

U.S. Fire Administration/National Fire Data Center

Establishing a Relationship Between Alcohol and Casualties of Fire

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Findings

- Alcohol abuse is a leading risk factor for unintentional injuries, the fifth leading cause of death in the United States. The overall costs resulting from unintentional injuries and deaths totaled \$517 billion in 2001. Nearly 7% of the adult population meet the diagnostic criteria for alcohol abuse.
- Nearly half of adult emergency room patients treated for trauma are alcohol impaired.
- Fires are the fourth leading cause of unintentional injuries; studies indicate that up to 40% of residential fire death victims are alcohol impaired.
- Burn victims with high alcohol blood levels are more likely to die than burn victims with no alcohol impairment.
- Children are not exempt from the effects of alcohol and fire, primarily through no fault of their own. Fire fatalities in these instances can be attributed to the caregivers' impaired judgment.
- Smoking combined with alcohol abuse exacerbates the risk of fires, fire injuries, and fire deaths.

This report links alcohol abuse with the risk of unintentional injuries, with specific focus on fire injuries where alcohol may be a contributing factor. Alcohol abuse and resulting unintentional injuries impose a burden on individuals, those around them, and society as a whole. Alcohol abuse is a leading risk factor for unintentional injury and is associated with increased risk of injury in automobile crashes, falls, fires, drowning, homicides, and suicides.^{1,2,3}

USE AND EFFECTS OF ALCOHOL

Alcohol is a major contributing factor to unintended injuries in the United States.⁴ Studies have estimated that nearly half of alcohol-related deaths are the result of injuries sustained from motor vehicle crashes, falls, fires, drownings, homicides, and suicides.⁵ Alcohol depresses the central nervous system, potentially to the point of stupor, coma, and death; and individuals who consume large quantities of alcohol experience disordered thought patterns, impaired judgment, impaired perception, and a decrease in generalized motor control.

Alcohol is widely used in U.S. society. It is heavily advertised and is embedded in everyday life, including religious traditions.^{6,7} Although the 20-year trend (1980–99) in the rate of alcohol consumption is down 12%,⁸ this downward trend does not minimize the potential devastating effect that alcohol may have on abusers.

The role of alcohol as a risk factor for unintentional injury stems primarily from reduced cognitive function, impaired physical coordination and performance, and increased risk-taking behavior. Injuries tend to be more serious among the alcohol-impaired, because alcohol affects the physiology of the victim.⁹ Alcohol consumption has consequences not only for the health and well being of those who drink but, by extension, the lives of those

around them. A classic example of this is the intoxicated driver who fails to fasten his seat belt. This individual not only risks greater injury to himself, but as a result of his impaired senses is a high risk to other drivers and pedestrians.

The following statistics give a glimpse of the magnitude of alcohol use in the United States:

- (1) Approximately 14 million people (7% of the adult population) meet the diagnostic criteria for alcohol abuse or alcoholism.¹⁰
- (2) More than half of all adults have a close family member who is or had been an alcoholic.¹¹
- (3) Approximately one-fourth of children younger than 18 is exposed to alcohol abuse or alcohol dependence in the family.¹²
- (4) Between 20% and 30% of patients seen in hospital emergency departments have alcohol problems.¹³

UNINTENTIONAL INJURIES

Unintentional injuries are the fifth leading cause of death in in the United States, behind heart, cancer, cerebrovascular, and chronic lower respiratory diseases.¹⁴ Over 97,000 people died from unintentional injuries in 1999. Of those, 3,348 resulted from fire and burns (Figure 1).

The national trend of unintentional injuries has declined 43% over the past 40 years. This downward trend may be attributed to local, state, and national prevention and educational campaigns; to better technology (e.g., airbags in automobiles, smoke alarms and built-in fire protection systems); and to improvements in product safety and stricter building codes. Nevertheless, wage losses, medical expenses, property damage, employer costs, fire losses, and other expenses related to unintentional injury and fatalities ran to an estimated \$516.9 billion in 2001.¹⁵

FIGURE 1. 1999 DEATH RATE (PER 100,000 POPULATION) BY TYPE OF ACCIDENT

CAUSE	NUMBER	RATE
All accidents	97,860	35.9
Motor vehicle accident	42,401	15.5
Accidental poisoning/exposure to noxious substances	12,186	4.5
Accidental drowning and submersion	3,529	1.3
Accidental exposure to smoke, fire, and flames	3,348	1.2
Accidental discharge of firearms	824	0.3

ALCOHOL'S INVOLVEMENT IN UNINTENTIONAL INJURIES

Alcohol abuse is a leading risk factor for unintentional injuries. The short-term physiological effects of alcohol diminish motor coordination and balance and impair perception and judgment. Alcohol is also thought to perpetuate accident-prone behavior. Studies have estimated that nearly half of adult trauma patients receiving treatment in emergency rooms have been injured while under the influence of alcohol.¹⁶ In 1997 for example, traffic crashes involving alcohol killed more than 16,000 people, alcohol was involved in 39% of all fatal traffic crashes, up to 77% of deaths from falls involved alcohol, and the victim had been drinking in up to 47% of drowning deaths.¹⁷ The end result of acute alcohol intoxication is carelessness.

ALCOHOL AND FIRE CASUALTIES

Fires are the fourth leading cause of unintentional injuries in the United States, after motor vehicle crashes, poisonings, and drownings.¹⁸ In 2000, more than 3,500 people died of unintended exposure to smoke, fire, and

flames.¹⁹ Scientists have estimated that alcohol is involved in 40% of all residential fire deaths.²⁰ One study on published medical examiner results revealed that 42% of unintentional fire and burn fatalities were intoxicated (with a blood alcohol level greater than or equal 0.1).²¹ Another study found that alcoholics in Toronto have a fire death risk 9.7 times that of the city's population.²² Further, a study of decedents in North Carolina found that 53% (69 of 130) adult victims were intoxicated,²³ and in Alabama, more than half of the victims older than 17 tested positive for alcohol.²⁴ Of the 374 fire fatalities in Minnesota from 1996 to 2002, 133 (36%) were found to have positive blood alcohol concentrations.²⁵

Chronic alcohol use has been shown to disrupt the immune system response to a significant burn.²⁶ Because alcohol and burns each suppress immune response, the synergistic effect is an extremely suppressed immune response.^{27,28} Burn victims who had been drinking are three times more likely to die than burn victims with no alcohol present in their blood streams.²⁹

Public perception of alcohol's contribution to fatal fire injuries may be underestimated.³⁰ This suggests that because public awareness of alcohol's contribution to fire fatalities and injuries is underestimated, the public pays too little attention to the potential fire risk posed by alcohol abuse.

Children. Children are not exempt from the harmful effects of alcohol, primarily through no fault of their own (e.g., involvement in traffic accidents). In 1998, children up to age 14 were involved in 5% of unintentional fire injuries, but this same group accounted for 20% of all fire deaths and 14% of all fire injuries.³¹ One study found that, of juvenile fatalities examined, 15% died in fires where the surviving adult was impaired by alcohol or drugs.³² "Case after case revealed that fire deaths of children were attributed to the parents' failure to perceive and respond to a fire emergency because of impairment of their sensory, judgment, or physical functions by alcohol consumption."³³ Although anecdotal, the inference that caregivers who are alcohol impaired contribute to children casualties is compelling.

Smoking. Smoking is the fifth most frequent cause of residential fire, the leading cause of fire deaths, and the second most common cause of fire-related injuries.³⁴ Smoking combined with alcohol is often identified as factors in fire deaths in residences,³⁵ where the majority of fire fatalities occurs. Smokers consume more alcohol than do nonsmokers. Alcohol abusers and smokers are an especially dangerous combination since smoking materials represent a ready-made fire threat while at the same time alcohol consumption decreases the chances of detecting, mitigating, and escaping a fire.

Data from Minnesota is particularly revealing. Smoking, the leading cause of fatal fires in Minnesota, accounted for 26% of fire fatalities (94 deaths) from 1996 to 2002. Of these fatalities from smoking-related fires, 62% (58 of 94) had a blood alcohol level meeting or exceeding the state standard of 0.1.

CONCLUSION

Fire casualties are emerging as an unintentional injury subset highly influenced by problematic drinking behaviors. Because the public's perception of this problem may be low, it may be possible to minimize fire risk by increasing the awareness of those who drink and those who are surrounded by regular drinkers. Educational campaigns warning the public of the dangers of drunk driving have been successful, and the same can be done to shed light on the subtle dangers of alcohol and fire. For further information, contact your local fire department or the U.S. Fire Administration.

To request additional information, comment on this report, or review the detailed methodology used in this analysis, visit <http://www.usfa.fema.gov>

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