

# AGE AT ONSET OF ALCOHOL USE AND ITS ASSOCIATION WITH DSM-IV ALCOHOL ABUSE AND DEPENDENCE: Results from the National Longitudinal Alcohol Epidemiologic Survey

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**ABSTRACT:** *Data from 27,616 current and former drinkers interviewed in the 1992 National Longitudinal Alcohol Epidemiologic Survey were used to examine the relationship between age at first use of alcohol and the prevalence of lifetime alcohol abuse and alcohol dependence, among all U.S. adults 18 years of age and over and within subgroups defined by sex and race. The rates of lifetime dependence declined from more than 40% among individuals who started drinking at ages 14 or younger to roughly 10% among those who started drinking at ages 20 and older. The rates of lifetime abuse declined from just over 11% among those who initiated use of alcohol at ages 16 or younger to approximately 4% among those whose onset of use was at ages 20 or older. After using multivariate logistic regression models to adjust for potential confounders, the odds of dependence decreased by 14% with each increasing year of age at onset of use, and the odds of abuse decreased by 8%. These findings are discussed with respect to their implications for prevention policies and the need to integrate epidemiological and intervention research.*

Although early onset of alcohol use has been closely associated with numerous adverse short-term and long-term consequences, very little is known about the relationship between early onset and the subsequent development of alcohol abuse and dependence. Early onset

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of alcohol use is a major public health concern in terms of its impact on adolescent morbidity and mortality. Among adolescents and young adults, early onset of alcohol use has been associated with motor vehicle crashes (Millstein & Irwin, 1988; U. S. Congress, 1991), tobacco and other drug use (Schuckit & Russell, 1983), sexual intercourse, infrequent condom use and pregnancy (Di Clemente, 1992; Epstein & Tamar, 1984), sexually-transmitted diseases (Shafer & Boyd, 1991), violence (Choquet, Menke, & Manfredi, 1991), depression and suicide (Kaplan, Landa, Weinhold, & Shenker, 1984; Deykin, Levy, & Wells, 1987; Robbins & Alessi, 1985), and alcohol abuse and dependence symptomatology (Gruber, DiClemente, Anderson, & Lodico, 1996).

Long-term consequences of early onset of alcohol use among adolescents and adults have also been documented in the literature. Early onset of alcohol use is associated with greater risks of other drug use and abuse (Irwin, Schuckit, & Smith, 1990; Robbins & Przybeck, 1985), early onset of alcohol abuse and dependence (Andersson & Magnusson, 1988; Von Knorring, Palm, & Andersson, 1985), and psychopathology (Buydens-Branchy, Branchy, & Noumair, 1989; Rich, Young, & Fowler, 1986).

Important limitations of most of this research on alcohol use relates to their small sample sizes and the absence of generalizability either to other adolescent populations or to the general population (including untreated individuals).

The purpose of this study is to extended the body of research on alcohol use disorders conducted over recent years by directly examining the relationship between age at onset of alcohol use and the prevalence of alcohol abuse and dependence in late adolescence and adulthood. To our knowledge, no other study has determined the odds of alcohol abuse and dependence as a function of age at onset of alcohol use in a large representative sample of the United States population.

## **METHOD**

### **Study Sample**

This study was based on the National Longitudinal Alcohol Epidemiologic Survey (NLAES), a national probability sample sponsored by National Institute on Alcohol Abuse and Alcoholism (NIAAA). Field work for the study was conducted by the United States Bureau of the Census in 1992. Direct face-to-face interviews were administered to 42,862 respondents, 18 years of age and older, residing in the noninstitutionalized population of the contiguous United States, including the District of Columbia. Approximately 92% of the selected households participated in this survey, and 97.4% of the randomly selected respondents in these households participated in this survey.

The NLAES utilized a complex multistage design that featured sampling of primary sampling units with probability proportional to size and oversampling of the black and young adult (18 to 29 years) populations. The NLAES design has been described in detail elsewhere (Grant, et al., 1994; Massey, Moore, Parsons, & Tadros, 1989).

### **Measures**

Diagnoses of Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV: American Psychiatric Association, 1994) alcohol use disorders were derived

from the Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS), a fully structured psychiatric interview designed to be administered by trained interviewers who were not clinicians (Grant & Hasin, 1992). The AUDADIS included an extensive list of symptom questions that operationalized the DSM-IV criteria for alcohol abuse and dependence.

The AUDADIS diagnoses of alcohol abuse and dependence satisfied the clustering and duration criteria of the DSM-IV definitions. The criteria of the DSM-IV include the requirement for a clustering of symptoms within any 1-year period. The duration criterion is defined as the repetitiveness with which symptoms must occur to be counted as positive towards a diagnosis. They are represented by the terms 'recurrent', 'often' and 'persistent' appearing in the description of most of the abuse and dependence diagnostic criteria. Not only were the clustering criteria represented in past year AUDADIS diagnoses of abuse and dependence, but the corresponding past diagnoses (before the past year) also were measured as syndromes, or the clustering of the required number of symptoms necessary to achieve a diagnosis: (1) at the same time; (2) continuously for at least 1 month; or (3) repeatedly for at least 1 month. For the purposes of the present study, respondents were classified with a lifetime alcohol use disorder if they had experienced an episode of abuse or dependence in past year and/or before the past year. The DSM-IV abuse and dependence diagnostic groups were mutually exclusive. Respondents classified as lifetime alcohol abusers did not meet criteria for lifetime dependence. Respondents classified with lifetime dependence included those with and without abuse diagnoses. Reliabilities of past year and prior to past year alcohol use disorders were 0.76 and 0.73 as determined in an independent test-retest study conducted in the general population prior to fielding the full survey (Grant et al., 1995).

Age of drinking onset was ascertained by asking respondents how old they were when they first started drinking, not counting small tastes or sips of alcohol. Measures selected as control variables for multivariate analyses were demographic and alcohol-related items that have been shown to affect the risk of alcohol abuse and dependence. These included race (black vs. nonblack), sex, age (18–24 years; 25–44 years; 45–64 years; 65+ years) and duration of drinking in years. Duration of drinking was estimated by subtracting the age at onset of drinking from either the age at last drink (for former drinkers) or age at interview (for past year or current drinkers). When age at drinking onset equaled age at last drink, the duration of drinking variable was set at 0.5 years. The test-retest reliability of the drinking onset variable was 0.72 (Grant et al., 1995).

Family history of alcoholism was ascertained through a series of questions that asked about 18 different types of first- and second-degree biological relatives. For each type of relative, the respondent was asked how many relatives of that type lived to be at least ten years old and how many were ever alcoholics or problem drinkers. An alcoholic or problem drinker was defined for the respondent in a manner consistent with the DSM-IV criteria for alcohol use disorders: "By alcoholic or problem drinker, I mean a person who has physical or emotional problems because of drinking, problems with a spouse, family or friends because of drinking, problems at work because of drinking, problems with the police because of drinking—like drunk driving—or a person who seems to spend a lot of time drinking or being hungover." In a test-retest study conducted in conjunction with the pretest for the NLAES, the family history items generally showed good to excellent reliability, with kappas of 0.70 or higher for most types of first- and second-degree relatives

(e.g., 0.72 for fathers, 1.00 for mothers, 0.90 for brothers, 0.73 for sisters, and 0.77 for both maternal and paternal grandparents). Slightly lower kappa values were obtained for sons and daughters (0.65 for each). The family history measure in this study was considered as positive if any first- or second-degree relatives were reported as having been alcoholics or problem drinkers.

### Statistical Analysis

The analysis consisted of two parts. First, the prevalences of lifetime alcohol abuse and dependence were estimated for each year of age at onset of alcohol use from ages 12 to 25 years for the overall sample and separately by sex and race. Second, linear logistic regression analyses were used to assess the relationship between age at onset of alcohol use and the odds of alcohol abuse or dependence in late adolescence and adulthood, controlling for the effects of sex, race, age, duration of drinking, family history of alcoholism and current drinking status, that is, current (past year) drinker versus former drinker (drank in the past, but not in the past year). All analyses were conducted using SUDAAN, a software package that uses Taylor series linearization to adjust for the complex design of the NLAES (Research Triangle Institute, 1996).

## RESULTS

Sixty-six percent ( $n=27,616$ ) of the NLAES sample was composed of current (18,352) and former (9,264) drinkers. Fifty-one percent of the drinkers were male, and 49% were female. Mirroring the distribution found in the general population, 88.9% of the drinkers were nonblack, and 11.1% were black.

Table 1 shows the prevalence of lifetime alcohol dependence for each year of age at onset of alcohol use from age 12 or less to age 25 or older. The prevalence of lifetime alcohol dependence decreased steeply as a function of increasing age at onset of drinking. In the total sample, more than 40% of respondents who initiated drinking before 15 years of age were classified with alcohol dependence at some time in their lives. Corresponding prevalences among those who started drinking at ages 15 and 16 were 38.7% and 30.6%, respectively. The prevalence of lifetime alcohol dependence among those who started drinking at age 17 was 24.5%, decreasing steadily to approximately 10% among those who started drinking at ages 21 and 22. Interestingly, the prevalence of dependence increased slightly among those respondents who initiated drinking at ages 22 and 23 years after which the prevalence of dependence resumed its decline. The downward trend of alcohol dependence as a function of increasing age at onset of alcohol use that was observed in the total sample of drinkers was similar to that observed within each sex and racial subgroup.

Table 2 presents the prevalence of lifetime alcohol abuse as a function of age at initiation of drinking. Similar to the results for alcohol dependence, the prevalence of abuse generally declined with each increasing year of age at onset of drinking. The prevalence of lifetime abuse peaked among respondents who began drinking at age 14 years (between 11.6% and 14.7%, depending on sex and race), declining slowly to between 1.8% and 3.6% among respondents 25 years and older at initiation of drinking.

Multivariate linear logistic analyses were conducted to assess the contribution of age at onset of drinking to the odds of lifetime abuse and dependence, controlling for the effects

**TABLE 1**  
Age at First Alcohol use and the Prevalence of Lifetime Alcohol Dependence

Age at First Alcohol Use (in Years)	Prevalence <sup>1</sup> of Lifetime Dependence				
	Male n=13,990	Female n=13,626	Black n=3,062	Nonblack n=24,554	Total n=27,616
12 or Younger	41.3 (2.7)	39.1 (3.7)	36.3 (6.7)	41.1 (2.2)	40.6 (2.1)
13	49.4 (3.4)	43.2 (3.9)	44.4 (9.9)	47.5 (2.7)	47.3 (2.7)
14	43.2 (2.5)	36.2 (2.9)	31.1 (6.4)	41.5 (2.0)	40.8 (1.9)
15	39.8 (1.8)	36.6 (2.2)	27.4 (4.5)	39.5 (1.5)	38.7 (1.4)
16	33.0 (1.2)	26.6 (1.4)	25.4 (3.4)	31.0 (1.0)	30.6 (0.9)
17	26.8 (1.3)	20.7 (1.3)	23.4 (3.2)	24.6 (1.0)	24.5 (1.0)
18	19.4 (0.8)	12.5 (0.7)	13.9 (1.6)	16.9 (0.6)	16.6 (0.6)
19	19.9 (1.5)	12.2 (1.1)	14.3 (3.2)	16.7 (1.1)	16.5 (1.0)
20	14.7 (1.3)	7.4 (0.8)	12.5 (2.6)	11.3 (0.8)	11.4 (0.8)
21	11.9 (1.0)	8.1 (0.7)	10.6 (2.3)	9.9 (0.6)	10.0 (0.6)
22	11.3 (1.7)	7.6 (1.3)	9.5 (3.3)	9.5 (1.1)	9.5 (1.1)
23	15.7 (3.1)	13.8 (2.2)	15.0 (4.8)	14.7 (2.0)	14.7 (1.9)
24	20.4 (3.7)	8.2 (2.2)	16.0 (5.1)	13.2 (2.3)	13.6 (2.1)
25 or Older	9.7 (1.2)	6.9 (0.7)	9.6 (1.5)	7.7 (0.7)	7.9 (0.6)

<sup>1</sup> Prevalence expressed as a weighted percentage; ns presented as unweighted figures.

Note: Standard errors appear in parentheses

**TABLE 2**  
Age at First Alcohol use and the Prevalence of Lifetime Alcohol Abuse

Age at First Alcohol Use (in Years)	Prevalence <sup>1</sup> of Lifetime Abuse				
	Male n=13,990	Female n=13,626	Black n=3,062	Nonblack n=24,554	Total n=27,616
12 or Younger	8.1 (1.4)	8.6 (1.9)	8.0 (4.1)	8.3 (1.2)	8.3 (1.1)
13	13.6 (2.6)	7.4 (2.3)	2.5 (2.5)	12.1 (1.9)	11.5 (1.8)
14	14.7 (2.0)	12.2 (2.0)	11.6 (4.7)	14.0 (1.5)	13.8 (1.5)
15	12.4 (1.2)	11.1 (1.4)	9.7 (4.1)	12.1 (0.9)	11.9 (0.9)
16	12.3 (0.9)	7.7 (0.8)	8.7 (2.5)	10.7 (0.7)	10.6 (0.7)
17	10.3 (0.8)	8.1 (0.9)	5.8 (1.7)	9.8 (0.6)	9.5 (0.6)
18	9.1 (0.6)	5.7 (0.5)	3.3 (0.9)	8.1 (0.4)	7.8 (0.4)
19	6.9 (0.8)	5.6 (0.7)	3.6 (1.2)	6.6 (0.6)	6.3 (0.6)
20	6.4 (0.8)	2.8 (0.5)	2.2 (1.0)	5.1 (0.5)	4.8 (0.5)
21	6.5 (0.8)	3.1 (0.5)	5.1 (1.9)	4.7 (0.5)	4.8 (0.4)
22	5.9 (1.7)	3.8 (1.0)	2.6 (1.7)	5.2 (1.1)	4.9 (1.0)
23	3.2 (1.0)	3.9 (1.4)	0.0 (0.0)	4.0 (1.0)	3.6 (0.9)
24	4.3 (1.9)	2.2 (1.1)	1.1 (1.1)	3.5 (1.2)	3.1 (1.0)
25 or Older	3.6 (0.8)	2.0 (0.4)	1.8 (0.9)	2.7 (0.4)	2.5 (0.4)

<sup>1</sup> Prevalence expressed as a weighted percentage; ns presented as unweighted figures.

Note: Standard errors appear in parentheses

of sex, race, age, duration of drinking, current drinking status, and family history of alcoholism. Age at first alcohol use was entered into this analysis as a continuous measure. After adjusting for the other model covariates, age at onset of alcohol use remained a major contributor to the development of alcohol abuse and alcoholism. Specifically the odds of lifetime alcohol dependence were reduced by 14% with each increasing year of age at first use. Similarly, the odds of lifetime alcohol abuse were reduced 8% with each increasing year that drinking onset was delayed.

The contribution of age at onset of alcohol use to the odds of lifetime alcohol abuse and dependence varied little across sex and race subgroups. Among males, females and nonblacks the odds of lifetime alcohol dependence were reduced 14.7%, 13.2%, and 14.5%, respectively, with each increasing year of age at onset of alcohol use, while the corresponding reduction among blacks was somewhat lower (8.1%). The odds of lifetime abuse were reduced 7.0%, 9.1%, 6.7% and 7.8% among males, females, blacks and nonblacks, respectively.

## DISCUSSION

Age at first use of alcohol is a powerful predictor of lifetime alcohol abuse and dependence. The prevalence of each of these disorders showed a striking decrease with increasing age at onset of use. After using multivariate techniques to adjust for potential confounders, the odds of lifetime alcohol dependence and abuse were reduced by 14% and 8%, respectively, for each increasing year of age at initiation.

The prevalence of alcohol abuse showed a steady decline with postponement of age at first use. However, the trend for dependence was not as uniform. Specifically, the prevalence of dependence increased from 9.5% for initiation at age 22 to 14.7% and 13.6% for initiation at ages 23 and 24, respectively. A possible explanation for this finding is that initiation of alcohol use abnormally late (i.e., after a large majority of the population initiates use) may be an indicator of the presence of other psychopathology and perhaps efforts at self-medication in response to those disorders. Although the present study cannot conclusively confirm this interpretation, the perturbation in the decline of the prevalence of alcohol dependence occurring during these ages deserves further study.

Very little variation in risk was noted across sex and race subgroups of the population. However, the reduction in risk of dependence, but not abuse, with each increasing year of age of onset of use was lower among blacks than nonblacks. Although the interpretation of this finding is unclear, this result highlights the need for research on racial minorities and other groups whose unique cultural traditions and life experiences may contribute to different patterns of risk for alcohol dependence.

The findings of this study identified preadolescence and early adolescence (ages 16 and younger) as a particularly vulnerable period for initiation of drinking, one that is strongly associated with an elevated risk of developing an alcohol use disorder. Although these results suggest that preventive efforts should be targeted toward the delay of alcohol use onset until after ages 18 or 19 when the associated risk of alcohol abuse and dependence has dramatically dropped, such a recommendation should be considered cautiously. The strength of such a preventive strategy lies in its focus on the prevention of alcohol abuse and dependence rather than alcohol use, a strategy that recognizes that the use of alcohol is

commonplace among American adolescents and youth. However, the weakness of such a preventive strategy is the lack of a complete understanding as to why the onset of alcohol use is related to the development of alcohol abuse and dependence.

The most significant contribution of this study is the focus it provides for the direction of future research and preventive efforts. There exists an urgent need to integrate epidemiological and etiologic research with intervention research, with a view toward the prevention of alcohol use disorders. Such an integration should take the form of a prospective study incorporating prevention efforts targeted toward early onset alcohol users. This research could ascertain if it is the delay in alcohol use or, more likely, other associated factors that account for the inverse relationship between age at first drink and the risk of lifetime alcohol use disorders. Within this paradigm, another central research question is to determine the status of early onset use as either a critical and potentially modifiable risk factor in the development of alcohol use disorders, or alternatively, as a marker or early indicator of the inevitable, and perhaps unmodifiable development of alcohol use disorders. It will also be possible to determine whether delaying onset of alcohol use has any adverse or unintended effects, for example, increasing the prevalence of other drug use and experimentation among adolescents. From a methodological point of view, a prospective longitudinal study could also reduce the extent of recall bias inherent in cross-sectional designs (including the present study) and increase our ability to disentangle the importance of the contribution of age of onset of alcohol use and duration of drinking on the development of alcohol use disorders.

## REFERENCES

- American Psychiatric Association. (1994). DSM-IV. Washington, DC: Author.
- Andersson, T., & Magnusson, D. (1988). Drinking habits and alcohol abuse among young men: a prospective longitudinal study. *Journal of Studies on Alcohol*, *49*, 245–252.
- Buydens-Branchey, L., Branchy, M.H., & Noumair, D. (1989). Age of alcoholism onset. I. Relationship to psychopathology. *Archives of General Psychiatry*, *46*, 225–230.
- Choquet, M., Menke, H., & Manfredi, R. (1991). Interpersonal aggressive behavior and alcohol consumption among young urban adolescents in France. *Alcohol and Alcoholism*, *26*, 381–390.
- DiClemente, R.J. (1992). Psychosocial determinants of condom use among adolescents. In R.J. DiClemente (Ed.), *Adolescents and AIDS: A generation in jeopardy* (pp. 34–51). Newbury Park, CA: Sage.
- Deykin, E.Y., Levy, J.C., & Wells, V. (1987). Adolescent depression, alcohol and drug abuse. *American Journal of Public Health*, *77*, 178–182.
- Epstein, L., & Tamar, A.T. (1984). Health-related behavior of adolescents: change over time. *Journal of Adolescent Health Care*, *5*, 91–95.
- Grant, B.F., Harford, T.C., Dawson, D.A., Chou, P.S., & Pickering, R.P. (1995). The Alcohol Use Disorder and Associated Disabilities Interview Schedule: Reliability of alcohol and drug modules in a general population sample. *Drug and Alcohol Dependence*, *39*, 37–44.
- Grant, B.F., & Hasin, D.S. (1992). *The Alcohol Use Disorder and Associated Disabilities Interview Schedule*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.
- Grant, B.F., Peterson, A., Dawson, D.S., & Chou, S.P. (1994). *Source and accuracy statement for the National Longitudinal Alcohol Epidemiologic Survey*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

- Gruber, E., DiClemente, R.J., Anderson, M.M., & Lodico, M. (1996). Early drinking onset and its association with alcohol use and problem behavior in late adolescence. *Preventive Medicine, 25*, 293-300.
- Kaplan, S.L., Landa, B., Weinhold, C., & Shenker, I.R. (1984). Adverse health behaviors and depressive symptomatology in adolescence. *Journal of the American Academy of Child Psychiatry, 23*, 595-601.
- Massey, J., Moore, T.F., Parsons, R.P., & Tadros, W. (1989). *Design and estimation from the National Health Interview Survey, 1985-1994*. Hyattsville, MD: National Center for Health Statistics.
- Millstein, S.G., & Irwin, C.E. (1988). Accident-related behaviors in adolescence: A biopsychosocial view. *Alcohol, Drugs and Driving, 4*, 21-29.
- Research Triangle Institute. (1996). *Software for survey data analysis (SUDAAN), version 6:30*. Research Triangle Park, NC: Author.
- Rich, C.L., Young, D., & Fowler, R.C. (1986). San Diego suicide study. I. Young vs. old subjects. *Archives of General Psychiatry, 43*, 577-582.
- Robbins, L.N., & Przybeck, T.R. (1985). Age of onset of drug use as a factor in drug and other disorders. National Institute on Drug Abuse (Ed.), *Etiology of drug abuse*. DHHS Publication No. (ADM) 85-1335. Washington, DC: Government Printing Office.
- Robbins, D.R., & Alessi, N.E. (1985). Depressive symptoms and suicide: behavior in adolescents. *American Journal of Psychiatry, 142*, 588-592.
- Schuckit, M.A., & Russell, J.W. (1983). Clinical importance of age at first drink in a group of young men. *American Journal of Psychiatry, 140*, 1221-1223.
- Shafer, M.A., & Boyer, C.B. (1991). Psychosocial and behavioral factors associated with risk of sexually-transmitted diseases, including human immunodeficiency virus infection among urban high school students. *Journal of Pediatrics, 119*, 826-833.
- U.S. Congress, Office of Technology Assessment. (1991). Alcohol, tobacco and drug use. In *Adolescent health: background and the effectiveness of selected prevention and treatment services*. OTA-H466. Washington, DC: Government Printing Office.
- Von Knorring, L., Palm, U., & Anderson, H.E. (1985). Relationship between treatment outcome and subtype of alcoholism in men. *Journal of Studies on Alcohol, 46*, 388-391.