

# Alcohol and Boating: Who Drinks and Who Dies

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## Abstract

**Background:** Alcohol is beginning to be recognized as an important risk factor in other transportation, including in boating fatalities. However, little is known regarding the prevalence of drinking on the water. This paper describes the prevalence of alcohol use among recreational boaters on the Chesapeake Bay. **Methods:** From May to October 1997 and 1998, boats were selected at random from those approaching boat ramps, marinas, or boats that were drifting or at anchor. Interviews and self-administered questionnaires were given to the operator and two random passengers, followed by a breath sample. **Results:** Breath samples were obtained on 82% of boaters (74% of respondents were male). Drinking on the day of the survey was reported by 33% of respondents, but only 24% had a positive BAC: (10% > 50 mg/dl, 5% > 100 mg). Drinking was higher among: 25-44 year olds (30% BAC positive), those in cabin motorboats (34%), those swimming and cruising (33% and 25% retrospectively), and lowest for fishing (9%). Those with positive BACs increased from 4% at 9 a.m. to 40% after 9 p.m. High BACs were similar in operators and passengers, and between men and women. Crude comparison of BAC in boaters in the survey to boating fatalities in Maryland show that elevated BACs are much more prevalent in fatalities. **Conclusions:** Alcohol use on the water is common. Unlike drivers on the highway, the BACs are more likely to be elevated in boaters, and men and women have similar BACs. Data from this prevalence study will also be used in an ongoing case-control study of alcohol and boating fatality risk. Upon completion of case-control analyses, the prevalence data will also be used to estimate attributable risk.

## **Introduction**

Alcohol is widely recognized for its role in traffic deaths and in many other unintentional injuries, including drowning (Smith et al 1988,1999). Alcohol is also beginning to be recognized as an important risk factor in other transportation, including in boating fatalities (NTSB 1993, Pentilla et al. 1979, Smith et al. 1988,1999). The US Coast Guard reports that 821 people died in recreational boating fatalities in the US in 1997 and 815 in 1998 (USCG 1998). The National Vital Statistics Data for the US on the other hand reported only 758 deaths in 1997 using the external cause codes for boating E830 – E838 (CDC wonder 2000). Both these figures are believed to be underestimates due to underreporting of fatalities as due to boating (Baker et al 1992, Smith &Langley 1999). Alcohol use is widely believed to be an important factor in many of these fatalities, but poor data from many states prevent an accurate assessment nationally. An accompanying paper in these proceedings however clearly documents the involvement of alcohol in boating fatalities in one state, North Carolina (Foss et al 2000). While this and other studies document the prevalence of alcohol involvement in boating fatalities little is known regarding the prevalence of drinking on the water among all boaters out enjoying this recreational activity.

This Study aims to measure the prevalence of alcohol use among recreational boaters in Maryland using both self-reported drinking patterns and measured BAC using breathalyzers. The study is part of a larger case-control study that will to examine the risk of alcohol use for boating fatalities. This current paper describes the prevalence of alcohol use among recreational boaters on the Chesapeake Bay in Maryland.

## **Materials and Methods**

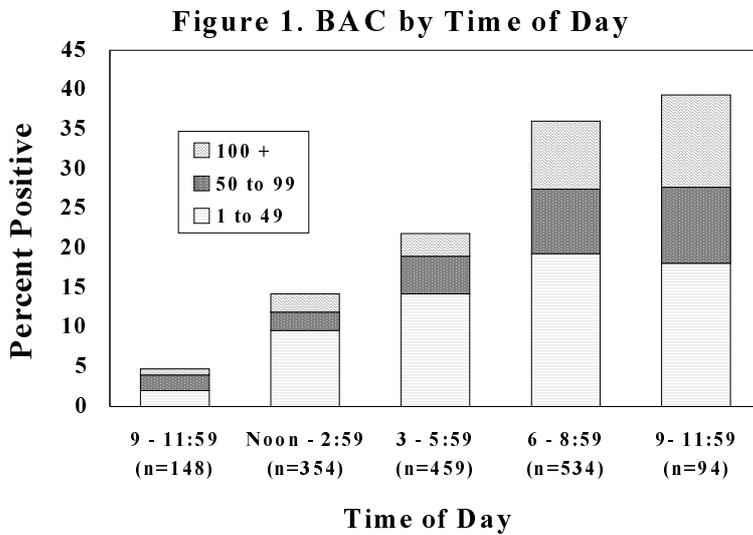
From May to October 1997 and 1998 a survey was conducted of boaters on the water across various parts of the Chesapeake Bay in Maryland. Boats were selected at random from those approaching boat ramps, marinas, and other places where boats come to rest or boats that were drifting or at anchor. Interviews and self-administered questionnaires were given to the operator and up to two random passengers. Respondents had to be at least 18 years old on completion of the questionnaire. A breath sample was requested from participants and an Intoxilyzer 400 was used to measure estimated blood alcohol concentration (BACs). Individual BAC results are stored internally and were blind to interviewers and respondents. For the purposes of sampling the Chesapeake Bay was divided into 6 regions; three areas on each side of the bay.

## **Results**

Of the 1954 boats surveyed, breath samples were obtained on 82%, (78% completed questionnaires and breath samples and 69% gave breath samples only). Only 8.6 % refused any participation in the study. Based on initial assessment by the interviewers those who refused were of similar age and did not appear to be more intoxicated or to be drinking more than respondents. Overall 74% of respondents were male (vs. 26% female). Boat operators comprised 54% of the sample with the rest being passengers. The medium age was 45.3 years (SD = 13.1) with a range from 18 to 92 years.

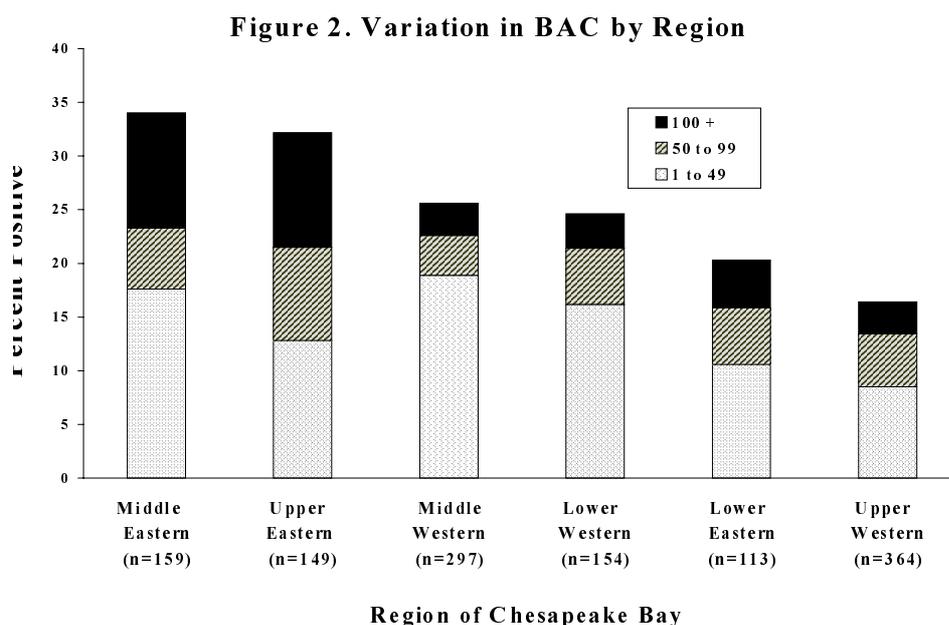
Overall 33% of respondents, reported drinking alcohol on the day of the survey, but only 24% were found to have a positive BAC: (10% > 50 mg/dl, 5% > 100 mg). Drinking was higher among: 25-44 year olds (30% positive), those swimming and cruising (33% and 25%,

retrospectively), and lowest for fishing (9%). The proportion of persons with positive BACs varied by time of day and increased from only 4% at 9 a.m. to 40% after 9 p.m. (Figure 1).

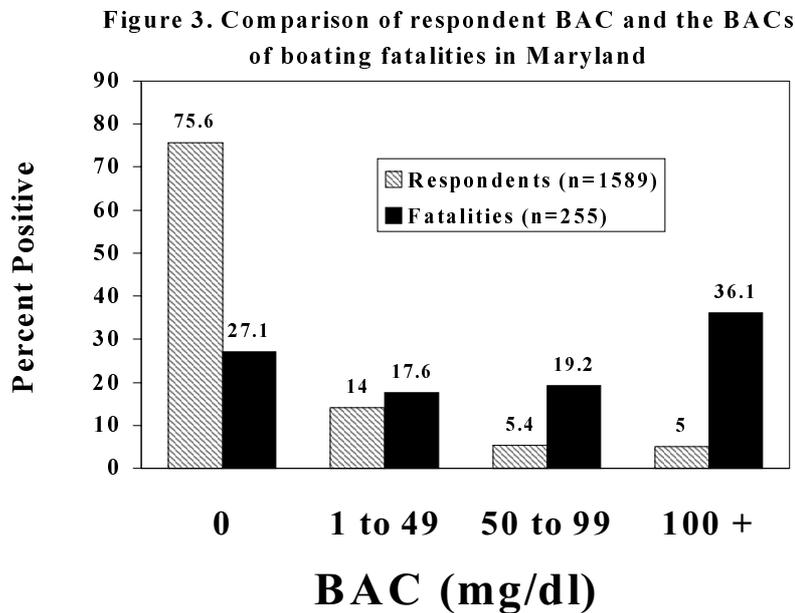


The proportion of boaters with high BACs and with any elevation was similar in operators and passengers. The highest portion of drinkers was in cabin motorboats (34% with elevated BAC) compared to 20% for open motorboats.

While only 26% of the boaters surveyed were women, they were found to have the exact same distribution of BAC's as men. We also found considerable variation in drinking from one region of the bay to the other. The highest proportion of boaters with an elevated BAC (35%) was in the middle eastern portion of the bay, while the lowest was on the upper western part (16%) (Figure 2).



A comparison of BAC's between boating fatalities in Maryland and the boaters surveyed found that fatalities were greatly over represented among those with a BAC of 100 mg/dl or higher reflecting the increased risk in this group (Figure 3).



### Discussion

Alcohol use is widely promoted on the water through advertising and the popular press. Alcohol use on the water is also common, with about a third of boaters in our study reporting drinking on the day of the survey. The proportion of boaters with any elevation of BAC (only 24%) is less than self-reported drinking because of metabolism of alcohol by the body. In total 10% of boaters had a BAC over 50 mg/dl and 5% were over 100 mg/dl.

The proportion of boaters in our study with elevated BAC is much higher than in comparable studies for automobile drivers. Most studies find less than 1% of drivers in the daytime have elevated BAC's and even at nighttime only 3-4% have BAC's over 100mg/dl. The 1996 US National Roadside Survey found that 2.8 % of drivers from 10:00 PM to 3:00 AM on weekend nights had a BAC of 100mg/dl or more (Voas et al 1998). An unexpected finding from our study was that women had BAC levels as high as men. This finding is marked contrast to studies of drinking and driving. In the National Roadside Survey females had much lower BACs than males with only 1.5 % of female drivers having a BAC over 100 mg/dl on weekend nights compared to 3.5 % for men. Unfortunately these roadside surveys do not give any data on BAC for earlier times of the day that would be more comparable to those in our boating study. It was also notable that the proportion of boaters drinking varied widely by one region of the bay to the other, with only 3 % in one region being over 100 mg/dl compared to 11 % the highest region. A similar study done as part of our larger Case-control study found that only 2% of North Carolina boaters were over 100 mg/dl (unpublished data).

A random digit dial telephone survey conducted in 1994 found that 31% of 597 respondents who had operated a boat that year did so at least once while under the influence of alcohol (Logan et al 1999). Other studies have found similar results (Howland et al 1990, Howland et al 1995). However, these do not really provide a good picture of what the actual prevalence

of drinking on the water is at any one time. In addition there are concerns regarding the validity of telephone surveys because response rates are only about 50 –60%. It is interesting that the 1994 telephone survey found that only 14.3 % of women who reported operating a boat did so at least once while influenced by alcohol. The small number of respondents (23 respondents) however, makes estimates unreliable. The study also did not examine alcohol use among passengers and thus ignored an important high-risk group. Our study provides important new data on the actual use of alcohol among boaters on the water.

In 1998 the Coast Guard reported that alcohol use was the cause in 119 (14.6 %) of 815 fatalities. However, this is acknowledged to be a large undercount of alcohol involvement (NTSB 1993). For example we found that 73% of the fatalities in Maryland had an elevated BAC (Figure 3), 55% over 50mg/d,l and 36% were 100+mg/dl. It is also noteworthy that the BACs of the boating fatalities in Maryland are much more likely to be elevated than those of boaters in our prevalence survey, indicating that alcohol is an important risk factor for boating fatalities. Among fatalities 36% were over 100mg/dl while only 5% of those surveyed were at this level. A more detailed analysis of this data will be provided in upcoming papers presenting the case-control analyses. There is clear evidence from other studies of drowning that alcohol is a particular hazard in aquatic environments (Howland et al, 1993, 1995, Smith & Brenner 1995, Wright 1985). In addition one small study done in California found increased risks for boating fatalities from alcohol use although the sample size was small and no multivariate methods were used (Mengert et al. 1992).

To date most efforts at boating safety, particularly with regard to alcohol have promoted the same policies as those that have been so successful for drunk driving. However, our earlier article pointed out the hazards of this approach, particularly with regard to the promotion of the concept of the designated skipper/designated driver (Howland, Smith et al 1993). There is clear evidence that many passengers drown by simply falling overboard regardless of the actions of the skipper. While sober car drivers may greatly reduce the risks to their passengers the same is not true on the water. The finding that people are more likely to drink on the water than when driving a car also suggests that there is a need to develop improved strategies to reduce drinking on the water.

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