	12.2	20.8	3.5
India [b]	2000-2001	0.7	1.6	0.0
Indonesia [b]	2000-2001	0.8	1.3	0.3
Kazakhstan [a]	2003	3.1	6.8	1.1
Lao People's Democratic Republic (the) [a]	2003	11.5	19.2	5.3
Latvia [a]	2003	14.4	27.3	4.3
Lebanon [b]	2000-2001	0.2	0.4	0.0
Malawi [a]	2003	1.9	4.5	0.2
Malaysia [a]	2003	0.2	0.5	0.0
Mali [a]	2003	0.3	0.6	0.0
Mauritius [a]	2003	2.8	5.2	0.0
Mexico [a]	2003	3.1	6.3	0.8
Morocco [a]	2003	0.6	1.2	0.2
Namibia [a]	2003	5.4	10.6	2.0
Nepal [a]	2003	0.6	1.3	0.2
Nigeria [b]	2000-2001	1.0	1.7	0.6
Paraguay [a]	2003	16.1	29.2	4.4
Philippines (the) [a]	2003	7.3	13.6	0.9
Russian Federation (the) [a]	2003	5.7	6.9	4.6
Slovakia [a]	2003	17.8	28.4	9.0
Spain [a]	2003	8.6	15.1	3.2
Sri Lanka [a]	2003	0.8	1.5	0.0

[a] *At least once a week consumption of five or more standard drinks in one sitting.*
[b] *At least once a week consumption of six or more drinks in one sitting.*
***Note**: Countries in bold indicate that surveys were not national. Please refer to individual country profiles for details of references/sources used.*

Country	Year	Total (%)	Male (%)	Female (%)
Tunisia [a]	2003	3.3	6.3	0.0
Turkey [a]	2003	0.8	2.1	0.0
Ukraine [a]	2003	8.5	13.4	4.9
Uruguay [a]	2003	8.4	13.5	2.8
Viet Nam [a]	2003	3.7	8.1	0.0
Zimbabwe [a]	2003	2.8	6.6	0.3

[a] *At least once a week consumption of five or more standard drinks in one sitting.*
[b] *At least once a week consumption of six or more drinks in one sitting.*
***Note**: Countries in bold indicate that surveys were not national. Please refer to individual country profiles for details of references/sources used.*

Source: WHO Global Status Report on Alcohol 2004, p.34 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 23:

Table 13: Relative risks for beneficial alcohol-related health effects for different drinking categories (compared to abstainers)

Disease	ICD-9	RR					
		Drinking category I		Drinking category II		Drinking category III	
		F	M	F	M	F	M
Diabetes	250	0.92	0.99	0.87	0.57	1.13	0.73
Ischaemic stroke	433-435	0.52	0.94	0.64	1.33	1.06	1.65
Cholelithiasis	574	0.82	0.82	0.68	0.68	0.50	0.50

Sources: Gutjahr & Gmel (2001), Ridolfo & Stevenson (2001) (in press).
Definition of drinking categories:
***category I:** for females not exceeding on average 0 to 19.99 g pure alcohol per day; for males not exceeding on average 0 to 39.99 g pure alcohol per day;*
***category II:** for females not exceeding on average 20 to 39.99 g pure alcohol per day; for males not exceeding on average 40 to 59.99 g pure alcohol per day;*
***category III:** for females on average 40 g pure alcohol and above per day; for males on average 60 g pure alcohol and above per day. For comparison: a 75 cl. bottle of wine contains about 70 g of pure alcohol.*

Source: WHO Global Status Report on Alcohol 2004, p.47 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 24:

Table 15: Attributable fractions of acute alcohol-related health effects in the adult general population

Injury	ICD-9	USA		AUSTRALIA		CANADA		AUSTRALIA	
		Stinson et al.1993		English et al.1995		Single et al.1996		Ridolfo & Stevenson 2001	
		F	M	F	M	F	M	F	M
Motor vehicle traffic accidents	E810-E819	0.42	0.42	0.18	0.37	0.43	0.43	0.11 for deaths (d) and hospitalizations (h); pedestrians 0.17 (d); 0.06 (h)	0.33 (d); 024 (h); pedestrians 0.40 (d); 0.37 (h)
Motor vehicle nontraffic accidents	E820-E825	0.42	0.42	0.18	0.37	0.43	0.43		
Bicycle accident injuries	E826	0.20	0.20	0.18	0.37	0.20	0.20		
Other road vehicle accident injuries	E829	0.20	0.20	0.18	0.37	0.2	0.20		
Water transport accident injuries	E830-E839	0.20	0.20	No data	No data	0.20	0.20	No data	No data
Air-space transport accident injuries	E840-E845	0.16	0.16	No data	No data	0.16	0.16	No data	No data
Accidental ethanol and methanol poisoning	E860.0-E860.2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Accidental fall injuries	E880-E888	0.35	0.35	0.34	0.34	0.13-0.34	0.20-0.34	0.14 for age <65 ; 0.04> = 65	0.22 for age<65 ; 0.12> = 65
Arson injuries	E890-E899	0.45	0.45	0.44	0.44	0.38	0.38	0.44	0.44
Accidental excessive cold	E901	0.25	0.25	No data	No data	0.25	0.25	No data	No data
Accidental drowning	E910	0.38	0.38	0.34	0.34	0.31-0.50	0.31-0.50	0.34	0.34
Accidental aspiration	E911	0.25	0.25	1.00	1.00	0.25	0.25	1.00	1.00
Striking against / struck by objects	E917	0.25	0.25	No data	No data	0.07	0.07	No data	No data
Caught in / between objects	E918	0.25	0.25	No data	No data	0.07	0.07	No data	No data
Occupational and machine injuries	E919-E920	0.25	0.25	0.07	0.07	0.07	0.07	0.07	0.07
Accidental firearm missile injuries	E922	0.25	0.25	No data	No data	0.25	0.25	No data	No data
Suicide, self-inflicted injuries	E950-E959	0.28	0.28	0.08	0.12	0.11-0.19	0.23-0.31	0.29	0.32
Victim, fight, brawl,rape	E960	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Victim assault firearms	E965	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Victim assault cutting instrument	E966	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Victim child battering	E967	0.46	0.46	0.16	0.16	0.16	0.16	0.16	0.16
Victim assault other	E968	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Late effects of injuries by another	E969	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Remarks:Ranges refer to age-specific attributable fractions; minimum (>0) and maximum estimates are shown.									

Source: Rehm et al. (in press)

Source: WHO Global Status Report on Alcohol 2004, p.48 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 25:

Table 16: Global burden of disease in 2000 attributable to alcohol according to major disease categories (DALYs in 000s)

Disease or Injury	Female	Male	Total	% of all alcohol-attributable DALYs
Conditions arising during the perinatal period	55	68	123	0%
Malignant neoplasm	1021	3180	4201	7%
Neuro-psychiatric conditions	3814	18 090	21 904	38%
Cardiovascular diseases	-428	4411	3983	7%
Other noncommunicable diseases (diabetes, liver cirrhosis)	860	3695	4555	8%
Unintentional injuries	2487	14 008	16 495	28%
Intentional injuries	1117	5945	7062	12%
Alcohol-related disease burden all causes (DALYs)	**8926**	**49 397**	**58 323**	**100%**
All DALYs	693 911	761 562	1 455 473	
% of all DALYs that can be attributable to alcohol	**1.3%**	**6.5%**	**4.0%**	In comparison: estimate for 1990: 3.5%

Source: Rehm et al. (2003d)

Source: WHO Global Status Report on Alcohol 2004, p.51 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 26:

Table 17: Burden of disease in 2000 attributable to tobacco, alcohol and drugs by developing status and sex

	High mortality developing (AFR-D, AFR-E, AMR-D, EMR-D, SEAR-D)*			Low mortality developing (AMR-B, EMR-B, SEAR-B,WPR-B)*			Developed (AMR-A, EUR-A, EUR-B, EUR-C,WPR-A)*		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Total DALYs (000s)	420 711	412 052	832 763	223 181	185 316	408 497	117 670	96 543	214 213
- Smoking and oral tobacco (%)	3.4	0.6	2.0	6.2	1.3	4.0	17.1	6.2	12.2
- Alcohol (%)	2.6	0.5	1.6	9.8	2.0	6.2	14.0	3.3	9.2
- Illicit drugs (%)	0.8	0.2	0.5	1.2	0.3	0.8	2.3	1.2	1.8

**[All WHO member states are classified into the following geographical regions and mortality strata:*
Epidemiological Sub-Regions:
AFR - African Region
EMR - Eastern Mediterranean Region
EUR - European Region
AMR - Region of the Americas
SEAR - South-East Asian Region
WPR - Western Pacific Region
Mortality Strata:
A. Very low child, very low adult
B. Low child, low adult
C. Low child, high adult
D. High child, high adult
E. High child, very high adult
For more information on the different regions, see www.who.int/choice/demography/regions/en/index.html [see http://www.who.int/choice/demography/regions/en/index.html]

Source: Rehm et al. (2003d)

Source: WHO Global Status Report on Alcohol 2004, p.51 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 27:

Table 18: Characteristics of adult alcohol consumption in different regions of the world 2000 (population weighted averages)

WHO Region (Definition see below)	Beverage type mostly consumed	Total consumption[1]	% unrecorded of total[2]	% heavy drinkers[3]	% drinkers among males	% drinkers among females	Consumption per drinker[4]	Average drinking pattern[5]
Africa D (e.g. Nigeria, Algeria)	Mainly other fermented beverages	4.9	53	5.3	47	27	13.3	2.5
Africa E (e.g. Ethiopia, South Africa)	Mainly other fermented beverages and beer	7.1	46	10.3	55	30	16.6	3.1
Americas A (Canada, Cuba, the United States)	> 50% of consumption is beer, about 25% spirits	9.3	11	11.2	73	58	14.3	2.0
Americas B (e.g. Brazil, Mexico)	Beer, followed by spirits	9.0	30	9.1	75	53	14.1	3.1
Americas D (e.g. Bolivia, Peru)	Spirits, followed by beer	5.1	34	2.7	74	60	7.6	3.1
Eastern Mediterranean B (e.g. the Islamic Republic of Iran, Saudi Arabia)	Spirits and beer, but scarce data	1.3	34	1.5	18	4	11.0	2.0
Eastern Mediterranean D (e.g. Afghanistan, Pakistan)	Spirits and beer, but scarce data	0.6	56	0.1	17	1	6.0	2.4
Europe A (e.g. Germany, France, the United Kingdom)	Wine and beer	12.9	10	15.7	90	81	15.1	1.3
Europe B (e.g. Bulgaria, Poland, Turkey)	Spirits	8.3	41	8.8	72	52	13.4	2.9
Europe C (e.g. the Russian Federation, Ukraine)	Spirits	13.9	38	18.6	89	81	16.5	3.6
South-East Asia B (e.g. Indonesia,Thailand)	Spirits	3.1	27	1.2	35	9	13.7	2.5
South-East Asia D (e.g. Bangladesh,India)	Spirits	2.0	79	0.9	26	4	12.9	3.0
Western Pacific A (e.g. Australia, Japan)	Beer and spirits	8.5	20	4.2	87	77	10.4	1.2
Western Pacific B (e.g. China, the Philippines, Viet Nam)	Spirits	5.0	26	4.1	84	30	8.8	2.2

[1] *Estimated total alcohol consumption per resident aged 15 and older in litres of absolute alcohol (recorded and*

[2] *Percentage of total adult per capita consumption (= column 3) which is estimated to be unrecorded*

[3] *Estimated % rate of heavy drinking (males ≥ 40 g and females ≥ 20 g) among those aged 15+*

[4] *Estimated total alcohol consumption (in litres of absolute alcohol) per adult drinker*

[5] *Estimated average pattern of drinking (1-4 with 4 being the most detrimental pattern i.e. based on many heavy drinking occasions, drinking outside meals, high level of fiesta drinking and drinking in public places, etc. and 1 being the least detrimental pattern i.e. least heavy drinking occasions, drinking with meals, no fiesta drinking, elast drinking in public places, etc.)*

Source: Rehm et al. (2003d)

Source: WHO Global Status Report on Alcohol 2004, p.53 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 28:

Table 19: Alcohol-related harm in different regions of the world (population weighted averages), DALYs (000s)

	Developing countries				Developed countries				World	
	very high or high mortality		low mortality		very low mortality only burden		Former Socialist:low mortality			
	AFR-D, AFR-E, AMR-D, AMR-B, EMR-D, SEAR-D***		AMR-B, EMR-B, SEAR-B, WPR-B***		AMR A, EUR A, WPR A***v>		Eur B, C***			
	DALYs	%	DALYs	%	DALYs	%	DALYs	%	DALYs	%
Neuro-psychiatric conditions* and other NCD**	4369	33.2	12 006	47.0	6484	68.7	3601	30.7	26460	44.2
Alcohol use disorders	3885	29.5	5715	22.4	6318	65.8	2550	21.7	18469	31.7
Unintentional injuries	5033	38.2	5961	23.4	1571	16.4	3929	33.5	16494	28.3
Intentional injuries	1689	12.8	2940	11.5	558	5.8	1874	16.0	7061	12.1
Total alcohol related burden in DALYs	13 165	100.0	25 519	100.0	9445[#]	100.0	11742	100.0	58323	100.0
Total burden of disease in DALYs	845 628		411268		115246		100250		1472392	
% of total disease burden which is alcohol related	1.6		6.2		8.3		11.7		4.0	

** dominated by alcohol use disorders (plus epilepsy and depression)*
*** other noncommunicable diseases, dominated by liver cirrhosis (plus diabetes)*
 # before reduction of – 1548 DALYs due to protective effects of vascular diseases
****[All WHO member states are classified into the following geographical regions and mortality strata:*
Epidemiological Sub-Regions:
AFR - African Region
EMR - Eastern Mediterranean Region
EUR - European Region
AMR - Region of the Americas
SEAR - South-East Asian Region
WPR - Western Pacific Region
Mortality Strata:
A. Very low child, very low adult
B. Low child, low adult
C. Low child, high adult
D. High child, high adult
E. High child, very high adult
For more information on the different regions, see www.who.int/choice/demography/regions/en/index.html [see http://www.who.int/choice/demography/regions/en/index.html]]

Source: Rehm et al. (2003d); WHO (2001c, p. 150) (also available www.who.int/whr2001/2001/main/en/annex/Annex3-en-WEB.xls [see http://www.who.int/whr2001/2001/main/en/annex/Annex3-en-WEB.xls]); own calculations

Source: WHO Global Status Report on Alcohol 2004, p.54 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 29:

Table 20: Selected population alcohol-attributable fractions, by disease category, sex and level of development (% DALYs for each cause) in 2000

GBD disease categories	World			High mortality developing (AFR-D,AFR-E, AMR-D,EMR-D,SEAR-D)*		Low mortality developing (AMR-B,EMR-B, SEAR-B,WPR-B)*		Developed (AMR-A,EUR-A, EUR-B,EUR-C,WPR-A)*	
	Males	Females	Both	Males	Females	Males	Females	Males	Females
Mouth and oropharynx cancers	22	9	19	11	4	28	10	41	28
Oesophagus cancer	37	15	29	17	6	42	16	46	36
Liver cancer	30	13	25	23	10	32	11	36	28
Other neoplasms	6	3	4	2	1	5	2	11	8
Unipolar depressive disorders	3	1	2	2	0	3	0	7	2
Epilepsy	23	12	18	14	7	27	13	45	36
Alcohol use disorders	100	100	100	100	100	100	100	100	100
Ischaemic heart disease	4	-1	2	7	0	5	0	2	-3
Haemorrhagic stroke	18	1	10	7	2	21	2	26	0
Ischaemic stroke	3	-6	-1	1	0	3	0	5	-16
Cirrhosis of the Liver	39	18	32	19	7	45	13	63	49
Motor vehicle accidents	25	8	20	19	5	25	8	45	18
Drownings	12	6	10	8	4	10	6	43	25
Falls	9	3	7	5	1	8	3	21	8
Poisonings	23	9	18	7	3	11	7	43	26
Other unintentional injuries	15	5	11	10	4	15	6	32	16
Self-inflicted injuries	15	5	11	8	2	10	5	27	12
Homicide	26	16	24	18	12	28	16	41	32
Other Intentional injuries	13	7	12	7	3	20	11	32	19

*[All WHO member states are classified into the following geographical regions and mortality strata:
Epidemiological Sub-Regions:
AFR - African Region
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Mortality Strata:
A. Very low child, very low adult
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D. High child, high adult
E. High child, very high adult
For more information on the different regions, see www.who.int/choice/demography/regions/en/index.html]

Source: Babor, Rehm & Room (in press)

Source: WHO Global Status Report on Alcohol 2004, p.55 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 30:

Table 21 [bis]: Social and economic costs of alcohol abuse for selected countries

Country	Year	Total Cost Estimate	% of GDP
Australia	1998-1999	A$ 7560.3 million	
Canada	1992	$7.52 billion	1.1
Chile		$2.969 billion	
Finland	1990	$3.351-5.738 billion	
France	1997	115 420.91 FF	1.42
Ireland		2.4 billion	
Italy	2003	€26-66 billion	5-6
Japan	1987	US$ 5.7 billion	
Netherlands (the)		€2.577 billion	
New Zealand	1990	$16.1 billion	4.0
Scotland	2001-2002	$1.071 billion	1.5
South Africa		$1.7 billion	2.0
Switzerland	1998	6480 million Swiss francs	
United Kingdom (the)		£15.4 billion	
United States (the)	1998	$184.6 billion	

Note: Please refer to the individual country profiles to obtain the original source used.

Source: WHO Global Status Report on Alcohol 2004, p.66 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 31:

Table 21: Standardized mortality rates (per 100 000) for acute and chronic disease and injury, by WHO regional subgroupings (data shown is for most recent year available)

WHO sub-group	Country	Falls	Inten-tional injuries	Traffic casual-ties	Accidental poisoning	Alcohol use disorders	Liver cirrhosis	Mouth and oropha-rynx cancer	Ischae-mic heart disease
AFR-D	Mauritius	2.77	14.44	15.91		2.04	15.78	3.85	173.51
AMR-A	Canada	3.08	12.09	8.45	2.73	1.61	5.24	2.06	82.97
AMR-A	Cuba	12.26	18.22	12.19	0.32	2.31	7.61	3.82	108.52
AMR-A	United States of America (the)	6.78	20.21	15.00	0.58	1.90	7.47	2.00	112.40
AMR-B	Argentina	0.79	15.51	9.56	0.45	1.83	6.39	2.14	49.38
AMR-B	Bahamas (the) [a,b]	0.45	26.02	20.04	0.30	3.98	16.91	2.49	85.79
AMR-B	Brazil [a]	3.53	29.63	16.63	0.17	3.28	11.31	3.87	72.26
AMR-B	Chile	0.83	10.26	10.69	0.27	1.47	20.49	1.35	62.42
AMR-B	Colombia [a]	3.34	69.15	17.71	0.29	0.03	6.25	1.72	89.80
AMR-B	Costa Rica [a]	2.35	11.78	17.83	0.27	0.93	7.81	2.22	93.08
AMR-B	El Salvador [a]	3.92	50.62	33.51	0.22	19.50	12.41	1.05	77.84
AMR-B	Mexico	3.14	15.00	11.64	1.05	5.82	36.15	1.33	75.78
AMR-B	Panama [a]	3.69	15.88	15.25	0.41	1.03	7.91	2.83	59.02
AMR-B	Paraguay [a]	0.74	16.38	10.42	0.43	1.42	6.26	2.05	51.31
AMR-B	Trinidad and Tobago	2.48	16.74	11.87	3.33	0.67	9.55	3.87	170.91
AMR-B	Uruguay	1.43	15.18	10.05	4.02	1.45	5.95	3.27	60.10
AMR-B	Venezuela	3.19	19.39	23.20	2.24	0.84	11.21	1.81	119.36
AMR-D	Ecuador [a]	3.42	22.16	11.95	1.96	2.97	15.45	0.97	31.32
EMR-B	Kuwait	2.20	3.93	19.01	0.65	0.05	4.01	0.97	79.10
EMR-D	Egypt [a]	0.93	0.51	6.65	0.15	0.00	35.89	0.57	27.05
EUR-A	Austria	6.76	15.38	9.84	1.11	2.98	14.95	3.96	100.03
EUR-A	Croatia	8.33	17.32	11.27	1.72	3.18	20.90	5.27	127.98
EUR-A	Czech Republic (the)	12.18	14.31	8.65	2.76	0.76	12.36	4.04	141.13
EUR-A	Denmark	12.20	13.00	9.57	2.96	6.90	11.70	3.17	90.91
EUR-A	Finland	10.84	23.20	7.77	9.12	3.63	9.60	1.82	122.98
EUR-A	France	8.69	15.01	13.06	0.79	3.37	11.45	5.85	39.12
EUR-A	Germany	4.40	11.15	8.05	1.14	4.01	13.36	3.77	95.74
EUR-A	Greece	3.20	4.06	18.88	2.57	0.05	3.83	1.22	63.65
EUR-A	Icelandb	2.81	11.42	6.16	0.57	2.29	2.58	1.60	108.20
EUR-A	Ireland	7.00	11.97	10.14	1.04	1.98	3.94	3.04	133.70
EUR-A	Israel	1.46	8.26	5.57	0.26	0.93	3.85	1.20	77.33
EUR-A	Italy	7.48	6.38	11.76	0.37	0.22	10.73	2.90	57.20
EUR-A	Luxem-bourg [b]	5.25	16.77	17.36	5.22	4.17	12.19	4.28	59.33
EUR-A	Malta [b]	8.70	9.55	4.49	1.30	0.37	5.46	4.64	144.63
EUR-A	Nether-lands (the)	2.66	9.54	6.59	0.74	1.39	4.44	2.47	70.17
EUR-A	Norway	8.05	12.16	6.05	1.99	3.44	3.10	2.47	81.19
EUR-A	Portugal	3.38	4.82	12.50	0.64	0.32	13.08	4.06	50.51
EUR-A	Spain	2.31	7.49	13.98	2.03	0.52	8.45	3.75	49.94
EUR-A	Sweden	18.45	21.10	5.84	1.49	2.47	3.97	1.69	89.28
EUR-A	Switzerland	2.88	14.65	6.50	3.85	2.31	5.79	3.33	70.55

[a] Caution should be exercised when interpreting the results as death registration level is incomplete.
[b] As countries with very small population size are likely to have spurious trends, care should be exercised when making inter-country comparisons.

WHO sub-group	Country	Falls	Inten-tional injuries	Traffic casual-ties	Accidental poisoning	Alcohol use disorders	Liver cirrhosis	Mouth and oropha-rynx cancer	Ischae-mic heart disease
EUR-A	United Kingdom (the)	14.80	14.62	5.62	1.91	0.87	7.36	2.15	112.41
EUR-B	Albania [a]	1.22	11.52	7.83	2.97	0.39		1.88	77.81
EUR-B	Armenia	0.72	3.62	5.43	1.32		13.07	2.16	261.22
EUR-B	Azerbaijan [a]	0.30	6.80	5.15	1.14		34.02	1.23	284.62
EUR-B	Bulgaria	3.06	14.95	10.92	2.18	0.77	12.74	3.12	144.31
EUR-B	Kyrgyzstan [a]	3.39	21.81	11.36	13.61	1.98	38.36	2.98	240.83
EUR-B	Poland	7.87	15.04	13.21	3.72	2.91	10.67	3.61	102.65
EUR-B	Romania	5.80	13.75	11.23	5.10	3.38	37.09	5.72	175.06
EUR-B	Slovenia	11.82	24.24	13.42	1.57	4.90	26.29	6.34	78.62
EUR-B	TFYR Macedonia	0.99	19.09	5.12	0.97	0.80	5.70	2.51	84.17
EUR-B	Turkme-nistan [a]	4.01	28.40	8.60	19.04		42.35	3.63	319.76
EUR-B	Uzbekistan [a]	11.25	14.68	8.89	1.31		39.05	2.59	316.50
EUR-C	Belarus	5.14	38.92	13.97	29.09		12.76	4.37	331.23
EUR-C	Estonia	7.99	38.35	14.35	25.65	3.63	17.39	6.18	274.79
EUR-C	Hungary	18.67	25.96	11.69	1.40	2.87	45.79	12.64	179.07
EUR-C	Kazakhstan [a]	2.41	42.20	12.02	44.47	1.90	23.20	3.54	269.93
EUR-C	Latvia	13.25	37.26	22.78	13.60	8.15	12.10	3.99	250.55
EUR-C	Lithuania	10.22	45.94	18.16	16.20	1.10	14.36	5.58	250.20
EUR-C	Republic of Moldova (the) [a]	3.33	22.37	11.69	8.60	1.58	65.03	4.72	311.58
EUR-C	Russian Federation (the)	8.42	61.42	25.82	36.62			4.49	285.38
EUR-C	Ukraine	9.30	8.72	10.56	1.85		20.72	5.21	368.11
WPR-A	Australia	2.27	13.63	8.91	3.05	0.99	3.77	2.69	85.46
WPR-A	Japan	2.78	18.80	7.38	0.38	0.24	6.15	2.23	27.29
WPR-A	New Zealand	4.17	13.23	11.57	0.83	0.46	2.40	2.65	102.50
WPR-A	Singapore [a]	3.09	9.47	4.96	0.09		2.84	5.83	91.24
WPR-B	Philippines (the) [a]	2.35	19.80	8.60	0.30	0.71	10.00	4.67	86.22
WPR-B	Republic of Korea (the) [a]	6.59	16.00	20.00	0.92	2.48	20.02	1.69	27.01

[a] Caution should be exercised when interpreting the results as death registration level is incomplete.
[b] As countries with very small population size are likely to have spurious trends, care should be exercised when making inter-country comparisons.

Source: WHO Global Status Report on Alcohol 2004, p.56 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 32:
Table 3: Total recorded alcohol per capita consumption (15+)

in litres of pure alcohol

Country	Total
Iran	0.00
Kuwait	0.00
Libyan Arab Jamahiriya (the)	0.00
Saudi Arabia	0.00
Somalia	0.00
Bangladesh	0.00
Mauritania	0.01
Pakistan	0.02
Algeria	0.03
Nepal	0.08
Comoros	0.08
Yemen	0.08
Indonesia	0.10
Egypt	0.10
Niger (the)	0.11
Jordan	0.11
Guinea	0.14
Sri Lanka	0.18
Iraq	0.20
Chad	0.23
Sudan (the)	0.27
Cambodia	0.36
Myanmar	0.36
Morocco	0.41
Tajikistan	0.41
Qatar	0.44
Senegal	0.48
Mali	0.49
Brunei Darussalam	0.49
Bhutan	0.57
Syrian Arab Republic (the)	0.62
Micronesia (Federated States of)	0.64
Tunisia	0.65
Turkmenistan	0.77
India	0.82
Solomon Islands	0.86
Equatorial Guinea	0.90
Ethiopia	0.91
Togo	0.95
Papua New Guinea	1.01
Malaysia	1.06
Djibouti	1.08
Vanuatu	1.11
Benin	1.22
Armenia	1.23
Oman	1.32
Viet Nam	1.35
Madagascar	1.38
Samoa	1.42
Malawi	1.44
Turkey	1.48
Uzbekistan	1.52
Eritrea	1.54
Ghana	1.54

Country	Total
Guatemala	1.64
Central African Republic (the)	1.66
Kiribati	1.66
Mozambique	1.67
Fiji	1.69
Côte d'Ivoire	1.71
Maldives	1.72
Kenya	1.74
Lesotho	1.83
Mongolia	1.96
Israel	1.99
Ecuador	1.99
Dem. Republic of the Congo	2.01
Gambia (the)	2.27
Honduras	2.28
Congo	2.36
Namibia	2.39
Georgia	2.41
Albania	2.51
Nicaragua	2.53
Bahrain	2.63
Singapore	2.73
United Arab Emirates (the)	2.75
Guinea-Bissau	2.76
Kazakhstan	2.89
Angola	2.91
Zambia	3.02
Liberia	3.12
Mauritius	3.16
Trinidad and Tobago	3.22
Jamaica	3.37
Bolivia	3.43
El Salvador	3.45
Seychelles	3.61
Cuba	3.65
Cameroon	3.66
Cape Verde	3.72
Philippines (the)	3.75
Ukraine	4.04
The form. Yugoslav Rep. of Mac.	4.12
Lebanon	4.13
Antigua and Barbuda	4.24
Burkina Faso	4.38
China	4.45
Belize	4.50
Guam	4.50
Mexico	4.62
Peru	4.68
Zimbabwe	5.08
United Republic of Tanzania	5.29
Brazil	5.32
Botswana	5.38
Costa Rica	5.45
Kyrgyzstan	5.50

Country	Total
Dem. People's Republic of Korea	5.68
Iceland	5.74
Norway	5.81
Suriname	5.82
Guyana	5.84
Colombia	5.92
Chile	6.02
Panama	6.04
Sao Tome and Principe	6.07
Dominican Republic (the)	6.11
Haiti	6.51
Slovenia	6.55
Saint Vincent and Grenadines	6.58
Sierra Leone	6.64
Paraguay	6.66
Cyprus	6.67
Barbados	6.70
Lao People's Democratic Republic (the)	6.72
Malta	6.74
Rwanda	6.80
Sweden	6.86
Azerbaijan	6.94
Uruguay	6.96
Bulgaria	7.13
Japan	7.38
Grenada	7.39
Saint Kitts and Nevis	7.62
Romania	7.63
French Polynesia	7.68
Republic of Korea (the)	7.71
South Africa	7.81
New Caledonia	7.83
Gabon	7.97
Belarus	8.12
Canada	8.26
Thailand	8.47
United States of America (the)	8.51
Argentina	8.55
Bosnia and Herzegovina	8.62
Poland	8.68
Venezuela	8.78
Italy	9.14
Australia	9.19
Dominica	9.19
Bahamas (the)	9.21
Greece	9.30
Latvia	9.31
Burundi	9.33
Swaziland	9.51
Netherlands (the)	9.74
New Zealand	9.79
Estonia	9.85
Netherlands Antilles	9.94
Nigeria	10.04

Country	Total
Belgium	10.06
United Kingdom (the)	10.39
Finland	10.43
Saint Lucia	10.45
Russian Federation (the)	10.58
Switzerland	11.53
Hungary	11.92
Denmark	11.93
Spain	12.25
Lithuania	12.32
Slovakia	12.41
Portugal	12.49
Austria	12.58
Croatia	12.66
Germany	12.89
Bermuda	12.92
Reunion	13.39
France	13.54
Republic of Moldova (the)	13.88
Ireland	14.45
Czech Republic (the)	16.21
Luxembourg	17.54
Uganda	19.47

Source & © WHO Global Status Report on Alcohol 2004, p.11 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 33:

Table 4: Top 20 countries with highest beverage-specific adult per capita [APC] consumption

[in liters of pure alcohol]

Beer

Country	APC in liters of pure alcohol
Czech Republic (the)	9.43
Ireland	9.24
Swaziland	7.49
Germany	7.26
Austria	6.42
Luxembourg	6.16
Uganda	6.14
Denmark	6.02
The United Kingdom	5.97
Belgium	5.90
Venezuela	5.69
Lithuania	5.53
Slovakia	5.34
Australia	5.20
Croatia	5.16
Netherlands Antilles	4.96
Netherlands (the)	4.91
Finland	4.89
United Republic of Tanzania	4.85
Gabon	4.77

Wine*

Country	APC in liters of pure alcohol
Luxembourg	9.43
France	8.38
Portugal	7.16
Italy	6.99
Croatia	6.42
Switzerland	6.23
Argentina	5.63
Spain	5.07
Bermuda	4.95
Greece	4.78
Denmark	4.57
Austria	4.47
Hungary	4.47
Uruguay	4.35
Germany	3.38
Romania	3.37
Chile	3.25
French Polynesia	3.10
Bulgaria	3.05
Republic of Korea (the)	2.99

*Throughout the report, fermented beverages are included in the wine category. However, for this table only average wine has been used to present the countries with the highest adult per capita wine consumption. If the fermented beverages were included, countries such as Uganda, Nigeria, Burundi, Sierra Leone, Rwanda and Sao Tome and Principe would appear to be among the top 'wine' drinking countries.

Spirits

Country	APC in liters of pure alcohol
Republic of Moldova (the)	10.94
Reunion	8.67
Russian Federation (the)	7.64
Saint Lucia	7.27
Dominica	7.20
Thailand	7.13
Bahamas (the)	7.05
Latvia	6.62
Haiti	6.46
Belarus	6.34
Lao People's Democratic Republic	6.09
Bosnia and Herzegovina	6.03
Saint Vincent and Grenadines	5.98
Dem. People's Republic of Korea	5.48
Slovakia	5.44
Grenada	5.06
Lithuania	4.92
Azerbaijan	4.66
Kyrgyzstan	4.61
Czech Republic (the)	4.41

Source: WHO "Global Status Report on Alcohol 2004, p.13 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]"

Annex 34:

Table 5: Estimated volume of unrecorded consumption in litres of pure alcohol per capita for population older than 15 for the years after 1995

Country	Unrecorded consumption
Albania	3.0
Algeria	0.3
Argentina	1.0
Armenia	1.9
Australia	0.0
Austria	1.0
Azerbaijan	1.9
Barbados	-0.5
Belarus	4.9
Belgium	0.5
Belize	2.0
Bolivia	3.0
Botswana	3.0
Brazil	3.0
Bulgaria	3.0
Burkina Faso	3.3
Burundi	4.7
Cameroon	2.6
Chile	2.0
China	1.0
Colombia	2.0
Costa Rica	2.0
Croatia	4.5
Cuba	2.0
Czech Republic (the)	1.0
El Salvador	2.0
Eritrea	1.0
Estonia	5.0
Ethiopia	1.0
Fiji	1.0
Georgia	2.0
Guatemala	2.0
Guyana	2.0
Haiti	0.0
Honduras	2.0
Hungary	4.0
Iceland	1.0
India	1.7
Iraq	1.0
Jamaica	1.0
Japan	2.0
Kazakhstan	4.9
Kenya	5.0
Kyrgyzstan	2.0
Latvia	7.0
Lithuania	4.9
Luxembourg	-1.0
Malaysia	3.4
Mauritius	11.0
Mexico	3.0
Mongolia	2.0
Myanmar	0.4
Nicaragua	0.5
Nigeria	3.5

Country	Unrecorded consumption
Paraguay	1.5
Peru	1.0
Philippines (the)	3.0
Poland	3.0
Republic of Korea (the)	7.0
Republic of Moldova (the)	12.0
Romania	4.0
Russian Federation (the)	4.9
Rwanda	4.3
Saudi Arabia	0.6
Senegal	0.8
Seychelles	5.2
Slovakia	7.0
Slovenia	1.3
South Africa	2.2
Spain	1.0
Sri Lanka	0.5
Sudan	1.0
Suriname	0.0
Swaziland	4.1
Syrian Arab Republic (the)	0.4
Tajikistan	4.0
TFYR Macedonia	2.9
Thailand	2.0
Trinidad and Tobago	0.0
Tunisia	0.5
Turkey	2.7
Turkmenistan	1.0
Uganda	10.7
Ukraine	8.0
Uzbekistan	1.9
Venezuela	2.0
Zimbabwe	9.0

Source & © WHO "Global Status Report on Alcohol 2004, p.13 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]"

Annex 35:

Table 6: Rate of last year abstainers among the adult population

Country	Year	Total (%)	Male (%)	Female (%)
Albania	1995	24.0	12.0	36.0
Algeria	1995	89.0	80.0	98.0
Argentina [a]	2003	16.2	7.5	23.2
Armenia	1995	24.0	12.0	36.0
Australia	2001	17.5	14.1	20.8
Austria	1993	11.0	5.8	16.1
Azerbaijan	1995	24.0	12.0	36.0
Barbados	1995	49.5	29.0	70.0
Belarus	1995	3.0	2.0	4.0
Belgium	2001	18.9	11.5	25.8
Belize	1995	34.0	24.0	44.0
Benin [a] [b]	1998		16.8	14.3
Bolivia	1995	34.5	24.0	45.0
Botswana	1995	53.5	37.0	70.0
Brazila	2001-2002	51.5	40.0	60.5
Bulgaria	1997		32.1	65.1
Cambodia	1995	85.0	74.0	96
Canada [b]	1998-1999	22.1	17.8	26.1
Chile	2002	25.3	22.0	28.6
China [a]	2000-2001	48.6	27.5	73.1
Colombia	2000-2001	15.1	4.9	20.7
Costa Rica	1995	60.0	45.0	75.0
Cuba	1995	49.5	29.0	70.0
Cyprus	1995	8.0	1.0	15.0
Czech Republic (the)	2002	14.6	9.1	20.0
Denmark [b]	1997-1998	3.0	2.0	4.0
Egypt	2000-2001	99.5	99.0	100.0
El Salvador	1995	23.5	9.0	38.0
Fiji [b]	1993	88.7	78.8	97.9
Finland	2000	7.4	7.1	7.7
France	1999	6.7	4.3	8.9
Georgia	2000-2001	22.9	8.7	33.5
Germany	2000	5.1	4.3	5.9
Greece	1995	8.0	1.0	15.0
Guatemala	1995	53.5	45.0	62.0
Guyana	1995	30.0	20.0	40.0
Haiti	1995	60.0	58.0	62.0
Honduras	1995	23.5	9.0	38.0
Hungary	2001	17.5	9.2	25.5
Iceland	2003	11.8	11.4	12.2
India [a]	2000-2001	79.1	67.1	89.3
Indonesia	2000-2001	94.8	89.8	98.9
Iraq	1995	89.0	80.0	98.0
Ireland [c]	2002	22.0	17.0	26.0
Israel	2001	35.5	25.7	45.4

[a] *Regional survey*
[b] *No definition of abstainers given.*
[c] *Last month abstainers*
[d] *The former Yugoslav Republic of Macedonia*
[e] *Current abstainers*
Note: Please refer to individual country profiles for details of references/sources used.

Country	Year	Total (%)	Male (%)	Female (%)
Italy	2000	25.0	36.4	12.8
Jamaica	2001	57.6	43.8	69.4
Japan	2001	13.5	7.4	19.7
Jordan	1995	86.0	74.0	98.0
Kenya	1995	55.0	45.0	65.0
Kiribati [b]	1981	73.1	51.4	92.9
Kyrgyzstan	1995	70.0	60.0	80.0
Lebanon	2000-2001	77.4	67.4	86.7
Lesotho [a] [b]		74.0	47.0	81.0
Lithuania	1999	20.0	10.0	28.0
Luxembourg	1995	2.5	1.0	4.0
Malaysia	1995	49.5	35.0	64.0
Marshall Islands (the)		66.3	80.6	95.5
Mexico	1998	41.6	22.4	55.0
Micronesia (Federated States of)		67.6	45.1	90.9
Mongolia	1995	41.5	20.0	63.0
Myanmar	1995	69.5	45.0	94.0
Namibia	1998		39.0	53.0
Netherlands (the)	2001	15.8	9.4	21.8
New Zealand [b]	2000	15.0	12.0	17.0
Nicaragua	1995	23.5	9.0	38.0
Nigeria [a]	2000-2001	75.6	51.3	89.6
Norway	1999	6.0	5.8	6.2
Pakistan	1995	94.5	90.0	99.0
Palau	1990-1991		23.1	64.2
Papua New Guinea	1995	54.5	22.0	87.0
Paraguay	1995	28.0	18.0	38.0
Peru	2002	24.9	20.2	29.0
Philippines (the)	1995	40.0	10.0	70.0
Poland	1995	19.0	12.0	26.0
Portugal	1995	15.5	7.0	24.0
Republic of Korea (the) [b]	2001	27.1	12.4	38.9
Republic of Moldova (the)	1995	13.5	9.0	18.0
Romania	1995	38.0	23.0	53.0
Russian Federation (the)	1996	23.1	9.0	35.0
Saudi Arabia	1995	97.0	95.0	99.0
Seychelles	1995	27.5	10.0	45.0
Singapore	2000-2001	74.5	66.6	82.3
Slovakia	2000-2001	7.7	3.6	10.4
Slovenia	1995	24.0	12.0	36.0
South Africa	1995	69.0	55.0	83.0
Spain [a]	2003	37.7	26.9	48.7
Sri Lanka	2002	67.6	41.4	92.9
Suriname	1995	42.5	30.0	55.0
Sweden	2002	11.3	8.0	14.7
Switzerland	2002	22.5	14.2	30.4
Syrian Arab Republic (the)	2000-2001	95.7	92.4	98.8
Tajikistan	1995	70.0	60.0	80.0

[a] *Regional survey*
[b] *No definition of abstainers given.*
[c] *Last month abstainers*
[d] *The former Yugoslav Republic of Macedonia*
[e] *Current abstainers*
Note: Please refer to individual country profiles for details of references/sources used.

Country	Year	Total (%)	Male (%)	Female (%)
Thailand [b]	2001	67.4	44.1	90.2
TFYR Macedonia [d]	1995	24.0	12.0	36.0
Tokelau [e]	1976		50.0	92.0
Trinidad and Tobago	1995	49.5	29.0	70.0
Tunisia	1995	82.5	70.0	95.0
Turkey	2000-2001	80.4	77.5	82.5
Turkmenistan	1995	45.0	35.0	55.0
Uganda [a]	2003	54.3	48.2	60.3
The United Kingdom	2000	12.0	9.0	14.0
United States of America (the)	2002	33.9	29.3	38.2
Uzbekistan	1995	70.0	60.0	80.0
Venezuela	1995	42.5	30.0	55.0

[a] *Regional survey*
[b] *No definition of abstainers given.*
[c] *Last month abstainers*
[d] *The former Yugoslav Republic of Macedonia*
[e] *Current abstainers*
Note: Please refer to individual country profiles for details of references/sources used.

Source: WHO Global Status Report on Alcohol 2004, p.24 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 36:

Table 7: Heavy drinkers among the adult population

Country	Year	Total (%)	Male (%)	Female (%)
Argentina [a,b,c]	2003		11.5	2.0
Australia [d]	2001	7.0	6.7	7.2
Austria [b,c]	1993		17.3	7.0
Brazil [b,c]	2001-2002		17.8	18.2
Bulgaria [e]	1997		18.2	0.8
Burkina Faso [b]	2003	11.6	10.0	13.2
Chad [b]	2003	11.0	12.8	9.5
Colombia [c,f]	2001-2002	31.8	52.4	21.0
Costa Rica [b,c]	2003		5.0	3.0
Czech Republic (the) [b,c]	2002		25.7	12.5
Dominican Republic (the) [b]	2003	2.1	1.1	3.1
Ecuador [b]	2003	4.1	7.3	1.7
Estonia [e]	1997		9.3	0.5
Ethiopia [b]	2003	9.3	8.1	10.6
Finland [b,c]	2000		5.8	3.4
France [b,c]	1999		16.6	7.8
Georgia [c,f]	2001-2002	27.8	50.1	10.6
Germany [b,c]	2000		11.2	11.3
Ghana [b]	2003	1.9	2.1	1.7
Hungary [b]	2003	12.4	16.9	9.3
India [b]	2003	1.4	2.4	0.4
Israel [b,c]	2001		5.9	4.7
Italy [g]	2000	5.8	9.8	2.0
Japan [b,c]	2001		22.7	4.9
Lao People's Dem. Rep. [b]	2003	2.7	3.8	1.8
Mexico [c,f]	2000-2001	14.2	18.1	11.6
Namibia [b]	2003	4.1	3.1	4.9
Nepal [b]	2003	3.5	3.0	4.0
Netherlands (the) [b,c]	1999		10.4	11.1
Nigeria [b,c]	2003		27.8	36.1
Norway [b,c]	1999		3.0	5.2
Paraguay [b]	2003	3.1	5.6	1.0
Russian Federation (the) [b]	2003	2.4	3.7	1.6
Slovakia [b]	2003	7.0	5.2	7.9
South Africa [c,f]	1998	7.6	7.0	8.8
Switzerland [b,c]	1997		8.6	6.1
Turkey [c,f]	2000-2001	1.7	1.3	2.5
Uganda [b,c]	2003		40.1	20.3

[a] : *Regional survey*
[b] : *Consumption of 40 g or more pure alcohol/day for men and 20 g or more pure alcohol/day for women.*
[c]: *Among drinkers only*
[d]: *Consumption of more than 40 g pure alcohol/day for men and more than 20 g pure alcohol/day for women.*
[e]: *Consumption of 560 g of ethanol a week or more (80 g a day or more).*
[f]: *Consumption of five or more standard drinks for males and three or more standard drinks for females on a typical drinking day.*
[g]: *Consumption of more than 0.5 litres of wine daily.*
Note: Please refer to individual country profiles for details of references/sources used.

Country	Year	Total (%)	Male (%)	Female (%)
The United Kingdom [c,f]	2000		39.0	42.0
United States of America (the) [b,c]	1996		6.4	5.0
Viet Nam	2003	2.9	5.7	0.6
Zimbabwe	2003	2.7	5.8	1.0

[a] : *Regional survey*
[b] : *Consumption of 40 g or more pure alcohol/day for men and 20 g or more pure alcohol/day for women.*
[c]: *Among drinkers only*
[d]: *Consumption of more than 40 g pure alcohol/day for men and more than 20 g pure alcohol/day for women.*
[e]: *Consumption of 560 g of ethanol a week or more (80 g a day or more).*
[f]: *Consumption of five or more standard drinks for males and three or more standard drinks for females on a typical drinking day.*
[g]: *Consumption of more than 0.5 litres of wine daily.*
Note: Please refer to individual country profiles for details of references/sources used.

Source: WHO Global Status Report on Alcohol 2004, p.27 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 37:

Table 8: Heavy episodic drinkers among the adult population

Country	Year	Total (%)	Male (%)	Female (%)
Australia [a]	2001	13.4	15.3	11.6
Belgium [b]	2001	20.1	32.6	8.4
Bosnia and Herzegovina [e]	2003	1.2	2.9	0.0
Brazil [e]	2003	9.9	17.2	4.1
Burkina Faso [e]	2003	10.9	13.9	7.7
Canada [c,f]	2001-2002	20.1	28.3	11.2
Chad [e]	2003	12.3	17.2	7.9
China [e]	2003	3.8	7.5	0.3
Colombia [g]	2001-2002	5.2	11.6	1.9
Comoros (the) [e]	2003	0.2	0.4	0.0
Congo [e]	2003	5.2	8.3	2.5
Costa Rica [c,d]	2003		22.1	8.2
Côte d'Ivoire	2003	4.1	6.5	0.9
Czech Republic (the) [c,d]	2002		28.8	9.9
Dominican Republic (the) [e]	2003	9.1	15.7	3.5
Ecuador [e]	2003	4.7	9.3	1.2
Estonia [e]	2003	6.9	15.2	2.3
Ethiopia [e]	2003	4.1	7.7	0.4
Finland [c,h]	2000		49.1	14.1
France [c,h]	2000		27.9	9.7
Georgia [e]	2003	10.8	22.3	1.2
Germany [c,d]	2000		42.1	12.7
Ghana [e]	2003	1.4	2.5	0.4
Guatemala [e]	2003	1.3	3.4	0.2
Hungary [e]	2003	9.1	18.9	1.9
Iceland [c,d]	2001		42.7	20.0
India [e]	2003	1.4	2.9	0.1
Italy [b,c]	2001-2002		12.8	11.5
Japan [c,h]	2001		38.3	10.7
Kazakhstan	2003	4.4	8.8	2.0
Lao People's Dem. Republic (the) [e]	2003	12.3	20.9	4.8
Mexico [c,d]	1998		46.9	5.8
Namibia [e]	2003	6.2	9.5	4.0
Netherlands (the) [c,h]	1999		36.6	11.6
Nigeria [c,d]	2003		52.0	39.6
Paraguay [e]	2003	14.3	27.4	3.4
Philippines (the) [e]	2003	7.0	13.2	1.6

[a] *Consumption of seven or more standard drinks for males (five or more for females) on any one drinking occasion at least monthly.*
[b] *At least once a month six or more drinks on the same day.*
[c] *Among drinkers only*
[d] *Consumption of five or more drinks on one occasion at least once a month in the last year.*
[e] *At least once a week consumption of five or more standard drinks in one sitting.*
[f] *Consumption of five or more drinks on one occasion, 12 or more times in the last year.*
[g] *Consumption of six or more drinks on one occasion weekly or more.*
[h] *Consumption of six or more drinks on one occasion at least once a month in the last year.*
***Note**: Countries in bold indicate that surveys were not national but regional. Please refer to individual country profiles for details of references/sources used.*

Country	Year	Total (%)	Male (%)	Female (%)
Russian Federation (the) [b]	2003	8.2	15.1	3.6
Slovakia [b]	2003	6.8	13.9	2.8
Spain [e]	2003	4.6	8.5	1.6
Sri Lanka [e]	2003	2.4	4.9	0.1
Ukraine [e]	2003	9.6	19.5	3.7
Uganda [c,d]	2003		46.0	17.6
The United Kingdom [g]	2000	17.0	24.0	9.0
Viet Nam [e]	2003	4.7	10.2	0.3
Zimbabwe [e]	2003	4.0	10.1	0.9

[a] *Consumption of seven or more standard drinks for males (five or more for females) on any one drinking occasion at least monthly.*
[b] *At least once a month six or more drinks on the same day.*
[c] *Among drinkers only*
[d] *Consumption of five or more drinks on one occasion at least once a month in the last year.*
[e] *At least once a week consumption of five or more standard drinks in one sitting.*
[f] *Consumption of five or more drinks on one occasion, 12 or more times in the last year.*
[g] *Consumption of six or more drinks on one occasion weekly or more.*
[h] *Consumption of six or more drinks on one occasion at least once a month in the last year.*
***Note**: Countries in bold indicate that surveys were not national but regional. Please refer to individual country profiles for details of references/sources used.*

Source: WHO Global Status Report on Alcohol 2004, p.28 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

Annex 38:

Table 9: Alcohol dependence among adult population

Country	Year	Total (%)	Male (%)	Female (%)	Measure
Argentina [a]	1999	4.31	6.67	1.74	ICD-10
Australia [a]	1997	3.5	5.2	1.8	ICD-10
Austria [b]	1996	2.2			CAGE
Belgium [b]	2001	7.0	9.5	3.6	N.A.
Brazil [b]	2001	11.2	17.1	5.7	N.A.
Canada [c]	2002	9.3	14.0	4.5	mixed
Chile [d]		6.4	11.0	2.1	DSM-III-R
China [b]	2001	3.8	6.6	0.2	DSM-III-R
Colombia [a]	2000-2001	4.8	9.8	2.2	ICD-10
Costa Rica [b,e]	2000-2001	7.0	10.8	2.4	mixed
Egypt [a]	2000-2001	0.2	0.4	0.0	ICD-10
Ethiopia [d]	1994	1.0	1.9	0.1	CAGE/CIDI
Finland [b]	2000	4.0	6.5	1.5	DSM-IV
France [b]	2000		13.3	4.1	DETAf
Georgia [a]	2000-2001	3.2	7.3	0.2	ICD-10
Germany [b]	2000	3.8	6.0	1.5	DSM-IV
India [a]	2000-2001	3.6	6.8	0.7	ICD-10
Indonesia [a]	2000-2001	1.0	1.7	0.3	ICD-10
Iran [e]		7.3	11.9	2.7	DSM-IV
Japan [d]	1997-1999	4.1	8.4	0.7	DSM-III-R
Mexico [a]	2000-2001	1.8	4.2	0.2	ICD-10
Netherlands (the) [b]	1996	5.5	9.0	1.9	DSM-III-R
Nigeria [a]	2001-2002	0.7	1.9	0.0	ICD-10
Peru [h]	2002	10.6	17.8	4.3	ICD-10
Poland [b]	1999	12.2	23.3	4.1	CAGE
Republic of Korea (the) [a]	2003	4.3	6.9	1.7	CIDI
Singapore [a]	2001-2002	0.6	1.1	0.2	ICD-10
Slovakia [A]	2001-2002	4.8	9.4	1.1	ICD-10
South Africa [d]	1998		27.6	9.9	CAGE
Syrian Arab Republic (the) [a]	2001-2002	0.2	0.5	0.0	ICD-10
Turkey [a]	2001-2002	1.3	1.7	0.7	ICD-10
The United Kingdom [b]		4.7	7.5	2.1	ICD-10
United States of America (the) [g]	2002	7.7	10.8	4.8	DSM-IV
Uruguay [b]	2001	5.0	8.5	1.3	DSM-IV

[a] *Last year alcohol dependence*
[b] *No definition of alcohol dependence given.*
[c] *Alcohol dependence classification was based on a set of questions which examined aspects of alcohol tolerance (for e.g. needing more to have an effect), withdrawal, loss of control, and social or physical problems related to alcohol use in daily life.*
[d] *Lifetime alcohol dependence*
[e] *Alcohol dependency/alcoholic was defined as an individual that presents/displays the inability to abstain from the consumption of spirits or is unable to stop when consuming spirits as well as symptoms of greater deprivation (e.g. tremors).*
[f] *Diminuer entourage trop alcohol (Reduce alcohol-based surroundings) test*
[g] *Alcohol dependence or abuse*
***Note**: Countries in bold indicate that surveys were not national. Please refer to individual country profiles for details of references/sources used.*

Source: WHO Global Status Report on Alcohol 2004, p.30 [see http://www.who.int/substance_abuse/publications/global_status_report_2004_overview.pdf]

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Exploring Productivity Outcomes from a Brief Intervention for At-Risk Drinking in an Employee Assistance Program

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Abstract

Brief intervention (BI) research has traditionally examined alcohol and drug use outcomes; however it is unknown whether BIs can also impact on-the-job productivity. This exploratory study examines changes in workplace productivity and related costs for clients receiving a BI for at-risk drinking in the employee assistance program (EAP). Participants were 44 clients attending the EAP for behavioral health concerns, screened for at-risk drinking, assigned to BI+Usual Care (n=25) or UC alone (n=19), and who completed 3-month follow-up. Absenteeism, presenteeism, and productivity costs were derived as outcomes. At follow-up, participants in the BI+UC group had improved productivity when at work (presenteeism) compared to the UC group. The estimated cost savings from improved productivity for the BI+UC group was $1200 per client over the UC group. Groups did not differ by absenteeism (missed days of work). Preliminary evidence suggests the broad impact BIs may have. Implications for future BI research are discussed.

1. Introduction

Employee assistance programs (EAPs) offer short-term counseling and longer-term referrals for a variety of behavioral health concerns such as depression and alcohol problems (Levy Merrick, Volpe-Vartanian, Horgan, & McCann, 2007). EAPs are free and available to about 63% of workplaces with 100+ employees (U.S. Bureau of Labor Statistics, 2006). Services are widespread and can reach individuals of diverse occupations, backgrounds, and income levels. Services are brief, typically four sessions, and include evaluation, brief treatment, and/or outside referral.

Research suggests that EAPs are an underutilized resource for addressing alcohol problems. Between 11 and 35% of the workforce experiences at-risk drinking (Frone, 2006; Mazas et al., 2006; Roche, Pidd, Berry, & Harrison, 2008), which is defined as experiencing non-severe yet substantial alcohol-related problems (Chan, Neighbors, Gilson, Larimer, & Marlatt, 2007;

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National Institute on Alcohol Abuse and Alcoholism, 2005; Sobell, Sobell, Toneatto, & Leo, 1993; U.S. Preventive Services Task Force, 2004). In the context of the workplace, these individuals may be drinking before or during work, working while intoxicated, or drinking at levels that impact their work productivity. Although EAPs were originally designed to address workplace alcoholism (Roman, 1981; Roman & Blum, 2002), the majority of employees with at-risk drinking are not identified by EAP clinicians or provided services if identified (Chan, Neighbors, & Marlatt, 2004).

Addressing at-risk drinking among employees is important because drinking too much can be associated with worksite problems such as late arrivals, early departures, turnover, co-worker conflict, injuries, absenteeism, and workplace aggression (Mangione et al., 1999; McFarlin & Fals-Stewart, 2002; McFarlin, Fals-Stewart, Major, & Justice, 2001; Osterberg, 2006; Webb et al., 1994), and because at-risk drinking often precedes alcohol abuse and dependence (Institute of Medicine, 1990). Using an EAP to address at-risk drinking may help prevent more serious alcohol consumption and also reduce broader worksite problems.

Alcohol-related consequences are costly to employers and society. Impaired productivity and employment losses are estimated at $93 to $134 billion annually (Burke, 1988; Harwood, 2000; National Institute on Alcohol Abuse and Alcoholism, 2001; Office of National Drug Control Policy, 2001). Direct healthcare costs alone from at-risk drinking are between $26.4 to $35.8 billion per year (Goplerud & Summers, 2005; Harwood, 2000) These estimates do not factor in other costs such as high job turnover rates, coworker conflict, injuries, higher health benefit costs (when the employer subsidizes insurance), and workplace aggression (Mangione et al., 1999; McFarlin & Fals-Stewart, 2002; McFarlin et al., 2001; Webb et al., 1994). Alcohol-related employment problems (e.g., reduced efficiency, premature death, increased unemployment) represent more than 70% of total alcohol costs incurred by workplaces (Harwood, 2000). Targeting preventive services to individuals with at-risk drinking in the worksite may lead to decreases in personal, employer, and societal costs associated with long-term alcohol use disorders and treatment.

Brief interventions (BIs) aim to raise awareness of at-risk drinking and prevent more serious alcohol problems from developing (Substance Abuse and Mental Health Services Administration, 2008). BIs can be delivered in 5–60 minutes in one to five sessions, where clients identified for at-risk behavior are provided normative feedback information, education, skill-building, and practical advice, rather than psychotherapy or other specialized treatment techniques (Babor & Higgins-Biddle, 2000). BIs often utilize a Motivational Interviewing (MI) style (Miller & Rollnick, 2002). MI is a counseling style used to enhance a client's intrinsic motivation to change by exploring and resolving their ambivalence regarding substance use behavior and desire to change. The style emphasizes a nonconfrontational and nonjudgmental counselor stance, which is contrary to expert or authoritarian styles that serve to confront, educate, and convince clients of the need to change. BIs utilizing MI can stand alone or be used as a prelude if more intensive treatment is warranted.

Substantial evidence supports the effectiveness of BIs in settings such as primary care, trauma centers, and college settings (Bien, Miller, & Tonigan, 1993; Dunn, Deroo, & Rivara, 2001; Fleming et al., 2002; Hettema, Steele, & Miller, 2005; Marlatt et al., 1998). However, only a small number of published studies have examined the efficacy of BIs in worksite settings (Anderson & Larimer, 2002; Osilla, Zellmer, Larimer, Neighbors, & Marlatt, 2008; Webb, Shakeshaft, Sanson-Fisher, & Havard, 2009). Implementing BIs in EAPs or other healthcare settings may be difficult due to barriers at the organizational and clinician level (Watkins, Pincus, Taneilian, & Lloyd, 2003). At the clinician level, insufficient knowledge of the referral process, options for empirically based interventions, discomfort with asking about drinking, time constraints, and lack of screening techniques may all contribute to barriers associated with

implementing BIs (Spandorfer, Israel, & Turner, 1999; Adams, Barry, & Fleming, 1996). EAP settings may also face additional barriers specific to the worksite, such as workers' concerns about confidentiality, time constraints due to work schedules, and stigma associated with obtaining treatment for drinking issues.

In addition to a lack of literature examining BIs in worksite settings, it is also unknown whether BIs, regardless of setting, impact worksite-specific outcomes. Preliminary evidence suggests that a BI in an EAP can efficaciously reduce heavy drinking, peak blood alcohol content, and drinking consequences compared to clients receiving standard EAP care alone (Osilla et al., 2008), but research has yet to determine whether changes in alcohol-specific outcomes correspond with changes in worksite-specific behaviors such as on-the-job productivity. The impact of BIs on such workplace outcomes may provide new and important insights to the broad application of BIs in other domains.

Worksite outcomes describe behaviors that affect on-the-job productivity and also their associated costs incurred as a result of at-risk drinking. Behaviors include performance while at work (presenteeism) and reduced productivity due to being absent from work (absenteeism; Mattke, Balakrishnan, Bergamo, & Newberry, 2007). Presenteeism measures how efficiently and well an individual performs on-the-job (Mattke et al., 2007). For example, someone with low presenteeism may not do work when expected, work as carefully as they should, concentrate as well on their work, and in general have lower work performance than most coworkers. Absenteeism is measured as the amount of time absent from work because of physical or mental health (Kessler et al., 2004). Someone with high absenteeism would have more hours or days missed from work.

The literature on the impact of drinking on productivity is mixed with studies suggesting no relationship (Burton et al., 2005; Serxner, Gold, & Bultman, 2001), a relationship between at-risk drinking and lower presenteeism but not absenteeism (Pelletier, Boles, & Lynch, 2004), and a relationship with at-risk drinking and increased absenteeism (Goplerud & Summers, 2005; McFarlin & Fals-Stewart, 2002; Roche et al., 2008; Upmark, Moller, & Romelsjo, 1999). As argued by Frone (2006), one of the reasons this relationship is unclear is because most studies fail to specifically measure alcohol impairment in the workplace, making it difficult to discern valid and reliable information. Measuring productivity systematically and with psychometrically sound measures aids in understanding how health conditions, such as at-risk drinking, impact worksite outcomes.

By understanding the impact of at-risk drinking on worksite outcomes, associated costs can be calculated to further reflect how these behaviors translate to financial costs to employers and society. For example, several studies have conducted general cost-benefit analyses of BIs in primary care and emergency department settings. These studies have demonstrated that the societal benefits (e.g., reduced alcohol-related accidents and hospital admissions) far outweigh the implementation costs of BIs (Fleming et al., 2000; Fleming et al., 2002; Gentilello, Ebel, Wickizer, Salkever, & Rivara, 2005; Solberg, Maciosek, & Edwards, 2008). However, no studies to our knowledge have documented costs specifically related to worksite outcomes for an employed population (e.g., cost savings from improved on-the-job productivity). Examining worksite outcomes is important because interventions can have broad impacts on mood, work productivity, job retention, and number of hours worked (e.g., Wang et al., 2007). Thus, improved productivity may significantly impact both health and other work outcomes. The current study (1) explores whether a BI provided by EAP counselors to clients with at-risk drinking can decrease worksite outcomes (presenteeism and absenteeism), and (2) provides preliminary estimates of the productivity-related cost savings for clients in the BI condition compared to EAP usual care (UC). The findings in this study are meant to examine whether worksite productivity may be a promising outcome to examine in future BI studies.

2. Methods

2.1. Screening and recruitment

Participants were individuals 18 and older seeking behavioral health services at one of five external EAP offices in three states (see Osilla et al., 2008 for original report). A large EAP corporation that serves over 1,200 employers operated the EAP offices. Before the first EAP appointment, all EAP clients completed a self-report health screen questionnaire, which included questions regarding alcohol consumption from the Alcohol Use Disorders Identification Test-Consumption questions (AUDIT-C; Babor, de la Fuente, Saunders, & Grant, 1992). Clients with AUDIT-C scores greater than or equal to 5 (males) or 3 (female) who were not being seen as a couple or family or because of a work-related mandate were invited to participate in the study (Dawson, Grant, & Stinson, 2005). These cut-off scores represent at-risk drinking criteria defined by the National Institute of Alcohol Abuse and Alcoholism (2005) and the U.S. Department of Health and Human Services (2000). Of the clients screened, about 30% met criteria for at-risk drinking. Figure 1 describes recruitment and attrition of the participants throughout the study. Data were analyzed by group according to an intent-to-treat framework.

Randomization was conducted at the counselor level rather than the participant level due to EAP organizational policy, client access to services, and reluctance to alter workflows. To create a feasible randomization method, counselors were stratified and randomly assigned to either the BI+UC (intervention) or the UC only (comparison) group. Counselor demographics, EAP experience, substance use, and MI experience were collected after obtaining informed consent (Baer et al., 2004). Counselors were stratified by gender and clinical experience and then randomly assigned to one of the intervention groups by coin toss.

The BI was delivered during the second counseling session. All clients received UC for the first session because clients presented with concerns other than drinking required counselor assessment. During the second session, clients in the intervention group received BI, while clients in the comparison group arm received UC. The BI consisted of personalized feedback, which was derived from the client's baseline assessment and delivered by counselors using a MI style (Miller & Rollnick, 2002). Feedback was modeled after previous research (Anderson & Larimer, 2002; Marlatt et al., 1998) and included a comparison of drinking rates with U.S. norms (Chan et al., 2007), typical and peak blood alcohol content (BAC), alcohol expectations, high risk drinking situations, and negative drinking consequences. A copy of the feedback, tips to maintain moderation, and a personalized BAC card were given to each client. Six female and three male counselors with an average of 19.83 (*SD* = 9.79) years of counseling experience delivered the BI or UC.

Clients completed a self-report baseline assessment between their first and second session and a follow-up 3 months after baseline. Additional information about the study is described elsewhere (Osilla et al., 2008). Final analyses included participants who completed all assessments (N=44).

2.2. Participants

Participants were 64% female, 84% Caucasian, and an average of 38 years old (*SD* = 12.87). Participants earned an average annual salary of $33,700 (before taxes, *SD* = $15,400) and were employed in diverse occupations such as clerical/administrative (e.g., secretary, billing clerk), service (e.g., security officer, food service worker), and professional (e.g., engineer, accountant) jobs. Table 1 summarizes overall and group-level demographics of the sample.

2.3. Measures of productivity and costs

Assessments examined work performance at baseline and 3-month follow-up utilizing sections of the World Health Organization's Health and Productivity Questionnaire (HPQ; Kessler et al., 2004; Kessler et al., 2003). The HPQ measures efficiency and performance at work (presenteeism) and hours missed from work (absenteeism). Self-report of presenteeism and absenteeism from the HPQ has been well validated against supervisor ratings, peer evaluations, and other metrics of job performance (Kessler et al., 2004; Kessler et al., 2003). These variables are calculated as values of efficiency and missed hours. In addition, ratios can be created comparing an individual's efficiency and missed hours relative to other workers with a similar job type. The HPQ also measures demographics such as the participant's self-reported job type and average annual income before taxes.

The HPQ can also be used to calculate cost savings associated with changes in employee productivity. These costs translate to the amount of money employers save or lose when an employee is more or less productive at work (e.g., when an employee is absent from work and a replacement is needed). In the context of BI research, information from the HPQ can provide estimates of the costs and cost savings associated with providing BI to employees with at-risk drinking.

2.3.1. Absenteeism—First, hours missed from work in the past 4 weeks were calculated by subtracting the number of hours participants actually worked in the past 4 weeks from the number of hours their employer expected them to have worked. For example, a typical 40-hour work week would total 160 hours in the past 4 weeks. If a participant worked 100 hours out of an expected 160-hour week, the participant would have missed 60 hours of work in the past 4 weeks. Alternatively, if a participant worked 200 hours out of an expected 160-hour work week, the participant would have worked 40 extra hours in the past 4 weeks (160 minus 200 or −40 hours of work) according to the HPQ scoring system. Second, a ratio representing the percent of work hours missed was calculated by dividing the number of hours missed by the total expected hours of work. For example, if a participant had missed 60 hours of work out of the 160 expected hours, the participant would have missed about 38% of her work hours in the past 4 weeks. However, if a participant worked 40 hours in addition to her 160 expected hours, her ratio of work hours missed would be 125%.

2.3.2. Presenteeism—On-the-job work efficiency/performance in the past 4 weeks was measured on an 11-point scale (0-worst performance to 10-top performance) by asking the participant's usual performance on the days they worked in the past 4 weeks and the performance of most workers in a job similar to theirs. Consistent with the HPQ scoring instructions (Kessler, Petukhova, McInnes, & Ustun, 2007), these two scores were then multiplied by 10 to yield a presenteeism score between 0 and 100. For example, if a participant scored a 3 on their own performance, their presenteeism score would be 30. A ratio representing the participant's relative performance compared to most other workers was calculated by dividing the participant's presenteeism score by the score of most workers. For example, if a participant scored 30 on presenteeism and their rating of most workers was 90, the participant performed at 33% of the level of most workers in a job type similar to hers.

2.3.3. Costs of lost productivity—Costs of productivity due to changes in absenteeism and lower presenteeism were monetized by taking the product of total lost workdays, the participant's average daily salary, a worker absence multiplier, and a fringe benefits multiplier (Loeppke et al., 2007). For interpretation purposes, negative values of cost represent productivity gained (money *saved*) and positive values of cost represent productivity loss (money *lost*). Figure 2 summarizes the costs formula and is described briefly below. Total lost workdays was calculated by converting the hours missed from work into total days missed

from work, and converting the presenteeism ratio (percent the participant performed at the level of most workers) into the amount of days lost due to low presenteeism (HPQ Data Consortium, 2003). To calculate the latter, the presenteeism ratio was subtracted from 1, then multiplied by the actual days worked in the past 4 weeks (e.g., using the example above, subtracting .33 from 1 and multiplying by the number of days worked (100 hours/8 hours a day = 12.5 days worked), totaling 8.375 days lost due to low presenteeism).

Worker-absence (Nicholson et al., 2006) and fringe benefit multipliers (U.S. Bureau of Labor Statistics, 2005) were drawn from existing literature to account for how different worker occupations have varying impacts on employers and team production when absent (e.g., absence of a flight attendant or construction worker has a larger impact on employer costs than food service workers). For job categories that did not map onto existing literature, the first and second author independently matched HPQ categories to the existing sources and reached a consensus on discrepancies. For example, the "professional" category in the HPQ was matched to six jobs (Nicholson et al., 2006): Construction engineer; aerospace engineer; mechanical engineer; registered nurse, hospital; registered nurse, hospital operating room; and registered nurse: physician's office. Taking the average of the worker absence multipliers across the six occupations produced a multiplier of 1.44 for the HPQ "professional" category. Multipliers were interpreted as the percent of the employee's daily salary incurred by employers when employees are absent (worker-absence multiplier) or when employees receive their fringe benefits (compensation or perks in addition to salary).

2.3.4. Statistical methods—The data were examined for outliers using boxplots and no datapoints were excluded. We used ordinary least squares regression to compare levels of presenteeism and absenteeism in the two groups, controlling for baseline measures of the same variable, to identify significant differences between intervention groups at follow-up. To analyze costs, ordinary least squares regression with bootstrap estimation of standard errors was used to control for baseline differences. Bootstrap estimation was used in order to provide appropriate standard errors with highly skewed costs data. We corrected for clustering of clients within counselors for all outcome measures using Huber-White sandwich estimates and, after correcting, found no substantive differences. Therefore, we present the uncorrected results. Analyses were carried out using Stata 10.0 for Macintosh (StataCorp, 2007).

3. Results

3.1. Sample characteristics

There were no statistically significant differences between eligible clients who consented versus those who did not consent with the exception that eligible male clients consenting to the study drank more and scored about 1 point higher on the AUDIT-C than male clients who did not consent (F (1, 121) = 6.45, p = .012). Eligible men (n=16) scored an average of 7.78 on the AUDIT-C (SD = 2.08) and women (n=28) scored 4.42 (SD = 1.73). Clients who had missing outcomes data were not significantly different in demographics and at-risk drinking scores compared to clients with these data.

Table 1 compares the demographic characteristics of the intervention and comparison groups. There were no statistically significant differences found at baseline. In addition, participants attended an average of three EAP sessions, which did not differ by group (BI+UC: M = 3.08, SD = 1.35; UC: M = 3.17, SD = 1.34). Table 2 presents raw means and standard deviations for the outcome variables, which were later controlled for in all analyses. Regarding baseline values of missed hours by group, consider the range of missed hours possible (−70 hours to 130 hours). In addition, t-tests showed there were no statistically significant differences in outcome measures at baseline between the two groups. Though the raw data seems to show that the UC-only group demonstrates more improved workplace performance at follow-up,

variation and differences at baseline make the raw values difficult to interpret. We therefore controlled for baseline values in all analyses.

3.2. Presenteeism and absenteeism

As shown in Table 3, after controlling for variation in baseline levels of presenteeism, participants in the intervention group had increased presenteeism (better on-the-job efficiency/performance) compared to participants in the comparison group at 3-month follow-up. Participants in the intervention group scored 9.51 points greater than the comparison group ($p = 0.010$; 95% CI [2.43, 16.58]; $d = 0.73$). In addition, after controlling for baseline presenteeism ratios (participant's performance relative to other workers), participants in the intervention group reported higher ratios (better on-the-job performance compared to other workers) than the comparison group. The intervention group scored 0.16 points greater than the comparison group ($p = 0.011$; 95% CI [0.04, 0.29]; $d = 0.72$). Both of these measures of presenteeism had large effect sizes for the intervention (using the standard definitions provided by Cohen, 1992). The absenteeism variables failed to achieve statistical significance at the conventional 0.05 level, but were in the predicted direction. Participants in the intervention group had about 6 fewer missed hours of work over the comparison group, and with a small effect size of 0.28.

3.3. Costs of lost productivity

Costs of productivity were measured at baseline and follow-up. After controlling for variation in baseline costs, the cost differential per participant in the intervention group at follow-up was estimated to be −$1,175.82 ($p = 0.003$, CI 95% [−$2,059.69, −$491.91], $d = .66$) over a participant in the comparison group; a medium effect size for this finding. These were costs *saved* in the intervention condition from improved productivity over the 4-week time period prior to the follow-up assessment.

4. Discussion

The current study explored whether a BI for at-risk drinking can impact broader outcomes such as presenteeism and absenteeism, and the associated productivity cost savings. Preliminary evidence suggests that worksite productivity increases when EAP clients with at-risk drinking receive a one session BI in addition to UC, compared to those who only receive UC, and that the effect sizes are large. Previous research has shown that BIs can decrease drinking behavior at similar effect sizes (Anderson & Larimer, 2002; Dunn et al., 2001; Hettema et al., 2005), but the effect on workplace productivity as an additional outcome has not been previously explored. Measures of productivity are important because lost productivity is costly to employers and evidence that BIs can decrease costs would document a return on investment for employers and help justify wide dissemination. Further, documenting the impacts of improved productivity would be valuable to employers striving to increase job retention, turnover, and the health of their employees.

Consistent with the literature, the increase in productivity comes primarily from increases in presenteeism and not decreases in absenteeism (Goetzel et al., 2004; Hemp, 2004). One hypothesis would be that absenteeism may be a byproduct of more severe drinking consequences not detectable among at-risk drinkers. For example, research suggests that absenteeism increases as alcohol consumption increases (Roche et al., 2008; Upmark et al., 1999). Thus, individuals with clinical diagnoses of alcohol abuse and dependence may be more likely to experience absenteeism. Because this study specifically recruited individuals with at-risk drinking, changes in absenteeism may not have been detectable. Also, our sample size was small, which may affect why differences were not detectable.

The increase in productivity may translate directly into cost savings for employers and EAPs interested in implementing BIs. BIs are inexpensive to deliver (Zarkin, Bray, Davis, Babor, & Higgins-Biddle, 2003) and the benefits far outweigh the costs (Fleming et al., 2000; Fleming et al., 2002; Gentilello et al., 2005; Solberg et al., 2008). Thus, the implementation costs may be negligible compared to the amount saved. In this study, the estimated cost savings from productivity at 3-month follow-up was about $1,200 for each client that attended the one-session intervention. Participants from both groups received the same amount of services and did not differ in the total number of EAP sessions they attended, allowing us to attribute the savings to the intervention because of randomization (Kessler & Stang, 2006).

We conducted an exploratory study to examine whether workplace productivity may be a promising outcome for future BI research. As such, this study has several limitations. First, our small sample size does affect our ability to generalize these findings. While outliers were not noted, samples with fewer participants can be easily influenced by atypical participants than samples with more participants. The generalizability of the results to other EAPs and non-EAP worksite settings is also unknown. Second, randomization occurred at the counselor level, which may impact interpretation of the generalizability of these results. Although the use of an appropriate correction did not substantively alter our results, individually randomized studies at the participant level have greater power to detect effects (Murray, 1998). Third, this study recruited participants from various occupations and while we controlled for baseline variations of absenteeism and presenteeism, these variables may vary by occupation because of policies and workplace norms (e.g., obligation to stay home if ill when working in a medical setting; Lerner & Lee, 2006). Fourth, the long-term sustainability of performance outcomes and cost savings is unknown. The HPQ only assesses the costs of the past 4 weeks at the 3-month follow-up and we do not have data on opportunity costs (e.g., decision to attend the EAP during work hours) and longer-term costs. Thus, it is difficult to know whether costs were saved continuously since baseline. Also, the extent to which those cost savings might be carried forward or invalidated by later events is unknown. Finally, we tested more than one outcome variable, and therefore our type I error rate is potentially inflated. While we considered adjusting for multiple tests, we felt the Bonferroni or Benjamini-Hochberg correction would not be well suited for this exploratory study given the small sample size and the potential to further reduce power. Thus, these findings should be interpreted as preliminary and further research with larger and more diverse samples is encouraged.

Future BI research may consider examining the effects of presenteeism and absenteeism with larger samples (including general work and non-EAP samples) and longer follow-up to assess the longer-term cost savings associated with BIs. These studies may also estimate societal costs associated with improved productivity (e.g., reduced car accidents and rates of alcohol use disorders) and how these costs further offset BI implementation costs (e.g., to evaluate cost-effectiveness). For example, previous cost-benefit analyses examining a BI in primary care and trauma settings (e.g., Fleming et al., 2000; Gentilello et al., 2005) may be applied to BIs with an employed population.

This study demonstrates preliminary evidence of how alcohol-related BIs can significantly impact worksite outcomes. The EAP is an underutilized resource that has great potential for providing screening and BIs for the large proportions of employees that experience at-risk drinking. Utilizing EAPs meets both employer goals to improve productivity and public health goals of curbing alcohol use disorders. BIs are currently among the most highly recommended preventive services in primary care because of significant personal and societal benefits (Solberg et al., 2008) and are equally important as routine care for the worksite. Widely implementing BIs in standard EAP care may have the potential for decreasing the prevalence of alcohol use disorders in the worksite and improving broader outcomes such as worksite productivity.

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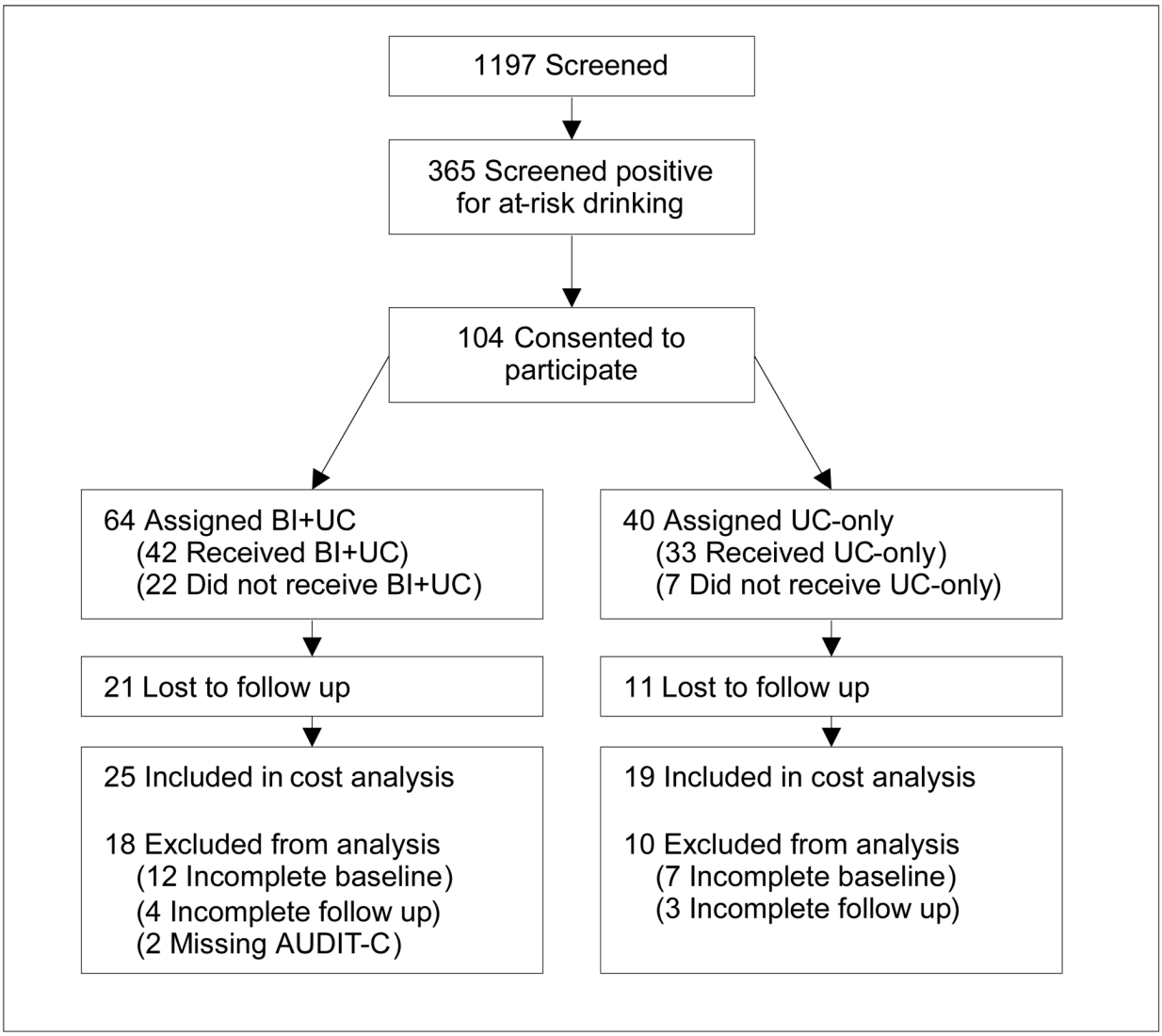


BI = brief intervention

UC = usual care

AUDIT-C = Alcohol Use Disorders Identification Test-Consumption Questions

Figure 1.
Recruitment and attrition of study subjects

Costs of lost productivity =

(Total lost workdays [a]) x (Daily Salary [b]) x (Absence multiplier [c]) x (Fringe benefits multiplier [d])

[a] Total lost workdays = Total missed days of work + days lost to low presenteeism (HPQ Data Consortium, 2003)

[b] Average Daily Salary = Total Compensation/250 (HPQ Data Consortium, 2003)

[c] Absence multiplier = Derived from Nicholson et al., 2006

[d] Fringe Benefit Multiplier = Derived from U.S. Bureau of Labor Statistics, 2005

Figure 2.
Cost formula derivation

Table 1

Sample demographics

Characteristic	Overall (N=44)	BI+UC (N=25)	UC-only (N=19)
Gender (% Female)	63.64	68.00	57.89
Age, mean yrs (SD)	38.05 (12.87)	37.24 (13.64)	39.10 (12.07)
Ethnicity (%)			
Caucasian	84.09	88.00	78.95
Latino/Hispanic	2.27	4.00	0.00
African American	2.27	4.00	0.00
Multi-Racial	4.55	4.00	5.26
Other	6.82	0.00	15.79
Annul income, mean, US$, (SD)	$33,659.09	$32,380.00	$35,342.11
	($15,463.30)	($13,361.39)	($18,109.51)
Education (%)			
Graduated from college	43.90	40.91	47.37
Attended some college	39.02	45.45	31.58
Did not attend college	17.07	13.64	21.05
Occupation (%)			
Executive, administrator, or senior			
Manager	4.55	4.00	5.26
Professional	22.73	24.00	21.05
Technical support	15.91	20.00	10.53
Sales	4.55	8.00	0.00
Clerical and administrative support	22.73	28.00	15.79
Service occupation	20.45	8.00	36.84
Precision production and crafts worker	0.00	0.00	0.00
Operator or laborer	9.09	8.00	10.53

Table 2

Raw means of productivity variables at baseline and follow-up

	BI+UC N=25		UC N=19	
	Baseline	3 mo FU	Baseline	3 mo FU
Variable [a]	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**
ABSENTEEISM				
Hours Missed [b]	8.84 (30.76)	7.88 (23.03)	24.95 (50.86)	16.53 (17.10)
Ratio of Work Hours Missed	0.05 (0.19)	0.05 (0.14)	0.15 (0.31)	0.10 (0.11)
PRESENTEEISM				
Work Performance	71.20 (18.33)	84.00 (10.11)	64.74 (22.20)	73.16 (13.76)
Relative Work Performance	1.03 (0.31)	1.18 (0.20)	0.93 (0.39)	1.00 (0.21)
COSTS				
Costs of lost productivity	−$153.88 ($2,316.76)	−$888.52 ($1,556.77)	$1,316.10 ($3,218.04)	$776.50 ($1,668.17)

[a] Each variable was assessed in the past 4 weeks from the assessment

[b] Hours missed ranged from −70 (participant worked 70 hours more than expected in 4 weeks) to 130 (participant worked 130 hours less than expected in 4 weeks)

BI = brief intervention

UC = usual care

Table 3

Adjusted productivity variables at follow-up

Variable	Difference [a]		Significance			
	M	*SE*	*p*	*95% CI*		*d*
ABSENTEEISM (past 4 weeks)						
Hours Missed	−5.87	6.12	0.343	−18.23	6.49	−0.28
Ratio of Work Hours Missed	−0.04	0.04	0.346	−0.11	0.04	−0.28
PRESENTEEISM (past 4 weeks)						
Work Performance	9.51	3.50	0.010	2.43	16.58	0.73
Relative Work Performance	0.16	0.06	0.011	0.04	0.29	0.72
COSTS (past 4 weeks)						
Costs of lost productivity	−$1,175.82	$389.49	0.003	−$2,059.69	−$491.91	−0.66

[a] Difference between BI+UC and UC groups

BI = brief intervention

UC = usual care

Have I got a problem?
www.haveigotaproblem.com

Am I a safe drinker?

What are the recommended safe limits of alcohol drinking?

- **Men** should drink no more than 21 units of alcohol per week (and no more than four units in any one day).
- **Women** should drink no more than 14 units of alcohol per week (and no more than three units in any one day).
- **Pregnant women.** The exact amount that is safe is not known. Therefore, advice from the Department of Health is that pregnant women and women trying to become pregnant should not drink at all. If you do choose to drink when you are pregnant then limit it to one or two units, once or twice a week. And never get drunk.

In general, the more you drink above the safe limits, the more harmful alcohol is likely to be. And remember, binge drinking can be harmful even though the weekly total may not seem too high. For example, if you only drink once or twice a week, but when you do you drink 4-5 pints of beer each time, or a bottle of wine each time, then this is a risk to your health. Also, even one or two units can be dangerous if you drive, operate machinery, or take some types of medication.

What is a unit of alcohol?

One unit of alcohol is 10 ml (1 cl) by volume, or 8 g by weight, of pure alcohol. For example:

- One unit of alcohol is about equal to:
  - half a pint of ordinary strength beer, lager, or cider (3-4% alcohol by volume), or
  - a small pub measure (25 ml) of spirits (40% alcohol by volume), or
  - a standard pub measure (50 ml) of fortified wine such as sherry or port (20% alcohol by volume)
- There are one and a half units of alcohol in:
  - a small glass (125 ml) of ordinary strength wine (12% alcohol by volume), or
  - a standard pub measure (35 ml) of spirits (40% alcohol by volume)

But remember, many wines and beers are stronger than the more traditional ordinary strengths. A more accurate way of calculating units is as follows. The percentage alcohol by volume (% abv) of a drink equals the number of units in one litre of that drink. For example:

- Strong beer at 6% abv has six units in one litre. If you drink half a litre (500 ml) - just under a pint - then you have had three units.
- Wine at 14% abv has 14 units in one litre. If you drink a quarter of a litre (250 ml) - two small glasses - then you have had three and a half units.

Some other examples

Three pints of beer, three times per week, is at least 18-20 units per week. That is nearly the upper weekly safe limit for a man. However, each drinking session of three pints is at least six units, which is more than the safe limit advised for any one day.

Another example: a 750 ml bottle of 12% wine contains nine units. If you drink two bottles of 12% wine over a week, which is 18 units. This is above the upper safe limit for a woman.

Isn't alcohol good for you?

For men aged over 40 and for women past the menopause, it is thought that drinking a small amount of alcohol (1-2 units per day) helps to protect against heart disease and stroke.

Do you know how much you are drinking?

When asked 'How much do you drink?' many people give a much lower figure than the true amount. It is not that people usually lie about this, but it is easy not to realise your true alcohol intake. To give an honest answer to this question, try making a drinking diary for a couple of weeks or so. Jot down every drink that you have. Remember, it is a pub measure of spirits that equals one unit. A home measure is often a double.

If you are drinking more than the safe limits, you should aim to cut down your drinking.

For more information visit: Patient.co.uk

Global Status Report on Alcohol 2004

World Health Organization
Department of Mental Health and Substance Abuse
Geneva
2004

Part I

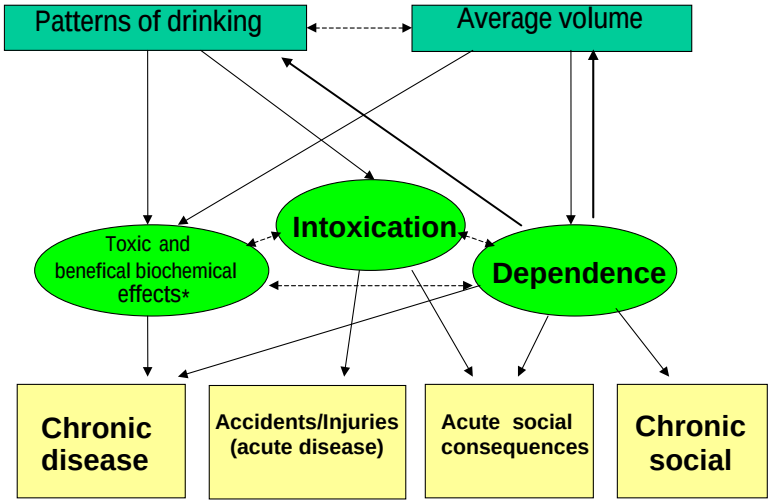
Consequences of alcohol use

Health effects and global burden of disease

Alcohol use is related to wide range of physical, mental and social harms[1]. Most health professionals agree that alcohol affects practically every organ in the human body. Alcohol consumption was linked to more than 60 disease conditions in a series of recent meta-analyses (English et al., 1995; Gutjahr, Gmel & Rehm, 2001; Ridolfo & Stevenson, 2001; Single et al., 1999). The present chapter mainly draws on the work of Gutjahr and Gmel (2001) and Rehm et al. (in press).

The link between alcohol consumption and consequences depends a) on the two main dimensions of alcohol consumption: average volume of consumption and patterns of drinking; and b) on the mediating mechanisms: biochemical effects, intoxication, and dependence (see Figure 4 for the main paths).

Figure 4: Model of alcohol consumption, mediating variables, and short-term and long-term consequences



** Independent of intoxication or dependence*
***Source**: Rehm et al. (2003c)*

Direct biochemical effects of alcohol may influence chronic disease either in a beneficial (e.g., protection against blood clot formation of moderate consumption (Zakhari, 1997), which is protective for coronary heart disease) or harmful way (e.g., toxic effects on acinar cells triggering pancreatic damage (Apte, Wilson & Korsten, 1997). ***Intoxication*** is a

[1] Social outcomes of alcohol are defined as changes that affect the social behaviour of individuals, or their interaction with partners and other family members, or their circumstances (Klingemann & Gmel, 2001). Social outcomes would include family problems, public disorder, or workplace problems. Social outcomes or consequences will not be addressed as part of this chapter unless they are part of the International Statistical Classification of Diseases and Related Health Problems (ICD). The majority of these problems are not covered by the ICD classification, even though health by WHO is defined in a broad way to include well-being. However, the quantification of such outcomes is difficult to derive and fraught by methodological difficulties. It is nevertheless important to note that social harm has a major impact on wellbeing, which may even exceed that from "quantifiable" diseases. For overviews see e.g. Klingeman and Gmel (2001) or Gmel and Rehm (2003).

powerful mediator mainly for acute outcomes, such as accidents, or intentional injuries or deaths, domestic conflict and violence (Klingemann & Gmel, 2001; Gmel & Rehm, 2003). ***Alcohol dependence*** is a powerful mechanism sustaining alcohol consumption and thus impacting on both chronic and acute consequences of alcohol (see Drummond, 1990), though it is also a consequence of drinking itself.

Total consumption or average volume of consumption has been historically the usual measure of exposure linking alcohol to disease (Bruun et al., 1975). Average volume of consumption as a risk factor is mainly linked to long-term consequences (WHO, 2000a). Acute effects of alcohol related to injury and death are much better predicted by *patterns of drinking* (Rehm et al., 1996; Bondy, 1996; Puddey et al., 1999), although there is also an association with volume of drinking. For example, the same overall average volume of alcohol can be consumed in small quantities regularly with meals (e.g. two drinks a day with meals) or in large quantities on few occasions (e.g. two bottles of wine on a single occasion every Friday). In other words, the impact of an average volume of consumption on mortality or morbidity is partly moderated by the way alcohol is consumed by the individual, which in turn is influenced by the social context (Room & Mäkelä, 2000). It should be noted that patterns of drinking have not only been linked to acute health outcomes such as injuries (Greenfield, 2001; Rossow, Pernanen & Rehm, 2001), but also to chronic diseases such as coronary heart disease (CHD) and especially sudden cardiac death (Britton & McKee, 2000; Chadwick & Goode, 1998; Puddey et al., 1999; Trevisan et al., 2001a; Trevisan et al., 2001b).

Thus, the variation of disease burden due to alcohol consumption across countries depends at least on two factors. First, it depends on the overall amount consumed in a country for which an indicator is *per capita* consumption. *Per capita* consumption of course is also influenced by the percentages of drinkers (or abstainers) in a country. Second, it depends on the way alcohol is consumed, e.g. regularly in moderate amounts with meals versus irregular in heavy drinking occasions often outside meals. Similarly, the distribution of alcohol related burden across diseases may vary widely across countries. At the risk of oversimplifying, chronic alcohol-related diseases predominantly depend on volume of drinking and should thus have a bigger share of the total burden in countries in which total *per capita* consumption is high, but the prevailing drinking pattern is a regular drinking pattern, whereas the share of acute consequences on the total burden should be higher in countries, where alcohol is commonly used more infrequently but often in high amounts when alcohol consumption takes place.

"Alcohol relatedness" varies across diseases. This is commonly expressed in alcohol attributable fractions (AAF). Some diseases or consequences are fully attributable to alcohol (e.g. the alcohol dependence syndrome), other consequences have a high alcohol attribution such as liver cirrhosis, for some consequences there are many other factors which may cause a disease, among which alcohol often plays one role, and thus the alcohol attributable part may be low. Low, however does not mean negligible. If 10% of all cases may be attributable to alcohol, for some highly prevalent diseases (e.g. breast cancer for women) the alcohol-related share may clearly outnumber diseases that are fully attributable to alcohol, but commonly rare. There are different ways to determine AAFs of diseases (for details see English et al., 1995). One is the indirect way, where relative risk estimates derived from meta-analyses are combined with country-specific disease prevalences to yield country-specific AAFs. The second is to use directly estimated AAFs, e.g. the percentage of traffic accidents where an involved person was tested positive for a blood alcohol concentration (BAC) exceeding a certain amount (e.g. 0.5 per mille). For most chronic diseases the indirect method is used. Behind this calculation stands the assumption that the mechanism for the development of a disease depend mainly on the consumed amount of alcohol and is therefore cross-culturally

stable. Therefore, Relative Risks (RR) can be derived by meta-analytical pooling of epidemiologic studies across different countries and regions all over the world. Differences in AAFs across countries then depend mainly on the prevalence of consumption distribution, e.g. the prevalence of chronic heavy drinking.

For most acute diseases, however, AAFs should be derived directly, because they depend on the way alcohol is consumed, e.g. a drinking pattern of frequent drinking to intoxication. An example for consequences for which the AAF are commonly directly derived are road accidents for which an alcohol attributable fraction is based on whether the accident-responsible driver tested positive for alcohol and to what degree (e.g. at blood alcohol concentration BAC $\geq$0.05%).

Harmful effects of alcohol consumption excluding depression and coronary heart disease

Wholly alcohol-attributable diseases

A number of diseases are by definition fully attributable to alcohol (AAF = 1 or 100%). These are listed in Table 12

Table 12: Disease conditions which are by definition alcohol-related (attributable fraction of 1)

ICD-9	Disease
291	Alcoholic psychoses
303	Alcohol-dependence syndrome
305.0	Alcohol abuse
357.5	Alcoholic polyneuropathy
425.5	Alcoholic cardiomyopathy
535.3	Alcoholic gastritis
571.0–571.3	Alcoholic liver cirrhosis
790.3	Excess blood alcohol
980.0, 980.1	Ethanol and methanol toxicity

Source: Rehm et al. (2003c)

Diseases with a contributory role

Cancer

Oropharyngeal, oesophageal and liver cancers: Alcohol has consistently been related to the risk of cancer of the mouth (lip, tongue), pharynx, larynx, hypopharynx, oesophagus and liver (Corrao et al., 1999; English et al., 1995; Gurr, 1996; Single et al., 1999; US Department of Health and Human Services, 2000; WHO, 2000a). The relationship between average volume of alcohol consumption and cancer is usually characterized as almost monotonically increasing relative risks with increasing volume of drinking (Bagnardi et al., 2001).

Female breast cancer: Much research has been conducted over the last decade on breast cancer. Prior to 1995, it has most often been concluded that evidence of a causal relationship with alcohol was insufficient (English et al., 1995; Rosenberg, Metzger & Palmer, 1993;

Schatzkin & Longnecker, 1994). However, recent studies and reviews have shown that not only hazardous or harmful drinking, but also even moderate alcohol consumption, can cause female breast cancer (Single et al., 1999). A meta-analysis by Smith-Warner et al. (1998) found a clear linear relationship over the whole continuum of consumption. Other original studies supported this finding (Bowlin et al., 1997; Corrao et al., 1999; Nasca et al., 1994; Royo-Bordonada et al., 1997; Swanson et al., 1997; van den Brandt, Goldbohm & van 't Veer, 1995; Wingo et al., 1997).

Cancers of the stomach, pancreas, colon, rectum, prostate, salivary glands, ovarium, endometrium, bladder: Many recent research projects have investigated whether these cancers are alcohol-related. Overall, evidence for a causal relationship between alcohol and cancer of the stomach, pancreas, colon, rectum, if any was found, was weak and inconclusive (Bode & Bode, 1997; Boutron et al., 1995; De Stefani et al., 1998; Gapstur, Potter & Folsom, 1994; Harnack et al., 1997; Ji et al., 1996 ; Longnecker & Enger, 1996; Lundberg & Passik, 1997; Piette, Barnett & Moos, 1998; Sarles, Bernard & Johnson, 1996; Seitz, Poschl & Simanowski, 1998; Seitz et al., 1998; Soler et al., 1998). A recent meta-analysis assessing the link between alcohol and various types of cancer showed that statistically significant increases in risk existed for cancers of the stomach, colon, rectum and ovaries (Bagnardi et al., 2001).

On prostate cancer, again most studies did not report observing an increased risk (Breslow & Weed, 1998; Ellison et al., 1998; Hiatt et al., 1994; Tavani et al., 1994), whereas two cohort studies (Ajani et al., 1998; Putnam et al., 1998) and one case–control study (Hayes et al., 1996) reported a small increased risk in men who consume even moderate amounts of alcohol.

It has been hypothesized that alcohol might constitute a risk factor for cancer of the major salivary glands (Horn-Ross, Ljung & Morrow, 1997; Muscat & Wynder, 1998), ovarium, endometrium (Bradley et al., 1998; Longnecker & Enger, 1996; Newcomb, Trentham-Dietz & Storer, 1997; Parazzini et al., 1995), and the bladder (Bruemmer et al., 1997; Donato et al., 1997; Longnecker & Enger, 1996; Yu et al., 1997). For each of these sites, results were either scarce or heterogeneous, or the effects, if any were found, not statistically significant. In sum, evidence for a causal relationship between alcohol and cancers of these sites so far has not produced consistent results, especially with regard to physiological pathways.

Overall, the risk relationship between alcohol and alcohol-related cancers can be characterized by an almost linear dose–response relationship between volume of drinking and the relative risk of outcome. Although there have been speculations about the impact of patterns of drinking**,** especially for breast cancer (Kohlmeier & Mendez, 1997), the current state of knowledge does not suggest that patterns of drinking play an important role in the etiology of cancer.[2]

Cardiovascular disease

There is increasing research in the past decades about the role of alcohol as both a risk and protective factor for cardiovascular disease. *Coronary heart disease* and the protective role of alcohol has been the focus of most research and will be discussed in a separate point below. Most studies suggest that low-level consumption equally offers some protection against *ischaemic stroke*.

[2] Part of this lack of an influence on patterns of cancer risk may be due to methodological reasons. Most epidemiological studies only measure volume of consumption and only model monotonically increasing trends and thus could not detect any influence of patterns of drinking even it were present.

In contrast, *hypertension* and other cardiovascular disorders such as *cardiac arrhythmias* or *heart failure* are adversely affected by alcohol (see Friedman, 1998; Klatsky, 1995; Puddey et al., 1999; Rosenqvist, 1998; US Department of Health and Human Services, 1997; Wood et al., 1998). There are some indications that hypertension may be related to the pattern of heavy drinking occasions (Murray et al., 2002; Puddey et al., 1999; Wannamethee & Shaper, 1991).

For *haemorrhagic stroke***,** the weight of evidence suggests an increase in risk for males even at low levels of consumption (Berger et al., 1999; Jackson, 1994; Sacco et al., 1999; You et al., 1997). For females the most recent meta-analyses of Ridolfo and Stevenson (2001) suggested a protective effect for drinking below 40 g pure ethanol per day, but an 8-fold increased risk for drinking above these limits. Patterns of drinking not only play a role in any protective effects of alcohol on CHD, drinking patterns are also relevant to risks of stroke (Hillbom, Juvela & Karttunen, 1998) and for sudden cardiovascular death or cardiovascular death in general (Kauhanen et al., 1997a; Kauhanen et al., 1997b; Kozarevic et al., 1982; Poikolainen, 1983; Wannamethee & Shaper, 1992) with heavy drinking occasions and intoxication resulting in increased risk.

Liver cirrhosis

Alcohol has been estimated as the leading cause of liver cirrhosis in established market economies (Corrao et al., 1997; Corrao et al., 1998; English et al., 1995). There is some debate whether alcohol's contributory role should be restricted to alcoholic liver cirrhosis alone or be extended to unspecified liver cirrhosis. Several authors contend that, empirically, it is extremely difficult to separate alcoholic from unspecified liver cirrhosis, and that the term "unspecified liver cirrhosis" is applied when no specific etiological factor is reported or identified (English et al., 1995). Research in the United States and in Central and South American countries indicated that an appreciable proportion of cirrhosis deaths without mention of alcohol was in fact attributable to alcohol (Haberman & Weinbaum, 1990; Puffer & Griffith, 1967; Room, 1972).

On the other hand, applying RRs of liver cirrhosis derived in established market economies to other countries can be extremely misleading. In many countries (e.g. China or India), liver cirrhosis is mainly caused by other factors such as viral infections. The corresponding AAFs have been shown to vary between less than 10% (China) and 90 % (Finland) (WHO, 2000a).

The relationship between alcohol consumption and liver cirrhosis seems to be mainly dependent on volume of drinking and independent of patterns of drinking (Lelbach, 1975; Lelbach, 1976). However, some research also indicates a potential effect of occasions of heavy drinking (Rhodés, Salaspuro & Sorensen, 1993).

Effects of prenatal alcohol exposure

Alcohol consumption during pregnancy is related to various risks to the fetus, which include gross congenital anomalies and Fetal Alcohol Spectrum Disorders (FASD), which include conditions such as fetal alcohol syndrome (Alvear, Andreani & Cortes, 1998; Church et al., 1997; Faden, Graubard & Dufour, 1997; Habbick et al., 1997; Larkby & Day, 1997; Larroque & Kaminski, 1996; Mattson et al., 1997; Passaro & Little, 1997; Passaro et al., 1996; Polygenis et al., 1998; Roebuck, Mattson & Riley, 1998; Shu et al., 1995; Windham et al., 1995). FASD ranges from individual anomalies at one end and serious neurobiological dysfunctions, including mental retardation, on the other (Connor & Streissguth, 1996). The prenatal teratogenic effects of alcohol also include lethal consequences. They comprise spontaneous abortion, low birth weight, fetal damage, prematurity, and intrauterine growth retardation (Abel, 1997; Bradley et al., 1998; Windham et al., 1997).

Mental conditions
The co-morbidity of alcohol dependence with other mental conditions is high, both in clinical and in general population samples (e.g. Grant & Harford, 1995; Merikangas et al., 1998). The crucial question in this respect is about causation. Sufficient evidence for a causal role of alcohol consumption at this point of research appears to exist mainly for depression. Since this relationship is controversial it will be discussed below in a separate section.

Other chronic conditions
Other risks of alcohol consumption currently discussed in the literature include *epilepsy* (see e.g. Jallon et al., 1998; Leone et al., 1997; Martín et al., 1995), *acute and chronic pancreatitis* (Ammann, Heitz & Klöppel, 1996; Skinazi, Lévy & Bernades, 1995; Damström Thakker, 1998; Robles-Diaz & Gorelick, 1997) and *psoriasis* (English et al., 1995).

Beneficial health effects of alcohol consumption excluding CHD

Ischaemic stroke
Cerebrovascular disease (stroke) consists of several subtypes, the most common subtypes being ischaemic stroke and haemorrhagic stroke, which are affected differently by alcohol. For ischaemic stroke, the predominant type of stroke, the weight of evidence including biological mechanisms, suggests effects similar to those for CHD, namely that low to moderate consumption may offer some protection (Beilin, Puddey & Burke, 1996; Hillbom, 1998; Keil et al., 1997; Kitamura et al., 1998; Knuiman & Vu, 1996; Sacco et al., 1999; Thun et al., 1997; Yuan et al., 1997; Wannamethee & Shaper, 1996). Alcohol consumption has detrimental effects on haemorrhagic stroke.

Other beneficial health effects of alcohol consumption

Alcohol may offer some protection against *diabetes* and cholelithiasis (gallstones) (English et al., 1995; see also Ashley et al., 2000, for a recent overview on beneficial effects of alcohol). Findings from a cohort of more than 40 000 male health professionals showed that moderate alcohol consumption may decrease the risk of diabetes, perhaps through the effects of alcohol on insulin sensitivity (Rimm et al., 1995). The protective effect was further substantiated, mainly in studies in established market economies (Perry et al., 1995; Ajani et al., 1999), however there may be differential effects on men and women, and even detrimental effects at higher levels of intake (Wei et al., 2000; Kao et al., 1998). Plausible biological mechanisms were seen to exist in mediating effects of moderate alcohol intake on glucose tolerance and insulin resistance (Facchini, Chen & Reaven, 1994; Kiechl et al., 1996; Lazarus, Sparrow & Weiss, 1997; Flanagan et al., 2000).

With regard to *cholelithiasis* (gallstones) there is some evidence that alcohol may offer some protection against gallstones (English et al., 1995; Holman et al., 1996). These findings have been substantiated by recent large-scale cohort and case-control studies, which reported an inverse relationship (Attili et al., 1998; Caroli-Bosc et al., 1998; Chen et al., 1999; Leitzmann et al., 1998).

Table 13 gives an overview of diseases on which alcohol potentially has beneficial effects.

Table 13: Relative risks for beneficial alcohol-related health effects for different drinking categories (compared to abstainers)

Disease	ICD-9	RR					
		Drinking category I		Drinking category II		Drinking category III	
		F	M	F	M	F	M
Diabetes	250	0.92	0.99	0.87	0.57	1.13	0.73
Ischaemic stroke	433-435	0.52	0.94	0.64	1.33	1.06	1.65
Cholelithiasis	574	0.82	0.82	0.68	0.68	0.50	0.50

Source*: Gutjahr, Gmel & Rehm (2001), Ridolfo & Stevenson (2001); Rehm et al. (in press).*

***Definition of drinking categories**: **category I**: for females not exceeding on average 0 to 19.99 g pure alcohol per day; for males not exceeding on average 0 to 39.99 g pure alcohol per day; **category II**: for females not exceeding on average 20 to 39.99 g pure alcohol per day; for males not exceeding on average 40 to 59.99 g pure alcohol per day; **category III**: for females on average 40 g pure alcohol and above per day; for males on average 60 g pure alcohol and above per day. For comparison: a 75 cl. bottle of wine contains about 70 g of pure alcohol.*

CHD as a chronic condition where alcohol has harmful and beneficial consequences

Coronary heart disease[3] is one of the leading causes of death in the world (Murray & Lopez, 1996a). The most important health benefits of alcohol have been found in the area of coronary heart disease at low to moderate levels of average volume of alcohol consumption (Beaglehole & Jackson, 1992; Doll, 1998; Edwards et al., 1994; Fuchs et al., 1995; Goldberg, Hahn & Parkes, 1995; Hillbom, 1998; Holman et al., 1996; Jackson, 1994; Rehm et al., 1997; Single et al., 1999; Svärdsudd, 1998). Only a few individual-level studies have failed to substantiate this association in men (Hart et al., 1999) or women (Fillmore et al., 1998; Maskarinec, Meng & Kolonel, 1998).

While some studies have found that alcohol may offer protection against CHD not only at low to moderate average intake, but across the continuum of alcohol consumption (Camargo et al., 1997; Doll et al., 1994; Keil et al., 1997), they nevertheless show that most of the protective effect is gained at low levels of consumption such as one drink every other day. The common assumption nowadays is that – at least in established market economies - average volume of drinking and CHD shows a J-shape relationship (Corrao et al., 2000), with detrimental effects compared with abstainers at higher levels of alcohol intake. The epidemiological evidence that light to moderate average alcohol consumption protects against CHD is strengthened by substantial evidence concerning the biological mechanisms by which a protective effect could be mediated:

- Favourable lipid profiles, especially an increase in high-density lipoproteins (HDL) (Baraona & Lieber, 1998). It has been estimated that as much as 40%–50% of the protective effect may be attributable to this mechanism (Criqui et al., 1987; Criqui & Ringek, 1994; Shu et al., 1992).
- Favourable effects on coagulation profiles, in particular, through its effects on platelet aggregation (McKenzie & Eisenberg, 1996; Rubin, 1999) and fibrinolysis (Reeder et al., 1996).

[3] CHD is used here for denoting all diseases with ICD 9 rubrics 410–414 (ICD 10: I20–I25). The same categories have also been labelled ischaemic heart disease (IHD).

- Favourable effects on insulin resistance (Kiechl et al., 1996; Lazarus, Sparrow & Weiss, 1997; Rankin, 1994).
- Favourable effects on hormonal profiles, in particular, its estrogen effects (Svärdsudd, 1998).
- Alcohol metabolite acetate has been postulated to protect against CHD by promoting vasodilation (US Department of Health and Human Services, 1997).
- Alcohol may affect inflammation (Imhof et al., 2001; Jacques et al., 2001; Morrow & Ridker, 2000; Ridker, 2001).

Finally, it is possible that some of the protective effects are mediated through the anti-oxidative constituents of alcohol beverages, especially wine (Reinke & McKay, 1996). However, most of the protective effect appears to be linked to ethanol, per se. In sum, the relationship between average volume of drinking and CHD seems to be J-shaped. Light to moderate drinking is associated with a lower CHD risk than abstaining or heavy drinking. However, the studies on average volume of consumption and CHD are heterogeneous, indicating that factors other than the ones included in the study co-determine the relationship. One of the main factors is pattern of drinking (i.e. the way in which the same average amount of alcohol is consumed). In this respect two patterns deserve mentioning: irregular heavy drinking occasions and drinking with meals.

As regards **heavy drinking occasions**, several studies showed that for the same volume consumed (i.e. adjusting for volume in multiple regression models) heavy drinking occasions (e.g. eight drinks in one sitting) have detrimental effects on CHD (McElduff & Dobson, 1997; Murray et al., 2002; Trevisan et al., 2001a).

In addition to the effect on CHD, there appears to be a relationship between irregular heavy drinking occasions and other forms of cardiovascular death, especially sudden cardiac death (Kauhanen et al., 1997b; Wannamethee & Shaper, 1992; Wood et al., 1998). This is consistent with the physiological mechanisms of increased clotting and reducing the threshold for ventricular fibrillation after heavy drinking occasions, which have been reviewed by McKee and Britton (1998). Specifically, heavy drinking occasions have been shown to increase low-density lipoproteins, which in turn have been linked to negative cardiovascular outcomes. Contrary to low or moderate steady drinking, heavy irregular drinking occasions are not associated with an increase of high-density lipoproteins, which themselves have been linked to favourable cardiovascular outcomes. In addition, irregular drinking is associated with increased risk of thrombosis, occurring after cessation of drinking (Renaud & Ruf, 1996). Finally, irregular heavy drinking seems to predispose to histological changes in the myocardium and conducting system, as well as to a reduction in the threshold for ventricular fibrillation. In sum, irregular heavy drinking occasions are mainly associated with physiological mechanisms increasing the risk of sudden cardiac death and other cardiovascular outcomes, in contrast to the physiological mechanisms triggered by steady low to moderate consumption and linked to favourable cardiac outcomes.

With respect to **drinking with meals,** Trevisan and colleagues (2001a; 2001b) reported more protective effects of alcohol consumption when it was predominately consumed with meals compared to alcohol consumption outside meals.

The potential mechanisms linking consumption of alcoholic beverages with meals to a lower CHD risk, remain to be fully clarified. Mechanisms may be the reduced postprandial blood pressure (Foppa et al., 1999), positive effects on fibrinolysis (Hendriks et al., 1994) and lipids

(Veenstra et al., 1990), and an increased alcohol elimination rate or a reduced alcohol absorption rate with food in the gastrointestinal tract (Gentry, 2000; Ramchandani, Kwo & Li, 2001). Several studies - mainly conducted at the aggregate level - showed that cultural drinking patterns are related to differential effects of volume on CHD mortality and morbidity. Most of them were either related to drastic changes in alcohol consumption and CHD mortality connected with the anti-alcohol campaign of the last years of the Soviet Union (Shkolnikov & Nemtsov, 1997; Bobak & Marmot, 1999; Britton & McKee, 2000; Leon et al., 1997; McKee, Shkolnikov & Leon, 2001; Notzon et al., 1998; Shkolnikov, McKee & Leon, 2001). Another indirect line of research on the effect of heavy drinking on CHD shows that countries with a tradition of heavier or binge-drinking occasions on weekends show proportionately high CHD or cardiovascular disease morality on or immediately after the weekend [Germany: CHD, (Willich et al., 1994); Moscow, Russian Federation: cardiovascular disease events, (Chenet et al., 1998); Lithuania: CHD events, (Chenet et al., 2001); Scotland: CHD events (cf. Evans et al., 2000)]. Finally, in the Global Burden of Disease (GBD) 2000 study, the moderating effect of drinking patterns on CHD could be demonstrated (Gmel, Rehm & Frick, 2003; Rehm et al., in press).

Depression

Alcohol is implicated in a variety of mental disorders which are not alcohol-specific. However, before the GBD 2000 study no major overview on alcohol-attributable burden of disease has included these conditions (English et al., 1995; Gutjahr, Gmel & Rehm, 2001; Rehm & Gmel, 2001; Ridolfo & Stevenson, 2001; Single et al., 1999). While the causality of the relation is hard to define, sufficient evidence now exists to assume alcohol's causal role in depression, a common mental disorder.

In the general population, alcohol dependence and major depression co-occur over-proportionally, on both a 12-month and a lifetime basis (Kessler et al., 1996; Kessler et al., 1997; Lynskey, 1998). Among alcohol consumers in the general population, higher volume of consumption is associated with more symptoms of depression (Graham & Schmidt, 1999; Mehrabian, 2001; Rodgers et al., 2000). Among patients in treatment for alcohol abuse and dependence, the prevalence of major depression is higher than in the general population (Lynskey, 1998; Schuckit et al., 1997). Higher prevalence of alcohol use disorders has been documented for patients in treatment for depression (Alpert et al., 1999; Blixen, McDougall & Suen, 1997).

This suggests that alcohol use disorders are linked to depressive symptoms, and that alcohol dependence and depressive disorders co-occur to a larger degree than expected by chance. However, it is not clear in the individual case whether the depression caused alcohol problems, whether the alcohol consumption or alcohol problems caused depression, or whether both could be attributed to a third cause (Vaillant, 1993). The pathway from depression to harmful alcohol use and alcohol dependence has long been discussed under the heading of self-medication (i.e. the use of alcohol to alleviate depressive symptoms). In addition, a shared third cause could be certain neurobiological mechanisms (see Markou, Kosten & Koob, 1998) or genetic predisposition. To be a causal factor, one condition is that alcohol use disorders must precede depression, i.e. only that fraction of depression can logically be caused by alcohol dependence where the onset of dependence preceded the onset of depression. Such fractions can be found in many countries (see data of the International Consortium in Psychiatric Epidemiology (ICPE), Merikangas et al., 1998). Commonly, proportions of depressive disorders, which are preceded by alcohol dependence, were higher

for males than for females. This corresponds to the higher prevalence rates of alcohol dependence in men. In fact, the proportion of depressive disorders and alcohol dependence rates correlate to about 0.80 (Rehm et al., in press; Rehm & Eschmann, 2002). Besides strength of association (commonly two-fold to three-fold increase in risk of depressive disorders have been found, e.g. Schuckit, 1996; Swendsen et al., 1998; Hilarski & Wodarki, 2001), reversibility (remission during abstinence) is a key indicator for causal effect of alcohol dependence on depressive disorders. There is sufficient evidence that abstinence substantially removes depressive symptoms in alcohol dependent persons within a short time frame (Brown & Schuckit, 1988; Dackis et al., 1986; Davidson, 1995; Gibson & Becker, 1973; Penick et al., 1988; Pettinati, Sugerman & Maurer, 1982; Willenbring, 1986).

The evidence indicates that a clear and consistent association exists between alcohol dependence and depressive disorders and that chance, confounding variables and other bias can be ruled out with reasonable confidence as factors in this association.

Summary on diseases related mainly to chronic alcohol consumption

Table 14 gives an overview of relative risks of major chronic diseases related to alcohol consumption.

Table 14: Relative risk for major chronic disease categories by sex and average drinking category

Disease	ICD-9 4digit	ICD-10 4digit	F			M		
			Drinking cat.I	Drinking cat.II	Drinking cat.III	Drinking cat.I	Drinking cat.II	Drinking cat.III
Conditions arising during the perinatal period	760–779 minus 771.3	P00-P96						
Low birth weight	764–765	P05-P07	1.00	1.40	1.40	1.00	1.40	1.40
Malignant neoplasms	140–208	C00-C97						
Mouth and oropharynx cancers	140–149	C00-C14	1.45	1.85	5.39	1.45	1.85	5.39
Oesophagus cancer	150	C15	1.80	2.38	4.36	1.80	2.38	4.36
Liver cancer	155	C22	1.45	3.03	3.60	1.45	3.03	3.6
Breast cancer*			1.14	1.41	1.59	n.a.	n.a.	n.a.
Under 45 years of age*	174	C50	1.15	1.41	1.46	n.a.	n.a.	n.a.
45 years and over*			1.14	1.38	1.62	n.a.	n.a.	n.a.
Other neoplasms	210–239	D00-D48	1.10	1.30	1.70	1.10	1.30	1.70
Diabetes mellitus	250	E10-E14	0.92	0.87	1.13	1.00	0.57	0.73
Neuro-psychiatric conditions	290–319, 324–359	F01-F99, G06-G98						
Unipolar major depression	300.4	F32-F33	AAF were directly assessed using dependence rates, but varied widely across regions and sex. For details see Rehm et al. (in press).					
Epilepsy	345	G40-G41	1.34	7.22	7.52	1.23	7.52	6.83
Alcohol-use disorders	291, 303, 305.0	F10	AAF 100%	AAF 100%	AAF 100%	AAF 100%	AAF 100%	AAF 100%
Cardiovascular diseases	390–459	I00-I99						
Hypertensive disease	401–405	I10-I13	1.40	2.00	2.00	1.40	2.00	4.10
Coronary heart disease	410–414	I20-I25	0.82	0.83	1.12	0.82	0.83	1.00
			AAFs need modelling of drinking patterns and thus widely vary across regions and sex. For details see Rehm et al. (in press).					
Cerebrovascular disease	430–438	I60-I69						
Ischaemic stroke*	433-435		0.52	0.64	1.06	0.94	1.33	1.65
Haemorrhagic stroke*	430-432		0.59	0.65	7.98	1.27	2.19	2.38
Digestive diseases	530–579	K20-K92						
Cirrhosis of the liver	571	K70, K74	1.30	9.50	13.00	1.30	9.50	13.00

Sources: *Gutjahr & Gmel (2001), Ridolfo & Stevenson (2001); if indicated by *; the category III estimates for CHD were based on Corrao et al. (2000) and Rehm et al. (in press).*

***Definition of drinking categories**: **category I**: for females not exceeding on average 0 to 19.99 g pure alcohol per day; for males not exceeding on average 0 to 39.99 g pure alcohol per day; **category II**: for females not exceeding on average 20 to 39.99 g pure alcohol per day; for males not exceeding on average 40 to 59.99 g pure alcohol per day; **category III**: for females on average 40 g pure alcohol and above per day; for males on average 60 g pure alcohol and above per day. For comparison: a 75 cl. bottle of wine contains about 70 g of pure alcohol.*

Acute adverse health consequences: accidental injury and poisoning, suicide, interpersonal violence and assaults

Alcohol use has been associated with increased risk of injury in a wide variety of settings including road traffic accident (vehicles, bicycles, pedestrians), falls, fires, injuries related to sports and recreational activities, self-inflicted injuries or injuries resulting from interpersonal violence (Cherpitel, 1992; Freedland, McMicken & D'Onofrio, 1993; Hingson & Howland, 1987; Hingson & Howland, 1993; Hurst, Harte & Firth, 1994; Martin, 1992; Martin & Bachman, 1997; US Department of Health and Human Services, 1997; US Department of Health and Human Services, 2000). There is also some evidence that the presence of alcohol in the body at the time of injury may be associated with greater severity of injury and less positive outcomes (Fuller, 1995; Li et al., 1997).

Unintentional injuries

Alcohol consumption produces effects that are often perceived as positive, as evidenced by the widespread popularity of drinking. But it also leads to actions that result in unintentional injury and death. This section highlights research findings on causality of alcohol involvement and findings relevant to establishing dose–response relationships and drinking patterns. It focuses on traffic injuries, as most of the research has been conducted in this area, and traffic accidents are the most important component of unintentional injuries (Rehm et al., 2003a).

Studies relating average volume of drinking to risk of injury have found the risk of injury to be positively related to increasing average intake levels of alcohol, with the risk increasing at relatively low volumes of intake (Cherpitel et al., 1995). Several patterns of drinking have been related to injury risk. Frequent heavy drinking and frequent subjective drunkenness are both associated with injury, particularly injury resulting from violence (Cherpitel, 1996). Often, the greatest risk was found in individuals who consume relatively large amounts on some occasions, and whose highest amounts are markedly greater than their average amount per occasion (Gruenewald & Nephew, 1994; Gruenewald, Mitchell & Treno, 1996; Gruenewald, Treno & Mitchell, 1996; Treno, Gruenewald & Ponicki, 1997; Treno & Holder, 1997). This was also confirmed in a statistically adequate re-analysis of the Grand Rapids study, that indicates that though all levels of BAC are associated with an increased risk of crashes, relative to a BAC of zero, the risk slope was accelerated for less frequent drinkers (Hurst, Harte & Firth, 1994).

There are clear biological mechanisms why alcohol is related to injury. Moderate doses of alcohol have been demonstrated in controlled experimental studies to have cognitive and psychomotor effects that are relevant to the risk of injury, such as reaction time, cognitive processing, coordination and vigilance (Eckhardt et al., 1998; Krüger et al., 1993; Moskowitz & Robinson, 1988; US Department of Health and Human Services, 1997). The comprehensive recent review by Eckardt and colleagues (1998) concluded that the threshold dose for negative effects on psychomotor tasks is generally found at around 40 to 50 mg% (equivalent to 0.04%–0.05%).

In summary, the evidence indicates that the amount consumed per occasion, and more specifically blood alcohol content, is the critical feature in determining risk of injury. Table 15 gives the attributable fractions for alcohol for different kinds of injuries in four recent reviews. The reviews based their estimates on meta-analyses or other summaries of the

relations found in published studies. It should be recognized that, while there are many such studies, they are mostly from a relatively small range of countries, mostly from established market economies. Hence, such estimates cannot necessarily be projected to other countries with different patterns of drinking and different average volumes of drinking.

Intentional injuries

Alcohol is strongly associated with violent crime (Graham & West, 2001), although this association varies considerably across settings (Murdoch, Pihl & Ross, 1990; Room & Rossow (2001), Rossow, Pernanen & Rehm, 2001). Studies on violence have repeatedly shown that alcohol consumption precedes violent events, and that the amount of drinking is related to severity of subsequent violence. Based on meta-analyses of experimental studies there appears to be a small effect size of about 0.22 (Bushman, 1997) in the overall relationship between alcohol consumption and aggression. However, experimental research was not able to attribute effects on aggression to pharmacological effects only. Specific expectations of consumers as regards the effects of alcohol must accompany alcohol consumption to result in aggression (Gmel & Rehm, 2003). The general conclusion is that expectations form part of the "psycho-pharmacological" effects of alcohol (Bushman, 1997; Graham et al., 1998), and should not be separated in attempting to understand the effects of alcohol.

There are a number of different effects of alcohol contributing to increased likelihood of aggressive behaviour. Alcohol may have an effect on the serotonin (5HT) and GABA brain receptors that may reduce fear and anxiety about social, physical or legal consequences of one's actions. Alcohol also affects cognitive functioning (Peterson et al., 1990), leading to impaired problem solving in conflict situations (Sayette, Wilson & Elias, 1993) and overly emotional responses or emotional ability (Pihl, Peterson & Lau, 1993). Other behavioural and attitudinal effects of alcohol related to aggression have been identified, although at this point not necessarily linked to particular pharmacological effects on the brain. These include a narrow and tenacious focus on the present (Graham, West & Wells, 2000; Washburne, 1956), also described as "alcohol myopia" (Steele & Josephs, 1990), and increased concerns with demonstrating personal power, at least for men (Graham, West & Wells, 2000; McClelland et al., 1972; Tomsen, 1997).

Estimating the proportion of alcohol induced intentional injuries is problematic and needs assessment from different sources, such as time-series analyses, natural experiments, case–control studies, emergency-room studies, general population surveys, and experimental designs (Pernanen, 2001). For details of a potential approach, using volume of drinking and drinking patterns in a cross-cultural approach see Rehm et al. (in press).

Table 15: Attributable fractions of acute alcohol-related health effects in the adult general population

Injury	ICD-9	USA Stinson et al. (1993)		AUSTRALIA English et al. (1995)		CANADA Single et al. (1996)		AUSTRALIA Ridolfo & Stevenson (2001)	
		F	M	F	M	F	M	F	M
Motor vehicle traffic accidents	E810–E819	0.42	0.42	0.18	0.37	0.43	0.43	0.11 for deaths (d) and hospitali-zations (h); pedestrians 0.17 (d); 0.06 (h)	0.33 (d); 024 (h); pedestrians 0.40 (d); 0.37 (h)
Motor vehicle nontraffic accidents	E820–E825	0.42	0.42	0.18	0.37	0.43	0.43		
Bicycle accident injuries	E826	0.20	0.20	0.18	0.37	0.20	0.20		
Other road vehicle accident injuries	E829	0.20	0.20	0.18	0.37	0.2	0.20		
Water transport accident injuries	E830–E839	0.20	0.20	No data	No data	0.20	0.20	No data	No data
Air-space transport accident injuries	E840–E845	0.16	0.16	No data	No data	0.16	0.16	No data	No data
Accidental ethanol and methanol poisoning	E860.0–E860.2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Accidental fall injuries	E880–E888	0.35	0.35	0.34	0.34	0.13-0.34	0.20-0.34	0.14 for age <65; 0.04> = 65	0.22 for age <65; 0.12> = 65
Arson injuries	E890–E899	0.45	0.45	0.44	0.44	0.38	0.38	0.44	0.44
Accidental excessive cold	E901	0.25	0.25	No data	No data	0.25	0.25	No data	No data
Accidental drowning	E910	0.38	0.38	0.34	0.34	0.31–0.50	0.31–0.50	0.34	0.34
Accidental aspiration	E911	0.25	0.25	1.0	1.00	0.25	0.25	1.00	1.00
Striking against / struck by objects	E917	0.25	0.25	No data	No data	0.07	0.07	No data	No data
Caught in / between objects	E918	0.25	0.25	No data	No data	0.07	0.07	No data	No data
Occupational and machine injuries	E919–E920	0.25	0.25	0.07	0.07	0.07	0.07	0.07	0.07
Accidental firearm missile injuries	E922	0.25	0.25	No data	No data	0.25	0.25	No data	No data
Suicide, self-inflicted injuries	E950–E959	0.28	0.28	0.08	0.12	0.11–0.19	0.23–0.31	0.29	0.32
Victim, fight, brawl, rape	E960	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Victim assault firearms	E965	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Victim assault cutting instrument	E966	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Victim child battering	E967	0.46	0.46	0.16	0.16	0.16	0.16	0.16	0.16
Victim assault other	E968	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47
Late effects of injuries by another	E969	0.46	0.46	0.47	0.47	0.27	0.27	0.47	0.47

***Remarks**:Ranges refer to age-specific attributable fractions; minimum (>0) and maximum estimates are shown.*
***Source**: Rehm et al. (in press)*

To sum up, in some countries there would be even more alcohol-related "prevented" death than caused deaths, mainly owing to the beneficial effect of low and moderate alcohol consumption on cardiovascular disease in some populations, like women of advanced age. This, however applies mainly to countries with established market economies, where life expectancy is high and the country's prevailing drinking pattern is a regular drinking pattern of moderate amounts, preferably consumed with meals. If one considers, however, life years lost instead of counting deaths only, a different picture emerges. There are more life years lost due to alcohol consumption than deaths "prevented". This can be explained by the fact that the years gained from alcohol consumption's beneficial effect on CHD are usually gained at higher ages and comprise only few years compared to the many years lost in deaths at early ages, e.g. in alcohol-related traffic-casualties. The balance would even bend down more stronger to the detrimental side, if in addition to life years lost also years spent in disability were included in estimates, such as in the burden of disease measure of disability adjusted life years lost (for details see next paragraph). Figures 5 and 6 demonstrate the difference in counting death versus other measures of life years lost for alcohol use disorders.

Figure 5: Global disease burden (in DALYs) in 2001 from alcohol use disorders, by age group and sex

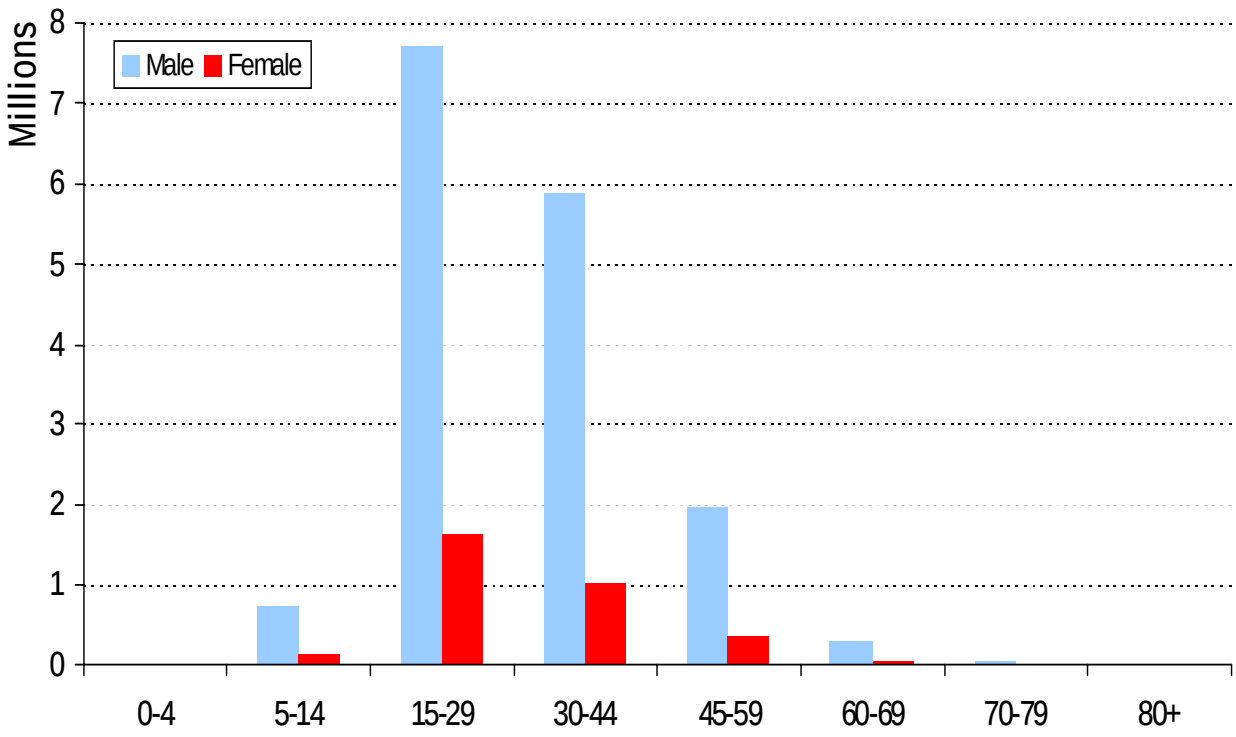
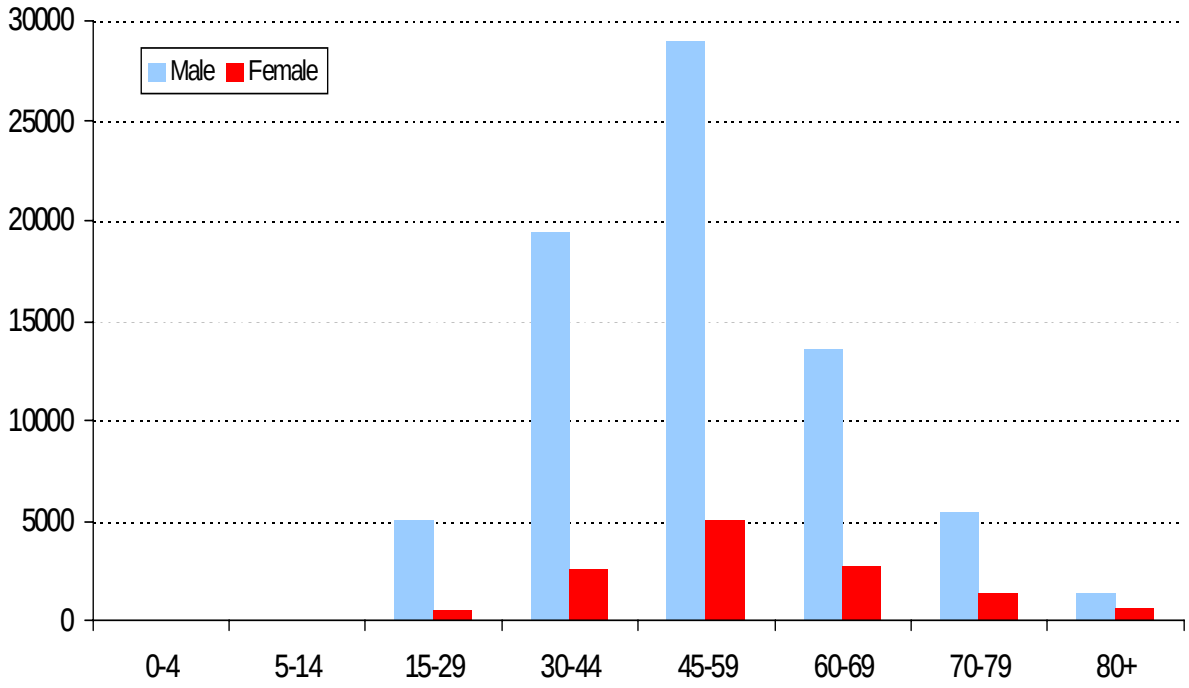


Figure 6: Global deaths in 2001 from alcohol use disorders, by age group and sex



The global burden of disease

A common measure of disease burden today are disability adjusted life years lost (DALYS, Murray & Lopez, 1996b). Such a measure combines mortality in terms of life years lost (YLL) due to premature death, and morbidity in terms of life years lived in disability (YLD). The latter weights the severity of a disease and its duration. For example, with a severity factor of 0.2 for a disease, five years spent in disability equals one year of life lost due to premature mortality. Alcohol-attributable DALYs are summarized in Table 16.

Table 16: Global burden of disease in 2000 attributable to alcohol according to major disease categories (DALYs in 000s)

Disease or Injury	Female	Male	Total	% of all alcohol-attributable DALYs
Conditions arising during the perinatal period	55	68	123	0%
Malignant neoplasm	1021	3180	4201	7%
Neuro-psychiatric conditions	3814	18 090	21 904	38%
Cardiovascular diseases	-428	4411	3983	7%
Other noncommunicable diseases (diabetes, liver cirrhosis)	860	3695	4555	8%
Unintentional injuries	2487	14 008	16 495	28%
Intentional injuries	1117	5945	7062	12%
Alcohol-related disease burden all causes (DALYs)	**8926**	**49 397**	**58 323**	**100%**
All DALYs	693 911	761 562	1 455 473	
% of all DALYs that can be attributable to alcohol	**1.3%**	**6.5%**	**4.0%**	*In comparison: estimate for 1990: 3.5%*

***Source**: Rehm et al. (2003d)*

What are the most striking differences between regions? Clearly alcohol-related burden is most detrimental in the developed world. Here 9.2% of all the disease burden is attributable to alcohol, only exceeded by the burden attributable to tobacco and blood pressure (see Table 17 and WHO, 2002). Here also the ratio of males to females is lowest. However, as Table 17 indicates, alcohol also places a toll on health in the developing world with relatively low mortality patterns. Here the disease burden attributable to alcohol is the highest of all 26 risk factors examined in the CRA of the GBD 2000 study (Ezzati et al., 2002). In the developing world with high mortality patterns like Africa and parts of South-East Asia, alcohol is not yet one of the major risk factors. Here, the most important risk factors are being underweight, unsafe sex, unsafe water sanitation and hygiene and other environmental factors. However, if seems to be predictable that alcohol–attributable burden will increase in these regions as well with economic development (Rehm et al., in press).

Table 17: Burden of disease in 2000 attributable to tobacco, alcohol and drugs by developing status and sex

	High mortality developing (AFR-D, AFR-E, AMR-D, EMR-D, SEAR-D)			**Low mortality developing (AMR-B, EMR-B, SEAR-B, WPR-B)**			**Developed (AMR-A, EUR-A, EUR-B, EUR-C, WPR-A)**		
	Male	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*
Total DALYs (000s)	420 711	412 052	832 763	223 181	185 316	408 497	117 670	96 543	214 213
Smoking and oral tobacco (%)	3.4	0.6	2.0	6.2	1.3	4.0	17.1	6.2	12.2
Alcohol (%)	2.6	0.5	1.6	9.8	2.0	6.2	14.0	3.3	9.2
Illicit drugs (%)	0.8	0.2	0.5	1.2	0.3	0.8	2.3	1.2	1.8

***Source**: Rehm et al. (in press).*

As stated above, the impact of alcohol consumption on diseases and the distribution of alcohol-related diseases should vary according to two factors: the volume and the drinking pattern.

Table 18 gives an overview of differences in alcohol consumption across WHO regions. The regional subgroupings have been defined by WHO (2000b) on the basis of high, medium or low levels of adult and of infant mortality. 'A' stands for very low child and very low adult mortality, 'B' stands for low child and low adult mortality, 'C' for low child and high adult mortality, 'D' for high child and high adult mortality, and 'E' for very high child and very high adult mortality (WHO, 2000b). From this it can be seen that in the developed low mortality countries (EUR-A, AMR-A, WPR-A) alcohol consumption of drinkers is usually high but alcohol is commonly consumed in a less detrimental way (e.g. regularly with meals; for details as regards the average drinking pattern, see Rehm et al., in press), and thus one would expect a larger share of chronic diseases including alcohol abuse and dependence, and a lower share of acute consequences such as injury. In developing countries with low mortality (AMR-B, EMR-B, SEAR-B, WPR-B) volume of drinking is high but drinking patterns are more detrimental. Thus, there should be a larger share of acute consequences. The same is true for high mortality developing countries (AFR-D, AFR-E, AMR-D, EMR-D, SEAR-D), for which however volume of drinking is usually low and thus the total alcohol-related burden should also be lower compared to the developing countries with low mortality. The greatest burden from alcohol consumption should be expected in the EUR-B and EUR-C regions where both volume of drinking is high and alcohol is consumed mostly in a detrimental pattern, and thus there should again be a high share of acute consequences again.

As Table 19 shows, empirically the aforementioned predictions could be confirmed, with the highest alcohol-related burden in the former socialist countries and the lowest burden in regions with low volume of drinking. Burden from acute consequences are highest in those regions, where regular drinking is rare, but alcohol is often consumed in large amounts when drinking takes place.

Table 20 shows the average attributable alcohol fractions (AAF) which were derived from calculations described in Babor, Rehm and Room (in press), for the categories of disorders for which alcohol was considered to be causal. The average AAFs are shown for men and women separately and together, for the world as a whole and for the three categories of high-mortality developing countries, low-mortality developing countries, and developed countries. Looking at the table, there are obvious gender differences to be found, with males having higher AAFs than females globally and in all regions. Also, the AAFs for developed countries are considerably higher than those of developing countries.

Table 21 gives an overview of standardized death rates for the chronic and acute diseases used in the current report (data shown is for most recent year available). It should be noted that these are not purely alcohol-related deaths. Traffic injuries, for example, also depend on the development of the transport system in a country, traffic or car densities, or road safety issues. Similarly, liver cirrhosis in many countries do not have a high alcohol involvement, but are related to poor sanitary conditions (poor drinking water quality causing high levels of hepatitis infections and liver diseases). Also, the numbers here do not imply that alcohol is responsible for all deaths from say cirrhosis of the liver or mouth and oropharynx cancer - with the exception of alcohol use disorders, the standardized mortality rates shown here are derived from the total number of deaths from the eight causes chosen irrespective of whether alcohol was a direct or indirect contributor to the deaths.

Table 18: Characteristics of adult alcohol consumption in different regions of the world 2000 (population weighted averages)

WHO Region (Definition see below)	Beverage type mostly consumed	Total consumption[1]	% unrecorded of total[2]	% heavy drinkers[3]	% drinkers among males	% drinkers among females	Consumption per drinker[4]	Average drinking pattern[5]
Africa D (e.g. Nigeria, Algeria)	Mainly other fermented beverages	4.9	53	5.3	47	27	13.3	2.5
Africa E (e.g. Ethiopia, South Africa)	Mainly other fermented beverages and beer	7.1	46	10.3	55	30	16.6	3.1
Americas A (Canada, Cuba, the United States)	> 50% of consumption is beer, about 25% spirits	9.3	11	11.2	73	58	14.3	2.0
Americas B (e.g. Brazil, Mexico)	Beer, followed by spirits	9.0	30	9.1	75	53	14.1	3.1
Americas D (e.g. Bolivia, Peru)	Spirits, followed by beer	5.1	34	2.7	74	60	7.6	3.1
Eastern Mediterranean B (e.g. the Islamic Republic of Iran, Saudi Arabia)	Spirits and beer, but scarce data	1.3	34	1.5	18	4	11.0	2.0
Eastern Mediterranean D (e.g. Afghanistan, Pakistan)	Spirits and beer, but scarce data	0.6	56	0.1	17	1	6.0	2.4
Europe A (e.g. Germany, France, the United Kingdom)	Wine and beer	12.9	10	15.7	90	81	15.1	1.3
Europe B (e.g. Bulgaria, Poland, Turkey)	Spirits	8.3	41	8.8	72	52	13.4	2.9
Europe C (e.g. the Russian Federation, Ukraine)	Spirits	13.9	38	18.6	89	81	16.5	3.6
South-East Asia B (e.g. Indonesia, Thailand)	Spirits	3.1	27	1.2	35	9	13.7	2.5
South-East Asia D (e.g. Bangladesh, India)	Spirits	2.0	79	0.9	26	4	12.9	3.0
Western Pacific A (e.g. Australia, Japan)	Beer and spirits	8.5	20	4.2	87	77	10.4	1.2
Western Pacific B (e.g. China, the Philippines, Viet Nam)	Spirits	5.0	26	4.1	84	30	8.8	2.2

1 Estimated total alcohol consumption per resident aged 15 and older in litres of absolute alcohol (recorded and unrecorded)
2 Percentage of total adult per capita consumption (= column 3) which is estimated to be unrecorded
3 Estimated % rate of heavy drinking (males ≥ 40 g and females ≥ 20 g) among those aged 15+
4 Estimated total alcohol consumption (in litres of absolute alcohol) per adult drinker
5 Estimated average pattern of drinking (1-4 with 4 being the most detrimental pattern i.e. based on many heavy drinking occasions, drinking outside meals, high level of fiesta drinking and drinking in public places, etc. and 1 being the least detrimental pattern i.e. least heavy drinking occasions, drinking with meals, no fiesta drinking, elast drinking in public places, etc.)
***Source**: Rehm et al. (2003b)*

Table 19: Alcohol-related harm in different regions of the world (population weighted averages), DALYs (000s)

	Developing countries				Developed countries				World	
	very high or high mortality		low mortality		very low mortality only burden		Former Socialist: low mortality			
	AFR-D, AFR-E, AMR-D, EMR-D, SEAR-D		AMR-B, EMR-B, SEAR-B, WPR-B		AMR A, EUR A, WPR A		Eur B, C			
	DALYs	%	DALYs	%	DALYs	%	DALYs	%	DALYs	%
Neuro-psychiatric conditions* and other NCD**	4369	33.2	12 006	47.0	6484	68.7	3601	30.7	26460	44.2
Alcohol use disorders	3885	29.5	5715	22.4	6318	65.8	2550	21.7	18469	31.7
Unintentional injuries	5033	38.2	5961	23.4	1571	16.4	3929	33.5	16494	28.3
Intentional injuries	1689	12.8	2940	11.5	558	5.8	1874	16.0	7061	12.1
Total alcohol related burden in DALYs	13 165	100.0	25 519	100.0	9445#	100.0	11742	100.0	58323	100.0
Total burden of disease in DALYs	845 628		411268		115246		100250		1472392	
% of total disease burden which is alcohol related	1.6		6.2		8.3		11.7		4.0	

**dominated by alcohol use disorders (plus epilepsy and depression)*
*** other noncommunicable diseases, dominated by liver cirrhosis (plus diabetes)*
 # before reduction of – 1548 DALYs due to protective effects of vascular diseases
***Source**: Rehm et al. (2003d); WHO (2001c, p. 150) (also available www.who.int/whr2001/2001/main/en/annex/Annex3-en-WEB.xls); own calculations*

Table 20: Selected population alcohol-attributable fractions, by disease category, sex and level of development (% DALYs for each cause) in 2000

GBD disease categories	World			High mortality developing (AFR-D, AFR-E, AMR-D, EMR-D, SEAR-D)		Low mortality developing (AMR-B, EMR-B, SEAR-B, WPR-B)		Developed (AMR-A, EUR-A, EUR-B, EUR-C, WPR-A)	
	Males	Females	Both	Males	Females	Males	Females	Males	Females
Mouth and oropharynx cancers	22	9	19	11	4	28	10	41	28
Oesophagus cancer	37	15	29	17	6	42	16	46	36
Liver cancer	30	13	25	23	10	32	11	36	28
Other neoplasms	6	3	4	2	1	5	2	11	8
Unipolar depressive disorders	3	1	2	2	0	3	0	7	2
Epilepsy	23	12	18	14	7	27	13	45	36
Alcohol use disorders	100	100	100	100	100	100	100	100	100
Ischaemic heart disease	4	-1	2	7	0	5	0	2	-3
Haemorrhagic stroke	18	1	10	7	2	21	2	26	0
Ischaemic stroke	3	-6	-1	1	0	3	0	5	-16
Cirrhosis of the Liver	39	18	32	19	7	45	13	63	49
Motor vehicle accidents	25	8	20	19	5	25	8	45	18
Drownings	12	6	10	8	4	10	6	43	25
Falls	9	3	7	5	1	8	3	21	8
Poisonings	23	9	18	7	3	11	7	43	26
Other unintentional injuries	15	5	11	10	4	15	6	32	16
Self-inflicted injuries	15	5	11	8	2	10	5	27	12
Homicide	26	16	24	18	12	28	16	41	32
Other Intentional injuries	13	7	12	7	3	20	11	32	19

Source: Babor, Rehm & Room (in press)

Table 21: Standardized mortality rates (per 100 000) for acute and chronic disease and injury, by WHO regional subgroupings (data shown is for most recent year available)

	Country	Falls	Intentional injuries	Traffic casualties	Accidental poisoning	Alcohol use disorders	Liver cirrhosis	Mouth and oropharynx cancer	Ischaemic heart disease
AFR-D	Mauritius	2.77	14.44	15.91	N.A.	2.04	15.78	3.85	173.51
AMR-D	Ecuador[a]	3.42	22.16	11.95	1.96	2.97	15.45	0.97	31.32
EMR-D	Egypt[a]	0.93	0.51	6.65	0.15	0.00	35.89	0.57	27.05
AMR-B	Argentina	0.79	15.51	9.56	0.45	1.83	6.39	2.14	49.38
	Bahamas (the)[a,b]	0.45	26.02	20.04	0.30	3.98	16.91	2.49	85.79
	Brazil[a]	3.53	29.63	16.63	0.17	3.28	11.31	3.87	72.26
	Chile	0.83	10.26	10.69	0.27	1.47	20.49	1.35	62.42
	Colombia[a]	3.34	69.15	17.71	0.29	0.03	6.25	1.72	89.80
	Costa Rica[a]	2.35	11.78	17.83	0.27	0.93	7.81	2.22	93.08
	El Salvador[a]	3.92	50.62	33.51	0.22	19.50	12.41	1.05	77.84
	Mexico	3.14	15.00	11.64	1.05	5.82	36.15	1.33	75.78
	Panama[a]	3.69	15.88	15.25	0.41	1.03	7.91	2.83	59.02
	Paraguay[a]	0.74	16.38	10.42	0.43	1.42	6.26	2.05	51.31
	Trinidad and Tobago	2.48	16.74	11.87	3.33	0.67	9.55	3.87	170.91
	Uruguay	1.43	15.18	10.05	4.02	1.45	5.95	3.27	60.10
	Venezuela	3.19	19.39	23.20	2.24	0.84	11.21	1.81	119.36
EMR-B	Kuwait	2.20	3.93	19.01	0.65	0.05	4.01	0.97	79.10
WPR-B	Philippines (the)[a]	2.35	19.80	8.60	0.30	0.71	10.00	4.67	86.22
	Republic of Korea (the)[a]	6.59	16.00	20.00	0.92	2.48	20.02	1.69	27.01

	Country	Falls	Intentional injuries	Traffic casualties	Accidental poisoning	Alcohol use disorders	Liver cirrhosis	Mouth and oropharynx cancer	Ischaemic heart disease
AMR-A	Canada	3.08	12.09	8.45	2.73	1.61	5.24	2.06	82.97
	Cuba	12.26	18.22	12.19	0.32	2.31	7.61	3.82	108.52
	United States of America (the)	6.78	20.21	15.00	0.58	1.90	7.47	2.00	112.40
EUR-A	Austria	6.76	15.38	9.84	1.11	2.98	14.95	3.96	100.03
	Croatia	8.33	17.32	11.27	1.72	3.18	20.90	5.27	127.98
	Czech Republic (the)	12.18	14.31	8.65	2.76	0.76	12.36	4.04	141.13
	Denmark	12.20	13.00	9.57	2.96	6.90	11.70	3.17	90.91
	Finland	10.84	23.20	7.77	9.12	3.63	9.60	1.82	122.98
	France	8.69	15.01	13.06	0.79	3.37	11.45	5.85	39.12
	Germany	4.40	11.15	8.05	1.14	4.01	13.36	3.77	95.74
	Greece	3.20	4.06	18.88	2.57	0.05	3.83	1.22	63.65
	Iceland[b]	2.81	11.42	6.16	0.57	2.29	2.58	1.60	108.20
	Ireland	7.00	11.97	10.14	1.04	1.98	3.94	3.04	133.70
	Israel	1.46	8.26	5.57	0.26	0.93	3.85	1.20	77.33
	Italy	7.48	6.38	11.76	0.37	0.22	10.73	2.90	57.20
	Luxembourg[b]	5.25	16.77	17.36	5.22	4.17	12.19	4.28	59.33
	Malta[b]	8.70	9.55	4.49	1.30	0.37	5.46	4.64	144.63
	Netherlands (the)	2.66	9.54	6.59	0.74	1.39	4.44	2.47	70.17
	Norway	8.05	12.16	6.05	1.99	3.44	3.10	2.47	81.19
	Portugal	3.38	4.82	12.50	0.64	0.32	13.08	4.06	50.51
	Spain	2.31	7.49	13.98	2.03	0.52	8.45	3.75	49.94
	Sweden	18.45	21.10	5.84	1.49	2.47	3.97	1.69	89.28
	Switzerland	2.88	14.65	6.50	3.85	2.31	5.79	3.33	70.55
	United Kingdom (the)	14.80	14.62	5.62	1.91	0.87	7.36	2.15	112.41
WPR-A	Australia	2.27	13.63	8.91	3.05	0.99	3.77	2.69	85.46
	Japan	2.78	18.80	7.38	0.38	0.24	6.15	2.23	27.29
	New Zealand	4.17	13.23	11.57	0.83	0.46	2.40	2.65	102.50
	Singapore[a]	3.09	9.47	4.96	0.09	N.A.	2.84	5.83	91.24

	Country	Falls	Intentional injuries	Traffic casualties	Accidental poisoning	Alcohol use disorders	Liver cirrhosis	Mouth and oropharynx cancer	Ischaemic heart disease
EUR-B	Albania[a]	1.22	11.52	7.83	2.97	0.39	N.A.	1.88	77.81
	Armenia	0.72	3.62	5.43	1.32	N.A.	13.07	2.16	261.22
	Azerbaijan[a]	0.30	6.80	5.15	1.14	N.A.	34.02	1.23	284.62
	Bulgaria	3.06	14.95	10.92	2.18	0.77	12.74	3.12	144.31
	Kyrgyzstan[a]	3.39	21.81	11.36	13.61	1.98	38.36	2.98	240.83
	Poland	7.87	15.04	13.21	3.72	2.91	10.67	3.61	102.65
	Romania	5.80	13.75	11.23	5.10	3.38	37.09	5.72	175.06
	Slovenia	11.82	24.24	13.42	1.57	4.90	26.29	6.34	78.62
	TFYR Macedonia	0.99	19.09	5.12	0.97	0.80	5.70	2.51	84.17
	Turkmenistan[a]	4.01	28.40	8.60	19.04	N.A.	42.35	3.63	319.76
	Uzbekistan[a]	11.25	14.68	8.89	1.31	N.A.	39.05	2.59	316.50
EUR-C	Belarus	5.14	38.92	13.97	29.09	N.A.	12.76	4.37	331.23
	Estonia	7.99	38.35	14.35	25.65	3.63	17.39	6.18	274.79
	Hungary	18.67	25.96	11.69	1.40	2.87	45.79	12.64	179.07
	Kazakhstan[a]	2.41	42.20	12.02	44.47	1.90	23.20	3.54	269.93
	Latvia	13.25	37.26	22.78	13.60	8.15	12.10	3.99	250.55
	Lithuania	10.22	45.94	18.16	16.20	1.10	14.36	5.58	250.20
	Republic of Moldova (the)[a]	3.33	22.37	11.69	8.60	1.58	65.03	4.72	311.58
	Russian Federation (the)	8.42	61.42	25.82	36.62	N.A.	N.A.	4.49	285.38
	Ukraine	9.30	8.72	10.56	1.85	N.A.	20.72	5.21	368.11

[a]Caution should be exercised when interpreting the results as death registration level is incomplete.
[b]As countries with very small population size are likely to have spurious trends, care should be exercised when making inter-country comparisons.

Internet therapy versus internet self-help versus no treatment for problematic alcohol use: a randomized controlled trial

Blankers M., Koeter M.W.J., Schippers G.M.
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From the Netherlands, the first randomised controlled trial to evaluate internet-based therapy for problem drinking via text-chat conversations with a real therapist finds this works better than an automated self-help option; on average alcohol intake was cut by nearly two-thirds.

Summary

The great size of the burden of ill health due to drinking partly results from the fact that most sufferers from alcohol-use disorders do not enter treatment, even though there are effective approaches. In particular, people whose problem drinking is recent and/or relatively less severe receive little attention. This 'treatment gap' can be bridged by innovative treatment options which access a currently under-served population and reduce problem drinking at the lowest possible cost. Internet-based interventions are one class of such innovations, seen as attractive to otherwise 'hidden' drinkers with relatively mild alcohol-related difficulties. Rather than an automated process, the most intensively resourced of internet-based interventions employ therapists to offer individualised feedback and therapeutic programmes in interaction with the client. This may be via successive e-mails or texts, on in 'real time' through text-based 'chat' conversations, internet telephone, or videoconferencing. The featured study conducted in the Netherlands was the first randomised controlled trial to evaluate real-time, internet-based therapy via text-chat conversations. It did this in comparison to no intervention, and to an automated and briefer on-line intervention offered on a self-help basis rather than therapist-led.

The interventions

Both interventions were text-based and derived from a Dutch treatment manual which embodied cognitive-behavioural therapy and motivational interviewing, the two most prominent 'talking' therapies for substance use problems.

The automated self-help program helps the user monitor their drinking, become aware of related thoughts and feelings, set drinking goals, and identify relapse-precipitating situations. Graphs depict their drinking-related contexts and inner states and their alcohol consumption, and compare the latter with their goal. To help reach this goal, the user is educated and trained in skills related to coping with craving, drinking lapses, peer pressure, and how to stay motivated in risky situations.

Another strand in the intervention offers social support from other participants through an internet-based forum. Participants can access the program on demand. It is suggested they use it daily for at least four weeks, but few do so.

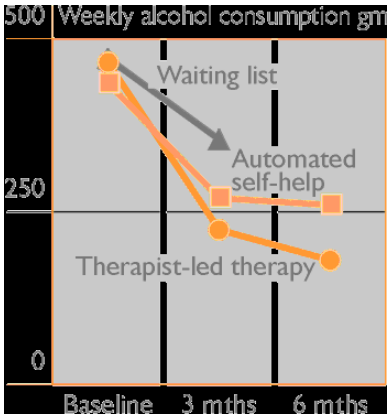
The therapist-led option uses similar but more extended cognitive-behavioural exercises, and offers up to seven text-based chat-therapy sessions of 40 minutes each on a different theme: introduction; pros and cons of drinking, how to monitor it and set goals; self-control; risky situations; craving and how feelings can influence drinking; lapse, relapse, and 'pro-lapse'; overall review. Before each, the participant works on a homework assignment. Therapists are psychologists working for the collaborating substance abuse treatment centre, trained and experienced in delivering face-to-face cognitive-behavioural therapy for drinkers and further trained in internet-based delivery using chat conversations. More so than phone or video contact, the chat medium promotes frank communication due to a high degree of perceived anonymity, enables participants to re-read and further benefit from the interaction between themselves and their therapist, and automatically documents the therapeutic process.

Visitors seeking to "reduce your alcohol intake or quit drinking" were recruited via the web site of Jellinek/Arkin, the collaborating substance abuse treatment centre. Interested visitors could complete a screening survey to determine their eligibility for the study, for which the main criteria were that they were adult drinkers living in the Netherlands who scored above the AUDIT questionnaire's threshold for risky drinking and on average drank over 140gm alcohol a week, but had not previously been treated for substance use problems, were not or had not been seriously ill in certain ways, and had not had used illegal drugs at significant levels. Such criteria correspond to those used to allocate patients to low-intensity outpatient treatment at the collaborating centre.

Eligible and consenting participants were randomly allocated either to one of the two interventions or to a three-month waiting period, after which they could access the therapist-led intervention. This meant that for the first three months, offering the internet-based interventions could be compared against offering no intervention. A further follow-up at six months checked for any persisting effects and differences between the two active interventions. It was expected that the study sample would benefit most from the most intensive (ie, the therapist-led) intervention and least from being placed on the waiting list.

In 2008–2009 1720 people completed the screening questionnaire, of whom 832 were eligible for the study and 205 decided to participate and were randomly allocated to the three arms. Averaging 42 years of age, half were women and around 8 in 10 were employed, typically in white-collar jobs. AUDIT scores averaged nearly 20 and they drank nearly every day, totalling about 450gm alcohol or 56 UK units, figures indicative of significant drink problems. They also scored as suffering from (relative to the general Dutch population) troubling psychological problems. Around 70% completed the three month follow-up assessments and 60% those at six months.

Main Findings



All four main outcomes (weekly drinking amount, AUDIT score representing drink-related problems, and two measures of quality of life) were significantly affected by the interventions.

Detailed analyses showed that while at three months weekly drinking amounts had on average fallen across the board, the fall was (as expected) greatest among patients allocated to the therapist-led intervention (down on average from 466gm to 224gm), somewhat less among those allocated to the self-help option (from 436gm to 270gm), and least among those placed on the waiting list (472gm to 355gm) *chart*. For both interventions the falls were significantly greater than after simply being placed on a waiting list, but not significantly different from each other. This pattern was replicated for other three-month outcomes. Among these was a combination intended to represent a good response to treatment: drinking below risky levels without any substantial deterioration in drink-related problems, psychological problems or quality of life. For every five people allocated to the therapist-led intervention, one achieved a good treatment response who would not have done so had they been placed on the waiting list.

By six months benefits from the therapist-led intervention had further increased but those from the self-help option had stayed more or less the same. The result was that the superiority of the therapist-led intervention had become more apparent and statistically significant in respect of drinking amount (down to 180gm per week versus 260gm), drink problems and quality of life, and narrowly missing being significant in respect of response to treatment.

The authors' conclusions

Both internet-based therapy and internet-based self-help reduced problem drinking, but the therapist-led option was the more effective of the two, especially at the longer (six month) follow-up. Not just drinking was beneficially affected but also alcohol-related problems and quality of life. The self-help option incurs minimal or no costs to the participant, while the therapy option could help equalise access to therapists by providing a service where therapist availability is limited and to types of drinkers (especially women and employees) currently under-served. Both have the potential to dramatically extend access to cognitive-behavioural therapies.

These findings were derived from a sample selected to be risky drinkers but not necessarily clinically diagnosable as suffering from an alcohol use disorder. They were also relatively well-educated and generally employed full time – exemplifying the 'new population' of problem drinkers who can be reached with internet-based interventions. Within these parameters, the sample was diverse. According to their AUDIT profile, drinkers who had been invited to participate but declined were not markedly different from those who did participate, suggesting that they too might respond well to the interventions. Loss to follow-up reaching 40% at six months raises concerns over the validity of the findings, but measures were taken to estimate what the outcomes of the missing participants would have been, and an analysis based only on those followed up produced similar results.

The consistency and magnitude of the findings favouring the interventions and especially the therapist-led option are indicative of a real and worthwhile impact, even if some of the findings of statistical significance might not have survived a stricter interpretation.

It is however of concern that so few people (1 in 8) who completed screening on the web site went on to participate in the study and that just 1 in 14 were represented in the six month follow-up. Despite any similarities on the measures assessed by the study (especially AUDIT scores), clearly people who are eligible for and then go on join and comply with a study differ in some ways from those who do not. Outside a research context, free and ungated access over the internet might result in a different mix of intervention participants from among those who expressed their interest by taking the screening test, and so too might the impacts of the interventions differ. For example, participants might have more serious substance use and psychiatric problems, some of which led web visitors to be excluded from the study. They might also be less interested in research and therefore perhaps less well educated and with less in the way of resources to aid their recovery.

None of this is to seriously cast doubt on the validity of the impacts on the people who did participate in the study, or to deny the probability that others interested enough to access the interventions would respond similarly. However, it could be that rather than a resource accessed widely enough to have an impact on public health across a country, internet-based alcohol treatment applications become one more niche option attracting and/or having a beneficial impact on a rather different population to conventional care.

The featured therapy-led intervention was among those whose impacts were simulated for the Netherlands, the results of which suggested that health would improve and/or costs be reduced if on-line brief interventions and therapy were added to or replaced conventional alcohol-related health care. The other interventions were:

• DrinkTest, a brief on-line intervention consisting of screening one's alcohol use followed by automated personalised advice;

• DrinkingLess, an on-line four-step cognitive behavioural intervention involving exploring one's alcohol use, setting goals, changing behaviour, and maintenance of behaviour change.

The second of these seems similar to the self-help option tested in the featured study. Since these three
eHealth interventions increase in intensity, it was suggested that they could be used in a stepped-care
framework, starting with the least intensive intervention, the DrinkTest, and if needed moving up to the more intensive levels of DrinkingLess and OnlineTreatment. See other Findings analyses for a review of computer-delivered self-help interventions for drinking and smoking and a review focused on drinking, both of which include commentary on the role of computer delivery and on UK findings.

This draft entry is currently subject to consultation and correction by the study authors and other experts. Last revised 26 April 2012