

**Citation:**

Hingson RW, Edwards EM, Heeren T, Rosenbloom D. Age of drinking onset and injuries, motor vehicle crashes, and physical fights after drinking and when not drinking. *Alcohol Clin Exp Res*. 2009 May;33(5):783-90. Epub 2009 Mar 6.

**PubMed ID:** [19298330](#)

**Study Design:**

Cross-sectional Study

**Class:**

D - [Click here](#) for explanation of classification scheme.

**Research Design and Implementation Rating:**

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

**Research Purpose:**

To explore whether early drinkers take more risks even when sober by comparing potential associations between age of drinking onset and these outcomes after drinking relative to when respondents have not been drinking.

**Inclusion Criteria:**

- Ever-drinkers aged 18 to 39

**Exclusion Criteria:**

None specifically mentioned.

**Description of Study Protocol:****Recruitment**

Ever-drinkers from a national sample. The study sample was comprised of 2 groups that completed the same questionnaire:

- A random sample from a prerecruited Internet panel who participated by Internet, which was established using list-assisted, random digit dial telephone techniques. Telephone numbers from phone banks with higher concentrations of black and Hispanic people were slightly over-sampled. 5,778 responded to the screening email and 3,409 completed the survey online.
- A nonresponse follow-up sample of individuals who were selected for but declined membership in the same Internet panel who participated by telephone. 612 completed the survey by telephone.

**Design:** Cross-sectional study

**Blinding used (if applicable):** not applicable

**Intervention (if applicable):** not applicable

### **Statistical Analysis**

- Analyses were conducted using SUDAAN
- Chi-square tests were used to evaluate unadjusted associations between the outcomes and demographic factors, and the outcomes and drinking behaviors
- GEE logistic regression models for repeated measures dichotomous outcomes compared whether odds ratios between age of onset and these adverse outcomes significantly differed when they occurred after drinking versus when not drinking
- Differential effects of age of onset were modeled through interaction terms between event condition (after drinking vs while not drinking) and age of drinking onset, which was represented through a set of indicator variables

### **Data Collection Summary:**

#### **Timing of Measurements**

Cross-sectional survey conducted in 2006. The same survey instrument was used for both the online and telephone surveys and was designed to take 30 minutes to complete.

#### **Dependent Variables**

- Alcohol dependence
- Unintentional injuries
- Motor vehicle crashes
- Physical fighting after drinking and when not drinking

#### **Independent Variables**

- Age of drinking onset, not counting tastes or sips
- Alcohol consumption

#### **Control Variables**

- Demographic characteristics: age, sex, race/ethnicity, education
- Cigarette and marijuana use
- Family history of alcoholism
- Ever experiencing alcohol dependence
- Frequency of binge drinking

### **Description of Actual Data Sample:**

**Initial N:** 5,778 responded to the screening email. 4,021 drinkers completed the survey (3,409 completed the survey online, 612 completed the survey by telephone).

**Attrition (final N):** 4,021 drinkers

**Age:** aged 18 - 39

- 1,225 aged 18 - 25 years
- 1,793 aged 26 - 35 years
- 787 aged 36 - 39 years

**Ethnicity:**

- 2,506 White non-Hispanic
- 413 Black non-Hispanic
- 619 Hispanic
- 265 Other

**Other relevant demographics:**

**Anthropometrics**

**Location:** United States

**Summary of Results:**

**Key Findings**

- Among respondents who ever drank, 38% had ever been a driver in a motor vehicle crash and 14% of those drivers were in accidents that occurred after they had been drinking, 34% reported ever being in a physical fight, and 64% of them were in fights that occurred after drinking, 27% were ever accidentally injured, and 50% of them were injured after drinking
- Compared with persons who started drinking at age 21+, those who started at ages <14, 14 to 15, 16 to 17, and 18 to 20, had, after drinking, respectively greater odds: 6.3 (2.6, 15.3), 5.2 (2.2, 12.3), 3.3 (1.5, 7.3) and 2.2 (0.9, 5.1) of having been in a motor vehicle crash; 6.0 (3.4, 10.5), 4.9 (3.0, 8.6), 3.7 (2.4, 5.6) and 1.9 (1.2, 2.9) of ever being in a fight; and 4.6 (2.4, 8.7), 4.7 (2.6, 8.6), 3.2 (1.9, 5.6), and 2.3 (1.3, 4.0) of ever being accidentally injured.
- The odds of experiencing motor vehicle accidents or injuries when not drinking were significantly elevated among early onset drinkers
- The odds of earlier onset drinkers being in fights were also significantly greater when respondents had been drinking than not drinking

**Odds of Involvement in a Motor Vehicle Accident, Physical Fight, and Unintentional Injury After Drinking and When Not Drinking, According to Age of Drinking Onset**

Age of Drinking Onset	After Drinking AOR (95% CI)	After Not Drinking AOR (95% CI)	P-value Comparing AORs
<b>Ever in Auto Accident</b>			
<14	6.3 (2.6, 15.3)	0.9 (0.5, 1.4)	<0.01
14 - 15	5.2 (2.2, 12.3)	1.1 (0.8, 1.6)	<0.01
16 - 17	3.3 (1.5, 7.3)	0.9 (0.7, 1.2)	<0.01
18 - 20	2.2 (0.9, 5.1)	0.8 (0.6, 1.0)	0.02
21+	1	1	---
<b>Ever in a Fight</b>			
<14	6.0 (3.4, 10.5)	2.2 (1.3, 3.8)	<0.01

14 - 15	4.9 (3.0, 8.0)	1.8 (1.2, 2.8)	<0.01
16 - 17	3.7 (2.4, 5.6)	1.9 (0.3, 2.7)	<0.01
18 - 20	1.9 (1.2, 2.9)	1.1 (0.8, 1.6)	0.01
21+	1	1	---
<b>Ever Accidental Injury</b>			
<14	4.6 (2.4, 8.7)	1.3 (0.8, 2.3)	<0.01
14 - 15	4.7 (2.6, 8.6)	1.3 (0.8, 1.9)	<0.01
16 - 17	3.2 (1.9, 5.6)	1.4 (0.9, 2.0)	<0.01
18 - 20	2.3 (1.3, 4.0)	1.0 (0.7, 1.4)	<0.01
21+	1	1	---

Adjusted odds ratios for general estimation equations logistic regression models controlling for current age, sex, race, education, cigarette use, marijuana use, family history of alcohol problems, ever alcohol dependent, and exceeded recommended daily limits (5+ for men, 4+ for women) during current and heaviest drinking period.

### Author Conclusion:

Starting to drink at an earlier age is associated with greater odds of experiencing motor vehicle crash involvement, unintentional injuries, and physical fights when respondents were drinking, but less so when respondents had not been drinking. These findings reinforce the need for programs and policies to delay drinking onset.

### Reviewer Comments:

*Large number of subjects from nationally representative sample. Authors note the following limitations:*

- *Cross-sectional survey design required some respondents to recall age of drinking onset many years earlier*
- *Social desirability biases may foster underreporting of alcohol use and associated problems*
- *Potential confounding factors, genetic factors, disinhibitory behavior patterns, and other psychiatric disorders may have contributed to the observed associations*
- *The fighting variable did not identify the context in which violence occurred, and relations between age of drinking onset and fighting in these various situations may vary*
- *Survey's 37% response rate was low, raising questions about internal validity and generalizability*
- *Two subsamples of participants completed the survey at different times*

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### Research Design and Implementation Criteria Checklist: Primary Research

#### Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

### Validity Questions

<b>1.</b>	<b>Was the research question clearly stated?</b>	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
<b>2.</b>	<b>Was the selection of study subjects/patients free from bias?</b>	???
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	No
2.2.	Were criteria applied equally to all study groups?	???
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	???
<b>3.</b>	<b>Were study groups comparable?</b>	???
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	???
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	???

3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	???
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
<b>4.</b>	<b>Was method of handling withdrawals described?</b>	<b>Yes</b>
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
<b>5.</b>	<b>Was blinding used to prevent introduction of bias?</b>	<b>N/A</b>
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
<b>6.</b>	<b>Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?</b>	<b>Yes</b>
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
<b>7.</b>	<b>Were outcomes clearly defined and the measurements valid and reliable?</b>	???
7.1.	Were primary and secondary endpoints described and relevant to the question?	N/A
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	???
7.5.	Was the measurement of effect at an appropriate level of precision?	???
7.6.	Were other factors accounted for (measured) that could affect outcomes?	???
7.7.	Were the measurements conducted consistently across groups?	Yes
<b>8.</b>	<b>Was the statistical analysis appropriate for the study design and type of outcome indicators?</b>	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
<b>9.</b>	<b>Are conclusions supported by results with biases and limitations taken into consideration?</b>	Yes
9.1.	Is there a discussion of findings?	Yes

9.2.	Are biases and study limitations identified and discussed?	Yes
<b>10.</b>	<b>Is bias due to study's funding or sponsorship unlikely?</b>	<b>Yes</b>
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes

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