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# Blood Alcohol Testing for Motor Vehicle Deaths



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**Wisconsin  
1984**

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108946

BLOOD ALCOHOL TESTING  
FOR MOTOR VEHICLE DEATHS  
Wisconsin, 1984



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**NCJRS**

**FEB 5 1988**

**ACQUISITIONS**

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Wisconsin Division of Health  
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## SUMMARY

1. Drivers of cars and trucks accounted for 345 of the 562 fatalities tested for blood alcohol in 1984 and motorcyclists for 52. Although testing of passenger deaths is not required, 101 were processed. The balance of the tests were for pedestrians (41), snowmobilers (8), boaters (6), operators of tractors and other equipment (5), and bicyclists (4). (Page 8)
2. Relevant evidence of intoxication (blood alcohol concentration of 0.05% or higher) was found for 51.8 percent of all highway fatalities tested in 1984. For 45.2 percent of these, blood alcohol concentrations (BACs) were of a level to constitute prima facie evidence of intoxication (0.10+%). This pattern has been substantially unchanged since the inception of the blood alcohol testing program in 1968. (Page 8-9)
3. Of those with significant blood alcohol concentration (0.05+%), the proportion male was 82.8 percent and female 17.2 percent. (Page 10)
4. Alcohol involvement was highest among drivers of motorcycles (71.2 percent) then passengers (54.5 percent) followed by drivers of cars and trucks (49.3 percent) and pedestrians (43.9 percent). (Page 10)

### DRIVERS/MOTORCYCLISTS

5. Among driver/motorcyclist fatalities tested, the proportion of alcohol involvement was highest for those aged 24 and under (62.7 percent) and lowest for those 45 years of age and older (24.5 percent). (Page 11)
6. A significantly larger proportion of fatalities in nighttime accidents, (76.7 percent) than daytime accidents (15.6 percent) involved alcohol. Alcohol involvement increased during the evening to a high of 84.7 percent in the period from midnight to six A.M. (Page 24)
7. Alcohol involvement was more frequent among Saturday and Sunday fatalities (59.9 percent) than among those occurring Monday through Friday (46.5 percent). For 1984 there was no significant association with holiday weekends. The proportion of tested fatalities with alcohol involvement shows no seasonal differentials. (Page 28)

Note: Graphics appearing in this report were prepared using Show Graphics Package of the Madison Academic Computing Center (MACC) and plotted on a Hewlett Packard 7221 Plotter. Assistance was provided by Phillip Klein, Section of Resource Data.

## INTRODUCTION

This report has been prepared as part of the requirement of Wisconsin Statute 346.71(2) which specifies that the Division of Health, without revealing individual identity, shall disseminate and make public the results of blood alcohol tests of motor vehicle operators or pedestrians 16 years of age or older killed on Wisconsin highways.

Under Wisconsin Statute 885.235, if chemical analysis shows that there was 0.05 percent or less by weight of alcohol in a person's blood, it is prima facie evidence that he was not under the influence of this intoxicant; if the analysis shows more than 0.05 percent but less than 0.10 percent, it is relevant evidence of intoxication; and if 0.10 or more percent alcohol is found, it is taken as prima facie evidence of intoxication. Therefore, these groupings of blood alcohol concentration are emphasized in this report.

The main focus of the report is on drivers of cars, trucks and motorcycles, who account for 397 of the 562 reports processed in 1984. The second largest group of reports (101) is for passengers, although the statute does not specifically require blood testing of passengers killed. The balance of the reports are for pedestrians (41), snowmobilers (8), boaters (6), operators of tractors and other equipment (5), and bicyclists (4).

Data have been obtained from reports sent to the Division of Health by every coroner or medical examiner for all the counties. The report is prepared by the Center for Health Statistics under the general direction of Henry Krebs, Research Analyst. Data review and tabulations are by Jan L. Silbaugh, Research Technician.



Relevant Wisconsin Statutes

Section 346.71(2)\*

In cases of death involving a motor vehicle in which the decedent was the operator of a motor vehicle or a pedestrian 16 years of age or older and who died within 6 hours of the time of the accident, the coroner or medical examiner shall require that a blood specimen of at least 10 cc. be withdrawn from the body of the decedent within 12 hours after his or her death, by the coroner or medical examiner or by a physician so designated by the coroner or medical examiner or by a qualified person at the direction of such physician. All funeral directors shall obtain a release from the coroner or medical examiner prior to proceeding with embalming any body coming under the scope of this section. The blood so drawn shall be forwarded to a laboratory approved by the department of health and social services for analysis of the alcoholic content of such blood specimen. The coroner or medical examiner causing the blood to be withdrawn shall be notified of the results of each analysis made and shall forward the results of each such analysis to the department of health and social services. The department shall keep a record of all such examinations to be used for statistical purposes only. The cumulative results of the examinations, without identifying the individuals involved, shall be disseminated and made public by the department.

885.235\*\* Chemical Tests for Intoxication

- (1) In any action or proceeding in which it is material to prove that a person was under the influence of an intoxicant or had a blood alcohol concentration of 0.1% or more when operating or driving a motor vehicle, or while handling a firearm, evidence of the amount of alcohol in the person's blood at the time in question, as shown by chemical analysis of a sample of the person's blood or urine or evidence of the amount of alcohol in the person's breath, is admissible on the issue of whether he or she was under the influence of an intoxicant or had a blood alcohol concentration of 0.1% or more if the sample was taken within 3 hours after the event to be proved. The chemical analysis shall be given effect as follows without requiring any expert testimony as to its effect:
  - (a) 1. Except as provided in subd. 2, the fact that the analysis shows that there was 0.05% or less by weight of alcohol in the person's blood or 0.05 grams of alcohol or less in 210 liters of the person's breath is prima facie evidence that the person was not under the influence of an intoxicant and did not have a blood alcohol concentration of 0.1% or more.
  2. The fact that the analysis shows that there was more than 0.0% but less than 0.1% by weight of alcohol in the person's blood or more than 0.0 grams but less than 0.1 grams of alcohol in 210 liters of the person's breath is relevant evidence on the issue of being under the combined influence of alcohol and a controlled substance or any other drug but is not to be given any prima facie effect.

- (b) The fact that the analysis shows that there was more than 0.05% but less than 0.1% by weight of alcohol in the person's blood or more than 0.05 grams but less than 0.1 grams of alcohol in 210 liters of the person's breath is relevant evidence on the issue of intoxication or blood alcohol concentration but is not to be given any prima facie effect;
  - (c) The fact that the analysis shows that there was 0.1% or more by weight of alcohol in the person's blood or 0.1 grams or more of alcohol in 210 liters of the person's breath is prima facie evidence that he or she was under the influence of an intoxicant and is prima facie evidence that he or she had a blood alcohol concentration of 0.1% or more.
- (1m) In any action under s. 346.63 (2m), evidence of the amount of alcohol in the person's blood at the time in question, as shown by chemical analysis of a sample of the person's blood or urine or evidence of the amount of alcohol in the person's breath, is admissible on the issue of whether he or she had a blood alcohol concentration in the range specified in s. 346.63 (2m) if the sample was taken within 3 hours after the event to be proved. The fact that the analysis shows that there was more than 0.0% but not more than 0.1% by weight of alcohol in the person's blood or more than 0.0 grams but not more than 0.1 grams of alcohol in 210 liters of the person's breath is prima facie evidence that the person had a blood alcohol concentration in the range specified in s. 346.63 (2m).
- (2) The concentration of alcohol in the blood shall be taken prima facie to be three-fourths of the concentration of alcohol in the urine.
  - (3) If the sample of breath, blood or urine was not taken within 3 hours after the event to be proved, evidence of the amount of alcohol in the person's blood or breath as shown by the chemical analysis is admissible only if expert testimony establishes its probative value and may be given prima facie effect only if the effect is established by expert testimony.
  - (4) The provisions of this section relating to the admissibility of chemical tests for intoxication or blood alcohol concentration shall not be construed as limiting the introduction of any other competent evidence bearing on the question of whether or not a person was under the influence of an intoxicant, had a blood alcohol concentration of 0.1% or more or had a blood alcohol concentration in the range specified in s. 346.63 (2m).
  - (5) In this section:
    - (a) "Blood alcohol concentration of 0.1% or more" means a blood alcohol concentration of 0.1% or more by weight of alcohol in a person's blood or 0.1 grams or more of alcohol in 210 liters of a person's breath.
    - (b) "Controlled substance" has the meaning specified in s. 161.01 (4).
    - (c) "Drug" has the meaning specified in s. 450.06.

ESTIMATED PERCENT OF ALCOHOL IN THE BLOOD BY  
NUMBER OF DRINKS IN RELATION TO BODY WEIGHT  
(One drink equaling one vol. oz. of 100-proof whiskey  
or one 12-oz. bottle of beer)





Body Weight	Number of Drinks											
	1	2	3	4	5	6	7	8	9	10	11	12
100 lbs.	.038	.075	.113	.150	.188	.225	.263	.300	.338	.375	.413	.450
120 lbs.	.031	.063	.094	.125	.156	.188	.219	.250	.281	.313	.344	.375
140 lbs.	.027	.054	.080	.107	.134	.161	.188	.214	.241	.268	.295	.321
160 lbs.	.023	.047	.070	.094	.117	.141	.164	.188	.211	.234	.258	.281
180 lbs.	.021	.042	.063	.083	.104	.125	.146	.167	.188	.208	.229	.250
200 lbs.	.019	.038	.056	.075	.094	.113	.131	.150	.169	.188	.206	.225
220 lbs.	.017	.034	.051	.068	.085	.102	.119	.136	.153	.170	.188	.205
240 lbs.	.016	.031	.047	.063	.078	.094	.109	.125	.141	.156	.172	.188

(Subtract from the above the percent alcohol burned up during time elapsed since first drink, that is, 0.015% for each hour.)

Adapted from table produced by New Jersey Department of Law and Public Safety.

Percent of  
Blood Alcohol

Intoxication as Defined by Wisconsin Law

 .000 to .050	<u>Prima Facie</u> Evidence That You Are Not Intoxicated
 .051 to .099 <sup>a/</sup>	Relevant Evidence That You May Be Intoxicated
 .100 to .149	<u>Prima Facie</u> Evidence That You Are Intoxicated
 .150 and above	

<sup>a/</sup> Most scientific articles, United States reports, and reports from other states read "0.05 or more"; however, the Wisconsin statute reads "more than 0.05", perhaps inadvertantly making Wisconsin statute slightly less stringent. The same Wisconsin statute also reads "0.10 or more" which is consistent with the way it is read elsewhere, suggesting again that the reading "more than 0.05" in Wisconsin statute should for consistency actually read "0.05 or more". The latter interpretation does not significantly change any category of information in this report. We have chosen to use "0.05 or more" in this report to make the data comparable to most other literature.

## LIMITATIONS

Determinations of blood alcohol concentration (BAC) have been made for traffic fatalities occurring each year since the inception of the testing program in 1968. Those fatalities tested are not representative of all victims of traffic crashes, however, since the provisions of the statutes exclude persons below 16 years of age and those who died six hours or more after the time of the accident. Testing of passenger fatalities is not mandatory. Approximately 76 percent of the driver/motorcyclist fatalities are tested each year; in 1984 this figure was 75.6 percent. In order to be considered a valid measure, the blood specimen must have been taken within 12 hours after the death of the victim.

For approximately 54 percent of the deaths tested each year of the program, the blood alcohol concentration was 0.05% or higher, it was 0.10% or higher in about 47 percent of those tested.\* Research indicates that such figures are unlikely to represent the actual situation, however.\*\* It has been found that the more complete the testing for alcohol among fatalities, the lower the portion with high BAC levels. This results from the operation of three factors:

- (a) Exclusion of child victims (under 16) from the testing program.
- (b) Exclusion of those who survive longer than six hours. (It has been found that such persons tend not to have been drinking.)
- (c) Subjective judgment in obtaining samples from otherwise eligible cases may result in selective non-testing of fatalities in which it is assumed that "alcohol was not involved."

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\* Refer to footnote a/, P. 4.

\*\* Zylman, Richard. Overemphasis on alcohol may be costing lives. The Police Chief, Vol. 41 (1), January, 1974, 64-67.

The absence of tests on individuals who are less likely to have been drinking inflates the proportion, among those tested, with high blood alcohol levels. In other words, data available through programs for testing traffic fatalities show considerably higher proportions with high BACs than if all victims were tested.

Comparison with data from the Wisconsin Division of Motor Vehicles\* indicates that 75.6 percent of all driver/motorcyclist fatalities were tested in 1984.

Table 1  
 DRIVER/MOTORCYCLIST DEATHS TESTED  
 Wisconsin, 1968-1984

Year	Number Tested	Percent of All Driver/Motorcyclist Deaths
1968	423	n.a.
1969	422	n.a.
1970	439	70.1
1971	479	77.6
1972	441	71.6
1973	481	89.1
1974	329	64.0
1975	345	70.1
1976	351	67.0
1977	420	81.7
1978	437	75.9
1979	494	79.4
1980	482	81.0
1981	444	66.7
1982	378	80.9
1983	376	83.0
1984	397	75.6

\* Division of Motor Vehicles, Accident Data Section.

### Small Frequencies

The number of deaths tested in specific categories, such as type of fatality, age group, road class, etc., are generally small. Interpretations based on such small frequencies must be made with considerable caution, since they are subject to random fluctuation which may be substantial.\* As an example, the underlying conditions which resulted in 52 motorcyclist fatalities in 1984 might have produced 40 or 60, or 75 deaths instead. Statistical considerations indicate that the chances are 19 in 20 that between 36 and 66 deaths might have resulted from the same underlying conditions.

In particular, calculations such as percentages based on small frequencies give and exaggerated impression of the number of cases involved and are subject to large random error.\*\* In the same example, in 37 of the 52 motorcyclist deaths tested (71.2 percent) the blood alcohol concentrations exceeded 0.05%. The chances are 19 in 20 that the same underlying conditions which produced this result could have produced percentages between 48 percent and 94 percent. Percents have therefore not been calculated for fewer than 20 individuals. The number "20" is arbitrary, however, and is not set forth as a critical point distinguishing statistically reliable rates.

Statements based on statistical significance tests, however, take random error into account and assess the significance of a particular association against the background of expected random fluctuation. When statistical tests are cited in this report, the p value given indicates the level of significance at which the null hypothesis (no association) is rejected. Where no probability is specified, the significant test value is  $p=.05$ .

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\* Vital Statistics of the U.S., Vol. 1, 1959, p. 1-20.

\*\* Mainland, Donald. Elementary Medical Statistics. Philadelphia: W.B. Saunders Company, 1964.

ALL TRAFFIC DEATHS

Blood Alcohol Concentration (BACs) of 0.05% or higher were found for 291 persons tested and concentrations of 0.10% or higher, for 254 persons. Thus, BAC determinations were of a level to constitute prima facie evidence of intoxication in 87.3 percent of those individuals in which relevant evidence of intoxication was demonstrated. Thirty-seven of the driver deaths tested had BAC levels over 0.25%, indicative of marked intoxication,\* as did seven pedestrian deaths, five passengers and four motorcyclists. Sixteen decedents, including 11 drivers, had BACs as high as 0.30% or over.

Table 2

TRAFFIC DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC)  
AND TYPE OF FATALITY  
Wisconsin, 1984

Type of Fatality	Total Deaths Tested	Blood Alcohol Concentration								
		No Alcohol	.001-.049	.050-.099	.100-.149	.150-.199	.200-.249	.250-.299	.300-.349	.350+
All Traffic Deaths Tested	562	242	29	37	60	62	78	38	11	5
Drivers <u>a/</u>	345	161	14	11	24	44	54	26	9	2
Passengers <u>a/</u>	101	41	5	17	14	7	12	4		1
Pedestrians	41	18	5		7	1	3	4	2	1
Motorcyclists <u>b/</u>	52	13	2	7	11	8	7	3		1
Other <u>c/</u>	23	9	3	2	4	2	2	1		

a/ Includes automobiles, trucks, buses and similar vehicles.

b/ Includes motorscooters.

c/ Includes snowmobilers, bicyclists, boaters and unknowns.

\*Blum, Leon L. Blood Alcohol. Journal of the Indiana State Medical Association, 64(4); 311-312, 1971.

Type of Fatality and Sex

The proportion of tested traffic deaths with BACs of 0.10% or higher follows substantially the same pattern with respect to factors such as type of fatality, sex, age, road class, etc., as does the proportion with BACs 0.05% or higher. The percent of all tested traffic deaths with significant BAC levels (0.05+%) is almost eighty percent higher among males than among females. Also, males have much higher alcohol involvement by type of fatality. However, since the proportion of males among tested decedents is different for drivers (73.6 percent), passengers (56.4 percent), pedestrians (73.2 percent) and motorcyclists (90.4 percent), the high incidence of significant alcohol involvement among males affects the combined rates (both sexes) differently by type of fatality. For instance, the combined rate for motorcyclists is influenced more by the male rate than is the combined rate for passengers. Thus, comparisons should not be made between type of fatalities unless sex is taken into account.

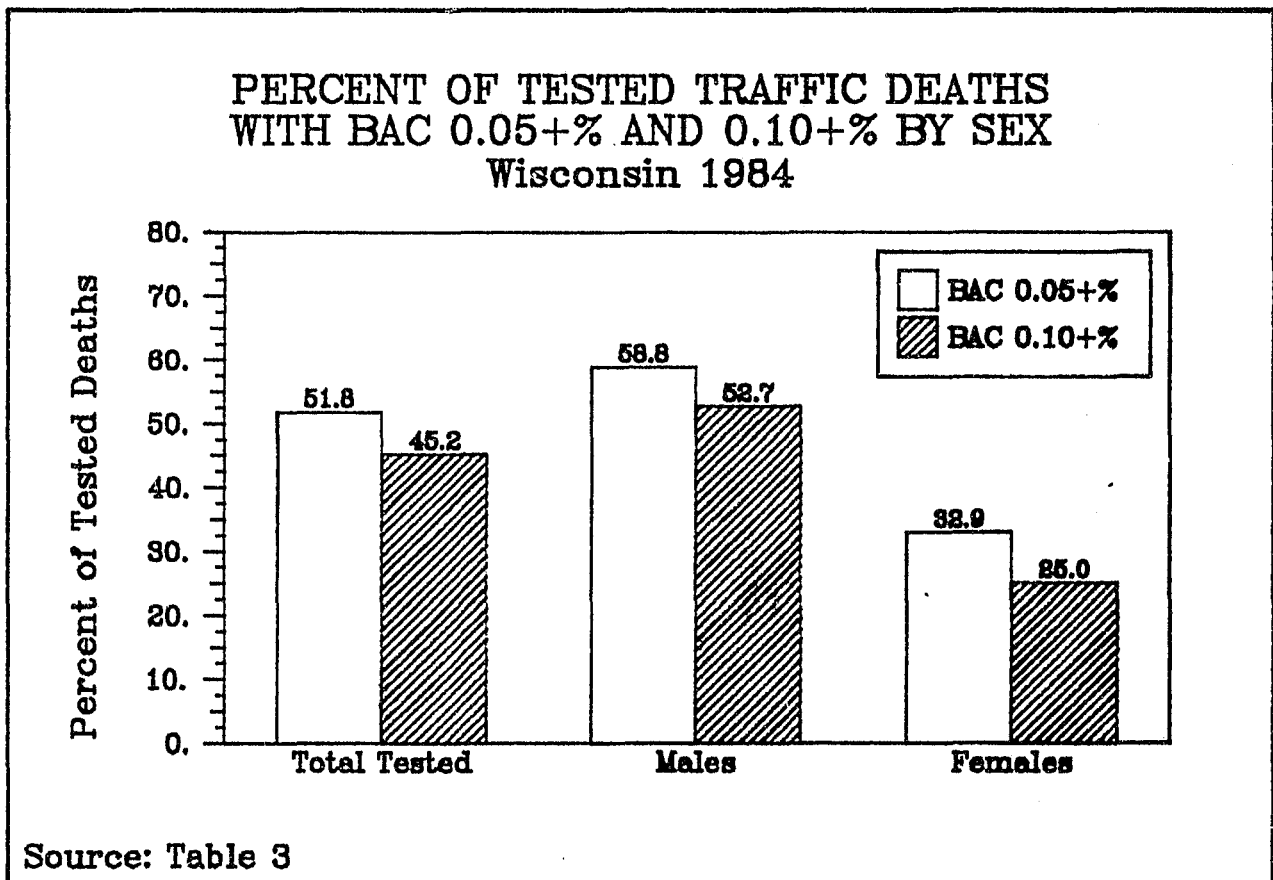




Table 3

TRAFFIC DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC)  
 TYPE OF FATALITY AND SEX  
 Wisconsin, 1984

Type of Fatality	Total			Males			Females		
	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%
All Traffic Dths.	562	291	254	410	241	216	152	50	38
Drivers <u>a/</u>	345	170	159	254	147	139	91	23	20
Passengers <u>a/</u>	101	55	38	57	37	27	44	18	11
Pedestrians	41	18	18	30	12	12	11	6	6
Motorcyclists <u>b/</u>	52	37	30	47	34	29	5	3	1
Other <u>c/</u>	23	11	9	22	11	9	1		

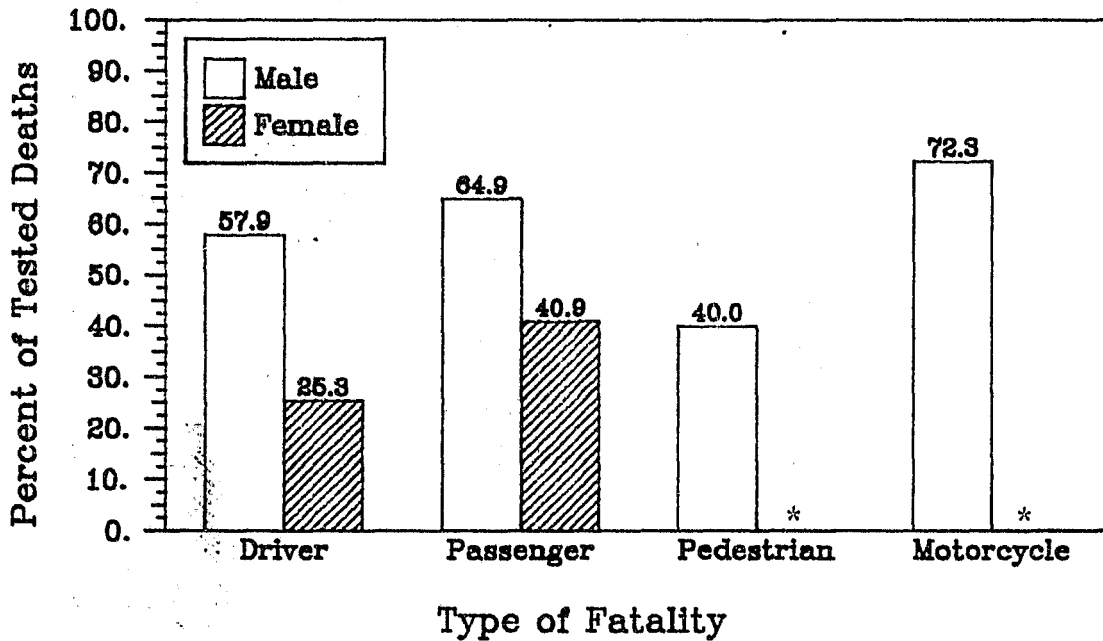
\* Decedents with BAC less than 0.05% included in total only.

a/ Includes automobiles, trucks, buses and similar vehicles.

b/ Includes motorscooters.

c/ Includes snowmobilers, bicyclists, boaters and unknown.

PERCENT OF TESTED TRAFFIC DEATHS  
 WITH BAC 0.05+% BY FATALITY AND SEX  
 Wisconsin 1984



Source: Table 3

\* Percentages based on fewer than 20 deaths are omitted because they are subject to large random fluctuations.

Table 4

TRAFFIC DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC),  
TYPE OF FATALITY, AGE AND SEX  
Wisconsin, 1984

Type of Fatality and Age	Total			Males			Females		
	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%
<u>Drivers a/</u>									
All Ages	397	207	189	301	181	168	96	26	21
16-24	150	94	83	119	84	75	31	10	8
25-44	145	88	83	109	75	72	36	13	11
45-64	54	21	19	42	19	18	12	2	1
65-74	30	4	4	17	3	3	13	1	1
75+	18			14			4		
<u>Passengers</u>									
All Ages	101	55	38	57	37	27	44	18	11
16-24	43	29	22	28	21	16	15	8	6
25-44	29	21	14	17	13	10	12	8	4
45-64	12	5	2	4	3	1	8	2	1
65-74	8			5			3		
75+	9			3			6		
<u>Pedestrians</u>									
All Ages	41	18	18	30	12	12	11	6	6
16-24	10	5	5	8	4	4	2	1	1
25-44	10	5	5	8	4	4	2	1	1
45-64	11	5	5	8	2	2	3	3	3
65-74	4	2	2	1	1	1	3	1	1
75+	6	1	1	5	1	1	1		

\* Decedents with BAC less than 0.05% included in total only..

a/ Includes motorcyclists.

Table 5

TRAFFIC DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC),  
TYPE OF FATALITY FOR HEALTH SYSTEM AGENCIES  
Wisconsin, 1984

(Occurrence data)

Type of Fatality	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%
	HSA 1 - (HPC)			HSA 2 - (SEWHA)		
All Traffic Deaths	120	60	51	128	67	56
Drivers <u>a/</u>	87	43	37	91	49	43
Passengers	22	13	10	25	12	8
Pedestrians	8	3	3	10	5	5
Other	3	1	1	2	1	
	HSA 3			HSA 4		
All Traffic Deaths	53	24	21	70	30	26
Drivers <u>a/</u>	39	20	19	52	23	21
Passengers	10	3	1	9	4	2
Pedestrians	1			5	1	1
Other	3	1	1	4	2	2
	HSA 5 - (WWHSA)			HSA 6 - (NCAHPA)		
All Traffic Deaths	104	58	55	73	41	35
Drivers <u>a/</u>	70	41	39	48	24	23
Passengers	18	10	9	14	10	6
Pedestrians	13	6	6	3	2	2
Other	3	1	1	8	5	4
	HSA 7 - (HSA/WLS)					
All Traffic Deaths	14	11	10			
Drivers <u>a/</u>	10	7	7			
Passengers	3	3	2			
Pedestrians	1	1	1			
Other						

\* Decedents with BAC less than 0.05% included in total only.  
a/ Includes motorcyclists.

Persons 65 and older comprised 24.4 percent of the pedestrians tested, 16.8 percent of the passengers and 12.1 percent of the drivers/motorcyclists.

The percent of all tested traffic deaths with appreciable levels of blood alcohol was significant for HSA 7, there are no significant differences for all other HSAs. Values ranged from a low of 42.9 percent BAC exceeding 0.05% in HSA 4 to a high of 78.6 percent in HSA 7.

## DRIVER/MOTORCYCLIST DEATHS

### Time Trends

Appreciable levels of blood alcohol were found for 52.1 percent of the driver/motorcyclist deaths tested in 1984. This is nearly the same percentage as reported for 1972. Examination of the graph on page 14 showing seventeen years of data reveals no apparent trend over time in the proportion of driver/motorcyclist deaths with BAC exceeding 0.05%. Although the proportion of tested deaths involving alcohol has varied from year to year over the seventeen year period, it has remained relatively close to the seventeen year average of 57.0 percent.

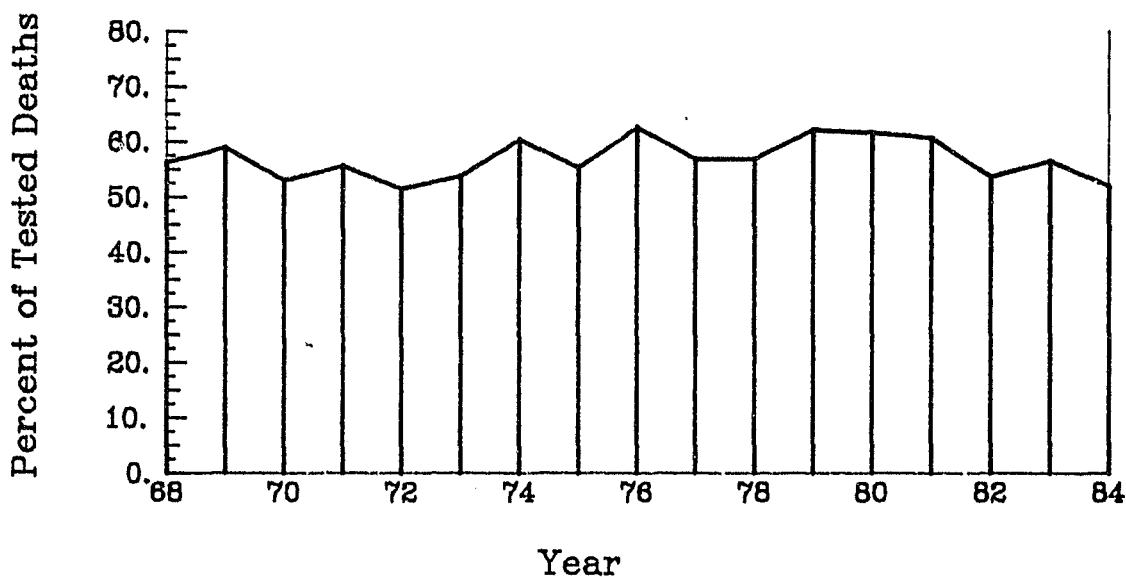
Table 6  
 DRIVER a/ DEATHS BY BLOOD ALCOHOL  
 CONCENTRATION (BAC) AND YEAR  
 Wisconsin, 1968-1984  
 (Occurrence data)

Year	Total Deaths		
	Tested*	BAC 0.05+%	BAC 0.10+%
1968	423	238	205
1969	422	249	203
1970	439	233	200
1971	479	267	232
1972	441	227	201
1973	481	259	233
1974	329	199	173
1975	345	191	168
1976	351	220	204
1977	420	239	219
1978	437	249	224
1979	494	308	277
1980	482	298	267
1981	444	270	244
1982	378	203	182
1983	376	213	195
1984	397	207	189

\* Decedent with BAC less than 0.05% included in total only.

a/ Includes motorcyclists.

PERCENT OF TESTED DRIVER/MOTORCYCLIST DEATHS  
 WITH BAC 0.05+% BY YEAR  
 Wisconsin 1968-1984

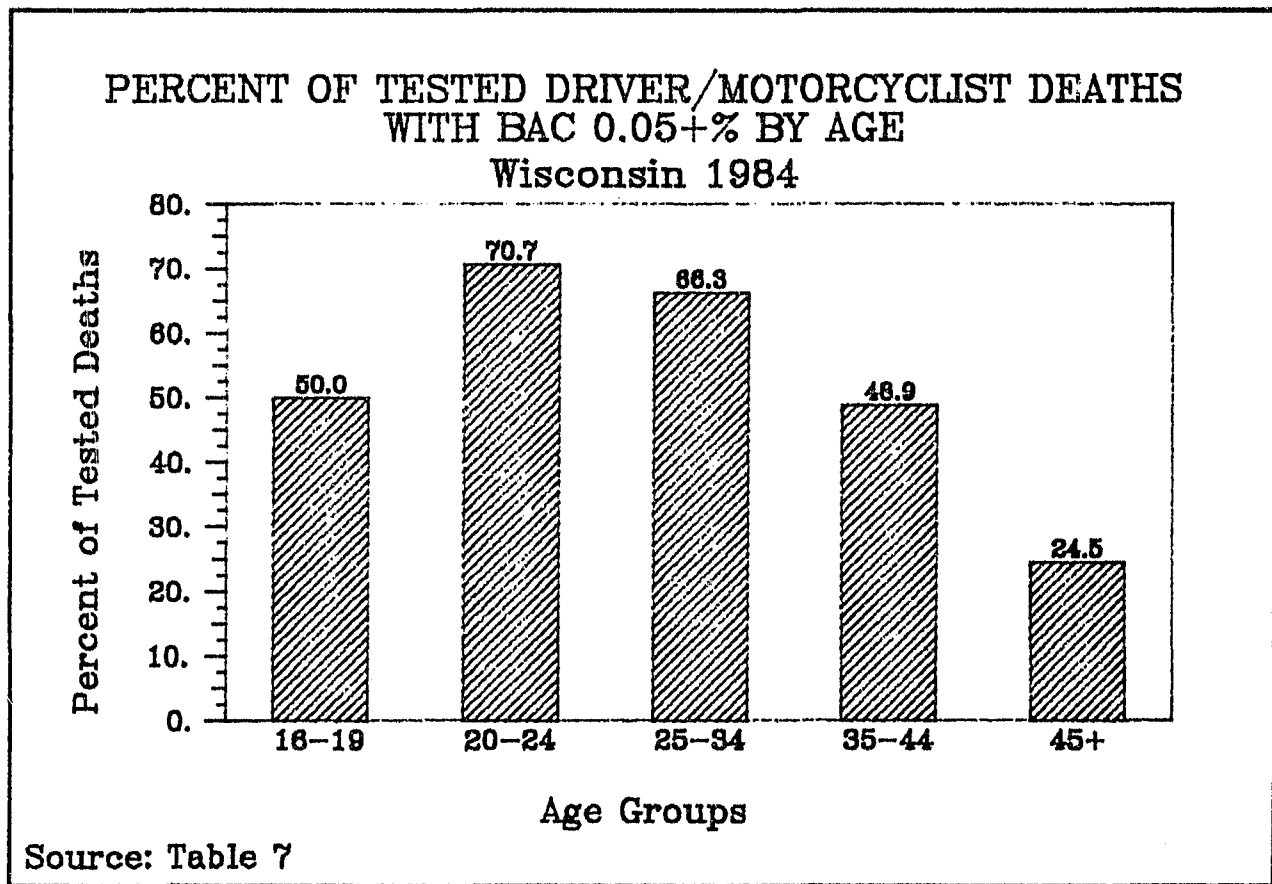


Source: Table 6

Age

Fifty-two percent of all the driver/motorcyclist deaths tested in 1984 had significant BAC levels (0.05+%). The proportion was high for age groups 20-34. The under twenty and 35-44 drivers had intermediate rates, while the rate was significantly lower for age group 45 and older. When age groups are collapsed into under 35 and 35 and older, the former has a significantly higher proportion than the latter.

An earlier study\* found that the degree of alcohol involvement among teenage driver fatalities aged 16-19 was greater than those aged 20-44. However, for the years 1975 through 1977 these two age groups did not differ significantly in proportion of fatalities with significant BAC levels, and in 1979 as in 1978 the 16-19 age group actually had a significantly lower (p. <.05) proportion of alcohol involvement (62.6 percent) than the 20-44 age group (73.8 percent). In 1980, the two age groups returned to parity.



\* Naor, E.M. and Nashold, R.D. Teenage driver fatalities following reduction in the legal drinking age. Journal of Safety Research 7 (2), June, 1975.

Table 7

DRIVER DEATHS <sup>a/</sup>  
 BY BLOOD ALCOHOL CONCENTRATION (BAC), AGE AND SEX  
 Wisconsin, 1984

Age	Total			Males			Females		
	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%
All Ages	397	207	189	301	181	168	96	26	21
16	9	4	2	8	3	1	1	1	1
17	12	2	1	9	2	1	3		
18	16	9	6	13	8	6	3	1	
19	21	14	13	17	14	13	4		
16-19	58	29	22	47	27	21	11	2	1
20	24	17	16	20	16	16	4	1	
21	16	10	9	13	10	9	3		
22	21	15	14	14	11	10	7	4	4
23	16	12	11	15	12	11	1		
24	15	11	11	10	8	8	5	3	3
20-24	92	65	61	72	57	54	20	8	7
25-29	60	38	35	50	34	33	10	4	2
30-34	38	27	27	27	22	22	11	5	5
35-39	31	17	15	21	15	13	10	2	2
40-44	16	6	6	11	4	4	5	2	2
45-49	16	7	7	11	7	7	5		
50-54	16	7	6	13	6	5	3	1	1
55-59	5	1	1	5	1	1			
60-64	17	6	5	13	5	5	4	1	
65-69	16	2	2	10	2	2	6		
70-74	14	2	2	7	1	1	7	1	1
75+	18			14			4		

\* Decedents with BAC less than 0.05% included in total only.

<sup>a/</sup> Includes motorcyclists.

### Relation to Numbers of Licensed Drivers, by Age

The rate per 100,000 licensed drivers must be interpreted with caution. In actuality, traffic mortality may be related to the amount of driving, or mileage, rather than to the number of drivers. Mileage information by age group is not available, however. Since the yearly mileage travelled per person is without doubt dependent on age, the relationship between the fatality rate based on mileage, could it be calculated, and the rate per 100,000 drivers would be different for each age-sex group.

Furthermore, the age-specific rates (per 100,000 drivers) of deaths with BAC levels of 0.05+ are dependent on the rates of deaths tested and the proportions of tested deaths with BAC levels of 0.05+. Rates per 100,000 drivers while intuitively appealing do not add any additional information and are difficult to interpret.

Analyses by age were based on the combined rates for males and females since there were too few female decedents to permit calculation of reliable rates and percentages. However, the proportion of females among tested deaths is uniformly low at all ages. Differential patterns of alcohol involvement by age for males and females would not, therefore, have a substantial effect on the combined distribution.



Table 8

RATES OF DRIVER DEATHS a/ PER 100,000 LICENSED DRIVERS b/  
 WITH BLOOD ALCOHOL CONCENTRATION (BAC) 0.05+% AND 0.10+%  
 BY AGE AND SEX c/  
 Wisconsin, 1984

Age Groups	Rates of All Tested Deaths			Rates of Tested Deaths with BAC 0.05+%			Rates of Tested Deaths with BAC 0.10+%		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All Ages	12.4	18.1	6.3	6.5	10.9	1.7	5.9	10.1	1.4
16-19	25.3	39.0		12.7	22.4		9.6	17.4	
20-24	22.7	34.4	10.2	16.0	27.2		15.0	25.8	
25-34	12.5	19.1	5.5	8.3	13.9		7.9	13.7	
35-44	8.2	10.9		4.0			3.7		
45-54	7.9	11.5							
55-64	5.7								
65+	11.8	13.9							

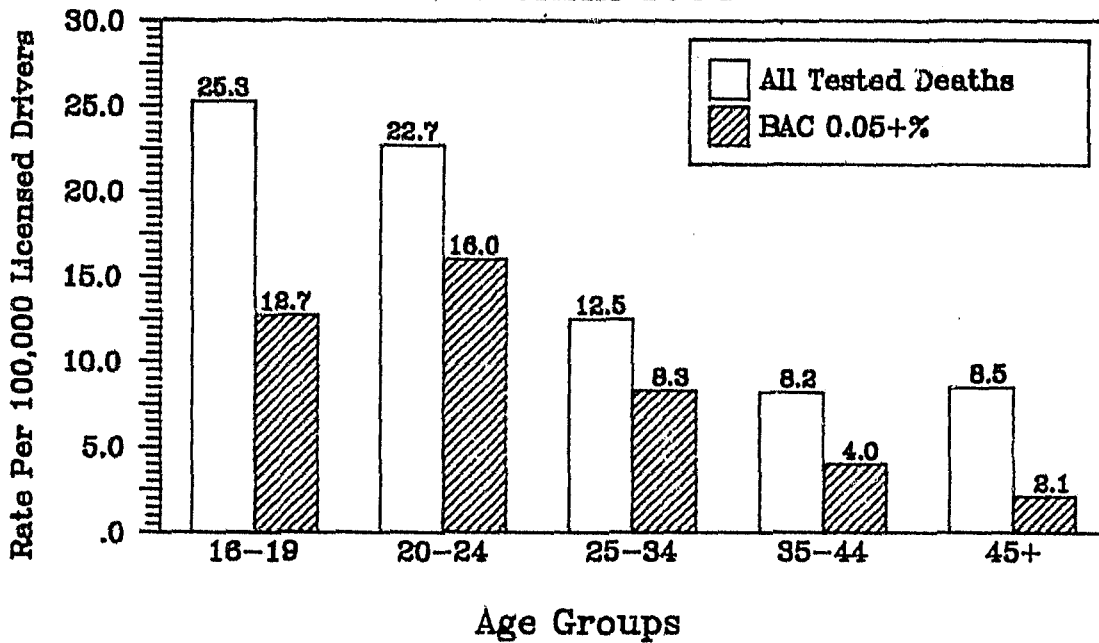
Rates based on fewer than 20 cases are omitted because they are subject to large random fluctuations.

a/ Includes motorcyclists

b/ See Appendix

c/ Source: Table 7

RATES OF TESTED DRIVER/MOTORCYCLIST DEATHS  
 WITH BAC 0.05+%  
 Wisconsin 1984



Source: Table 8

\* Percentages based on fewer than 20 deaths are omitted because they are subject to large random fluctuations.

Intersections and Road Class

Eighty-one percent of tested driver/motorcyclist deaths occurred at roadway areas other than intersections. In 1984 the proportion of tested driver/motorcyclist deaths with BAC levels of 0.05% or higher was not significantly higher in fatalities occurring at non-intersections (55.3 percent) than in fatalities at intersections (39.0 percent).

In 1984 BAC levels among tested driver/motorcyclist fatalities did not differ greatly by road class. The highest proportion of BAC levels of 0.05% or higher occurred on country and town roads (65.4 percent), and followed by city and village streets (62.7 percent), and highways (37.6 percent). The relationship between BAC levels and road class has been inconsistent in recent years.

No data are readily available to relate BAC levels to vehicular use, type of accident (single or multi-car), or person-miles travelled on specific types of roadways.

Table 9

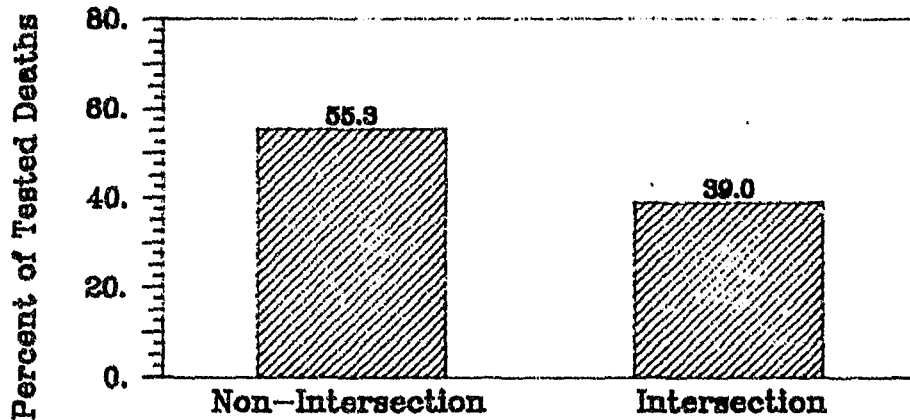
DRIVER DEATHS <sup>a/</sup> AT INTERSECTIONS  
BY BLOOD ALCOHOL CONCENTRATION (BAC) AND ROAD CLASS  
Wisconsin, 1984

Road Class	Total			Non-Intersection			Intersection		
	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%	Total* Tested	BAC 0.05+%	BAC 0.10+%
All Classes	397	207	189	320	177	163	77	30	26
Interstate	12	5	5	12	5	5	-		
U.S. Highways	67	26	24	58	24	22	9	2	2
State Highways	107	39	37	86	30	29	21	9	8
County Trunk & Town Roads	159	104	96	132	93	87	27	11	9
City & Village Streets	51	32	26	31	24	19	20	8	7
Unknown & Others	1	1	1	1	1	1	-		

\* Decedents with BAC less than 0.05% included in total only.

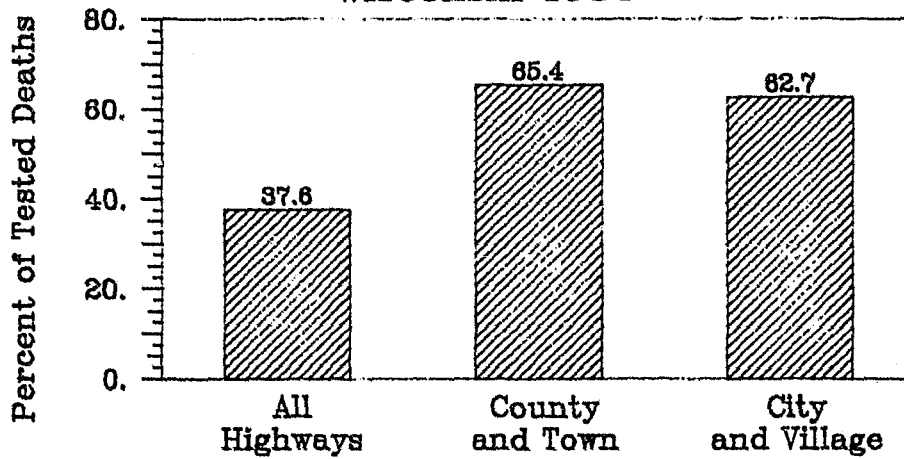
<sup>a/</sup> Includes motorcyclists.

PERCENT OF TESTED DRIVER/MOTORCYCLIST DEATHS  
WITH BAC 0.05+%-LOCATION  
Wisconsin 1984



Source: Table 9

PERCENT OF TESTED DRIVER/MOTORCYCLIST DEATHS  
WITH BAC 0.05+%-ROAD CLASS  
Wisconsin 1984



Source: Table 9

### Urban/Rural

In the last five years BAC levels have not shown a significant or consistent pattern with respect to urban/rural classification of the accident place. Significant BAC levels were found in 60.0 percent of the deaths in the 23 counties of less than 20,000 population ("small" rural counties), and 53.3 percent had BAC levels of 0.05% or higher of the deaths occurring in the 21 counties that were either included in Metropolitan Statistical Areas in 1984 or contained a city of 25,000 or more (urban counties). In rural counties with 20,000 or more population ("large" rural counties), 47.6 percent of the tested fatalities had BAC levels of 0.05% or higher.

Sixty-three percent of the tested deaths in urban counties occurred in rural areas of these counties. The proportion with alcohol involvement among these (61 of 123 deaths, or 49.6 percent) was not significantly different from those deaths which occurred in the urban areas of the counties (43 of 72 or 59.7 percent).

Detailed study of rural accidents in relation to predominant road type, road construction, location of taverns, geographic patterns of drinking behavior, place of residence and place of occurrence, etc., would be required to further elucidate the relationship of alcohol involvement and urbanization.

Table 10

DRIVER DEATHS a/ BY BLOOD ALCOHOL CONCENTRATION (BAC)  
FOR URBAN AND RURAL COUNTIES  
Wisconsin, 1984

(Occurrence data)

County Groups	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
State Total	397	207	189
Urban <u>b/</u>	195	104	95
"Large" Rural <u>c/</u>	147	70	61
"Small" Rural <u>d/</u>	55	33	33

\* Decedents with BAC less than 0.05% included in total only.

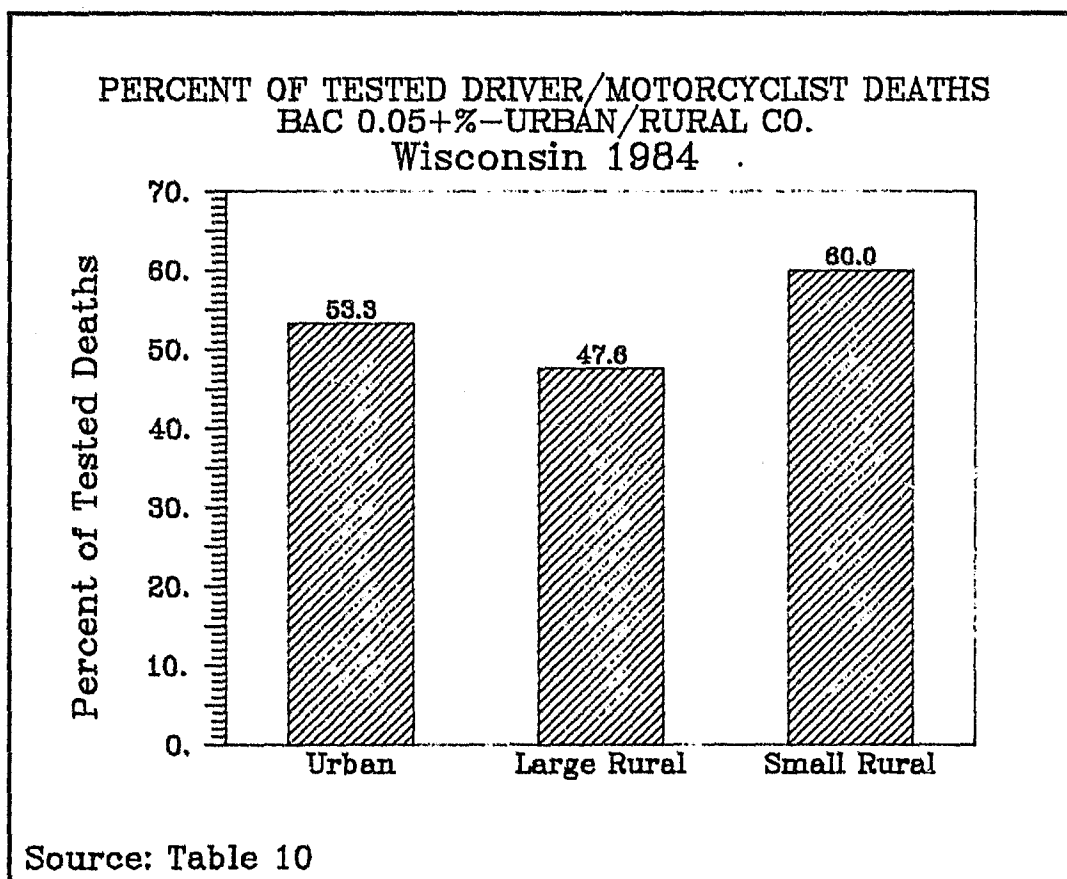
a/ Includes motorcyclists.

b/ Includes counties that are in Metropolitan Statistical Areas or contain a city of 25,000 or more in 1984.

c/ Includes remaining counties with 20,000 or more population in 1984.

d/ Includes remaining counties with less than 20,000 population in 1984.

(See Appendix)



Time of Accident

Over half (236 of 397) of the driver/motorcyclist fatalities tested occurred in the evening or at night, between 6 P.M. and 5:59 A.M. Comparison of deaths occurring during the day and at night shows that a significantly larger proportion ( $p < .001$ ) of nighttime accidents (76.7 percent) than daytime accidents (15.6 percent) involved alcohol. Alcohol involvement in the early evening (63.2 percent) is exceeded by that in the late evening (72.7 percent) although not significantly. However, the night hours, consistent with previous years, have by far the highest alcohol involvement (84.7 percent).

With the minor exception of 1979 a consistent pattern is evident since 1973. Although the level of alcohol involvement in the various time periods may vary from year to year, most notably the day and early evening hours, the same increasing progression of alcohol involvement from the day to the night hours is seen.

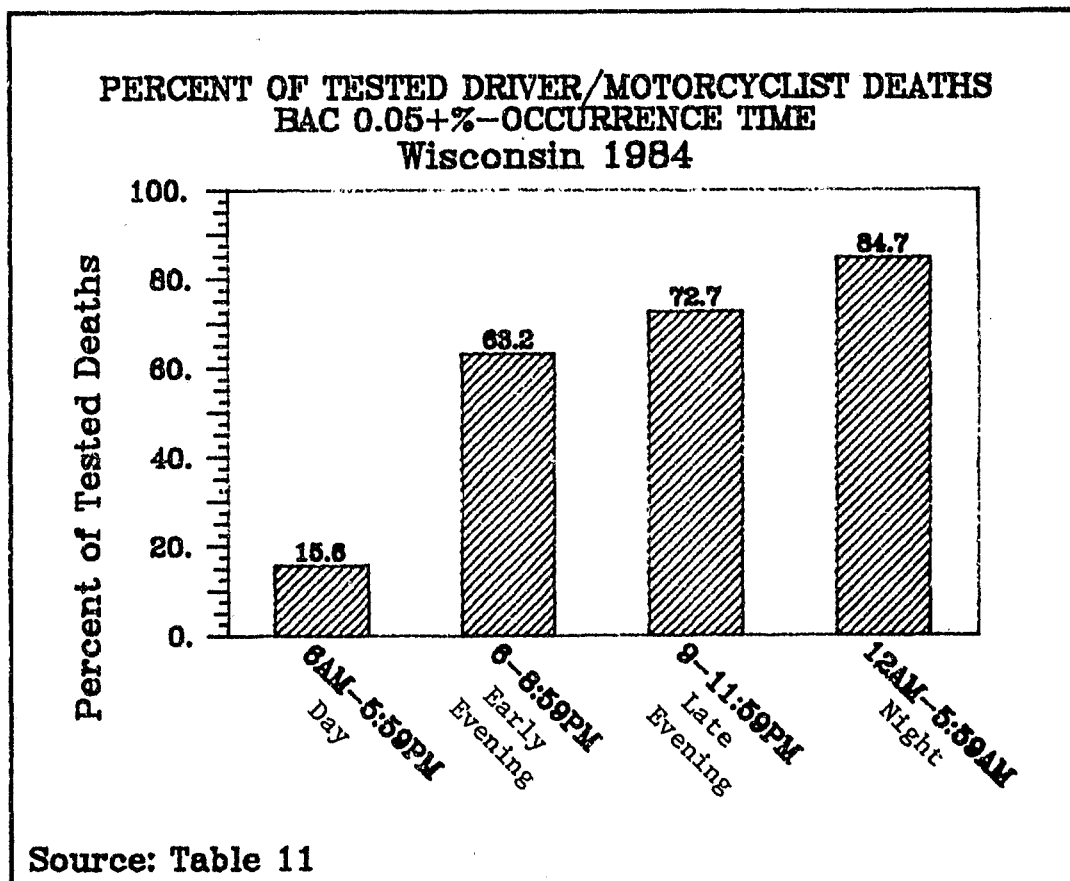


Table 11

DRIVER DEATHS a/ BY BLOOD ALCOHOL CONCENTRATION (BAC)  
AND TIME OF ACCIDENT  
Wisconsin, 1984

Time of Accident	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
Total	397	207	189
Early Morning 6 - 8:59 A.M.	28	3	3
Late Morning 9 - 11:59 A.M.	37	2	2
Early Afternoon Noon - 2:59 P.M.	46	7	6
Late Afternoon 3 - 5:59 P.M.	49	13	10
Day 6 A.M. - 5:59 P.M.	160	25	21
Early Evening 6 - 8:59 P.M.	57	36	33
Late Evening 9 - 11:59 P.M.	55	40	36
Night Midnight - 5:59 A.M.	124	105	98
12 - 12:59 A.M.	24	21	21
1 - 1:59 A.M.	44	39	34
2 - 2:59 A.M.	20	18	17
3 - 5:59 A.M.	36	27	26
Unknown 6 P.M. - 5:59 A.M.	1	1	1
Night 6 P.M. - 5:59 A.M.	237	182	168

\* Decedents with BAC less than 0.05% included in total only.

a/ Includes motorcyclists.

The pattern of alcohol involvement in the midnight to 3 A.M. period has been variable over the years. In 1984 the proportion of deaths with alcohol involvement was consistently high from 1 A.M. to 3 A.M. (88.6 and 90.0 percent) with (75.0 percent) in the predawn hours. However these differences were not statistically significant.

Detailed tabulations of BAC levels by time of accident and age of the decedent are available on request; however, the numbers become very small when cross-classified by time and age. There appears to be little difference in the patterns of associations among persons of different age groups.

### Day of Week

The time of day has a strong influence on both the number of fatalities and the proportion with alcohol involvement. One hundred sixty tested fatalities occurred between 6 A.M. and 6 P.M.; 25 had BAC's 0.05% or more (15.6 percent). Between 6 P.M. and 6 A.M., 236 tested fatalities occurred; 181 had significant alcohol involvement (76.7 percent). Days of the week are important influences as well. Weekdays (6 A.M. Monday to 6 P.M. Friday, 108 hours) claimed 197 tested fatalities, 83 with BAC's of 0.05% or more (42.1 percent) while weekends (6 P.M. Friday to 6 A.M. Monday, 60 hours) claimed 200 fatalities, 124 with significant BAC (62.0 percent).



Table 12

DRIVER DEATHS a/ BY BLOOD ALCOHOL CONCENTRATION (BAC)  
AND DAY OF WEEK ACCIDENT OCCURRED  
Wisconsin, 1984

Day of Week	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
Total	397	207	189
Monday	49	20	20
Tuesday	46	15	14
Wednesday	36	20	16
Thursday	43	22	21
Friday	56	30	28
Saturday	88	50	46
Sunday	79	50	44
Monday-Friday	230	107	99
Saturday-Sunday	167	100	90

\* Decedents with BAC less than 0.05% are included in total only.

a/ Includes motorcyclists.

### Seasonality and Holiday Periods

The proportion of tested driver/motorcyclist fatalities with alcohol involvement fluctuated by month. The highest number of tested fatalities with alcohol involvement were March with 26 and August with 25, the lowest was January with five. The highest percentage involvement were August (64.1), May (62.9) and March (61.9), the lowest January (31.3). No statistically significant monthly influences are to be found.

Alcohol involvement during the holiday periods of 1984 was analyzed using dates as consistent as possible with those of the National Safety Council. As in recent years, the proportion of tested driver/motorcyclist fatalities with BAC levels of 0.05% or higher for accidents occurring during holiday periods (21 out of 43, or 48.8 percent) was not significantly higher than during the rest of the year (207 out of 397, or 52.1 percent). Neither the weekend component nor the weekday part of the holiday periods were significantly higher (or lower) than their non-holiday counterparts.

Time Period	Weekend			Weekday		
	BAC .05+%	Fatality	Proportion with BAC	BAC .05+%	Fatality	Proportion with BAC
Holiday	9	19	47.4	12	24	50.0
Non-Holiday	91	148	61.5	95	206	46.1

Table 13

DRIVER DEATHS a/ BY BLOOD ALCOHOL CONCENTRATION (BAC)  
AND MONTH OF ACCIDENT  
Wisconsin, 1984

Month of Accident	Total Tested*	Percent of Tested Deaths			
		BAC 0.05+%	BAC 0.10+%	BAC 0.05+%	BAC 0.10+%
Total	397	207	189	52.1	47.6
January	16	5	4	31.3	25.0
February	16	9	9	56.3	56.3
March	42	26	26	61.9	61.9
April	18	9	8	50.0	44.4
May	35	22	20	62.9	57.1
June	40	23	19	57.5	47.5
July	42	18	16	42.9	38.1
August	39	25	21	64.1	53.8
September	37	20	18	54.1	48.6
October	45	20	20	44.4	44.4
November	28	15	14	53.6	50.0
December	39	15	14	38.5	35.9
Jan., Feb. and March	74	40	39	54.1	52.7
April, May and June	93	54	47	58.1	50.5
July, Aug. and September	118	63	55	53.4	46.6
Oct., Nov. and December	112	50	48	44.6	42.9

\* Decedents with BAC less than 0.05% are included in total only.

a/ Includes Motorcyclists.

## MOTORCYCLIST DEATHS

### Intersection and Road Class

In 1984 the number of motorcyclist fatalities resumed a decline begun in 1978 and only interrupted by a rise in 1982. The proportion of tested motorcyclist fatalities with BAC levels of 0.05% or higher decreased in 1984 (71.2), but not significantly so.

BAC levels of 0.05+% were found for 28 of 37 (75.7 percent) non-intersection and 9 of 15 (60.0 percent) intersection fatalities a difference which is not statistically significant. There was a slightly lower incidence of alcohol involvement among motorcyclist fatalities occurring on highways (8 of 13, 61.5 percent) compared to the other road classes (29 of 39, 74.4 percent) but this difference is not statistically significant.

Table 14

### MOTORCYCLIST DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC) AND ROAD CLASS Wisconsin, 1984

Road Class	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
All Motorcyclists	52	37	30
U.S. Highways	5	5	4
State Highways	8	3	2
County Trunk and Town Road	24	18	14
City and Village Streets	15	11	10

\* Decedents with BAC less than 0.05% included in total only.

### Urban/Rural

There was no significant differences apparent in the proportion of tested motorcyclist fatalities with BACs of 0.05% or higher occurring in urban counties (23 out of 32 deaths), in "larger" rural counties (10 out of 15 deaths) and in "small" rural counties (4 out of 5 deaths) or between urban (12 out of 16 deaths) and rural (25 out of 36 deaths) areas within counties. However, the numbers are quite small.

### Time and Day of Week

The majority of the tested fatalities (69.2 percent) occurred between 6 P.M. and 6 A.M. In addition alcohol involvement was higher during this period (29 out of 36 deaths) compared to the daylight hours (8 out of 16 deaths) not a statistically significant difference. Weekends had a higher incidence of alcohol involvement compared to weekdays (82.1 percent vs. 58.3 percent), a difference which is not statistically significant.

Table 15

MOTORCYCLIST DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC)  
DAY OF WEEK AND TIME OF ACCIDENT  
Wisconsin, 1984

Time and Day	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
Total	52	37	30
6 A.M. - Noon	5	1	1
Noon - 6 P.M.	11	7	4
6 P.M. - Midnight	19	15	13
Midnight - 6 A.M.	17	14	12
Monday - Friday	24	14	13
Saturday - Sunday	28	23	17

\* Decedents with BAC less than 0.05% included in total only.

PEDESTRIAN DEATHS

Intersection and Road Class

Of the tested pedestrian fatalities 43.9 percent, had BAC levels of 0.05% or higher. Alcohol involvement was lower for fatalities on highways and county roads (39.3 percent) than on city and village streets (50.0 percent), not a statistically significant difference. In rural areas the proportion of fatalities with significant BAC levels (0.05+%) was not significantly higher than in urban areas. Most (38 out of 41, or 92.7 percent) pedestrian fatalities occurred at roadway areas other than intersections. Of these 38, 42.1 percent had significant BAC levels.

Table 16

PEDESTRIAN DEATHS  
BY BLOOD ALCOHOL CONCENTRATION (BAC) AND ROAD CLASS  
Wisconsin, 1984

Road Class	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
All Pedestrians	41	18	18
Interstate	2		
U.S. Highways	2	1	1
State Highways	13	7	7
County Trunk and Town Roads	11	3	3
All Highways, County Trunk and Town Roads	28	11	11
City and Village St.	12	6	6
Unknown	1	1	1

\* Decedents with BAC less than 0.05% included in total only.

Table 17

PEDESTRIAN DEATHS BY BLOOD ALCOHOL CONCENTRATION (BAC),  
DAY OF WEEK AND TIME OF ACCIDENT  
Wisconsin, 1984

Time and Day	Total Deaths Tested*	BAC 0.05+%	BAC 0.10+%
Total	41	18	18
6 A.M. - Noon	2		
Noon - 6 P.M.	7	1	1
6 P.M. - Midnight	20	10	10
Midnight - 6 A.M.	12	7	7
Monday - Friday	26	12	12
Saturday - Sunday	15	6	6

\* Decedents with BAC less than 0.05% included in total only.

Time and Day of Week

As in the case of drivers, the pedestrian alcohol involvement was highest between 6 P.M. and 6 A.M., when 78.0 percent of the fatalities tested occurred. The night hours had an incidence of alcohol involvement of 53.1 percent (17 out of 32), a statistically significant difference from the daytime hours incidence of 11.1 percent (1 out of 9). Alcohol involvement was not significantly more frequent among fatalities occurring on the weekends (6 out of 15, 40.0 percent) than among weekday fatalities (12 out of 26, 46.2 percent).

Appendix

LICENSED DRIVERS BY AGE AND SEX  
Wisconsin, 1984

Age Groups	Total	Percent*	Male	Female
All Ages	3,192,135	87.7	1,660,742	1,531,393
16-19	228,993	73.3	120,647	108,346
20-24	405,599	91.5	209,550	196,049
25-34	784,072	95.7	402,935	381,137
35-44	574,790	95.2	293,846	280,944
45-54	405,577	93.9	209,047	196,530
55-64	385,226	89.6	201,655	183,571
65+	407,878	68.1	223,062	184,816

Source: Wisconsin Department of Transportation, Division of Motor Vehicles: Drivers License Statistics: Licensed Drivers (including motorcyclists) as of 12-31-84.

\*Percent per estimated population - July 1, 1984 in each age group.



URBAN AND RURAL CLASSIFICATION OF COUNTIES  
Wisconsin, 1984

Urban Counties

Includes counties that are Metropolitan Statistical Areas (MSA) or that contain a city of 25,000 or more in 1984. (Twenty-one counties with a total population of 3,342,096; 70.0% of total.)

Brown	Kenosha	Racine
Calumet	La Crosse	Rock
Chippewa	Manitowoc	St. Croix
Dane	Marathon	Sheboygan
Douglas	Milwaukee	Washington
Eau Claire	Outagamie	Waukesha
Fond du Lac	Ozaukee	Winnebago

"Large" Rural Counties

Includes remaining counties with 20,000 or more population in 1984. (Twenty-eight counties with a total population of 1,109,717; 23.2% of total.)

Barron	Juneau	Portage
Clark	Kewaunee	Sauk
Columbia	Langlade	Shawano
Dodge	Lincoln	Trempealeau
Door	Marinette	Vernon
Dunn	Monroe	Walworth
Grant	Oconto	Waupaca
Green	Oneida	Wood
Iowa	Pierce	
Jefferson	Polk	

"Small" Rural Counties

Includes remaining counties with less than 20,000 population in 1984. (Twenty-three counties with a total population of 322,570; 6.8% of total.)

Adams	Green Lake	Richland
Ashland	Iron	Rusk
Bayfield	Jackson	Sawyer
Buffalo	Lafayette	Taylor
Burnett	Marquette	Vilas
Crawford	Menominee	Washburn
Florence	Pepin	Waushara
Forest	Price	

Source: Official Population Estimates for 1984, Demographic Services Center, Wisconsin Dept. of Administration as of January 1, 1984.