

## Alcohol Use

Alcoholic beverages have been used in human societies since the beginning of recorded history. For most people who drink, alcohol is a pleasant accompaniment to social activities. Moderate alcohol use (up to two drinks per day for men and one drink per day for women and older people) is not harmful for most adults. Nonetheless, a large number of people get into serious trouble because of their drinking. Nearly a third of Americans abuse or become dependent on alcohol over the course of their lives and only 24% are ever treated for it.<sup>534</sup> A history of heavy drinking reduces life span by up to 25 years across all major chronic diseases, according to the National Institute of Alcohol Abuse, and Alcoholism (NIAAA).

Accompanying the near ubiquity of alcoholic beverages in human history has been an appreciation of the social and health problem caused by drinking.<sup>535</sup> Alcohol has been shown to be causally related to >60 different medical conditions, in most, but not all cases, detrimentally.<sup>536</sup> For most diseases there is a dose-response relation to the volume of alcohol consumption, with the risk of the disease increasing with higher intake levels. The exceptions are in the area of cardiovascular diseases, especially coronary heart disease and stroke, diabetes, and injuries, where other dimensions of consumption than average volume play a crucial role in determining outcome. Drinking of alcohol during pregnancy has been reported to raise the risk of premature births, low birthweight infants, and infections in babies after birth.<sup>537 538 539</sup> At the extreme, prenatal exposure to alcohol can result fetal alcohol spectrum disorder and its various component disorders, ie, fetal alcohol syndrome, alcohol-related birth defects, fetal alcohol effects, and alcohol-related neurological disorders.<sup>540</sup>

According to the National Institutes of Health, early alcohol use, independent of other risk factors, may contribute to the risk of developing future alcohol problems.<sup>541</sup> In 2000, alcohol consumption was the 3<sup>rd</sup> leading actual cause of death in this country,<sup>542</sup> and, in 2001, excessive alcohol use was responsible for approximately 75,000 preventable deaths and 2.3 million years of potential life lost in the United

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<sup>534</sup> Hasin DS et al. Prevalence, correlates, disability, and comorbidity of DSM-IV Alcohol Abuse and Dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2007;64:830-842.

<sup>535</sup> Room R et al. Alcohol and public health. *Lancet* 2005;365:519-530.

<sup>536</sup> Rehm J et al. The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease. *Addiction* 2003;98:1209-1228.

<sup>537</sup> Dew PC et al. The effect of health compromising behaviors on preterm births. *Matern Child Health J* 2007;11:227-233.

<sup>538</sup> Okah FA et al. Term gestation low birth weight and health compromising behaviors during pregnancy. *Obstet Gynecol* 2005;105:543-550.

<sup>539</sup> Gauthier TW et al. Maternal alcohol abuse and neonatal infection. *Alcoholism Clin Exper Res* 2005;29:1035-1043.

<sup>540</sup> Wattendorf DJ et al. Fetal alcohol spectrum disorders. *Am Fam Pract* 2005;72:279-282, 285.

<sup>541</sup> Hingston RW et al. Age at drinking onset and alcohol dependence: age at onset, duration, and severity. [Arch Pediatr Adolesc Med](#) 2006;160:739-746.

<sup>542</sup> Mokdad A et al. Actual causes of death in the United States, 2000. *J Am Med Ass* 2004;291:1238-1245.

States.<sup>543</sup> In purely economic terms, alcohol-related problems cost society approximately \$185 billion per year. Of these costs, >70% are due to productivity losses and illnesses attributed to alcohol, while <10% are for medical treatment of alcoholism and alcohol abuse.

The number of American adults who abuse alcohol increased during the 1990's from 7.41% to 8.46% in 2002, while alcohol dependency declined from 4.38% to 3.81%.<sup>544</sup> Alcohol abuse is defined by the NIAAA as causing a failure to fulfill major role obligations at work, school, or home; interpersonal social and legal problems; and/or drinking in hazardous situations, such as driving. Alcohol dependence (alcoholism) is characterized by impaired control over drinking, compulsive drinking, preoccupation with drinking, tolerance to alcohol and/or withdrawal symptoms.

Alcohol dependence contributes to other health problems and thereby increases the use of health care services. Between 15-30% of patients in acute care hospitals have alcohol problems, regardless of their admitted diagnosis. Unfortunately, only a fraction of these alcohol diagnoses are reflected in discharge diagnoses. In addition, the families of alcoholics consume more health care services than do those of non-alcoholics.

Workplace alcohol use and impairment directly affect an estimated 15% of the US workforce (19.2 million workers).<sup>545</sup> Specifically, an estimated 1.83% (2.3 million workers) drink before work, 7.06% (8.9 million workers) drink during the workday, 1.68% (2.1 million workers) work under the influence of alcohol, and 9.23% (11.6 million workers) work with a hangover. Drinking on the job, being under the influence or working with a hangover is more prevalent among men, younger workers, and unmarried workers. The highest level of alcohol use and impairment are found in management, sales, catering, and construction.

Alcohol and drugs were ranked by Kansas Citians as the 2<sup>nd</sup> leading community concern in a survey conducted in 2003 by the Kansas City Health Commission; health care providers ranked this as the leading community concern.<sup>546</sup>

## Prevalence

Nationally, about 47% of adult  $\geq 18$  years old regularly drink alcohol, 13% are infrequent drinkers, and 25% are lifetime abstainers.<sup>547</sup> Men are about 1.5 times more likely to be a regular drinker than

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<sup>543</sup> Midanik LT et al. Alcohol-attributable deaths and years of potential life lost – United States, 2001. *MMWR Morb Mortal Wkly Rep* 2004;53:866-870.

<sup>544</sup> Grant BF et al. The 12-month prevalence and trends in SDM-IV alcohol abuse and dependency: United States 1991-1992 and 2001-2002. *Drug Alcohol Depend* 2004;74:223-234.

<sup>545</sup> Frone M. Prevention and distribution of alcohol use and impairment in the workplace: a US national survey. *J Studies Alcohol* 2006;67:147-156.

<sup>546</sup> Kansas City Health Department. *Mobilizing for Action through Planning and Partnerships: Kansas City Community Health Assessment*. 2004. [www.kcmo.org/health](http://www.kcmo.org/health).

<sup>547</sup> National Center for Health Statistics. Summary health statistics for US adults: National Health Interview Survey, 2004. *Vital Health Stat Series* 2006;10(228). [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

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women and the prevalence of drinking declines with increasing age, although the gap between men and women is decreasing.<sup>548 549</sup> Non-Hispanic whites are more likely to be a current drinker and Asians are the most likely to be lifetime abstainers. Hispanics and non-Hispanic blacks are twice as likely to be lifetime abstainers as non-Hispanic whites. The Missouri Behavioral Risk Factor Surveillance System (BRFSS) 2006 annual report found that adults in the Kansas City area were less likely to drink alcohol than residents in the St Louis area.

Recent data from the Framington Heart Study found that the proportion of abstinence increased and average consumption among drinkers declined with age.<sup>550</sup> Further, the proportion of moderate use was higher but heavy use was lower among younger adults than older adults. Also, beer consumption has been decreasing over the last 50 years while drinking wine has increased. Despite these findings, the cumulative incidence of alcohol use disorders did not decrease.

According to the National Center for Health Statistics' 2007 *National Health Interview Survey* ([www.cdc.gov/nchs](http://www.cdc.gov/nchs)) 20.3% of adults had  $\geq 5$  drinks in 1 day at least once in the past year. For both men and women, younger adults were more like to behave in this manner, with men considerably more likely to do so than women. Non-Hispanic white adults had an age-adjusted rate of 24.0%, Hispanic adults 16.7%, and non-Hispanic black adults 11.6%. The prevalence of this behavior also seems to correlate with sleep deprivation with persons who got less sleep having higher rates and is most notable among men and younger adults.

Nearly 16 million Americans  $\geq 12$  years old meet the criteria of the American Psychiatric Association for alcohol abuse and dependence. Dependency often begins prior to 18 years of age.<sup>551</sup> Several million more adults engage in risky drinking that could lead to alcohol problems. These patterns include binge drinking and heavy drinking on a regular basis. In addition, more than half of adults report that one or more of their close relatives have a drinking problem. Nearly 4% of Missourians  $\geq 12$  years of age are dependent upon alcohol.<sup>552</sup> In a 2004 telephone survey commissioned by the Kansas City Health Department, 1.6% of respondents reported that they abused alcohol.<sup>553</sup>

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<sup>548</sup> Schoenborn CA et al. Health behaviors of adults: United States 1999-2001. National Center for Health Statistics, *Vital Health Stat Series* 2004;10(219). [www.cdc.gov/nchs](http://www.cdc.gov/nchs)

<sup>549</sup> Gruzca RA et al. Secular trends in lifetime prevalence of alcohol dependence in the United States: a re-evaluation. *Alcohol Clin Exper Res* 2008;32:763-770.

<sup>550</sup> Zhang Y et al. Secular trends in alcohol consumption over 50 years: the Framingham Study. *Am J Med* 2008;121:695-701.

<sup>551</sup> Hingston RW et al. Age of alcohol-dependence onset: associations with severity of dependence and seeking treatment. *Pediatrics* 2006;118:e755-e763.

<sup>552</sup> Wright D, Sathe N.. State estimates of substance use from the 2003-2004 National Surveys on Drug Use and Health. Substance Abuse and Mental Health Services Administration. 2006. [www.oas.samhsa.org](http://www.oas.samhsa.org).

<sup>553</sup> Kansas City Health Department. 2004 *Health Assessment Survey*. [www.kcmo.org/health](http://www.kcmo.org/health)

## Underage drinking

Although there are legal age limits for alcohol purchase and consumption, it is clear that many persons become current drinkers at earlier ages. Binge drinking, for example, is the most common pattern of alcohol consumption among high school youth.<sup>554</sup> About 30% of high school students binge drink.<sup>555</sup> Between 40% and 50% of high school students in Missouri and Kansas City claim to be current drinkers of alcohol,<sup>556</sup> with little difference between males and females (Table 155). Most had their first drink when 12-14 years old, although 25% of boys claim they were <11 years of age. Boys report drinking more to get drunk and girls drink more for social reasons; almost half of the students report frequently being around drunken peers. Among students who did not drink, the overwhelming reason for not drinking was that they did not want to drink, followed by the idea it is wrong; religious beliefs was the least mentioned reason for abstaining.

**Table 155 Consumption of at least part of one drink by students in the Kansas City metropolitan area.**

Recency of drinking	8 <sup>th</sup> grade		10 <sup>th</sup> grade		12 <sup>th</sup> grade	
Lifetime	59%		75%		85%	
30 day	47%		59%		68%	
7 day	23%		32%		41%	
	Male	Female	Male	Female	Male	Female
30 day	46%	49%	61%	56%	70%	66%
7 day	23%	22%	37%	28%	46%	36%

**Source:** Partnership for Children. 2006. *Kauffman Teen Survey Community Report, 2004-2005 Results*. [www.pfc.org](http://www.pfc.org)

According to Columbia University's National Center of Addiction and Substance Abuse, underage drinkers and adult excessive drinkers are responsible for 50.1% of the alcohol consumption in this country and 48.9% of the money spent on alcohol. In 1999, underage drinkers consumed 19.7% of the alcohol nationally or \$22.5 billion worth of alcohol. "Excessive" drinking by adults (consumption of >2 drinks daily) accounted for 30.4% of the alcohol consumed or \$34.4 billion worth of alcohol expenditures.

## Binge drinking

Binge drinking is defined as  $\geq 5$  drinks on the same occasion at least once in the prior month and it is estimated that about 23% of drinkers binge ([www.samhsa.gov](http://www.samhsa.gov)) and is growing at a faster rate among

<sup>554</sup> Miller JW et al. Binge drinking and associated health risk behaviors among high school students. *Pediatrics* 2007;119:76-85.

<sup>555</sup> Roeber J et al. Types of alcoholic beverages usually consumed by students in 9<sup>th</sup> -12<sup>th</sup> grades – four states, 2005. *MMWR Morb Mortal Wkly Rep* 2007;56:737-740.

<sup>556</sup> Grunbaume JA et al. Youth risk behavior surveillance – United States, 2003. *MMWR Morb Mortal Surveil Summ* 2004;53:SS-2.

underage girls than boys.<sup>557</sup> Among women in their 20s, bingeing is more common among higher educated women, but by age 40 less-educated women are more likely to be drinking too much.<sup>558</sup> Binge drinking among women has been reported to double their risk of breast cancer.<sup>559</sup> And, binge drinking has been strongly associated with alcohol-impaired driving.<sup>560</sup> Adult binge drinkers tend to prefer beer, while youth binge drinkers tend to use hard liquor.<sup>561</sup>

Approximately a quarter of drinkers in Missouri binge drink with the highest prevalence being among those 18-25 years old (~47%) ([www.oas.samhsa.org](http://www.oas.samhsa.org)). In 2001, the number of binge drinking episodes per person per year was between 7.9 and 12.3,<sup>562</sup> placing Missouri among the highest states for this behavior. According to the 2007 BRFSS report for Missouri, the prevalence of adult binge drinking was 16.2% (20.5% for males; 12.1% for females), while in the Kansas City metropolitan area the prevalence, in 2006, was 14.8%.<sup>563</sup> The national youth risk behavior surveillance program reported that 30.5% of Missouri high school student periodically binge drink.

In addition to binge drinking, there is heavy drinking which is defined as an average of >2 drinks/day during the preceding month for men and an average of >1 drink per day during the preceding month for women. The prevalence of heavy drinking among men in the Kansas City area was 3.9% and among women is was 3.6%. Heavy drinking has been associated with causing high blood pressure, stiff arteries, and rigid heart muscles in men and enlarged hearts in women, boosting their risk of heart attack and/or stroke.

Smoking, while drinking, may encourage individuals to drink more.<sup>564</sup> In rats, the level of alcohol in the bloodstream falls as nicotine levels increase. It is hypothesized that somehow the presence of nicotine delays the release of alcohol from the stomach to the intestines. This delay allows the alcohol molecules to be metabolized, leaving less alcohol to be absorbed by the intestines into the bloodstream. Thus, in people nicotine would diminish the desired effect of the alcohol and may encourage drinkers to drink more to achieve the pleasurable desired effect, particularly among heavy and binge drinkers.

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<sup>557</sup> Center on Alcohol Marketing and Youth. *Underage Age Drinking in the United States, 2005: a Status Report*. Georgetown University. 2006. [www.camy.org](http://www.camy.org)

<sup>558</sup> Jefferis B et al. Social gradients in binge drinking and abstaining trends in a cohort of British adults. *J Epidemiol Community Health* 2007;61:150-153.

<sup>559</sup> Morch L et al. Drinking patterns and mortality among Danish nurses. *Eur J Clin Nutr* 2008;62:817-822.

<sup>560</sup> Naimi TS et al. Binge drinking among US adults. *J Am Med Assoc* 2003;289:70-75.

<sup>561</sup> Naimi TS et al. What do binge drinkers drink? Implications for alcohol control policy. *Am J Prev Med* 2007;33:188-193.

<sup>562</sup> Nelson DE et al. Metropolitan-area estimates of binge drinking in the United States. *Am J Public Health* 2004;94:663-671.

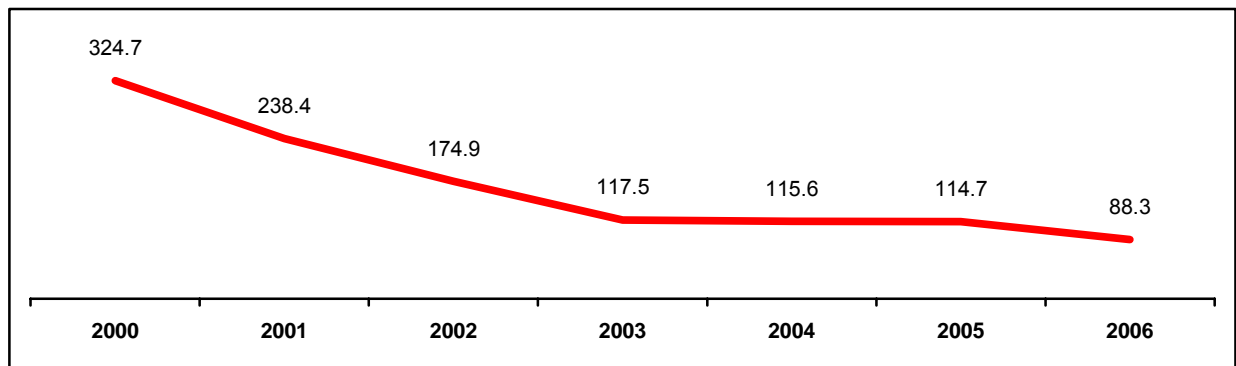
<sup>563</sup> Kilmer G et al. Surveillance of certain health behaviors and conditions among states and selected local areas – Behavioral Risk Factor Surveillance System (BRFSS), United States, 2006. *MMWR Surv Summ* 2008;57:SS-7.

<sup>564</sup> Parnell SE et al. Nicotine decreases blood alcohol concentrations in adult rats: a phenomenon potentially related to gastric function. *Alcoholism: Clin Exper Res* 2006;30:1408-1413.

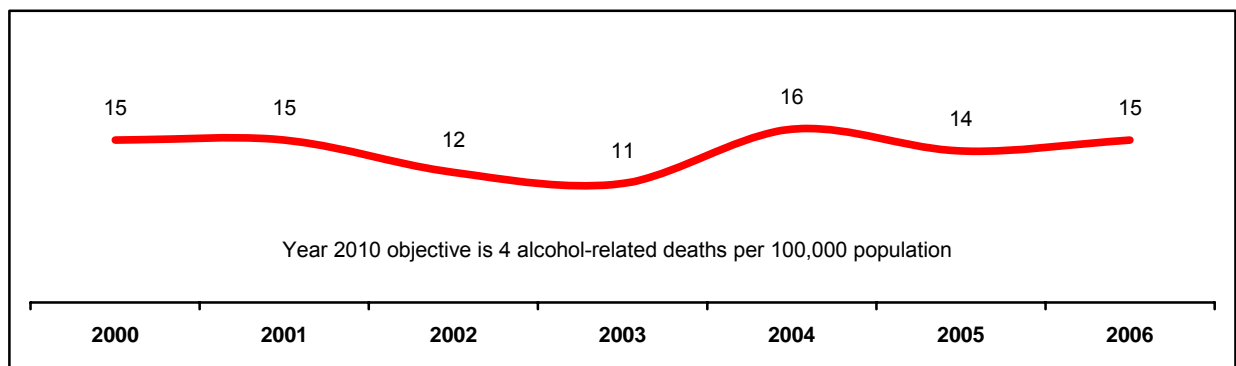
## Health consequences

In Kansas City during 2006, there were 321 emergency department visits and 386 hospitalizations for alcoholism, plus 37 emergency department visits and 274 hospitalizations for alcoholic cirrhosis. The age-adjusted hospitalization rates due to alcoholism decreased 72.8% between 2000 and 2006 (Figure 118). However, the age-adjusted deaths rates due to alcohol remained unchanged (Figure 119) and averaged 3.4 times higher than the *Healthy People 2010* national objective. The proportion of alcohol related deaths is highest persons 45-64 years old (Figure 120).

**Figure 118 Age-adjusted rates per 100,000 population for hospitalization due to alcoholism, Kansas City, Mo**

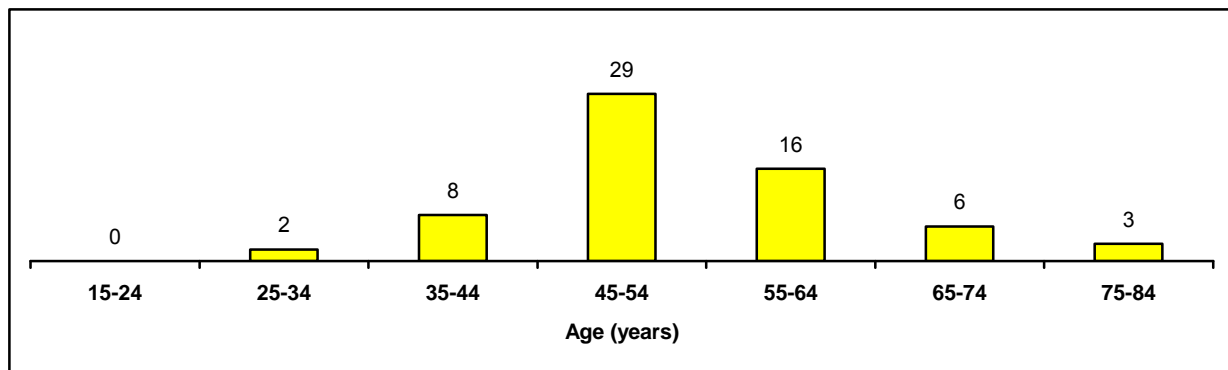


**Figure 119 Age-adjusted alcohol related death rates per 100,000 population, Kansas City, Mo**



Injury is the leading cause of visits to emergency departments in Kansas City and it well established that there is a relationship between drinking and injuries. A recent study suggests that 2-6% of all injuries that are seen in emergency departments can be attributed to drinking alcohol prior to incurring the injury.<sup>565</sup> For violence related injuries, 43% were attributed to drinking before the injury.

**Figure 120 Distribution of 65 alcohol related deaths by age among Kansas City, Mo, 2006**



### ***Driving under the influence***

Driving under the influence (DUI) of alcohol is both a safety and public health problem; about 15% of adults in the US drove DUI during the past year.<sup>566</sup> The estimated annual number of DUI episodes in the US declined from 123 million in 1993 to 116 million in 1997, but then increased to 159 million both in 1999 and 2002.<sup>567</sup> In 2002, the prevalence of DUI episodes was 2.3%. Over 80% of the people involved in DUI episodes had been binge drinking. Binge drinkers were >13 times more likely to DUI than people who drank alcohol but did not binge drink. Over half of DUI episodes involve moderate drinkers. In 2007, the Kansas City Police Department issued 1,845 violations for DUI.<sup>568</sup> Eighty percent of the violators were male and the age distribution of all the violators is shown in Figure 121.

The National Highway Traffic Safety Administration ([www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)) reports that persons in the 20-29 and 30-39 age groups are those with the highest rates of alcohol involvement for drivers of passenger cars, SUVs, pickups, and vans. However for motorcycle operators, the age groups with the

<sup>565</sup> Cherpitel CJ et al. Attributable risk of injury associated with alcohol use: cross-national data from the Emergency Room Collaborative Alcohol Analysis Project. *Am J Public Health* 2005;95:266-272.

<sup>566</sup> Substance Abuse and Mental Health Services Administration. State estimates of persons aged 18 or older driving under the influence of alcohol or illicit drugs. The NSDUH Report. April 17, 2008. <http://oas.samhsa.gov>

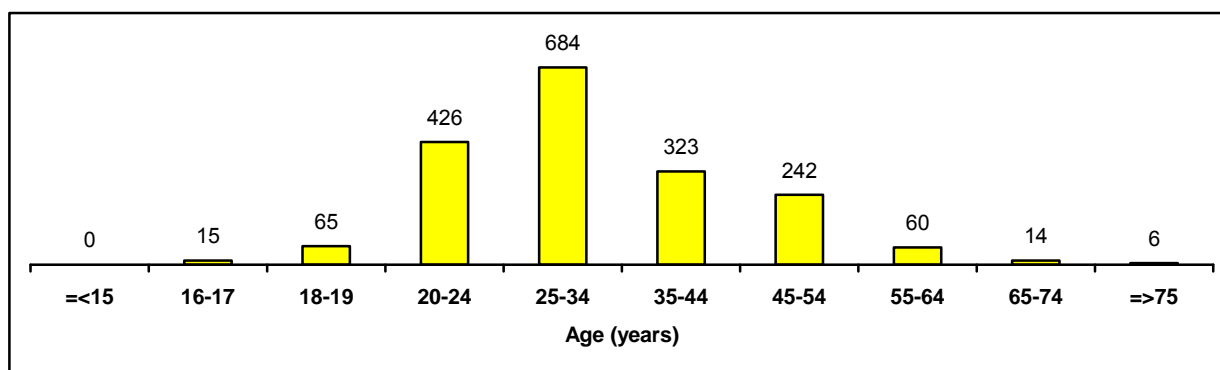
<sup>567</sup> Quinlan KP et al. Alcohol-impaired driving among US adults, 1993-2002. *Am J Prev Med* 2005;28:346-350.

<sup>568</sup> Kansas City, Missouri, Police Department. *Annual Report 2007*. [www.kcmo.org](http://www.kcmo.org)

highest rates of alcohol involvement were 30-39 and 40-49. Three-fourths (75%) of drivers with alcohol in fatal crashes had blood alcohol concentration (BAC) levels of 0.10 or 0.11 which is greater than the legal limit in all States and the District of Columbia. Without respect to age, motorcycle operators with alcohol in fatal crashes had a lower median BAC level than other vehicle type operators.

According to the NIAAA, the prevalence of driving after drinking has been declining, most significantly among persons 18-29 years old, although 22 and 23 years olds still had the highest prevalences of 11.5% and 10.4%, respectively. There was no decline in this behavior among females and among college students the prevalence of DUI has been rising.<sup>569</sup> Meanwhile, the Substance Abuse and Mental Health Services Administration reported that 21% of drivers <21 years old had driven in the past year while under the influence of alcohol or illicit drugs.<sup>570</sup> Non-Hispanic whites and Native Americans were more likely to report this behavior, as were males. In addition, 44% of 16-20 years olds had used alcohol in prior month, 30% were binge drinkers, and 10% were heavy drinkers. The prevalence of DUI in this age group was highest in the Midwest (approximately 25% of drivers <21 years of age). The 2003 Youth BRFSS report showed that 14.9% of Missouri high school students had driven after drinking alcohol and that 31.7% had ridden with a driver who had been drinking.

**Figure 121 Age distribution of 1,845 driving while under the influence of alcohol violators, Kansas City, Mo, 2007 (source: Kansas City Police Department )**



Missouri does not have an open container law. Currently, only the driver of a vehicle is prohibited from drinking alcoholic beverages in a moving vehicle. Missouri's permissible blood alcohol level for

<sup>569</sup> Hingson R et al. 2005. Magnitude of alcohol-related mortality and morbidity among US college students ages 18-24: changes from 1998 to 2001. *Annual Rev Public Health* 26:259-279.

<sup>570</sup> Substance Abuse and Mental Health Services Administration. Driving under the influence (DUI) among young persons. *The NSDUH Report* 12/3/04. [www.oas.samhsa.gov](http://www.oas.samhsa.gov).

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drivers is 0.08%. During 2006, 4.9% of all traffic accidents in Missouri and 25.1% of all fatal crashes were alcohol related.<sup>571</sup> In addition to the 270 persons killed, another 5,157 were injured in alcohol-related accidents. Sixty percent of the crashes involving alcohol occurred on Friday, Saturday and Sunday and 65% of alcohol related crashes occurred between 7 PM and 3 AM. Alcohol was involved in 3.5% of non-fatal crashes and in 18.1% of fatal crashes involving drivers <21 years old.

Among Missouri counties in 2006, Jackson ranked 2<sup>nd</sup> in alcohol related crashes, with Clay tied at 6<sup>th</sup> and Platte ranked 13<sup>th</sup>. Kansas City ranked 1<sup>st</sup> in alcohol related crashes among municipalities. Table 156 summarizes alcohol related motor vehicle crashes in Kansas City during 2006.

**Table 156 Motor vehicle accidents in which alcohol was involved, Kansas City, Mo, by county, 2006<sup>1</sup>**

Type	Total crashes	Portion of the City		
		Clay	Jackson	Platte
Motor vehicle crashes	601	114	440	47
Fatalities	18	2	15	1
Injuries	238	44	177	17

<sup>1</sup> From Missouri State Highway Patrol, 2006 Missouri Traffic Safety Compendium

<sup>571</sup> Missouri State Highway Patrol. 2006 Missouri Traffic Safety Compendium. [www.mshp.dps.missouri.gov](http://www.mshp.dps.missouri.gov)