

**ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILE 8672**  
**1422 SCOMM 52: JOINT SPEC. COMMITTEE ON LOCAL OPTION LAWS 1985-86**

last quarter-century. First, the consumption of all three major beverage types has increased.\* Second, a gradual shift away from the consumption of distilled spirits\*\* and toward greater consumption of lighter alcoholic beverages (beer and wine) has become more evident throughout the world.\*\*\*

To illustrate, Table IV-3 shows the changes in consumption of each beverage type for 25 industrialized countries, and Alaska, for the period from 1960 to 1975. The countries are grouped according to preferred alcoholic beverage, based on the relative proportions (in absolute alcohol) of their specific-beverage consumption rates. The bulk of the countries (including the U.S. as a whole) fall into a group reporting beer as the most frequently consumed alcoholic beverage (14 countries). The second largest group, including seven countries, show wine as the preferred alcoholic drink. The smallest group, four of 25 countries, prefer distilled spirits. Alaska is included in this last group.

As indicated in the table, any decreases in specific beverage consumption were relatively few--only three of the 25 countries reported decreases, in wine consumption, and those were minimal. All other countries reported increases in wine consumption, while the consumption of beer and distilled spirits increased, without exception, in all reporting countries. Percentage increases were generally greater for beer and wine, compared to distilled spirits, independent of preferred beverage, but particularly so in cases where the preferred national

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\*Jan de Lint, "The Background and Efficacy of Alcoholism Prevention Programs: A Brief Overview," (paper presented at the meeting of the Education Commission of the States Task Force on Responsible Decisions about Alcohol, Miami, Florida, June 23-25, 1974), p. 3.

\*\*Primarily in countries with a traditional heavy distilled spirits consumption.

\*\*\*Although increases in distilled spirits consumption have been noted for all countries, the proportion of total alcohol consumed in this form is decreasing. Lighter alcoholic beverages are those with a lower percentage content of absolute alcohol.

beverage is distilled spirits.

TABLE IV-3

PERCENTAGE INCREASES IN THE CONSUMPTION OF WINE, BEER AND DISTILLED SPIRITS IN PREDOMINANTLY WINE, BEER AND DISTILLED SPIRITS CONSUMING COUNTRIES, 1973 (1960-100)

| Beverage of Preference | Country         | Wine | Beer | Distilled Spirits |
|------------------------|-----------------|------|------|-------------------|
| A Wine                 | France          | -19  | 22   | 10                |
|                        | Hungary         | 20   | 57   | 93                |
|                        | Italy           | -1   | 157  | 131               |
|                        | Portugal        | 3    | 733  | 96                |
|                        | Spain           | 35   | 287  | 56                |
|                        | Switzerland     | 19   | 22   | 34                |
|                        | Yugoslavia      | 11   | 359  | 8                 |
| B Beer                 | Australia       | 84   | 24   | 23                |
|                        | Austria         | 75   | 57   | 4                 |
|                        | Belgium         | 97   | 27   | 127               |
|                        | Canada          | 181  | 23   | 65                |
|                        | C.S.S.A.        | -15  | 37   | 161               |
|                        | Denmark         | 241  | 53   | 140               |
|                        | E. Germany      | 73   | 36   | 119               |
|                        | Luxembourg      | 30   | 13   | 162               |
|                        | Netherlands     | 339  | 191  | 111               |
|                        | New Zealand     | 257  | 18   | 28                |
|                        | Rep. of Ireland | 225  | 59   | 143               |
|                        | Great Britain   | 228  | 33   | 86                |
|                        | U.S.A.          | 75   | 26   | 42                |
|                        | W. Germany      | 112  | 57   | 60                |
| C Distilled Spirits    | Finland         | 359  | 98   | 75                |
|                        | Norway          | 135  | 68   | 28                |
|                        | Poland          | 28   | 48   | 55                |
|                        | Sweden          | 118  | 49   | 14                |
|                        | Alaska          | 180  | 41   | 34                |

Source: Jan de Lint, "Alcohol Consumption and Alcohol Problems from an Epidemiological Perspective," (unpublished manuscript, Addiction Research Foundation, Toronto, Canada, 1976), Table 5.

The shift away from the consumption of distilled spirits to greater consumption of beer and wine has been a gradual but nevertheless definite trend in the United States for the last 100 years. In 1850, distilled spirits accounted for 90% of the total absolute alcohol consumed in this country. By 1974, spirits accounted for less than half of the total absolute alcohol consumed yearly. Beer now leads as the most popular alcoholic beverage among American drinkers. For the United States, 46% of the total absolute alcohol consumed was in the form of beer; 42% from distilled spirits.

Although Alaska differs from the nation as a whole in still preferring distilled spirits, the national and international trend toward increased wine and beer consumption can nonetheless be seen in Alaska, too.

As indicated by Table IV-4, distilled spirits accounted for 53% of the total absolute alcohol consumed in Alaska in 1975, (down from 58% in 1958), while beer increased from 35% in 1958 to 36% in 1975, and wine increased from 7% in 1958 to about 11% in 1975.

TABLE IV-4  
ALASKA SPECIFIC BEVERAGE CONSUMPTION IN GALLONS OF ABSOLUTE ALCOHOL  
PERCENTAGE OF TOTAL ABSOLUTE ALCOHOL CONSUMED  
(Per Capita 18 years +)

| Year  | Spirits |     | Wine |     | Beer |     | Total |      |
|-------|---------|-----|------|-----|------|-----|-------|------|
|       | A/A     | %   | A/A  | %   | A/A  | %   | A/A   | %    |
| 1958* | 1.46    | 58% | .18  | 7%  | .88  | 35% | 2.52  | 100% |
| 1959* | 1.54    | 57% | .18  | 7%  | .98  | 36% | 2.70  | 100% |
| 1960  | 1.70    | 58% | .20  | 7%  | 1.01 | 35% | 2.91  | 100% |
| 1961  | 1.71    | 59% | .20  | 7%  | .97  | 34% | 2.88  | 100% |
| 1962  | 1.64    | 57% | .21  | 7%  | 1.02 | 36% | 2.87  | 100% |
| 1963  | 1.72    | 59% | .20  | 7%  | .99  | 34% | 2.91  | 100% |
| 1964  | 1.84    | 60% | .22  | 7%  | 1.02 | 33% | 3.08  | 100% |
| 1965  | 1.99    | 62% | .24  | 7%  | 1.02 | 31% | 3.25  | 100% |
| 1966  | 1.97    | 60% | .24  | 7%  | 1.07 | 33% | 3.28  | 100% |
| 1967  | 2.06    | 58% | .29  | 8%  | 1.23 | 34% | 3.58  | 100% |
| 1968  | 2.12    | 58% | .29  | 8%  | 1.23 | 34% | 3.64  | 100% |
| 1969  | 2.33    | 58% | .37  | 9%  | 1.34 | 33% | 4.04  | 100% |
| 1970  | 2.25    | 57% | .36  | 9%  | 1.34 | 34% | 3.95  | 100% |
| 1971  | 2.37    | 55% | .44  | 10% | 1.53 | 35% | 4.34  | 100% |
| 1972  | 2.16    | 54% | .46  | 11% | 1.41 | 35% | 4.03  | 100% |
| 1973  | 2.18    | 53% | .48  | 12% | 1.46 | 35% | 4.13  | 100% |
| 1974  | 2.27    | 52% | .52  | 12% | 1.61 | 36% | 4.40  | 100% |
| 1975  | 2.40    | 53% | .50  | 11% | 1.64 | 36% | 4.54  | 100% |

\*Fiscal Year

Compiled from gallonage totals contained in Alaska Department of Revenue monthly reports, "Report of Alcoholic Beverages Distributed or Sold in Alaska."

Although it is useful to compare Alaska's drinking patterns with the nation as a whole, a more informative picture can be obtained by comparison with other states and regions in the country. Table IV-5 shows the ranking of states according to apparent consumption for all types of beverage alcohol, and for each type separately, for 1972 (the most recent year of readily available information). Table IV-6 is a graphic representation of the total absolute alcohol consumed, and

TABLE IV-5

APPARENT CONSUMPTION OF SPIRITS, WINE, AND BEER, AND OF  
ABSOLUTE ALCOHOL FROM EACH, AND OF TOTAL ALCOHOL, IN  
U.S. GALLONS PER PERSON IN THE DRINKING-AGE POPU-  
LATION, U.S.A. AND BY STATES, 1972

| State                | Distilled<br>Spirits | Absolute<br>Alcohol | Wine | Absolute<br>Alcohol | Beer  | Absolute<br>Alcohol | TOTAL<br>Absolute<br>Alcohol | Rank<br>Order |
|----------------------|----------------------|---------------------|------|---------------------|-------|---------------------|------------------------------|---------------|
| Alabama              | 1.88                 | 0.80                | 0.83 | 0.09                | 16.93 | 0.76                | 1.65                         | 48            |
| Alaska               | 5.06                 | 2.18                | 2.93 | 0.43                | 27.87 | 1.25                | 3.86                         | 4             |
| Arizona              | 2.61                 | 1.12                | 2.46 | 0.38                | 34.70 | 1.56                | 3.04                         | 9-10          |
| Arkansas             | 1.38                 | 0.59                | 0.55 | 0.14                | 17.68 | 0.79                | 1.52                         | 50            |
| California           | 3.17                 | 1.36                | 4.66 | 0.88                | 26.00 | 1.20                | 3.24                         | 8             |
| Colorado             | 2.95                 | 1.27                | 2.64 | 0.38                | 29.61 | 1.33                | 2.99                         | 12            |
| Connecticut          | 3.26                 | 1.40                | 2.43 | 0.35                | 21.81 | 0.98                | 2.73                         | 21            |
| Delaware             | 3.79                 | 1.63                | 1.87 | 0.27                | 28.15 | 1.27                | 3.17                         | 8             |
| Florida              | 3.69                 | 1.59                | 2.36 | 0.34                | 28.99 | 1.30                | 3.23                         | 7             |
| Georgia              | 2.69                 | 1.16                | 1.11 | 0.16                | 20.64 | 0.93                | 2.25                         | 36            |
| Hawaii               | 2.56                 | 1.10                | 1.91 | 0.28                | 24.43 | 1.10                | 2.48                         | 29            |
| Idaho                | 1.80                 | 0.77                | 1.94 | 0.28                | 30.65 | 1.38                | 2.43                         | 32            |
| Illinois             | 3.16                 | 1.36                | 2.18 | 0.32                | 27.36 | 1.23                | 2.91                         | 14-15         |
| Indiana              | 1.72                 | 0.74                | 0.88 | 0.13                | 22.78 | 1.02                | 1.89                         | 41            |
| Iowa                 | 1.63                 | 0.70                | 0.56 | 0.02                | 25.27 | 1.14                | 1.86                         | 43            |
| Kansas               | 1.59                 | 0.68                | 0.57 | 0.08                | 21.32 | 0.96                | 1.72                         | 47            |
| Kentucky             | 1.93                 | 0.83                | 0.70 | 0.10                | 22.30 | 1.01                | 1.94                         | 39            |
| Louisiana            | 2.04                 | 0.88                | 2.20 | 0.32                | 28.11 | 1.26                | 2.46                         | 33            |
| Maine                | 2.35                 | 1.01                | 1.68 | 0.24                | 29.92 | 1.35                | 2.60                         | 28            |
| Maryland             | 3.37                 | 1.45                | 2.10 | 0.30                | 28.68 | 1.29                | 3.04                         | 9-10          |
| Massachusetts        | 3.18                 | 1.37                | 2.54 | 0.37                | 26.50 | 1.19                | 2.93                         | 13            |
| Michigan             | 2.51                 | 1.08                | 1.92 | 0.28                | 31.25 | 1.41                | 2.77                         | 20            |
| Minnesota            | 2.65                 | 1.14                | 1.41 | 0.20                | 29.68 | 1.16                | 2.50                         | 27-28         |
| Mississippi          | 1.82                 | 0.78                | 0.87 | 0.11                | 21.93 | 0.99                | 1.88                         | 42            |
| Missouri             | 2.18                 | 0.94                | 1.34 | 0.19                | 25.66 | 1.15                | 2.28                         | 35            |
| Montana              | 2.52                 | 1.08                | 1.14 | 0.16                | 34.95 | 1.57                | 2.81                         | 18-19         |
| Nebraska             | 2.42                 | 1.04                | 1.10 | 0.16                | 28.81 | 1.30                | 2.50                         | 27-28         |
| Nevada               | 8.26                 | 3.55                | 5.23 | 0.76                | 41.86 | 1.88                | 6.19                         | 1             |
| New Hampshire        | 7.41                 | 3.19                | 2.67 | 0.39                | 40.93 | 1.84                | 6.42                         | 2             |
| New Jersey           | 3.14                 | 1.35                | 2.90 | 0.42                | 25.32 | 1.14                | 2.91                         | 14-15         |
| New Mexico           | 2.38                 | 1.02                | 2.42 | 0.35                | 32.08 | 1.44                | 2.81                         | 18-19         |
| New York             | 2.93                 | 1.26                | 3.08 | 0.44                | 25.78 | 1.16                | 2.86                         | 16            |
| North Carolina       | 2.08                 | 0.89                | 1.50 | 0.22                | 18.33 | 0.82                | 1.93                         | 40            |
| North Dakota         | 2.80                 | 1.20                | 1.15 | 0.17                | 29.25 | 1.32                | 2.69                         | 24            |
| Ohio                 | 1.84                 | 0.79                | 1.40 | 0.20                | 38.33 | 1.72                | 2.71                         | 22-23         |
| Oklahoma             | 1.79                 | 0.77                | 1.05 | 0.15                | 19.67 | 0.88                | 1.80                         | 45            |
| Oregon               | 2.13                 | 0.92                | 3.29 | 0.48                | 28.15 | 1.27                | 2.67                         | 25            |
| Pennsylvania         | 1.88                 | 0.81                | 1.50 | 0.22                | 28.66 | 1.29                | 2.32                         | 34            |
| Rhode Island         | 2.77                 | 1.19                | 2.97 | 0.43                | 30.62 | 1.38                | 3.00                         | 11            |
| South Carolina       | 2.95                 | 1.27                | 1.52 | 0.22                | 21.17 | 0.95                | 2.44                         | 31            |
| South Dakota         | 2.19                 | 0.94                | 1.15 | 0.17                | 23.44 | 1.05                | 2.16                         | 38            |
| Tennessee            | 1.50                 | 0.64                | 0.79 | 0.11                | 22.09 | 0.99                | 1.74                         | 46            |
| Texas                | 1.76                 | 0.76                | 1.42 | 0.21                | 31.95 | 1.44                | 2.11                         | 33            |
| Utah                 | 1.37                 | 0.59                | 1.06 | 0.15                | 18.15 | 0.82                | 1.56                         | 49            |
| Vermont              | 4.41                 | 1.90                | 3.15 | 0.48                | 34.78 | 1.56                | 3.92                         | 3             |
| Virginia             | 2.35                 | 1.01                | 1.81 | 0.22                | 22.29 | 1.00                | 2.23                         | 37            |
| Washington           | 2.36                 | 1.01                | 3.03 | 0.44                | 28.05 | 1.26                | 2.71                         | 27-28         |
| West Virginia        | 1.74                 | 0.75                | 0.69 | 0.10                | 20.00 | 0.90                | 1.75                         | 45            |
| Wisconsin            | 3.04                 | 1.31                | 1.87 | 0.27                | 39.73 | 1.79                | 3.37                         | 5             |
| Wyoming              | 2.81                 | 1.21                | 1.36 | 0.20                | 32.10 | 1.44                | 2.85                         | 17            |
| District of Columbia | 9.91                 | 4.26                | 6.31 | 0.91                | 30.56 | 1.37                | 6.54                         |               |
| U.S.A.               | 2.60                 | 1.12                | 2.16 | 0.31                | 26.62 | 1.20                | 2.63                         |               |

Amounts calculated from tax-paid withdrawals only. The drinking-age population is taken as 15 years and older.

Source: Mark Keller, ed., Alcohol and Health, 1974. (Washington, D.C.: Government Printing Office, 1974), p. 2, Table 1.

\*Figures for Alaska in this Table vary somewhat from Table IV-4, due to use of drinker population as 18 and over and inclusion of consumption by military (non-taxable) in Table IV-4.

percentage by beverage type, in each of the nine U.S. Census Regions.

As can be seen in Table IV-5, Alaska ranked as the fourth highest state in consumption of absolute alcohol in 1972. Although border-crossing by tourists, vacationers, travelers, and others seeking lower prices or drinking ages may cause some distortion in these figures, Alaska's relative isolation, despite the presence of tourists, suggests that the figure for Alaska is not underestimated. In fact, because the top three states--Nevada, New Hampshire and Vermont--are more likely to experience border-crossing than is Alaska, it is quite possible that this state had the dubious distinction of having the highest consumption (real consumption, by residents) of absolute alcohol in 1972.

TABLE IV-6  
REGIONAL SPECIFIC BEVERAGE CONSUMPTION AS A PERCENTAGE OF TOTAL  
CONSUMPTION AND TOTAL CONSUMPTION OF ABSOLUTE ALCOHOL IN  
U.S. GALLONS, 1972<sup>a</sup>

|                      | Spirits | Wine | Beer |                  |
|----------------------|---------|------|------|------------------|
| Alaska <sup>b</sup>  | 67%     | 11   | 32%  | 3.4 <sup>c</sup> |
| Pacific <sup>c</sup> | 41%     | 20%  | 39%  | 3.10             |
| New England          | 49%     | 12   | 39%  | 3.00             |
| Mountain             | 41%     | 11   | 48%  | 2.92             |
| Middle Atlantic      | 42%     | 14   | 44%  | 2.70             |
| South Atlantic       | 49%     | 10   | 41%  | 2.63             |
| East North Central   | 41%     | 10   | 49%  | 2.58             |
| West North Central   | 42%     | 7    | 51%  | 2.23             |
| West South Central   | 35%     | 10   | 55%  | 2.18             |
| East South Central   | 42%     | 5    | 52%  | 1.81             |
| U.S.A.               | 42%     | 12   | 46%  | 2.63             |

<sup>a</sup>Source: Modified from Alcohol and Health, Mark Keller, ed. (Washington, D.C.: Gov't Printing Office, 1974), p. 4.

<sup>b</sup>Computed from information in Table IV-5.

<sup>c</sup>Pacific Region includes Washington, Oregon, California, Hawaii and Alaska.

As can be seen from Table IV-6 Alaska is also within the region (Pacific) with the highest annual consumption of absolute alcohol

(3.10 gallons). The East South Central region had the lowest average consumption (1.81 gallons). This table also indicates that three regions--the Pacific, New England, and South Atlantic--share Alaska's preference for distilled spirits. Nevertheless, the extent of this preference and the high amount of total absolute alcohol consumed per capita set Alaska apart from other regions and most other states, as well as from the nation as a whole.

Brief Summary--Apparent Consumption

The per capita apparent consumption of alcoholic beverages in Alaska is high, viewed from various perspectives. As is true nationally and internationally, overall per capita consumption of beverage alcohol in Alaska, has also steadily increased. The average level of per capita consumption for Alaska, however, is relatively high by international comparison, and significantly higher than averages for the nation, national regions, and other states. Further, Alaska's increasing overall per capita consumption has been marked by a gradual shift away from consumption of distilled spirits toward lighter alcoholic beverages, but the shift is very slight. Alaska is distinguished from most other countries, the nation, most national regions, and states, by its continued and definitive preference for distilled spirits over beer and wine. Perhaps most important, however--and independent of its overall level of consumption or its specific beverage preference--is Alaska's dramatic and alarming rate of increase in annual per capita consumption.

Recent epidemiological research indicates that an increasing rate of average annual consumption indicates an increasing prevalence of alcoholism--a fact that makes Alaska's rapid rate of increasing consumption all the more disturbing. This area of investigation is

the topic of the next two sections of this Part of this Volume.\*

### C. APPARENT CONSUMPTION AND ALCOHOLISM

The relationship between rates of consumption of beverage alcohol and rates of alcoholism in a population has been the topic of considerable epidemiological investigation,\*\* particularly in recent years as the rates of annual consumption of absolute alcohol have risen rapidly around the world. One major position states that the overall level of consumption of beverage alcohol in a population determines both the prevalence of alcoholism as well as the extent and nature of alcohol-related organic pathologies.\*\*\*

It has been demonstrated for a wide variety of populations that there is a predictable pattern of individual consumption levels. This is to say that, within the range of different levels of individual alcohol consumption in a population, each individual consumption level occurs with a certain frequency. Thus, a certain percentage of drinkers may typically consume up to 1 cl. of absolute alcohol as a daily average. Another given percentage may consume between 1 and 2 cl. of absolute alcohol daily. Yet a third given percentage of the drinkers may consume between 3 and 4 cl. daily; and so on. Further, the portions of the drinking age population that consume these particular quantities of absolute alcohol are distributed in recurring and predictable patterns, depending on the mean annual consumption level for that population group.

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\*Also see Part II of this Volume, PREVALENCE, for discussion of the relationship between alcohol consumption in Alaska and the statewide alcoholic and alcohol abuser populations.

\*\*See also Part II, this Volume.

\*\*\*Concepts in this section are based on published research by Research Addictions Foundation, Ontario, Canada. See Reference List at end of this Part.

A graphic representation of these different specific-level consumption frequencies shows that their distribution tends to be log normal in character. This is to say that the distribution pattern formed by plotting the different individual frequencies creates a rather smooth, skewed curve that is referred to as a log normal curve, because it characterizes a known logarithmic normal distribution.\*

Research information regarding the actual distribution of frequencies of individual consumption levels in different population groups supports the theory that this distribution is indeed log normal in character. Thus, because of known properties and characteristics of log normal distributions, this particular distribution of individual consumption frequencies can be used to estimate the percentage of drinkers at any level of consumption in a given population, given the average annual consumption of beverage alcohol for that population group.

As an example, for a population with an average annual consumption of 25 liters (6.61 US gallons) of absolute alcohol, the distribution curve would be as is presented in Figure IV-2.

In such a population, the greatest percentage of the drinkers is distributed under the left-hand portion of the curve, in the lower consumption ranges. A smaller percentage of drinkers is located under the right-hand side, or tail of the curve, in the higher consumption levels.

More specifically, 55 percent of the drinkers in this population consume rather small quantities of alcohol--i.e., less than an average daily amount of 5 cl (1.69 oz.) of absolute alcohol. On the other side,

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\*In a logarithmic normal distribution, as opposed to a Gaussian or bell-shaped distribution, the natural logarithms (exponents) of the data--rather than the data themselves--are normally distributed.

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about 20 percent of the drinkers consume 10 cl. (3.38 oz.) or more as a daily average.

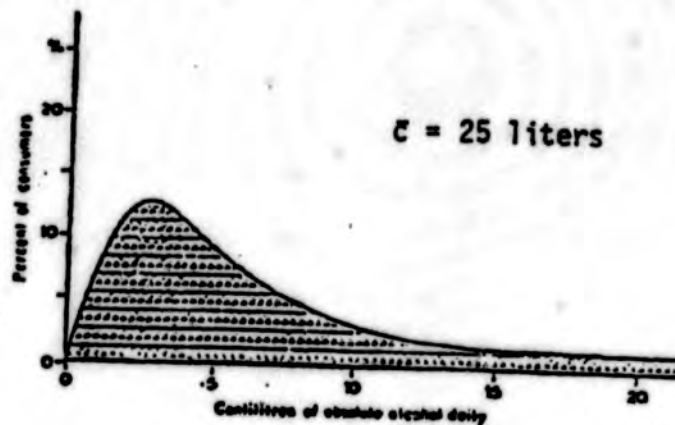


FIGURE IV-2 Frequency distribution of alcohol consumption

Source: Jan de Lint, "The Prevention of Alcoholism," Preventive Medicine, 3 (1974), p. 25.

By contrast, in a population where the average yearly consumption level of absolute alcohol is only 15 liters (3.96 gallons), as illustrated below in Figure IV-3, compared to 25 liters (as in Figure IV-2), only about 9 percent of the drinkers (instead of 20%) would be in the tail-end of the distribution and consume in excess of a daily average of 10 cl. of absolute alcohol.

These examples of alcohol consumption distribution curves serve to illustrate that, at higher levels of average daily consumption, gradually decreasing numbers of drinkers consume gradually increasing amounts of alcohol. However, the more important consideration illustrated by these distribution curves is the fixed relationship of excessive levels of consumption to lower alcohol use levels that apply in different populations. This is to say that, if changes occur in the prevalence of low or medium levels of consumption, then changes in the prevalence of excessive consumption must also occur. This can be seen

in the two different alcohol consumption distributions presented in Figure IV-2 and IV-3. In the population where the annual consumption per drinker is higher (i.e., 25 liters, Figure IV-2), the proportion of heavy drinkers who consume daily averages in excess of 10, 15, or 20 cl. per day of absolute alcohol is much larger than in the population where the annual per drinker consumption is lower (15 liters, Figure IV-3). Thus, according to this theory, the relationship between the overall level of alcohol consumption and the prevalence of excessive drinking in any populations is relatively, and predictably fixed.

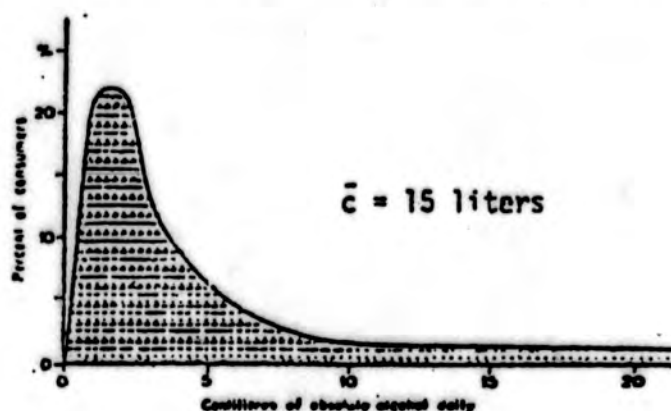


FIGURE IV-3 Frequency distribution of alcohol consumption

Source: Jan de Lint, "The Prevention of Alcoholism," Preventive Medicine, 3 (1974), p. 25.

Alcoholics are assumed to be located in the tail-end of these consumption distributions, for the purposes of this type of population-level analysis. Alcoholics are defined as drinkers who consume an average daily quantity of 15 cl. of absolute alcohol. This definition has been adopted by the Addictions Research Foundation, the center of the most active research on this topic in recent years. This arbitrary

definition is based on the reported daily averages of consumption of absolute alcohol for patients admitted to alcoholism clinics, and on estimates based on mortality rates of alcoholics.

A definition of alcoholism on the basis of consumption quantities is an arbitrary one, but justifiable and useful for population-level research. On an individual level (e.g., in a clinical setting), defining a person as alcoholic solely on the basis of consumption would not be satisfactory, as the sheer amount of alcohol consumed may or may not by itself indicate abnormal or alcoholic behavior.

There are several implications of this formulation. Independent of the exact definition of alcoholic drinking, the fact that the distribution of individual levels of consumption approximates a logarithmic normal curve means that the relationship between alcoholic levels of consumption and lower levels is fixed in any population group. Thus, as the annual average consumption of beverage absolute alcohol increases, so does the prevalence of excessive drinking. If this is the case, alcoholism may then theoretically be viewed as a behavioral disorder--since it would differ only in degree from "normal" drinking--rather than be defined as a discrete illness with a specific etiology. A further refinement of this theory would revise and adjust definitions of alcoholism, at the population-level of analysis, on the basis of the annual average consumption of absolute alcohol, particularly for the purposes of responding to alcoholism and alcohol abuse problems.

This application becomes more evident if two population groups with extreme differences in annual average consumption levels are compared. In a population with a very low average annual level of consumption (e.g., five liters), the very small percentage of drinkers who

consume excessive levels of beverage alcohol would have to be judged as deviating drastically from the drinking norm. In such a population, alcoholism would probably not be considered as primarily a consequence of the prevailing drinking norm. However, in a population where the annual average level of consumption is very high (e.g., 25 liters of absolute alcohol), the percentage of excessive drinkers would be relatively greater. Such a drinking pattern would be much more common throughout the population and thus not be judged to deviate as much from the drinking norm. Under this latter consideration, alcoholism in a high-consuming population would less likely be regarded as a result of an underlying socio- or psycho-pathology, but rather as a consequence of prevailing drinking customs.

In general, then, it can be said that the overall level of alcohol consumption, regardless of beverage source, determines the prevalence of excessive or hazardous consumers. Further, this relationship is fixed and applicable to different population groups. Thus, estimates of prevalence of hazardous drinkers are predictable. That these higher levels of consumption are hazardous is supported by the relationship between rates of consumption and rates of alcohol-related pathologies.

The important implication of this formulation is that it is not possible to reduce the rate of alcoholism in a population group without affecting the rate of other, non-alcoholic levels of consumption.

#### Consumption Averages and Alcohol-Related Mortality

According to the formulation presented in this section, as the rate of annual average consumption increases, so does the rate of

excessive drinkers, and so, too, does the rate of alcohol-related mortality. Table IV-7 provides an overview of this phenomenon and focuses on deaths due to cirrhosis of the liver, a conventionally accepted indicator of alcoholism in a population group (see Part II, Prevalence). Presented in this table, for a number of industrialized countries, are the annual average consumption of absolute alcohol, the estimated number of drinkers in excess of an average of 15 cl. of absolute alcohol daily, and the rates of death due to cirrhosis of the liver.

TABLE IV-7

ANNUAL PER DRINKER CONSUMPTION IN LITRES OF ABSOLUTE ALCOHOL, ESTIMATED RATES OF DRINKERS IN EXCESS OF A DAILY AVERAGE OF 15 CL OF ABSOLUTE ALCOHOL AND RATES OF DEATH FROM LIVER CIRRHOSIS

| Country                     | Consumption<br>(1966 or 1967)* | Estimated Rates of<br>Drinkers in Excess<br>of a Daily Average<br>of 15 cl of Absolute<br>Alcohol per 100,000<br>Population Aged 15<br>and Older** | Rate of Death<br>from Liver Cirrhosis<br>per 100,000<br>Population Aged<br>15 and Older<br>(1963, 1964,<br>or 1965)*** |
|-----------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| France                      | 25.9                           | 9405                                                                                                                                               | 45.3                                                                                                                   |
| Italy                       | 20.0                           | 5877                                                                                                                                               | 27.3                                                                                                                   |
| Portugal                    | 19.5                           | 5652                                                                                                                                               | 42.7                                                                                                                   |
| Spain                       | 17.1                           | 4625                                                                                                                                               | 24.3                                                                                                                   |
| Austria                     | 16.0                           | 4212                                                                                                                                               | 35.0                                                                                                                   |
| W. Germany<br>and W. Berlin | 16.0                           | 3978                                                                                                                                               | 26.7                                                                                                                   |
| Switzerland                 | 15.8                           | 3901                                                                                                                                               | 19.7                                                                                                                   |
| Luxembourg                  | 12.5                           | 2988                                                                                                                                               | 34.2                                                                                                                   |
| Hungary                     | 12.4                           | 2952                                                                                                                                               | 12.9                                                                                                                   |
| U.S.A.                      | 12.0                           | 2198                                                                                                                                               | 18.4                                                                                                                   |
| C.S.S.R.                    | 11.4                           | 2655                                                                                                                                               | 13.1                                                                                                                   |
| Canada                      | 11.1                           | 2272                                                                                                                                               | 10.0                                                                                                                   |
| England<br>and Wales        | 10.9                           | 1946                                                                                                                                               | 3.7                                                                                                                    |
| Rep. Of Ireland             | 10.9                           | 1946                                                                                                                                               | 4.5                                                                                                                    |
| Denmark                     | 9.4                            | 1848                                                                                                                                               | 10.2                                                                                                                   |
| Belgium                     | 9.3                            | 2052                                                                                                                                               | 12.9                                                                                                                   |
| Poland                      | 9.0                            | 1752                                                                                                                                               | 8.6                                                                                                                    |
| Sweden                      | 8.4                            | 1515                                                                                                                                               | 7.9                                                                                                                    |
| Netherlands                 | 7.7                            | 1456                                                                                                                                               | 4.9                                                                                                                    |
| Finland                     | 5.9                            | 945                                                                                                                                                | 4.6                                                                                                                    |
| Norway                      | 5.8                            | 945                                                                                                                                                | 4.7                                                                                                                    |

\*Alcohol consumption data were taken from the 1968 Annual Report of the Dutch Distillers' Association.

\*\*The numbers of drinkers in excess of a daily average of 15 cl of absolute alcohol were tabulated on the basis of data provided in J. Hyland and S. Scott, "Alcohol consumption tables: an application of the Ledermann equation to a wide range of consumption averages".

\*\*\*Demographic Yearbook of the United Nations, 1966.

Source: Jan de Lint and Wolfgang Schmidt, "Consumption Averages and Alcoholism Prevalence: A Brief Review of Epidemiological Investigations," British Journal of Addiction, 66 (1971), p. 109.

These data indicate that countries reporting relatively higher rates of consumption also report higher abuser rates, as well as higher rates of death from cirrhosis of the liver.

Given the fact, then, that consumption levels in Alaska have increased substantially since statehood, it follows that death in the state due to cirrhosis of the liver should show a similarly proportional increase, if this theoretical formulation holds true. That this is indeed the case, is clearly evident in the graphic presentation of information in Figure IV-4.

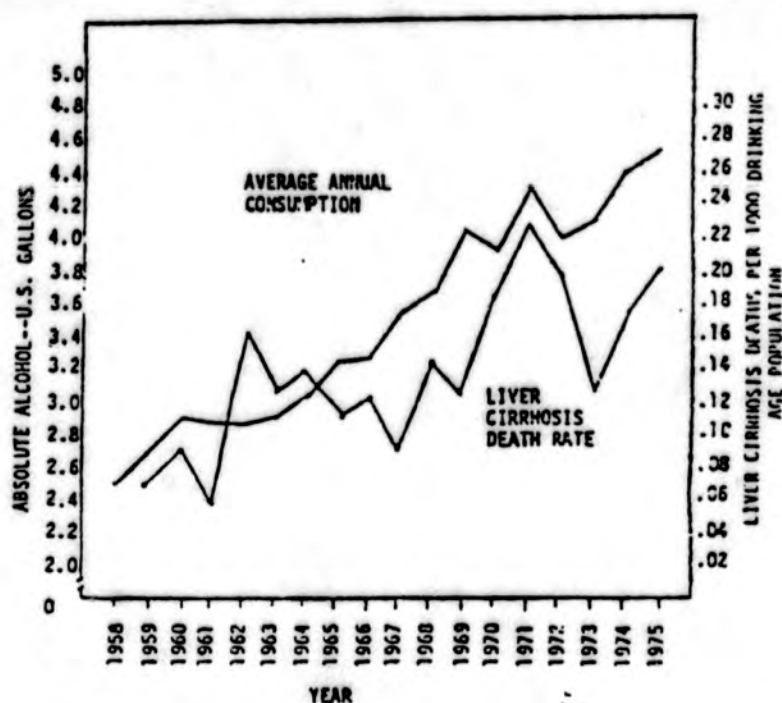


FIGURE IV-4 Annual per capita consumption and cirrhosis deaths per 1000 in the drinking age population, Alaska, 1958-1975.

Source: Consumption figures from Table IV-2, this Volume. Death information compiled from statistics provided by the Health Information Systems Section, Department of Health and Social Services.

This figure shows the average annual consumption of absolute alcohol in Alaska, from 1958 to 1975, and the rate of death due to cirrhosis

of the liver per 1000 persons in the drinking age population for the same period. As can be seen, the dramatic increases in Alaska's annual average consumption of absolute alcohol since 1958 have been matched very closely by equally significant increases in the death rate due to cirrhosis of the liver.

Figure IV-5 presents similar information for the state, but in this case shows the relationship between rate of consumption and rate of death due to alcoholism (as a reported cause of death).

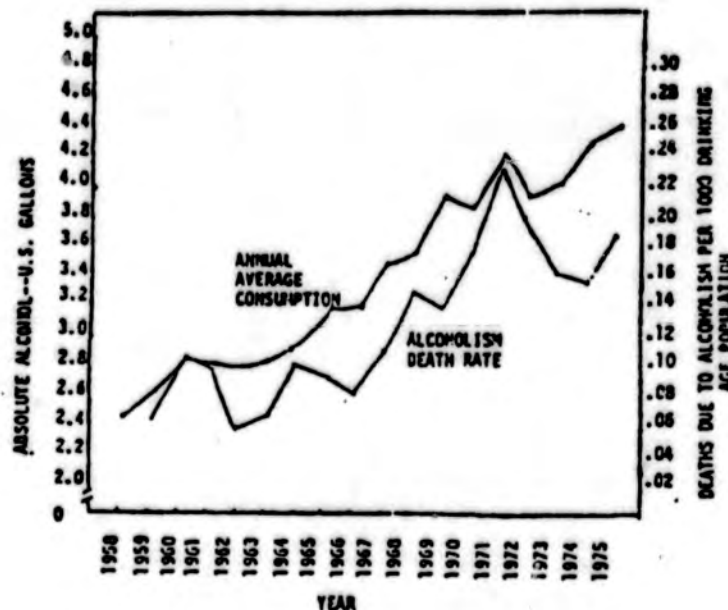


FIGURE IV-5 Annual per capita consumption and deaths due to alcoholism per 1000 in the drinking age population, Alaska, 1958-1975.

Source: Consumption figures from Table IV-2, this Volume. Death information compiled from statistics provided by the Health Information Systems Section, Department of Health and Social Services.

The findings are the same for this comparison. The rate of death due to alcoholism in Alaska has increased significantly from 1958 to 1975, and corresponds directly with the known increases in the annual average

consumption of absolute alcohol.

If the correlation between level of consumption and liver cirrhosis or alcoholism death rates is extremely high, however, such is not always the case with certain other types of mortality which, at first glance, might also be expected to positively co-vary. If consumption is compared with annual death rates for homicide, suicide, and accidental deaths, for example (as shown in Figure IV-6), there appears to be little positive correspondence. Certainly alcohol consumption plays an important role in the genesis of these death rates; nonetheless, intervening environmental and behavioral variables come into play in affecting them, and prevent unilinear covariance. What is lacking, in short, is the direct (in this case, organic) connection which exists between alcohol consumption and liver cirrhosis or death by alcoholism. Nevertheless, if it is impossible to graphically portray any direct correlation between alcohol consumption and these other mortality rates,

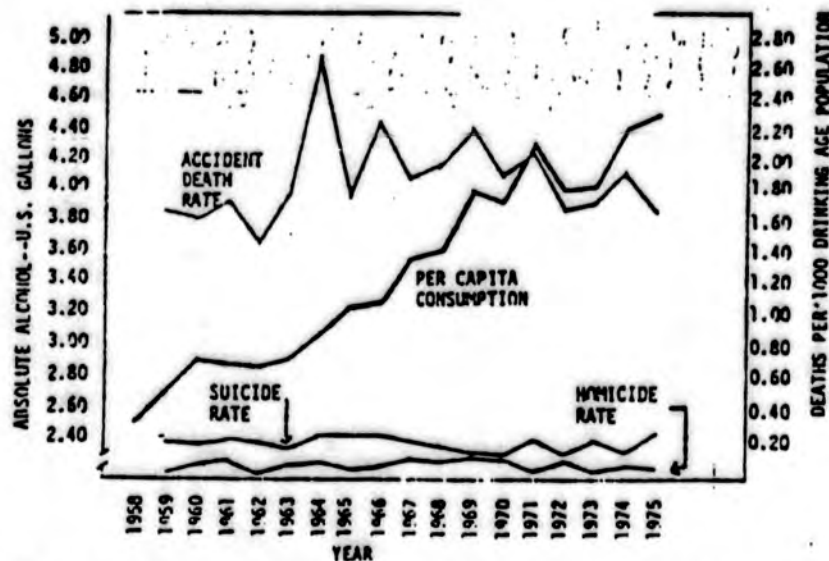


FIGURE IV-6 Annual per capita consumption and death rate for homicide, suicide and accidental deaths (per 1000 drinking age population), Alaska, 1958-75.

Source: Consumption figures from Table IV-2, this Volume.  
Death information compiled from statistics provided by the Health Information Systems Section, Department of Health and Social Services.

it should be understood that an indirect relationship does exist.

It is evident that in Alaska the relationship between increasing annual consumption and chronic excessive use, along with increasing annual rates of alcohol-related mortality, is particularly well demonstrated. That the relationship is so well demonstrated is perhaps indicative of an exaggeration of the phenomena due to the unusual conditions found in the state--i.e., a population group where the number of excessive users has reached extreme proportions.

#### D. FACTORS AFFECTING CONSUMPTION

Significant increases in the annual rates of consumption of absolute alcohol have occurred in many countries in recent years. The increases in consumption rates have also been accompanied by corresponding increases in alcohol-related mortality. This same trend holds true for the state of Alaska. According to the reported fixed relationship between excessive consumption and other more moderate use patterns, the overall level of consumption must be reduced if the rate of excessive consumption, and consequently, alcohol-related health problems, is to be reduced.

A number of factors are frequently discussed as facilitating the recent increases in levels of consumption--increasing diffusion of alcohol use patterns (more frequent use of alcohol for an increasing number of occasions), relaxation of government control measures, and increased consumer affluence. More specifically, there are a number of factors that are regarded as importantly related to the rate of consumption and require attention for consideration of methods to reduce excessive use of alcohol and alcohol-related damage to health.

In the past, alcoholism prevention and control measures have

included such considerations as prohibition of the sale of alcoholic beverages, control of the number and type of outlets, control of advertising, the taxation of beverage alcohol, and alcohol education. It has been noted that, in countries ranking highest in overall consumption and rates of death from liver cirrhosis (France, Italy, Portugal), alcoholic beverages are easily obtained and relatively inexpensive. Available information for Alaska regarding number and type of outlets for beverage alcohol, closing hours, and taxation of beverage alcohol, will be briefly presented within the context of their relationship to rates of consumption.

Number and Type of Outlets  
for Beverage Alcohol

The effectiveness of government control of licensing and regulation of the number and the type of retail sales outlets is very difficult to determine. The complex relationship between these measures and hours of sale, legal age of consumption, urban or rural influence, etc. makes it difficult to determine, let alone monitor, any systematic effects of any one of the measures or combinations of the measure. Such other factors as available transportation, size of outlet, and differences in regional and socio-cultural drinking patterns also contribute to the problem.

However, it is quite evident that in countries where the consumption of alcohol is quite high, there are numerous package stores and/or public drinking places. In the information that is provided below for Alaska, this same trend is evident.

Information about the number and type of retail sales outlets for distilled spirits for Alaska and the nation, for the period from 1973

to 1975, is presented in Table IV-8.\* A retail outlet licensed for on-premises sales allows the consumption of alcoholic beverages on the premises. Conversely, an off-premise license allows only for bulk or package purchase of beverage alcohol for consumption at some other location.

TABLE IV-8  
RETAIL LICENSES--SALE OF LIQUOR, ALASKA AND U.S., 1973-1975

| Type of License | Number of Licenses<br>per 1,000 |             | Number of Persons<br>per License |              |
|-----------------|---------------------------------|-------------|----------------------------------|--------------|
|                 | Alaska                          | U.S.        | Alaska                           | U.S.         |
| <u>1973</u>     |                                 |             |                                  |              |
| On Premises     | 1.73 (571)                      | .065        | 587                              | 1,536        |
| Off Premises    | <u>1.07 (352)</u>               | <u>.025</u> | <u>938</u>                       | <u>3,985</u> |
| Total Licenses  | 2.80 (923)                      | 1.14*       | 358                              | 876          |
| <u>1974</u>     |                                 |             |                                  |              |
| On Premises     | 1.23 (413)                      | .067        | 816                              | 1,499        |
| Off Premises    | <u>1.01 (340)</u>               | <u>.026</u> | 991                              | 3,883        |
| Total Licenses  | 2.23 (753)                      | 1.16*       | 448                              | 859          |
| <u>1975</u>     |                                 |             |                                  |              |
| On Premises     | 1.82 (639)                      | .069        | 551                              | 1,459        |
| Off Premises    | <u>1.07 (377)</u>               | <u>.025</u> | 934                              | 3,972        |
| Total Licenses  | 2.89 (1,016)                    | 1.19*       | 346                              | 842          |

\*Includes "On and Off" Premises as another category not applicable in Alaska.

Source: 1975 Annual Statistical Review, Distilled Spirits Council of the United States, 1976.

Inspection of Table IV-8 reveals that in terms of total number of licenses per 1000 population, there were proportionately more licensed retail outlets for liquor in Alaska than for the composite average of all the states. In fact, there were more than twice as many licensed outlets per 1000 persons for each of the three years shown. Similarly, there were about half as many people for each license in Alaska compared to the national average for each of the three years.

\*Information for retail outlets licensed only for sale of wine and/or beer was unavailable. Thus, the actual number of licensed outlets is greater than shown.

The proportion of total liquor licenses for on-premises sales, compared to the total number of licensed outlets, is about the same for Alaska as for the national composite. On the average, about 60% of retail liquor licenses allow on-premises consumption.

Compared to national averages, consumer accessibility to retail liquor sales appears to be greater in Alaska.

#### Closing Hours

Additional information regarding regulation of retail sales of beverage alcohol is presented in Table IV-9, which provides a comparison of prohibited hours of sale as fixed by state law for license states. This information shows that there are fewer hours of prohibited sales for either on-premises or off-premises sales in Alaska than in other license states. (The states not listed regulate off-premises retail sales through a direct government monopoly.)

Even though the available information regarding the effectiveness of various government control measures is ambiguous, the comparative information for Alaska indicates considerably less government control than in other states. Consumer accessibility, in terms of numbers and types of outlets and closing hours, appears to be greater in Alaska.

#### Taxation

Taxation is another, and perhaps more extensively used, method of controlling alcohol abuse. Taxes affect the consumer price of alcoholic beverages, and there are strong indications that the price of alcohol relative to personal disposable income is closely related to overall consumption and the prevalence of alcoholism.

TABLE IV-4  
PROHIBITED HOURS OF SALE FIXED BY STATE LAWS\*

| Licenses States                   | On-Premise Consumption<br>(Bars, Restaurants, etc.) | Off-Premise Consumption<br>(Package Stores) | No. Hours<br>Closure<br>On-Premise | No. Hours<br>Closure<br>Off-Premise |
|-----------------------------------|-----------------------------------------------------|---------------------------------------------|------------------------------------|-------------------------------------|
| Alaska                            | 5 am - 8 am                                         | 5 am - 8 am                                 | 3                                  | 3                                   |
| Arizona                           | 1 am - 6 am                                         | 1 am - 6 am                                 | 5                                  | 5                                   |
| Arkansas                          | 1 am - 7 am                                         | 1 am - 7 am                                 | 6                                  | 6                                   |
| California                        | 2 am - 6 am                                         | 2 am - 6 am                                 | 4                                  | 4                                   |
| *Colorado                         | 2 am - 7 am                                         | Midnight - 8 am                             | 5                                  | 8                                   |
| *Connecticut                      | 1 am - 9 am                                         | 8 pm - 8 am                                 | 8                                  | 12                                  |
| Delaware                          | 1 am - 9 am                                         | 1 am - 9 am                                 | 8                                  | 8                                   |
| *D.C.                             | 2 am - 8 am                                         | 9 pm - 10 am                                | 6                                  | 13                                  |
| Florida                           | Midnight - 7 am                                     | Midnight - 7 am                             | 7                                  | 7                                   |
| Indiana                           | 3 am - 7 am                                         | 3 am - 7 am                                 | 4                                  | 4                                   |
| Kansas                            | 11 pm - 9 am                                        | 11 pm - 9 am                                | 10                                 | 10                                  |
| Kentucky                          | Midnight - 8 am                                     | Midnight - 8 am                             | 8                                  | 8                                   |
| Louisiana                         | None                                                | None                                        | 0                                  | 0                                   |
| *Maryland                         | 2 am - 6 am                                         | Midnight - 6 am                             | 4                                  | 6                                   |
| *Minnesota                        | 1 am - 8 am                                         | 10 pm - 8 am                                | 7                                  | 10                                  |
| *Mississippi                      | Midnight - 10 am                                    | 10 pm - 10 am                               | 10                                 | 12                                  |
| Missouri                          | 1:30 am - 6 am                                      | 1:30 am - 6 am                              | 4 1/2                              | 4 1/2                               |
| Nebraska                          | 1 am - 6 am                                         | 1 am - 6 am                                 | 5                                  | 5                                   |
| Nevada                            | None                                                | None                                        | 0                                  | 0                                   |
| New Mexico                        | 2 am - 7 am                                         | 2 am - 7 am                                 | 5                                  | 5                                   |
| *New York                         | 3 am - 8 am                                         | Midnight - 8 am                             | 5                                  | 8                                   |
| North Dakota                      | 1 am - 8 am                                         | 1 am - 8 am                                 | 7                                  | 7                                   |
| Oklahoma                          | 10 pm - 10 am                                       | 10 pm - 10 am                               | 12                                 | 12                                  |
| South Carolina                    | Sundown - Sunrise                                   | Sundown - Sunrise                           | 12                                 | 12                                  |
| South Dakota                      | 2 am - 7 am                                         | 2 am - 7 am                                 | 5                                  | 5                                   |
| *Tennessee                        | 3 am - 8 am                                         | 11 pm - 8 am                                | 5                                  | 9                                   |
| *Texas                            | 2 am - 7 am                                         | 9 pm - 10 am                                | 5                                  | 13                                  |
| *Wisconsin                        | 2 am - 8 am                                         | 9 pm - 8 am                                 | 6                                  | 11                                  |
| Wyoming                           | 2 am - 6 am                                         | 2 am - 6 am                                 | 4                                  | 4                                   |
| Average of States<br>Listed Above |                                                     |                                             | 6                                  | 7                                   |
| Other<br>License States           |                                                     |                                             |                                    |                                     |
| Georgia                           | Fixed Locally                                       | Midnight - 8 am                             | -                                  | 8                                   |
| Hawaii                            | Nrs. Set By Counties                                | Nrs. Set By Counties                        | -                                  | -                                   |
| Illinois                          | Fixed Locally                                       | Fixed Locally                               | -                                  | -                                   |
| Massachusetts                     | Fixed Locally                                       | Fixed Locally                               | -                                  | -                                   |
| New Jersey                        | Fixed Locally                                       | Fixed Locally                               | -                                  | -                                   |
| Rhode Island                      | 1 am - 6 am                                         | Fixed Locally                               | 5                                  | -                                   |

\*States requiring closure of package stores prior to closure of on-premise outlets  
\*Excluding Sundays and holidays

Source: Distilled Spirits Council of the United States, Inc., Summary of State Laws and Regulations  
Relating to Distilled Spirits, 22nd Edition, 1975.

The recent increases in annual consumption of absolute alcohol in Canada and several other countries have been associated with a decreasing relative cost of beverage alcohol.\* This relationship is illustrated in Figure IV-7, which shows the price of absolute alcohol (expressed as a fraction of average disposable income) compared to annual average consumption of absolute alcohol in Ontario, Canada from 1929 to 1958.

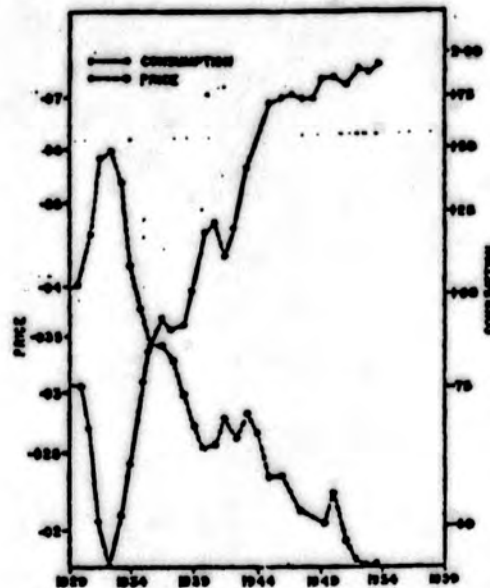


FIGURE IV-7 Alcohol Price (P) and Consumption (C), Ontario, 1929-1953.\*

\*P = the price of an average gallon of absolute alcohol expressed as a fraction of average disposable income.  
C = consumption in gallons of absolute alcohol per person 20 years and older.

Source: Jan de Lint and Wolfgang Schmidt, "Consumption Averages and Alcoholism Prevalence: A Brief Review of Epidemiological Investigations," *British Journal of Addiction*, 66 (1971), p. 101.

In this illustration, a relationship between the decreasing relative price of alcohol and increasing consumption levels in Ontario is quite clear. As the relative price of alcohol declines, average

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\*See reference Figure IV-7.

annual consumption increases.

A similar comparison of annual consumption averages and price of alcohol was made for the United States, for the period from 1958 to 1975 (Figure IV-8). As can be seen the same relationship of decreasing relative price of alcohol and increasing rate of consumption is demonstrated.

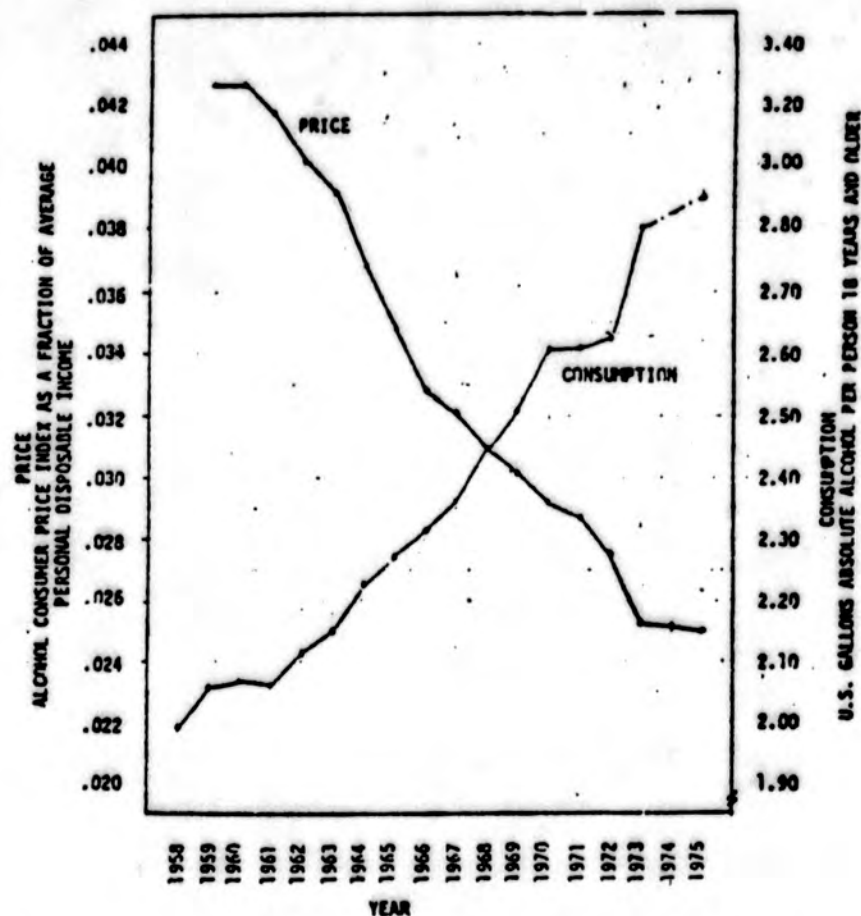


FIGURE IV-8 Price of beverage alcohol and consumption, U.S.A., 1958-1975.

Source: Consumer Price Index--Bureau of Labor Statistics, U.S. Dept. of Labor.  
Disposable Income--Survey of Current Business, U.S. Dept. of Commerce.

The same relationship between the relative price of alcohol and consumption levels is clearly evident for Alaska, (see Figure IV-9), although the lack of data limits the time period for comparison.

Annual consumption averages were able to be computed from 1958 to 1975, but the Consumer Price Index of alcohol as a function of disposable income was able to be computed only for the years 1970-1975.

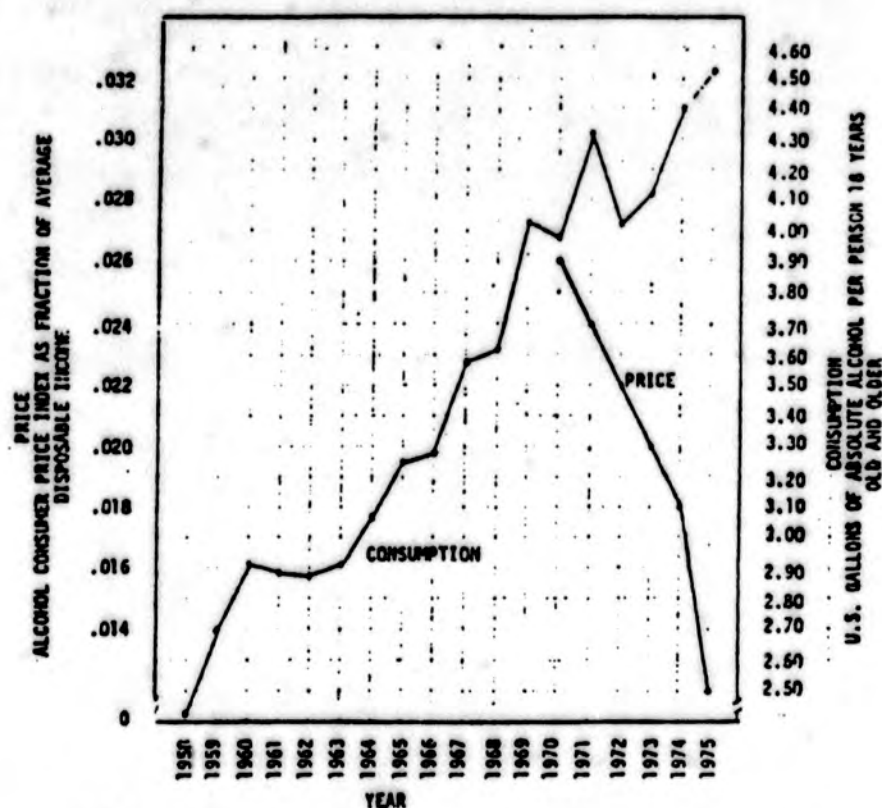


FIGURE IV-9 Price of beverage alcohol and consumption, Alaska, 1970 to 1975.

Sources: Consumer Price Index--Bureau of Labor Statistics, U.S. Dept. of Labor.  
Disposable Income--Survey of Current Business, U.S. Dept. of Commerce.

Note: Information necessary for computation of price prior to 1970 is not available.

The data for Alaska show a corresponding inverse relationship between consumption levels and the price of alcohol within the economic structure and consumption averages of the state.

In different terms, the Consumer Price Index (CPI) for alcoholic beverages in Alaska increased by .3% (three-tenths of one percent) in the period from 1970 to 1975. The CPI for all items increased 41.2% during the same time period. Average disposable income increased by

92%, while real disposable income (average disposable income adjusted for CPI changes) increased 35.7%. In effect, then, the consumer price of all commodities from 1970-1975 increased by more than 40%, while the price of beverage alcohol increased by only .3%--which means that, in relation to all other commodities, the price of alcohol decreased by more than 40%.

According to the distilled spirits industry, more than half the price of alcohol is comprised of taxes--federal and state; thus, if taxes do not change, the price of alcohol obviously does not behave like other noncontrol commodities in the free market. In Alaska the excise tax on beverage alcohol has not changed since 1961 (see Volume II).

It would seem that, particularly as applied to Alaska, the relationship between increasing annual average consumption and decreasing relative price of beverage alcohol is quite clear. Along with relatively greater accessibility, the decreasing price helps explain the dramatic increases in consumption that were noted for Alaska.

#### E. SUMMARY

By international comparison, the annual rate of consumption of beverage alcohol in Alaska is relatively high. By national comparison, the consumption level for Alaska is significantly higher. It is likely that, of all states, Alaska had the highest level of consumption of absolute alcohol in 1972 and probably still does. Alaska is further distinguished from most of the rest of the world in that the preferred beverage is still distilled spirits. The world-wide trend to lighter alcoholic beverages has also begun to show in Alaska, although it is very gradual. Independent of the relative consumption of specific

types of beverage alcohol, the average annual amount of absolute alcohol is the most important factor of concern. And, in Alaska, the rate of increase in average annual consumption is significant and dramatic. The average annual consumption of absolute alcohol per drinker in Alaska increased by 80% since 1958, a rate twice as fast as (or 100% greater than) the rate of increase for the nation as a whole.

The rate of increase is more than significant and dramatic. It is, in fact, quite alarming; particularly if viewed from the perspective of the information presented in this part, showing that the overall level of alcohol consumption, regardless of beverage source, determines the prevalence of hazardous consumers and alcohol-related organic pathologies. As overall levels of alcohol consumption increase, so does the prevalence of chronic excessive use, reflected by such indicators of health problems as deaths due to liver cirrhosis and deaths due to alcoholism. The application of this analytic framework to Alaska shows this correspondence among increasing consumption, alcoholism prevalence, and related health problem indicators, to be strikingly clear.

That Alaska can be characterized as a high consuming population goes without question, in view of the information presented in this part. Excessive drinking appears to approach the normative drinking pattern, rather than represent deviant behavior. The prevalence of alcoholism and high rates of alcoholism indicators appear to be more appropriately viewed within the context of social customs, rather than from the perspective of socio- or psycho-pathological illness or other disease concepts.

In addition, review of a few selected measures of government control of alcohol abuse showed that formal controls appear more

relaxed in Alaska than in many other states of the nation. Significant within this framework, is the evidence showing the high degree of correspondence between the increasing rate of annual consumption and the decreasing relative price of alcohol in the state. The relative price of alcohol is more closely associated with level of taxation than other market factors, as so much of the price of alcohol is comprised of federal and state taxes.

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relaxed in Alaska than in many other states of the nation. Significant within this framework, is the evidence showing the high degree of correspondence between the increasing rate of annual consumption and the decreasing relative price of alcohol in the state. The relative price of alcohol is more closely associated with level of taxation than other market factors, as so much of the price of alcohol is comprised of federal and state taxes.

## PART V. MORTALITY AND CONSUMPTION OF ALCOHOL

### A. INTRODUCTION

No account of alcohol and the problems it generates would be complete which failed to investigate the effects of alcohol consumption on society's death rates. Certainly, mortality rates and the events underlying them would still occur, even if alcohol did not exist. Nonetheless, it is a fact that the consumption of beverage alcohol does contribute to these rates an additional increment which otherwise would not be there. Accidental deaths, motor vehicle fatalities, homicides, suicides, etc.--all are increased, to one degree or another, by virtue of the presence or availability of alcohol in a society.

This increment--these additional deaths--for which alcohol consumption is directly responsible, is referred to as "excess mortality" due to alcohol. It is the purpose of this section of the Volume to identify that excess mortality as it occurs in Alaska; to delineate its characteristics across a variety of mortality categories; and, in general, to describe the nature of the relationship which obtains among alcohol consumption, alcohol abuse, and alcohol-related (-caused) excess mortality.

Since significantly elevated death rates have been consistently revealed in mortality studies of alcoholics and heavy drinkers,<sup>1</sup> discussion of the alcohol-related excess mortality in Alaska is presented within the context of the rates, patterns, and implications of consumption of beverage alcohol provided in Part IV.

## B. EXCESS MORTALITY AND EXCESS CONSUMPTION

Closely related to the fact of increasing alcohol consumption in the nation is the matter of alcohol-related excess mortality. The precise point at which alcohol consumption begins to affect a person's health or others' well-being is not ascertainable; nor is the relationship which unquestionably obtains between excess mortality and moderate drinking. Whatever these ambiguities, however, there is little dispute over the relation between excess mortality and heavy or excessive drinking.

While clinical studies of patients known to be "excessive drinkers" constitutes most of the available literature--requiring us to be mindful of the fact that their physical health was already sufficiently grave for them to seek some kind of treatment--the occurrence of high mortality rates among such persons remains, at the least, telling.

Such higher mortality rates were indicated by a series of studies, of alcoholic patients conducted by Schmidt and de Lint in Ontario between 1951 and 1963, showing a mortality rate among alcoholics over twice as high as that for the overall population.<sup>2</sup>

Similarly, a 1973 London study of hospital patients admitted with primary or secondary diagnoses indicating excessive drinking found a mortality rate 2.7 times greater than that for the general population.<sup>3</sup>

A large corporate study in the U.S., in 1973, of 899 known, suspected, and recovered alcoholics also showed an abnormally high death rate, 3.2 times greater than the normal.<sup>4</sup>

Further corroboration of the relation can be found in studies conducted by U.S. insurance companies to assess their "risk" population.<sup>5</sup> Comparing "standard" to "substandard" policyholders--the latter being

those whose records included adverse information regarding drinking-- it was found that overall mortality among the "substandard" group outstripped that for the other, by a ratio ranging from 2.14 to 4.54 times.

Virtually all reported studies, in fact, supply evidence for significantly higher mortality rates among alcoholics and heavy drinkers. The greatest portion of the findings and compiled evidence by Schmidt and de Lint suggests strongly that the rate of excess mortality in such cases is about two to four times greater than the normal.<sup>6</sup>

#### Alcohol and Specific Causes of Death

Given the fact of generally increased mortality among heavy drinkers, it remains to be said that the specific causes of alcohol-related deaths can themselves throw light on the relationship between alcohol consumption and mortality.

In general, research findings show that alcoholics manifest especially high death rates due to (1) cirrhosis of the liver, (2) heart disease and hypertension, (3) cancer of the upper digestive and respiratory tracts, and, also (4) pneumonia, and (5) vascular lesions of the central nervous system. While excess mortality in these instances cannot be entirely attributed to chronic heavy alcohol use-- nutritional and hygienic factors, emotional state, and heavy smoking being particularly important intervening variables<sup>7</sup>--a definitive association is indisputable.

Additionally, and of particular importance to Alaska, is the category of "violent" deaths, or deaths due to "violent causes"-- including accidents, suicides, homicides, and deaths attributable directly to alcoholism. Because of the extremely high mortality rates in Alaska from these causes, attention has been focused on them. The following discussion is an overview of substantive studies charting

the direct association between excessive alcohol consumption and deaths due to these specific causes. A discussion of overall and cause-specific mortality rates in Alaska follows in the context of these known associations.

#### Violent Causes

The depressive effects of alcohol on the central nervous system result in altered sensation, perception, motor performance, and emotional set. It is not surprising, therefore, that a strong relationship exists between the abuse of alcohol and accidental, and other violent deaths (homicide, suicide), and death by alcoholism.

The disinhibitory effects of alcohol may be expected to release suppressed feelings of aggression and hostility, and recent studies do indicate an association between alcohol intoxication and violent behavior. A comprehensive investigation of 588 criminal homicides, for example, showed that 55% of the offenders had been drinking at the time of their offense<sup>8</sup> (see also Part VI Alcohol and Crime).

A national study in 1970 by Michigan's Highway Safety Research Institute found that excessive alcohol intake was reported to have been associated with approximately one-half of all auto fatalities in one year. A number of similar studies have shown that drivers who have been drinking are much more likely to be involved in automobile accidents than non-drinking drivers<sup>9</sup> (see also Part VII).

A California coroner's study of over 300 fatalities resulting from non-highway accidents found that alcohol plays a major role in deaths from unintentional injuries such as accidental falls, poisonings, and accidents caused by fire. Of all cases, 58% of the fatalities had at least one indication of being an alcohol abuser or alcoholic individual, while a full 30% were known to be heavy drinkers or alcoholic persons. It has been documented that deaths from alcohol-related injuries occur

more often at home or during recreational events, than at work.

Studies have also been reported which link high rates of suicide among alcoholics to the depressing and isolating condition of an alcoholic's life. According to Schmidt and Popham, suicide has been found to be one of the more frequent causes of death among chronic heavy drinkers; similarly, a high proportion of alcoholics can be found among suicide cases.<sup>10</sup> Schmidt and de Lint have also noted the high rates of suicide among publicans, restaurateurs, and hoteliers who have in common a very high exposure to alcoholic beverages.<sup>11</sup>

#### Cirrhosis of the Liver

Because the liver is the organ most significantly involved with processing alcohol in the body, it is most often seriously affected by heavy drinking and alcohol abuse. It has been estimated that 10% of all alcoholic persons develop liver cirrhosis, a disease characterized by diffuse scarring of the liver, and that continued heavy drinking often leads to premature death by liver failure or hemorrhaging.<sup>12</sup>

Major studies of both clinical and non-clinical alcoholics and heavy drinkers have consistently found a very substantial degree of excess mortality from liver cirrhosis. In the Schmidt and de Lint sample, for example, it ranked second only to cardiovascular diseases in its contribution to total excess mortality for all causes of death.<sup>13</sup>

Numerous national and international studies have shown also that a decline in the general availability of beverage alcohol (such as during Prohibition, or following World War I) usually results in a sharp decline in the liver cirrhosis death rate. This, along with other clinical evidence, has caused Schmidt (et al.) to conclude that the

rate of death from cirrhosis usually rises and falls with the apparent level of alcohol consumption in the general population.<sup>14</sup> (See Parts on Prevalence and Consumption for more explanation.) In New York City, for example, which has one of the highest consumption rates in the country, cirrhosis of the liver ranks as the third leading cause of death between the ages of 25 and 65.<sup>15</sup>

#### Heart Disease

Several studies of samples of alcoholics have shown that 10 to 40 percent of all excess deaths are attributable to cardiovascular diseases.<sup>16</sup> Given the high incidence of cigarette smoking among alcoholics, as well as their significantly high rate of hypertension, it is virtually certain that alcoholism and alcohol abuse contribute significantly, if indeterminately, to excess deaths in this category.

#### Cancers of the Upper Digestive and Respiratory Tracts

As in most cause-specific deaths, it is not always clear to what extent the apparently high rate of death from the various cancers can be attributed to excessive alcohol use, to heavy smoking, or to some other cause. The relative risk of incurring cell carcinomas of the oral cavity, pharynx, larynx, and esophagus is increased independently by the duration and intensity of exposure to tobacco or alcohol, with sustained joint exposure enhancing the risk in a synergistic fashion.<sup>17</sup>

#### Overview: Mortality in the Nation

It is clear that excessive alcohol consumption is an important factor in contributing to many premature and excess deaths among

alcoholics and heavy drinkers. Specifically, it has been associated with excess mortality due to: accidents and other violent deaths, liver cirrhosis deaths, heart disease and associated hypertension, cancers of the upper digestive and respiratory tracts, and many other causes of death.

Major points of the preceding discussion are synopsized below:

- excessive alcohol consumption contributes a significant increment to national mortality rates, reflected across almost all causes of death;
- virtually all studies conducted report significantly higher mortality rates among alcoholics and heavy drinkers, with the bulk of the evidence suggesting strongly that the rate of excess mortality in such cases is two to four times greater than the normal;
- documentary evidence indicates a very strong influence of alcoholism and heavy drinking on accidents and other violent deaths (including homicides, suicides, liver cirrhosis deaths, and deaths due to alcoholism);
- studies of alcoholics have shown that 10 to 40 percent of all excess deaths in the nation are attributable to cardiovascular diseases (heart diseases and associated hypertension), with alcohol ingestion and smoking as significant contributing syndromes;
- the relative risk of incurring cell carcinomas (cancers) of the upper digestive and respiratory tracts is significantly increased by the duration and intensity of exposure to alcohol.

It can be seen from the findings noted above that the role of alcoholism and heavy drinking is spread across a range of mortality categories and related behaviors, manifesting itself as a significant contributing agent to mortality in the nation from a variety of causes. In the following section of the report, these and other national findings regarding the relationship of excessive consumption

and mortality will be applied to mortality and consumption rates as they occur in Alaska.

### C. ALCOHOL AND MORTALITY IN ALASKA

Two factors are important in discussing alcoholism and mortality in Alaska: the high average annual consumption of alcohol, and the relatively young age of the state's population.

The rates and patterns of beverage alcohol consumption have been discussed in detail in Part IV.

Alaska's population has been growing rapidly for the past thirty years, after remaining relatively unchanged during the first four decades of this century. During the 1960's, the birth rate in the state was 40% higher than in the United States as a whole, resulting in a distinctly young statewide population base. By 1970, for example, the median age was 22.9 years, compared with a national figure of more than 28. Also, more than 55% of the population was by then under 25 years old, with only 16% past the age of 44. During the same period, more than 31% of the national populace was past age 45. Given the high mobility of the younger age groups, and the considerably higher rates of alcohol consumption associated with them, this large number of young persons (especially age 15-44) now plays an important role in determining Alaska's generally low crude mortality rate.<sup>18</sup>

Crude Death Rate. The average annual rate of death for Alaska was 3.8 per 1000 population in 1975, compared to the national average of 9.2. The crude death rate has been about half the national average, as can be seen in Table V-1, which shows the crude death rates for

Alaska and the nation from 1970-to 1975.

TABLE V-1  
CRUDE DEATH RATES FOR ALASKA AND THE U.S., 1970-1975  
(PER 100,000 POPULATION)

| Year | Alaska <sup>a</sup> | U.S. <sup>b</sup> |
|------|---------------------|-------------------|
| 1970 | 4.7                 | 9.5               |
| 1971 | 4.7                 | 9.3               |
| 1972 | 4.6                 | 9.4               |
| 1973 | 4.4                 | 9.4               |
| 1974 | 4.2                 | 9.2               |
| 1975 | 3.8                 | 9.2               |

Sources:

<sup>a</sup>Alaska Vital Statistics, 1975, Health Information Section, Division of Public Health, Dept. of Health and Social Services.

<sup>b</sup>Vital Statistics of the United States, annuals--1970-1975, U.S. National Center for Health Statistics.

Although the crude death rate for Alaska is lower than the national average, this same relationship does not obtain when age, race and specific cause of death are considered.

Age. More specifically, mortality data for all causes of death show unequivocally that Alaska's mortality rate runs higher than the national average in the younger and middle age ranges, and lower in the more advanced age ranges. A comparison of expected and observed deaths by age in Alaska during 1974, Table V-2, shows that observed deaths were lower than expected (based on national averages) among persons under five years of age and also for persons over 75

(1,656 deaths expected, compared to 558 observed). The actual number of deaths for persons between age 5 and 44 was significantly greater than expected (490 observed compared to 310 expected). This effect is even more pronounced in males than in females.

TABLE V-2  
EXPECTED AND OBSERVED DEATHS IN ALASKA, 1974

|           | Alaska Population <sup>a</sup> |         |             | U.S. Mortality Rate per 1000 <sup>a</sup> |         |        | Alaska Expected Number of Deaths |         |       | Alaska Observed Number of Deaths <sup>b</sup> |         |       |
|-----------|--------------------------------|---------|-------------|-------------------------------------------|---------|--------|----------------------------------|---------|-------|-----------------------------------------------|---------|-------|
|           | Males                          | Females | All Persons | Males                                     | Females | All    | Males                            | Females | All   | Males                                         | Females | All   |
| Under 5   | 16,400                         | 15,600  | 32,000      | 25.06                                     | 19.22   | 22.19  | 411                              | 300     | 710   | 95                                            | 64      | 159   |
| 5-14      | 35,300                         | 34,700  | 71,000      | .52                                       | .33     | .43    | 19                               | 11      | 30    | 34                                            | 22      | 56    |
| 15-24     | 36,600                         | 25,700  | 62,300      | 1.92                                      | .60     | 1.29   | 70                               | 17      | 87    | 123                                           | 20      | 153   |
| 25-34     | 26,600                         | 23,000  | 49,600      | 2.17                                      | 1.03    | 1.59   | 56                               | 24      | 80    | 103                                           | 23      | 126   |
| 35-44     | 21,000                         | 17,000  | 38,000      | 4.10                                      | 2.37    | 3.21   | 86                               | 40      | 122   | 112                                           | 43      | 155   |
| 45-54     | 15,000                         | 12,000  | 27,000      | 9.68                                      | 5.13    | 7.33   | 145                              | 62      | 208   | 118                                           | 71      | 189   |
| 55-64     | 8,000                          | 6,000   | 14,000      | 22.89                                     | 10.93   | 16.59  | 183                              | 66      | 232   | 163                                           | 66      | 229   |
| 65-74     |                                |         |             |                                           |         |        |                                  |         |       |                                               |         |       |
| 75 & over | 4,000                          | 3,000   | 7,000       | 165.56                                    | 113.74  | 135.19 | 662                              | 341     | 946   | 252                                           | 147     | 399   |
| Unknown   |                                |         |             |                                           |         |        |                                  |         |       | 2                                             |         | 2     |
| Total     | 163,300                        | 137,000 | 300,300     |                                           |         |        | 1,632                            | 861     | 2,396 | 1,002                                         | 466     | 1,468 |

Sources:

<sup>a</sup> Statistical Bulletin, April, 1973. Based on 1970 Census.

<sup>b</sup> Alaska Vital Statistics, 1974, Health Information Section, Division of Public Health, Department of Health and Social Services.

Table V-2 indicates that mortality was exceptionally high for the age group 15-44, where the observed deaths exceeded the expected number by 59% (338 to 212). The number of female deaths in the same age bracket was also higher than expected, (by 19%) but the difference was far less compared to males, and the lower expectation for death among

females.

Race. With respect to race, Alaskan mortality data show clearly that the death rate for Natives is substantially greater than that for non-Natives. Table V-3 shows the number of deaths among Natives and non-Natives in Alaska during 1974, as well as the respective death rates. As can be seen, the crude mortality rate for Natives for that year was 7.36 per 1,000 population--more than twice as great as the mortality rate for non-Natives, which was 3.51 per 1,000 population. Another way of expressing the greater death rate for Natives is to note that, while comprising about 17% of the states population in 1974, about 30% of all deaths were Native. This is consistent with findings based on national trends, which also indicate a significantly greater death rate among non-whites than whites.<sup>19</sup>

TABLE V-3  
ALASKA DEATH RATES, BY RACE, 1974

| Race       | Population      | Number of Deaths<br>1974 | Death Rate<br>(Per 1,000) |
|------------|-----------------|--------------------------|---------------------------|
| Native     | 59,536 (16.9%)  | 438 (29.8%)              | 7.36                      |
| Non-Native | 293,761 (83.1%) | 1,030 (70.2%)            | 3.51                      |
| TOTAL      | 353,297         | 1,468                    | 4.16                      |

Source: Alaska Vital Statistics, 1974, Health Information Services,  
Division of Public Health, Department of Health and Social Services.

It can also be easily said that while the number of Native deaths in the very young and very old age categories are generally less than might be expected, the death rate in the 15-44 age group is astonishingly high. Table V-4 shows a comparison of expected and observed deaths for both Natives and non-Natives in Alaska during 1974. Looking at the

difference between expected and observed deaths for Natives in the 15-44 age category, it can be seen that Native males had 81 more deaths (or 389+ %) than might have been expected on the basis of overall U.S. rates, while Native females evidenced an even greater number of excess deaths, 37 (408+ %). A less high, but still excessive number of deaths in the 15-44 age bracket may also be noticed for non-Native males, but on a scale very much lower than that applicable to excess Native male deaths. Non-Native females, on the other hand, showed a rate of observed deaths which was lower than what might have otherwise been expected. (See Table V-4.)

Recent mortality data for 1975, as well, confirm the fact that the death rate for Natives in Alaska is much greater than that for non-Natives, and particularly high among the younger age categories. Table V-5 shows that in 1975 almost 40% of all Native deaths (168 of 441) occurred between the ages of 15 and 44, while those for non-Natives occurred predominantly after age 45 (over 60%).

Further evidence of the higher rate of mortality faced by Alaskan Natives are the disparate infant death rates and neonatal death rates faced by Natives and non-Natives. For example, in 1975 (see Table V-5) the infant death rate for whites was 12.2 per 1,000 live births, while that for Natives was 20.9. Similarly, the neonatal death rate for the same year among whites was 7.3 per 1,000 live births, while for Natives it was 14.6. Altogether, these data combine forcefully to establish the fact that Natives in Alaska suffer a much greater overall rate of death than non-Natives.

TABLE V-4  
EXPECTED AND OBSERVED DEATHS FOR NATIVES AND NON-NATIVES, ALASKA, 1974

| Age         | Alaska Native Population <sup>a</sup> |         |        | Alaska Non-Native Population <sup>b</sup> |         |         | U.S. Mortality Rate per 1,000 <sup>a</sup> |         |        | Alaska Observed Number of Deaths <sup>b</sup> |         |     |       |         |       | Alaska Native Expected Number of Deaths |         |     | Alaska Non-Native Expected Number of Deaths |         |       |
|-------------|---------------------------------------|---------|--------|-------------------------------------------|---------|---------|--------------------------------------------|---------|--------|-----------------------------------------------|---------|-----|-------|---------|-------|-----------------------------------------|---------|-----|---------------------------------------------|---------|-------|
|             | Males                                 | Females | All    | Males                                     | Females | All     | Males                                      | Females | All    | Males                                         | Females | All | Males | Females | All   | Males                                   | Females | All | Males                                       | Females | All   |
| Under 5     | 3,570                                 | 3,326   | 6,896  | 13,049                                    | 12,377  | 25,426  | 25.06                                      | 19.22   | 22.19  | 32                                            | 25      | 57  | 63    | 39      | 102   | 89                                      | 64      | 153 | 327                                         | 233     | 560   |
| 5-14        | 8,143                                 | 7,703   | 15,846 | 28,459                                    | 27,180  | 55,649  | .52                                        | .33     | .43    | 15                                            | 9       | 24  | 14    | 13      | 32    | 4                                       | 3       | 7   | 15                                          | 9       | 24    |
| 15-24       | 4,955                                 | 4,779   | 9,734  | 31,943                                    | 21,125  | 53,068  | 1.92                                       | .68     | 1.29   | 41                                            | 17      | 58  | 82    | 13      | 95    | 10                                      | 3       | 13  | 61                                          | 14      | 55    |
| 25-34       | 3,216                                 | 3,157   | 6,373  | 23,323                                    | 19,960  | 43,292  | 2.17                                       | 1.03    | 1.59   | 37                                            | 9       | 46  | 66    | 14      | 80    | 7                                       | 3       | 10  | 51                                          | 21      | 69    |
| 35-44       | 2,696                                 | 2,555   | 5,251  | 18,565                                    | 14,389  | 32,954  | 4.10                                       | 2.37    | 3.21   | 31                                            | 23      | 54  | 81    | 20      | 101   | 11                                      | 6       | 17  | 76                                          | 34      | 106   |
| 45-54       | 1,890                                 | 1,660   | 3,549  | 12,988                                    | 10,615  | 23,603  | 9.68                                       | 5.13    | 7.33   | 30                                            | 18      | 48  | 88    | 53      | 141   | 18                                      | 9       | 26  | 126                                         | 54      | 173   |
| 55-64       | 1,319                                 | 1,094   | 2,413  | 6,619                                     | 4,938   | 11,557  | 22.89                                      | 10.93   | 16.59  | 32                                            | 23      | 55  | 131   | 43      | 174   | 30                                      | 12      | 40  | 152                                         | 54      | 192   |
| 65-74       | 715                                   | 552     | 1,267  | 1,960                                     | 1,514   | 3,474   | 165.56                                     | 113.74  | 135.19 | 22                                            | 18      | 40  | 107   | 40      | 147   | 118                                     | 63      | 171 | 324                                         | 172     | 470   |
| 75 and over | 450                                   | 306     | 756    | 761                                       | 677     | 1,438   |                                            |         |        | 33                                            | 22      | 55  | 90    | 67      | 157   | 76                                      | 35      | 104 | 126                                         | 77      | 194   |
| Missing     |                                       |         |        |                                           |         |         |                                            |         |        | 1                                             |         | 1   | 1     |         | 1     |                                         |         |     |                                             |         |       |
| TOTAL       | 25,955                                | 25,231  | 52,186 | 137,677                                   | 112,784 | 250,461 |                                            |         |        | 274                                           | 164     | 438 | 728   | 302     | 1,030 | 363                                     | 198     | 541 | 1,253                                       | 673     | 1,926 |

Sources:

<sup>a</sup>Statistical Bulletin, 1973. Based on 1970 Census.

<sup>b</sup>Vital Statistics, 1974, Health Information Systems, Division of Public Health, Dept. of Health and Social Services.

TABLE V-5

RESIDENT DEATHS BY AGE BY RACE  
ALASKA, 1975

| Age               | Absolute Frequency |        |           | Relative Frequency |        |           |
|-------------------|--------------------|--------|-----------|--------------------|--------|-----------|
|                   | White              | Native | All Races | White              | Native | All Races |
| Under 1 month     | 40                 | 23     | 70        | 3.9%               | 5.2%   | 4.6%      |
| 1-11 months       | 27                 | 10     | 37        | 2.6                | 2.3    | 2.4       |
| 1-4 years         | 16                 | 13     | 29        | 1.6                | 2.9    | 1.9       |
| 5-14 years        | 25                 | 12     | 38        | 2.4                | 2.9    | 2.5       |
| 15-24 years       | 102                | 73     | 100       | 9.9                | 16.6   | 11.0      |
| 25-34 years       | 95                 | 50     | 151       | 9.3                | 12.2   | 9.9       |
| 35-44 years       | 88                 | 45     | 138       | 8.6                | 10.2   | 9.1       |
| 45-54 years       | 165                | 59     | 233       | 16.1               | 13.4   | 15.3      |
| 55-64 years       | 181                | 56     | 245       | 17.6               | 12.7   | 16.1      |
| 65-74 years       | 142                | 43     | 195       | 13.8               | 9.8    | 12.8      |
| 75 years and over | 146                | 57     | 205       | 14.2               | 12.9   | 13.5      |
| TOTAL             | 1,027              | 441    | 1,522     | 100.0%             | 100.0% | 100.0%    |

| Infant Death Rate* |      | Neonatal Death Rate* |      |
|--------------------|------|----------------------|------|
| White              | 12.2 | White                | 7.3  |
| Native             | 20.9 | Native               | 14.6 |
| All Races          | 14.3 | All Races            | 9.4  |

\*Rate per 1,000 live births.

Source: Alaska Vital Statistics, 1975, Health Information Sections, Division of Public Health, Department of Health and Social Services.

Specific Causes of Death. The profile of the leading causes of death in Alaska is somewhat different compared to the national average. The profile of the ten leading causes of death, in terms of percentage of total number, for Alaska and the U.S. is presented in Table V-6. Accidents account for the greatest percentage of deaths in Alaska, 27% in 1975 compared to 5% for the national average. Deaths due to suicide, alcoholism and homicide similarly account for a disproportionate share of the total compared with the national profile. Alcoholism and homicide, ranked as eight and ten in Alaska, are not even with the top leading ten causes for the U.S.

In addition, Alaska's pattern of leading causes of death differs in the relatively low percentage of deaths due to heart diseases and malignant neoplasms.

TABLE V-6  
TEN LEADING CAUSES OF DEATH, ALASKA AND THE U.S., 1975  
(Percent of Deaths)

| Alaska                      | Percent of Total | United States             | Percent of Total |
|-----------------------------|------------------|---------------------------|------------------|
| 1 Accidents                 | 27%              | Heart Diseases            | 38%              |
| 2 Heart Diseases            | 17%              | Malignant Neoplasms       | 20%              |
| 3 Malignant Neoplasms       | 9%               | Cerebrovascular Diseases  | 10%              |
| 4 Suicide                   | 5%               | Accidents                 | 5%               |
| 5 Cerebrovascular Disease   | 5%               | Influenza and Pneumonia   | 3%               |
| 6 Diseases of Early Infancy | 3%               | Diabetes                  | 2%               |
| 7 Cirrhosis of Liver        | 3%               | Cirrhosis of Liver        | 2%               |
| 8 Alcoholism                | 3%               | Arteriosclerosis          | 2%               |
| 9 Influenza and Pneumonia   | 3%               | Diseases of Early Infancy | 2%               |
| 10 Homicide                 | 2%               | Suicide                   | 1%               |
| Remainder                   | 23%              | Remainder                 | 16%              |
|                             | 100%             |                           | 100%             |

Source: Alaska Vital Statistics, 1975. Health Information Section, Division of Public Health, Department of Health and Social Services.

#### Alcohol-Related Mortality in Alaska: Specific Causes

The very brief summary of available research findings presented in a previous section indicated the relationship between alcoholism or alcohol abuse or heavy drinking and excess deaths due to such specific causes as cirrhosis of the liver, heart disease and hypertension; in addition, excess deaths due to accidents, homicide, suicide, and alcoholism are known to be related to consumption of beverage alcohol. Each of these specific causes of death are examined in relation to consumption of alcohol for Alaska in the following sections. It is interesting to note, though, the relatively high correspondence

between the increased mortality due to specific causes of death considered most closely associated with abusive consumption and the ten leading causes of death for Alaska.

Violent Deaths: Accidents

Historically, the most common cause of the selected causes of death shown in Table V-7, has been death by accident, from 1963 to 1975. Comparison of Alaska's accident mortality rate with that of the United States shows also that the Alaska rate has been--and remains--more than twice as high as the nation's, from 1959 to 1975. With the exception of one year, 1962, Alaska's accidental death rate has averaged over 118 deaths per 100,000 population since 1959, ranging from approximately 99 to 168 per 100,000 population. During the same period the overall average for the United States ranged from about 42 to 58 deaths per 100,000 population, but evidenced a definite declining trend. The trend for Alaska is mostly consistently high, but with wide fluctuation, as can be seen in Figure V-1.

Given the fact, then, that accidents are the number one cause of deaths in Alaska, and occur at a rate more than twice that of the rest of the nation, the extent of alcohol's involvement in accidents becomes an important question. To date, the most comprehensive reply has been a 17-month study of accidental deaths by the Anchorage Coroner-Public Administrator, completed in 1972. In that case, study of alcohol's possible involvement in 267 coroner's cases--all violent deaths and deaths unattended by a physician, including accidents, homicides, suicides, drownings, natural causes, and fire--found 115 cases, or 43% of the total, to be directly due to alcohol or its effects.<sup>20</sup>

TABLE V-7

NUMBER AND RATES OF SELECTED CAUSES OF DEATH, ALASKA AND THE NATION, 1959-1975

|                                | 1959  | 1960  | 1961  | 1962  | 1963  | 1964             | 1965  | 1966  | 1967  | 1968  | 1969  | 1970  | 1971  | 1972  | 1973             | 1974             | 1975             |
|--------------------------------|-------|-------|-------|-------|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|------------------|------------------|
| Accidents                      | 257   | 243   | 255   | 240   | 266   | 425 <sup>a</sup> | 303   | 376   | 323   | 353   | 392   | 353   | 400   | 338   | 354              | 410              | 419              |
| Alaska Rate                    | 116.8 | 107.5 | 113.8 | 98.8  | 114.4 | 167.9            | 114.3 | 138.2 | 116.2 | 123.9 | 132.9 | 116.9 | 128.6 | 104.9 | 107.3            | 116.8            | 100.5            |
| U.S. Rate                      | 52.0  | 52.3  | 50.4  | 52.3  | 53.4  | 54.3             | 55.7  | 58.5  | 57.2  | 57.5  | 57.6  | 56.4  | 55.0  | 55.4  | 55.2             | 49.5             | 41.7             |
| Homicides                      | 11    | 20    | 24    | 11    | 22    | 26               | 24    | 26    | 26    | 26    | 24    | 36    | 26    | 31    | 26               | 33               | 26               |
| Alaska Rate                    | 4.9   | 8.8   | 10.1  | 4.5   | 8.8   | 10.2             | 9.1   | 9.6   | 9.4   | 9.1   | 8.1   | 11.9  | 8.4   | 9.6   | 7.9              | 9.4              | 6.4              |
| U.S. Rate                      | 4.6   | 4.7   | 4.7   | 4.8   | 4.9   | 5.1              | 5.5   | 5.9   | 6.8   | 7.3   | 7.7   | 8.3   | 9.1   | 9.4   | 9.8              | 10.2             | 10.2             |
| Suicides                       | 35    | 31    | 38    | 37    | 35    | 45               | 47    | 46    | 43    | 37    | 22    | 40    | 48    | 36    | 56               | 43               | 74               |
| Alaska Rate                    | 15.9  | 13.7  | 16.1  | 15.2  | 14.0  | 17.6             | 17.8  | 16.9  | 15.5  | 13.0  | 7.5   | 13.2  | 15.4  | 11.2  | 16.9             | 12.2             | 18.3             |
| U.S. Rate                      | 10.6  | 10.6  | 10.4  | 10.9  | 11.0  | 10.8             | 11.1  | 10.9  | 10.8  | 10.7  | 11.1  | 11.6  | 11.7  | 12.0  | 12.0             | 12.1             | 12.6             |
| Alcoholism                     | 10    | 16    | 16    | 10    | 12    | 18               | 17    | 15    | 20    | 27    | 25    | 33    | 45    | 38    | 34               | 35               | 46               |
| Alaska Rate                    | 4.5   | 7.4   | 6.8   | 4.1   | 4.8   | 7.0              | 6.4   | 5.5   | 7.2   | 9.7   | 8.8   | 10.9  | 14.5  | 11.0  | 10.3             | 10.0             | 11.4             |
| U.S. Rate                      | 1.2   | 1.3   | 1.3   | 1.2   | 1.3   | 1.3              | 1.4   | 1.6   | 1.6   | 2.0   | 2.0   | 2.1   | 2.1   | 2.1   | 2.2 <sup>b</sup> | 2.2 <sup>b</sup> | 2.2 <sup>b</sup> |
| Liver Cirrhosis                | 11    | 14    | 9     | 24    | 20    | 22               | 19    | 21    | 15    | 26    | 23    | 34    | 42    | 38    | 26               | 37               | 49               |
| Alaska Rate                    | 5.0   | 6.2   | 3.8   | 9.9   | 8.0   | 8.7              | 7.2   | 7.7   | 5.4   | 9.1   | 7.8   | 11.2  | 13.5  | 11.8  | 7.9              | 10.6             | 12.1             |
| U.S. Rate                      | 10.9  | 11.3  | 11.3  | 11.7  | 16.9  | 12.1             | 12.8  | 13.6  | 14.1  | 14.6  | 14.8  | 15.5  | 15.4  | 15.6  | 15.9             | 15.8             | 14.7             |
| Heart Disease and Hypertension | 213   | 267   | 243   | 268   | 245   | 277              | 262   | 273   | 214   | 231   | 204   | 264   | 269   | 319   | 285              | 294              | 262              |
| Alaska Rate                    | 96.8  | 118.1 | 102.5 | 110.3 | 98.0  | 109.5            | 90.9  | 100.4 | 94.9  | 81.1  | 69.2  | 87.3  | 86.5  | 99.0  | 86.3             | 83.7             | 64.7             |
| U.S. Rate                      | 363.2 | 369.0 | 362.4 | 370.1 | 375.2 | 365.7            | 367.4 | 372.0 | 364.5 | 372.6 | 366.1 | 362.0 | 360.5 | 363.0 | 360.8            | 349.2            | 358.4            |

<sup>a</sup>Includes 113 victims of March 27, 1964 earthquake  
<sup>b</sup>Estimated--no information available

Sources: Vital Statistics of the United States, annuals (1959-1973); Vital Statistics Monthly Reports, 1973-1976; Alaska Vital Statistics, 1974 and 1975.

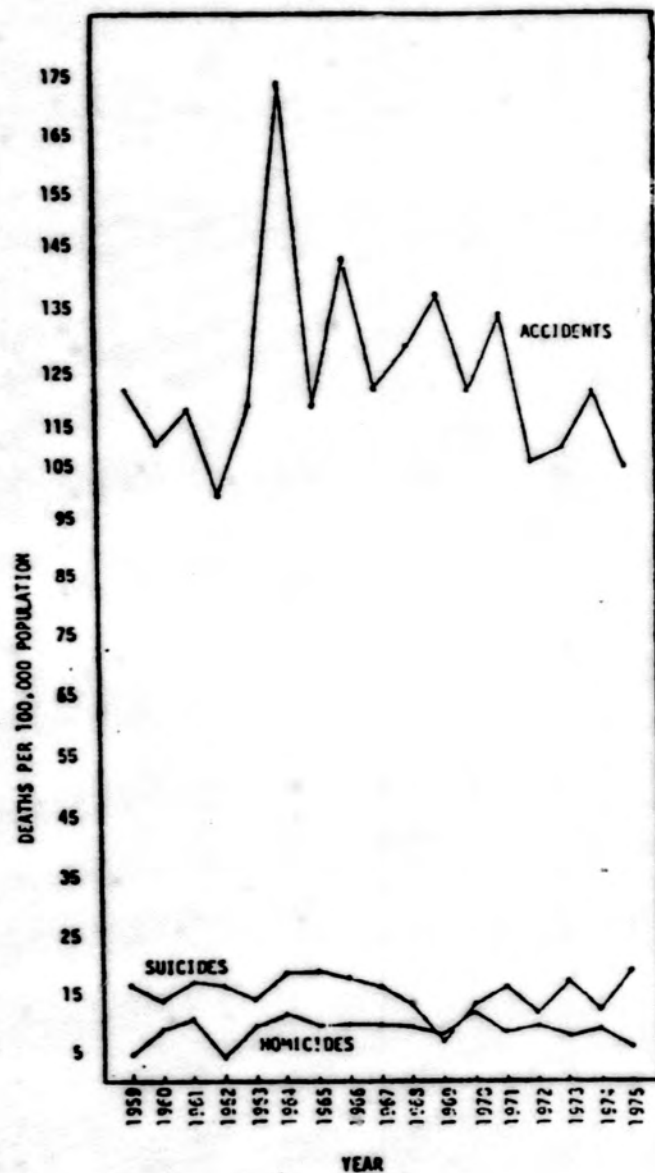


FIGURE V-1 Rate of death for accidents, suicides, and homicides, Alaska, 1959-1975 (per 100,000 population)

Source: See Table V-7 for rates.

Keeping the above in mind, it becomes possible to look at Alaska's accidental deaths from yet another perspective: transportation. As Table V-8 shows, the most common forms of accidents in Alaska during 1959-1966\* were water transportation (16.8% of all accidents), motor vehicle (16.0%), and aircraft (15.7%). Also worth noting, however, were drownings: if water transport drownings over the period are combined with non-transport drownings, the sum represents some 24.6% of all accidents. Thus, it can be seen that during 1959-1966 these four categories--all very characteristic of Alaska and its peculiar lifestyle--accounted for nearly 60%\*\* of all these accidents. Table V-8 also shows that these overall patterns had not changed significantly by 1974 and 1975. However, the percentage of accidental deaths due to motor vehicle crashes increased considerably during 1974 and 1975, compared to the 1959 to 1966 average of about 16% of the total number of accidental deaths. During 1974 and 1975, the percentage of motor vehicle deaths increased to about 18% and 28%. Investigation of motor vehicle fatalities found that 46% of all fatalities in 1975 involved alcohol. (See Part VII, Alcohol and Traffic Safety for more complete discussion).

The only information available regarding the extent of alcohol involvement in accidental deaths in Alaska is the Anchorage Coroner's study, 1972, showing that 43% of the accidental deaths investigated were alcohol-related, and the motor vehicle fatality files, 1975, showing that 46% of the fatalities involved alcohol. Obviously, generalizations about the extent of alcohol involvement in all accidental deaths cannot be

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\*Breakdown of accidental deaths by type for 1967 to 1974 was not available.

\*\*Non-redundant tally equals 58.4%.

TABLE V-8  
ALASKAN ACCIDENTAL DEATHS AND DEATH RATES FROM SELECTED CAUSES BY YEAR  
1959-1966 and 1974 and 1975\*

|                          | 1959    | 1960    | 1961    | 1962    | 1963    | 1964    | 1965    | 1966    | Total<br>Deaths<br>1959-66 | %<br>of all<br>Deaths<br>1959-66 | 1974    | %     | 1975    | %      |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------------|----------------------------------|---------|-------|---------|--------|
| All Accidents--Total     | 257     | 243     | 268     | 240     | 286     | 312**   | 303     | 376     | 2,285                      | 100%                             | 410     |       | 419     |        |
| Transport Accidents--    |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |        |
| Total                    | 126     | 108     | 102     | 126     | 145     | 161     | 168     | 192     | 1,128                      | 49.4%                            | 155     |       | 238     |        |
| Railway and Other        |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |        |
| Road Accidents           | 3       | 2       | 2       | -       | 3       | 1       | 3       | 4       | 18                         | 0.9%                             | -       |       |         |        |
| Motor Vehicle            | 34      | 43      | 26      | 39      | 45      | 47      | 57      | 74      | 365                        | 16.0%                            | 72      | 17.5% | 119     | 28.4%  |
| Water Transport--        |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |        |
| Drowning                 | 29      | 27      | 44      | 33      | 51      | 46      | 55      | 52      | 337                        | 14.7%                            | 29      | 7.1%  | 49      | 11.7%  |
| Other                    | 4       | 2       | 4       | 6       | 8       | 9       | 12      | 4       | 49                         | 2.1%                             | 2       | 0.5%  | 2       | 0.5%   |
| Aircraft                 | 56      | 34      | 26      | 48      | 38      | 58      | 41      | 53      | 359                        | 15.7%                            | 52      | 12.7% | 68      | 16.2%  |
| Non-Transport Accidents  |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |        |
| Total                    | 131     | 135     | 166     | 114     | 141     | 151*    | 135     | 184     | 1,157                      | 50.6%                            | 255     |       | 181     |        |
| Poisoning                | 12      | 11      | 12      | 8       | 13      | 10      | 17      | 8       | 91                         | 4.0%                             | 14      | 3.4%  | 21      | 5.0%   |
| Falls                    | 10      | 10      | 11      | 3       | 15      | 6       | 7       | 11      | 73                         | 3.2%                             | 22      | 5.4%  | 12      | 2.9%   |
| Fire                     | 18      | 19      | 46      | 27      | 30      | 34      | 21      | 68      | 265                        | 11.6%                            | 37      | 9.0%  | 22      | 5.3%   |
| Firearms                 | 16      | 14      | 15      | 12      | 12      | 15      | 11      | 15      | 110                        | 4.8%                             | 29      | 7.1%  | 16      | 3.8%   |
| Drowning (non-transport) | 25      | 32      | 22      | 22      | 26      | 32      | 38      | 30      | 227                        | 9.9%                             | 48      | 11.7% | 37      | 8.8%   |
| Excessive Cold           | 3       | 4       | 5       | 2       | 7       | 9       | 6       | 6       | 42                         | 1.8%                             | 4       | 1.0%  | 22      | 5.2%   |
| Other                    | 47      | 45      | 53      | 40      | 38      | 45*     | 35      | 46      | 349                        | 15.3%                            | 101     | 24.6% | 51      | 12.2%  |
| Total                    |         |         |         |         |         |         |         |         |                            |                                  | 100.0%  |       |         | 100.0% |
| Estimated Population     | 224,000 | 228,200 | 235,500 | 242,800 | 250,000 | 255,800 | 264,600 | 272,000 |                            |                                  | 353,000 |       | 434,000 |        |

Source: 1959-1966: Statistical Services Report, Dept. of Health and Welfare. 1974-1975: Alaska Vital Statistics, 1974 and 1975, Health Information Services, Division of Public Health, Department of Health and Social Services.

\*Breakdown of accidental deaths by type for years 1967-1974 is not available.

\*\*Includes victims of March 27, 1964 earthquake (113)

TABLE V-8  
ALASKAN ACCIDENTAL DEATHS AND DEATH RATES FROM SELECTED CAUSES BY YEAR  
1959-1966 and 1974 and 1975\*

|                          | 1959    | 1960    | 1961    | 1962    | 1963    | 1964    | 1965    | 1966    | Total<br>Deaths<br>1959-66 | %<br>of all<br>Deaths<br>1959-66 | 1974    | %     | 1975    | %     |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------------|----------------------------------|---------|-------|---------|-------|
| All Accidents--Total     | 257     | 243     | 268     | 240     | 286     | 312**   | 303     | 376     | 2,285                      | 100%                             | 410     |       | 419     |       |
| Transport Accidents--    |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |       |
| Total                    | 126     | 108     | 102     | 126     | 145     | 161     | 168     | 192     | 1,128                      | 49.4%                            | 155     |       | 238     |       |
| Railway and Other        |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |       |
| Road Accidents           | 3       | 2       | 2       | -       | 3       | 1       | 3       | 4       | 18                         | 0.9%                             | -       |       |         |       |
| Motor Vehicle            | 34      | 43      | 26      | 39      | 45      | 47      | 57      | 74      | 365                        | 16.0%                            | 72      | 17.5% | 119     | 28.4% |
| Water Transport--        |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |       |
| Drowning                 | 29      | 27      | 44      | 33      | 51      | 46      | 55      | 52      | 337                        | 14.7%                            | 29      | 7.1%  | 49      | 11.7% |
| Other                    | 4       | 2       | 4       | 6       | 8       | 9       | 12      | 4       | 49                         | 2.1%                             | 2       | 0.5%  | 2       | 0.5%  |
| Aircraft                 | 56      | 34      | 26      | 48      | 38      | 58      | 41      | 53      | 359                        | 15.7%                            | 52      | 12.7% | 68      | 16.2% |
| Non-Transport Accidents  |         |         |         |         |         |         |         |         |                            |                                  |         |       |         |       |
| Total                    | 131     | 135     | 166     | 114     | 141     | 151*    | 135     | 184     | 1,157                      | 50.6%                            | 255     |       | 181     |       |
| Poisoning                | 12      | 11      | 12      | 8       | 13      | 10      | 17      | 8       | 91                         | 4.0%                             | 14      | 3.4%  | 21      | 5.0%  |
| Falls                    | 10      | 10      | 11      | 3       | 15      | 6       | 7       | 11      | 73                         | 3.2%                             | 22      | 5.4%  | 12      | 2.9%  |
| Fire                     | 18      | 19      | 46      | 27      | 30      | 34      | 21      | 68      | 265                        | 11.6%                            | 37      | 9.0%  | 22      | 5.3%  |
| Firearms                 | 16      | 14      | 15      | 12      | 12      | 15      | 11      | 15      | 110                        | 4.8%                             | 29      | 7.1%  | 16      | 3.8%  |
| Drowning (non-transport) | 25      | 32      | 22      | 22      | 26      | 32      | 38      | 30      | 227                        | 9.9%                             | 48      | 11.7% | 37      | 8.8%  |
| Excessive Cold           | 3       | 4       | 5       | 2       | 7       | 9       | 6       | 6       | 42                         | 1.8%                             | 4       | 1.0%  | 22      | 5.2%  |
| Other                    | 47      | 45      | 53      | 40      | 38      | 45*     | 35      | 46      | 349                        | 15.3%                            | 101     | 24.6% | 51      | 12.2% |
| Total                    |         |         |         |         |         |         |         |         |                            |                                  | 100.0%  |       | 100.0%  |       |
| Estimated Population     | 224,000 | 228,200 | 235,500 | 242,800 | 250,000 | 255,800 | 264,600 | 272,000 |                            |                                  | 353,000 |       | 404,000 |       |

Source: 1959-1966: Statistical Services Report, Dept. of Health and Welfare. 1974-1975: Alaska Vital Statistics, 1974 and 1975, Health Information Services, Division of Public Health, Department of Health and Social Services.

\*Breakdown of accidental deaths by type for years 1967-1974 is not available.

\*\*Includes victims of March 27, 1964 earthquake (113)

made on the basis of this information alone, but the interrelation of alcohol abuse, transportation patterns and accidental deaths in the state is substantial, and clearly warrants intense further study.

Examination of the distribution of accidental deaths according to age shows a "high risk" population to be in the 15 to 34 age group. (See Table V-9.) During 1975, 217 of the 419 accidental deaths, or 50% of all accidental deaths were accounted for by the 15 to 34 age group; about 30% of the total deaths were in the 15 to 24 group. This general bracket also corresponds with the highest risk population of drinkers with problems as determined for Alaska in Part II of the Volume.

Finally, it can be noted that Alaska Natives, who in 1974 constituted approximately 17% of the state's total population were victims in over 30% (125 of 410) of all accidental deaths in 1974 and almost 32% (134 of 419) in 1975. (See Table V-10.)

#### Violent Deaths: Homicide and Suicide

It is characteristic of Alaska that violent deaths, including homicide and suicide, tend to occur more frequently than in the nation as a whole. This is especially true for suicides, and--until recent years, anyway--generally true for homicides, as well.

For example, the suicide rate in Alaska has been relatively constant during the period from 1959 to 1975. (See Figure V-1.) It has averaged almost 15 deaths per 100,000 population over the 17 year period, and reached a high point at 18.3 in 1975. (See Table V-7.) This compares to an increasing U.S. rate that has changed from 10.6 per 100,000 in 1959 to 12.6 in 1975.

With respect to homicides, however, Alaskan and national death rates show a different relationship. While the homicide mortality rate in Alaska in 1960 was originally much higher than in the nation

as a whole (8.8 compared to 4.7 per 100,000 population), it has risen relatively little since then. (See Table V-7 and Figure V-1.) The national rate has jumped from 4.7 per 100,000 population in 1960 to 10.2 during 1975 (See Table V-7). Thus, the difference between the Alaskan and national rate has decreased, relative to the increasing national average.

Concerning the role of alcoholism or alcohol abuse in these categories of Alaskan violent deaths, national and international studies conducted by Schmidt and de Lint, found suicide to be one of the more frequent causes of death among chronic heavy drinkers; also, among suicide cases, there tends to be a high proportion of alcoholics.<sup>21</sup> Other studies, pertaining to suicides among Alaskan Eskimos, further echo the involvement of alcohol.<sup>22</sup> Considering the relatively high number and rate of suicides in Alaska, the role of alcohol--though unspecifiable--is presumed significant. Similarly, no reliable information about the extent of alcohol involvement for homicides exists for Alaska. A generally accepted national estimate indicates alcohol involvement in approximately 64% of homicide cases.<sup>23</sup>

Concerning "risk populations" for Alaska's violent deaths rates, Table V-9 shows that in 1975 the 15-34 age group was most vulnerable, with respect to both suicide mortality (52 of 74 deaths, or 70% of all suicides) as well as homicide mortality (17 of 26 deaths, or 65% of all homicides).

Finally, it can be noted that Alaska Natives, who represented approximately 17% of the state's 1974 population appear to be victims of both suicide and homicide to a very disproportionate high degree. For example, Natives were involved in 47% of the state's suicides in 1974 (see Table V-16), and 43% in 1975. Similarly, they were the victims of homicides in 48% of all cases in 1974, and in 38% during 1975.

TABLE V-9  
RESIDENT DEATHS BY CAUSE BY AGE GROUP, ALASKA, 1975

| Cause of Death                 | Under 5    | 5-14      | 15-24     | 25-34     | 35-44     | 45-54     | 55-64      | 65+        | TOTAL      |
|--------------------------------|------------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|
| Heart Disease and Hypertension | 4          | 1         | 1         | 5         | 17        | 47        | 75         | 112        | 262        |
| Cirrhosis of Liver             | 0          | 0         | 1         | 5         | 7         | 16        | 15         | 5          | 49         |
| Accidents                      | 17         | 27        | 126       | 91        | 55        | 53        | 26         | 24         | 419        |
| Suicides                       | 0          | 0         | 32        | 20        | 12        | 0         | 9          | 1          | 74         |
| Homicides                      | 0          | 0         | 6         | 11        | 6         | 1         | 2          | 0          | 26         |
| Alcoholism                     | 0          | 0         | 2         | 3         | 12        | 16        | 11         | 3          | 46         |
| All Other Causes               | <u>115</u> | <u>10</u> | <u>12</u> | <u>16</u> | <u>29</u> | <u>92</u> | <u>116</u> | <u>256</u> | <u>646</u> |
| TOTAL                          | 136        | 38        | 180       | 151       | 138       | 233       | 245        | 401        | 1,522      |

Source: Alaska Vital Statistics, 1975. Health Information Services, Division of Public Health, Department of Health and Social Services.

### Alcoholism

A major indicator of alcohol's involvement in Alaska's mortality rates, valuable for its specificity (alcoholism deaths being 100% alcohol-related), is the extremely high rate of deaths due directly to alcoholism (see Table V-7). Traditionally four to five times as high as the nationwide rate, Alaska's alcoholism mortality rate has dramatically increased by 153% from 1959 to 1975, 4.5 deaths per 100,000 population compared to 11.4 in 1975. (See Table V-7 and Figure V-2.) The national rate has also increased during the same period, but not to the same extent, from 1.2 deaths per 100,000 to 2.2, an increase of 83%. In 1959 the alcoholism mortality rate for Alaska, compared to the U.S., was 275% greater, in 1975, it had jumped to 418% greater than the national average.

With regard to "high risk" populations, Table V-9 shows that fully 85% (39 of 46 deaths) of all deaths due to alcoholism in Alaska during 1975 occurred in the 35-64 age group, with almost 35% of them (16 of 46) occurring in the 45-54 bracket.

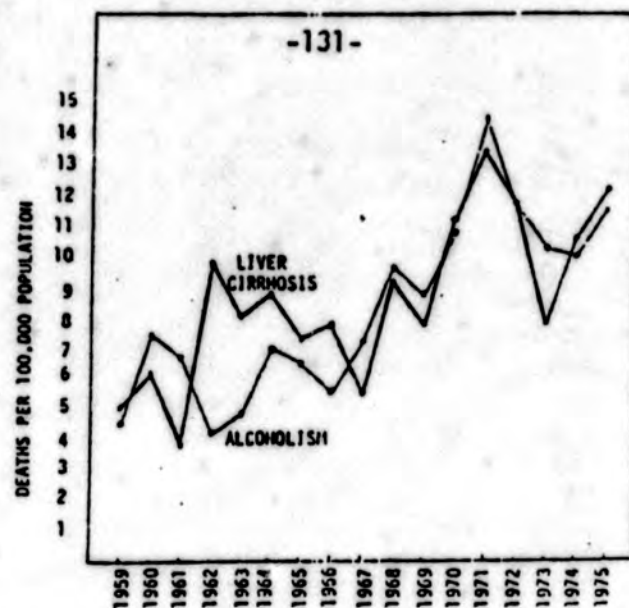


FIGURE V-2 Rate of death for liver cirrhosis and alcoholism deaths, 1959-1975 (per 100,000 population)

Source: See Table V-7 for rates.

Finally, it should be noted that the alcoholism mortality rate in Alaska--like virtually all other mortality rates in the state--is tremendously higher for Natives than for non-Natives. In Table V-10, for example, it can be seen that Natives (17% of the 1974 population--Table V-10) accounted for some 60% of all deaths (21 of 35) due to alcoholism in 1974, and almost 50% (22 of 46) in 1975.

TABLE V-10

RESIDENT DEATHS IN ALASKA, BY CAUSE AND RACE, 1974-75

| Cause           | 1974  |        |           | 1975  |        |           |
|-----------------|-------|--------|-----------|-------|--------|-----------|
|                 | White | Native | All Races | White | Native | All Races |
| Heart Disease   | 220   | 63     | 294       | 203   | 50     | 262       |
| Liver Cirrhosis | 28    | 9      | 37        | 28    | 19     | 49        |
| Accidents       | 279   | 125    | 410       | 276   | 134    | 419       |
| Suicides        | 22    | 20     | 43        | 39    | 32     | 74        |
| Homicides       | 14    | 16     | 33        | 11    | 10     | 26        |
| Alcoholism      | 14    | 21     | 35        | 24    | 22     | 46        |
| Other Causes    | 410   | 104    | 616       | 446   | 174    | 646       |
| TOTAL           | 987   | 438    | 1,468     | 1,027 | 441    | 1,522     |

Source: Alaska Vital Statistics, 1975. Health Information Services, Division of Public Health, Department of Health and Social Services.

### Cirrhosis of the Liver

Another major indicator of alcohol's impact on Alaskan mortality is the number of deaths due each year to cirrhosis of the liver--a condition often resulting directly from alcoholism and/or alcohol abuse. Deaths due to liver cirrhosis are conventionally used in estimates of prevalence of alcoholics in a population.\*

The absolute number of deaths, as well as the rate of death per 100,000 population, for liver cirrhosis has increased dramatically during the period from 1959 to 1975. Table V-7 shows that the number of liver cirrhosis deaths changed from eleven in 1959, to 49 in 1975, and despite fluctuations represents a real increase as indicated by the changes in rates. The rate of liver cirrhosis deaths increased by over 142% during that time period, 5.0 per 100,000 to 12.1 (Figure V-2).

This increase in the liver cirrhosis mortality rate also corresponds to increases in annual average rate of consumption of beverage alcohol during the same period. The rate of alcohol-related mortality is theoretically linked to the prevalence of alcoholism in a population. According to one major theory, the rate of alcoholism is directly related to level of consumption in a population.\*\* Figure V-3 shows the correspondence between the increases in the mortality rate for liver cirrhosis and increases in average annual consumption of absolute alcohol. The pathological relationship between excessive drinking and liver cirrhosis is well established and direct. The relationship between increasing average

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\*See Part II, PREVALENCE, for a more complete discussion.

\*\*See Part IV, CONSUMPTION.

consumption in Alaska and increasing mortality due to liver cirrhosis is clearly demonstrated in Figure V-3.

In terms of a "high risk" population, it can be seen from Table V-9 that in 1975 approximately 63% (31 of 49) of all liver cirrhosis deaths occurred in the 45-64 age group. Table V-10 adds to this the fact that Natives, only 17% of the 1974 population accounted for almost 25% (9 of 37) of all cirrhosis deaths in Alaska during 1974, and almost 40% of them (19 of 49) in 1975. Another way of looking at the same data reveals that, while white cirrhosis deaths in 1975 remained the same as in 1974 (28 deaths, each year), Native deaths due to liver cirrhosis almost doubled in the same period, from 9 in 1974 to 19 in 1975 (See Table V-10)--indicative, perhaps, of a shift begun years earlier, due to the progressive nature of the disease.



FIGURE V-3 Annual per capita consumption and cirrhosis deaths per 1000 in the drinking age population, Alaska, 1953-1975.

Source: Consumption figures from Table IV-2, this Volume. Death information compiled from statistics provided by the Health Information Systems Section, Department of Health and Social Services.

### Heart Disease

Next to accidents, heart disease and associated hypertension were the greatest cause of death in Alaska in 1975 (Table V-6); deaths from heart disease accounted for 17% of all deaths in 1975. Alaska's overall 1975 heart disease mortality rate (64.7 per 100,000 population)--albeit the second highest death rate in the state--is still considerably lower than the overall national heart disease rate (358.4 per 100,000). In addition this rate of death has steadily decreased since 1959, similar to the United States trend.

While the direct relationship of alcoholism or alcohol abuse to heart-related mortality is not specifiable, national samplings of alcoholic populations indicate that from 10 to 40 percent of all excess deaths are attributable to cardiovascular disease.<sup>24</sup>

Regarding a "high risk" population and heart disease, Table V-9 illustrates that the greatest risk of death from cardiovascular causes is to persons over age 45; who in 1975 accounted for 89% (234 of 262) of all such deaths. Also predictably, the table shows clearly that the risk of heart-related death increases steadily in proportion to advancing age.

Finally, it can be said that neither Alaskan Natives nor their non-Native counterparts appear to suffer disproportionally high heart disease mortality rates. As Table V-10 shows, Natives accounted for 21% (63 of 294) of all heart-related deaths in 1974, and 19% (50 of 262) in 1975--only slightly higher than their populational proportion. Non-Native Alaskans--approximately 83% of the 1974 population were, correspondingly, slightly low in their heart-related death rate, showing 75% (220 of 294) of all such deaths in 1974, and 77% (203 of 262) in 1975. (See Table V-10.)

#### D. REGIONAL DISTRIBUTION OF MORTALITY IN ALASKA (1974)

In the foregoing sections, Alaska's various mortality rates have been reviewed with regard to their relationship with alcoholism and alcohol abuse. Further, the role played by the state's exceptionally high overall level of alcohol consumption has been viewed as central to any understanding of that relationship. Given this, it will be helpful before concluding to briefly look at the geographic distribution of mortality in the state, as a means of identifying those areas and subpopulations most at risk with respect to alcohol-related excess mortality.

The geographical and racial (Native/non-Native) distribution of deaths in 1974\* will be presented by Native Regional Corporation and, alternatively, by Health Systems Agencies (health planning areas). Geographically the state is divided into twelve Native Regional Corporations; groups of these regions cluster to form the boundaries of three Health Systems Agencies (HSA). Accordingly the three HSA's and the component Native Corporation regions are: Northern Region HSA--Arctic Slope, Doyon, and Nana; Southcentral Region HSA--Ahtna, Chugach, Cook Inlet, Bristol Bay, Koniag, Aleut, Calista, and Bering Straits; and, the Southeast HSA--Sealaska. (See Figures V-4 and V-5.)

#### General Mortality: Findings

Table V-11 shows the distribution of deaths for Native and non-Natives, for each Native Corporation Region, along with rates and percentages for selected categories.

One evident pattern is the much greater rate of death in isolated and less populous areas. There were 1,468 deaths (all causes)

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\*1975 Mortality data were not available in time for compilation of regional analysis.

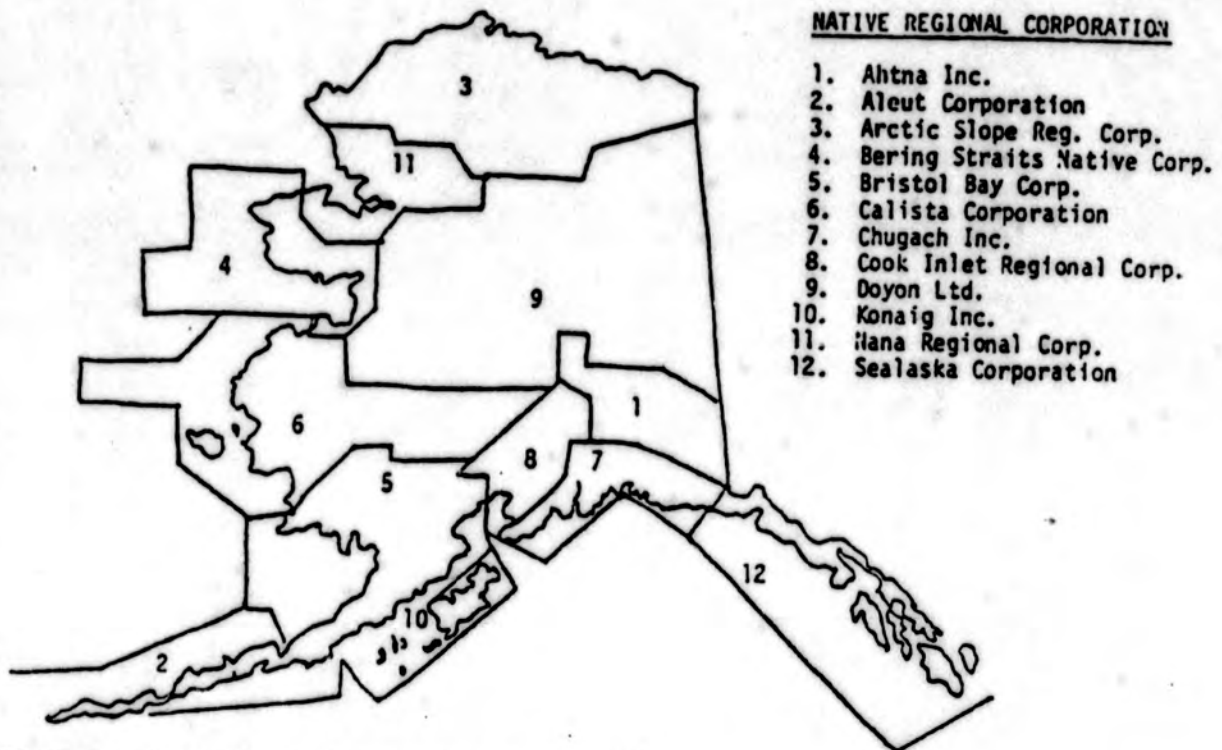


FIGURE V-4 Native Regional Corporation boundaries

Source: Alaska Vital Statistics, 1975, Health Information Services Section, Department of Health and Social Services.

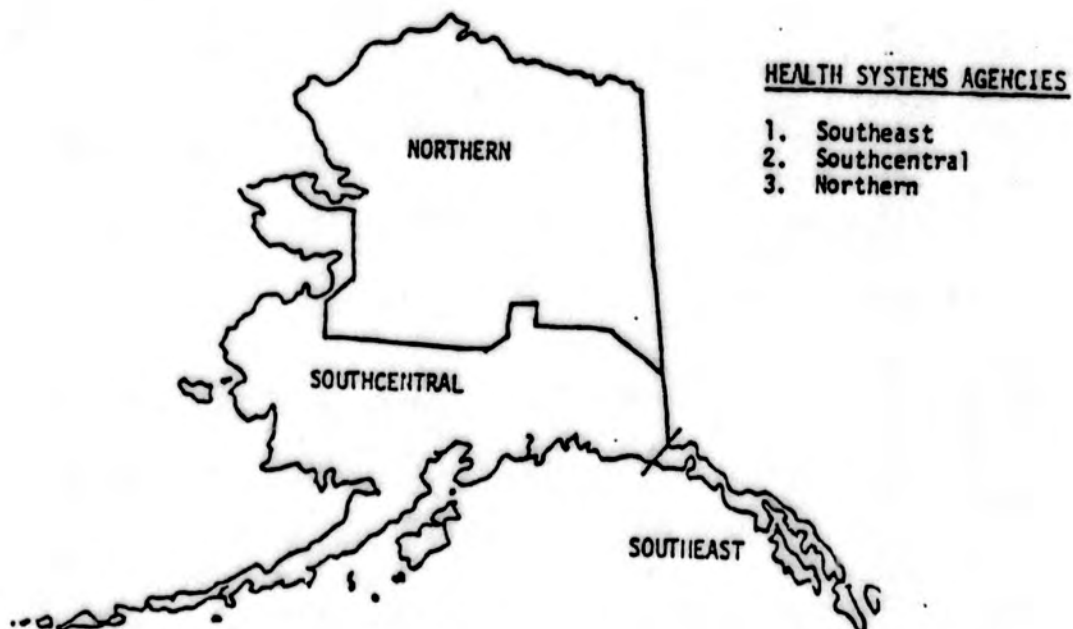


FIGURE V-5 Health Systems Agency boundaries

Source: Ibid.

in Alaska in 1974, resulting in a statewide overall death rate of 4.16 deaths per 1,000 population.\* For nine of the twelve regional corporations, regional death rates exceeded the statewide rate; regional rates for three regions were below the state average. Regional Corporations with deaths per 1,000 population above the state average of 4.16 were: Koniag--6.81, Chugach--6.64, Calista--5.60, Sealaska--5.26, Bristol Bay--5.14, Bering Strait--4.86, Arctic Slope--4.70, Nana--4.50, Ahtna--4.34. The three Native Regional Corporations with death rates below the state average were Doyon--3.8, Cook Inlet--3.53, and Aleut--3.39. If the populations of the regions are considered, however, it results that the nine regions with death rates higher than the statewide average (4.16) had a 1974 total population of only 109,312 people (31% of total 1974 population). The three regions with lower death rates represented a combined 1974 total of 243,985 people (68% of total). Thus, it is strongly evident that death rates in 1974 were highest in the less densely populated areas of Alaska, and lowest in the more populous areas.

Another pattern of overall Alaskan mortality is shown in the extremely high rate of death, statewide, among Natives (7.36 deaths per 1,000)--more than twice the 1974 rate for non-Natives (3.51). As Table V-11 shows, Native death rates in 1974 ranged as high as 11.59 per 1,000 in Aleut Native Corporation, almost three times the overall state death rate (4.16). Even Ahtna Native Corporation, it can be seen, with the lowest Native death rate of all the corporations (3.68), was still higher than the statewide average for non-Native (3.51 per 1,000).

Combining the twelve regional corporations into the recently established three health systems agencies--Northern, Southcentral, and Southeastern Regions--produces yet another set of mortality patterns.

\* Total population of Alaska in 1974 was estimated to be 353,297 of whom 59,536 were Natives and 293,761 non-Natives.

TABLE Y-1

RESIDENTS BY CAUSE BY NATIVE REGIONAL CORPORATION (GROUPED BY HEALTH SYSTEMS AGENCIES) BY RACE 1974

| Health Systems Agency<br>Native Corporation<br>Region     | Arctic<br>Slope | Southcentral    |               |                |                |                           |                         |                  |                  |                        |                 | South-<br>Eastern | Total<br>Native<br>Subtotals | Total<br>Non-Native<br>Subtotals | State<br>Totals |
|-----------------------------------------------------------|-----------------|-----------------|---------------|----------------|----------------|---------------------------|-------------------------|------------------|------------------|------------------------|-----------------|-------------------|------------------------------|----------------------------------|-----------------|
|                                                           |                 | Yukon<br>Dayton | Yukon<br>Nana | Yukon<br>Ahtna | Yukon<br>Aleut | Yukon<br>Bering<br>Strait | Yukon<br>Bristol<br>Bay | Yukon<br>Calista | Yukon<br>Chupach | Yukon<br>Cook<br>Inlet | Yukon<br>Koniag | Yukon<br>Sealaska |                              |                                  |                 |
| Total Population <sup>a</sup>                             | 5,939           | 68,416          | 4,414         | 2,534          | 7,384          | 9,468                     | 6,739                   | 14,195           | 8,776            | 169,185                | 9,246           | 50,770            |                              |                                  | 353,297         |
| Native Population <sup>a</sup>                            | 2,939           | 7,651           | 3,121         | 544            | 1,725          | 4,725                     | 3,854                   | 11,773           | 1,264            | 8,432                  | 2,310           | 9,405             | 59,536                       | 293,761                          | 59,536          |
| Non-Native Population <sup>a</sup>                        | 3,007           | 60,515          | 723           | 1,990          | 5,659          | 4,743                     | 2,172                   | 2,332            | 5,507            | 159,243                | 6,936           | 40,862            |                              |                                  | 293,761         |
| Deaths by Corporation <sup>b</sup><br>(Native/Non-Native) | 28<br>28        | 260<br>90 170   | 20<br>16 4    | 11<br>2 9      | 25<br>20 5     | 46<br>41 5                | 31<br>24 7              | 79<br>71 8       | 45<br>4 39       | 593<br>54 539          | 63<br>14 49     | 267<br>72 195     | 438<br>325                   | 1,039<br>(76%)                   | 1,468<br>(100%) |
| Death Rate (per 1000)                                     |                 |                 |               |                |                |                           |                         |                  |                  |                        |                 |                   |                              |                                  |                 |
| Total Population                                          | 4.71            | 3.80            | 4.50          | 4.34           | 3.39           | 4.86                      | 5.14                    | 5.69             | 6.64             | 3.53                   | 6.81            | 5.26              |                              |                                  | 4.16            |
| Native                                                    | 4.56            | 11.41           | 4.30          | 3.68           | 11.59          | 8.68                      | 11.05                   | 6.06             | 4.73             | 6.04                   | 6.36            | 7.27              |                              | 3.51                             |                 |
| Non-Native                                                | 0.00            | 2.81            | 5.53          | 4.52           | 0.88           | 1.05                      | 3.22                    | 3.36             | 7.00             | 3.38                   | 7.06            | 4.74              | 7.36                         |                                  |                 |
| Cause of Death<br>(Native/Non-Native)                     |                 |                 |               |                |                |                           |                         |                  |                  |                        |                 |                   |                              |                                  |                 |
| Tuberculosis                                              |                 | 2               | 1             |                |                | 1                         |                         | 2                |                  | 2                      |                 |                   | 8                            |                                  | 8               |
| Other Infectious                                          |                 | 1               | 1             |                |                |                           |                         | 1                |                  | 1                      |                 |                   | 3                            |                                  | 3               |
| Inflammatory Dis. of CHS                                  |                 | 1               | 1             |                |                |                           | 1                       | 1                |                  | 1                      |                 |                   | 1                            |                                  | 4               |
| Gastritis and Enteritis                                   |                 |                 |               |                |                |                           |                         |                  |                  |                        |                 |                   |                              |                                  | 1               |
| Influenza and Pneumonia                                   | 1               | 5               | 5             |                |                |                           |                         | 5                |                  | 3                      | 1               | 3                 | 15                           | 28                               | 43              |
| Other Respiratory                                         |                 | 2               | 5             | 1              |                | 2                         | 2                       | 2                | 3                | 13                     |                 | 5                 | 9                            | 26                               | 35              |
| Maternal                                                  |                 |                 |               |                |                |                           |                         |                  |                  |                        |                 |                   |                              |                                  |                 |
| Congenital Malform.                                       |                 | 2               | 1             | 1              |                | 1                         | 1                       |                  |                  | 1                      | 11              | 2                 | 8                            | 12                               | 22              |
| Dis. of Early Infancy                                     |                 | 6               | 12            |                | 1              | 5                         | 2                       | 6                |                  | 3                      | 22              | 1                 | 25                           | 42                               | 67              |
| Ill Defined                                               | 1               | 3               | 2             | 1              | 1              | 2                         | 1                       | 3                | 2                | 4                      | 13              | 3                 | 22                           | 27                               | 49              |
| Heart Disease                                             | 2               | 13              | 37            | 1              | 2              | 5                         | 2                       | 5                | 2                | 8                      | 115             | 3                 | 63                           | 231                              | 294             |
| Malignant Neoplasms                                       | 4               | 8               | 10            | 1              | 1              | 6                         | 2                       | 7                | 1                | 5                      | 76              | 4                 | 49                           | 139                              | 179             |
| Diabetes                                                  |                 |                 | 1             |                |                |                           |                         |                  |                  | 8                      |                 | 1                 | 1                            | 14                               | 15              |
| Vascular Lesions of CHS                                   | 1               | 3               | 16            |                | 3              |                           | 1                       | 5                | 1                | 38                     | 1               | 4                 | 19                           | 76                               | 95              |
| General Arteriosclerosis                                  |                 | 1               | 4             |                |                |                           |                         |                  |                  | 1                      |                 |                   | 2                            | 9                                | 10              |
| Chronic Hepatitis                                         |                 |                 |               |                |                |                           |                         |                  |                  |                        |                 |                   |                              | 2                                | 2               |
| Other Degenerative                                        | 3               | 1               | 1             |                |                |                           |                         | 1                |                  | 2                      | 18              | 1                 | 6                            | 24                               | 30              |
| Alcoholism                                                | 1               | 3               | 4             |                | 1              |                           |                         | 3                |                  | 2                      | 7               | 1                 | 21                           | 14                               | 35              |
| Cirrhosis of Liver                                        |                 | 1               | 4             |                | 1              |                           |                         | 1                | 2                | 3                      | 19              | 1                 | 9                            | 28                               | 37              |
| Homicides                                                 | 1               | 4               | 2             | 1              | 1              | 1                         |                         | 3                |                  | 2                      | 11              | 2                 | 16                           | 17                               | 33              |
| Suicides                                                  |                 | 4               | 6             | 6              | 1              | 5                         | 1                       | 2                |                  | 2                      | 8               | 2                 | 23                           | 23                               | 43              |
| All Accidents (sub-total)                                 | 15              | 25              | 43            | 1              | 2              | 12                        | 2                       | 7                | 1                | 14                     | 14              | 5                 | 23                           | 125                              | 245             |
| Motor Vehicles                                            | 1               | 1               | 8             |                | 1              | 4                         | 1                       | 1                |                  | 5                      | 37              | 1                 | 16                           | 54                               | 72              |
| Water Trans.--Drown.                                      |                 | 2               |               |                | 2              | 3                         |                         | 1                |                  | 10                     |                 | 8                 | 11                           | 20                               | 31              |
| Other Drowning                                            | 3               | 4               | 2             | 1              | 1              |                           | 1                       | 5                |                  | 17                     | 2               | 4                 | 18                           | 39                               | 48              |
| Firearms                                                  |                 | 1               | 2             |                |                |                           |                         | 4                |                  | 2                      | 11              | 3                 | 12                           | 17                               | 29              |
| Poison                                                    |                 |                 | 2             |                | 1              |                           |                         | 2                |                  | 8                      |                 | 1                 | 3                            | 12                               | 15              |
| Fire                                                      | 4               | 5               | 2             |                |                |                           | 1                       | 7                |                  | 7                      |                 | 5                 | 23                           | 13                               | 34              |
| Falls                                                     | 1               | 1               | 2             |                |                | 1                         |                         |                  | 1                | 9                      |                 | 2                 | 7                            | 15                               | 27              |
| Aircraft                                                  |                 | 1               | 13            | 1              |                |                           |                         | 1                |                  | 20                     | 1               | 5                 | 2                            | 59                               | 52              |
| Excess Cold                                               | 1               | 1               | 1             |                |                |                           |                         |                  |                  |                        |                 |                   | 1                            | 2                                | 4               |
| Other Accidents                                           | 5               | 9               | 11            | 1              | 1              | 4                         | 1                       | 3                | 3                | 5                      | 22              | 8                 | 29                           | 72                               | 101             |
| All Other                                                 | 1               | 6               | 7             | 2              |                | 2                         | 2                       | 2                |                  | 2                      | 16              | 2                 | 25                           | 27                               | 52              |
| Violent Deaths                                            | 17              | 37              | 54            | 8              | 2              | 19                        | 2                       | 31               | 5                | 33                     | 124             | 6                 | 27                           | 357                              | 554             |
| Percentage of Total<br>Rate (per 1000)                    | 61%             | 41%             | 35%           | 59%            | 59%            | 67%                       | 40%                     | 42%              | 14%              | 43%                    | 15%             | 43%               | 55%                          | 30%                              | 38%             |
| Total Population                                          | 2.86            | 1.40            | 7.75          | 2.37           | 1.63           | 2.22                      | 1.82                    | 2.55             | 1.22             | 1.74                   | 1.57            | 1.85              |                              |                                  | 1.58            |
| Native                                                    | 5.09            | 4.69            | 2.15          | 0.60           | 5.80           | 1.67                      | 2.59                    | 2.64             | 2.16             | 2.57                   | 2.60            | 2.91              | 3.21                         |                                  |                 |
| Non-Native                                                | 0.09            | 0.94            | 2.77          | 1.02           | 0.35           | 0.84                      | 0.44                    | 2.19             | 1.02             | 1.17                   | 1.89            | 1.57              |                              | 1.25                             |                 |

<sup>a</sup> Estimates based on information from Alaska Dept. of Labor, U.S. Census Report, and BIA Native Enrollment Print-out.

Based on the data displayed in Table V-11, a series of findings regarding overall mortality in Alaska in 1974 can be synopsized as follows:

The highest overall mortality rate in 1974 was in the Southeastern Region\* (5.26, compared to statewide average of 4.16 per 1,000), where the highest 1974 non-Native death rate (4.77) was also recorded. Additionally, the estimated population of 9,908 Natives in this health systems agency--representing 2.8% of the total statewide population--accounted for almost 5% of all 1974 deaths (72 of 1,468).

The highest Native death rate in 1974 of the three health systems agencies occurred in the Northern Region\*\* of Alaska, at 9.22 deaths per 1,000 population (compared to overall statewide Native death rate of 7.36). In that health systems agency, Natives--representing 18% of the systems agency population (14,352 of a total 78,799)--accounted for almost 44% of the total service area deaths (134 of 308).

In the Southcentral Region,\*\*\* the only 1974 mortality pattern of note was that Natives, while only 15% of the total systems agency population (35,096 of 223,728), accounted for 26% of the deaths in that agency (232 of 893)--thus repeating the pattern of high Native mortality, relative to death among non-Natives.

In sum, then, analysis of the distribution of mortalities (all causes) in Alaska during 1974 reveals the following patterns:

- overall death rates were highest in the less densely populated regions;

- the rate of death among Natives in the state (7.36 per 1,000 population) was more than twice as high as the rate of death among non-Native (3.51);

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\*Includes only Sealaska Native Corporation.

\*\*Includes Arctic Slope, Doyon, and Nana regional corporations.

\*\*\*Includes Ahtna, Aleut, Bering Strait, Bristol Bay, Calista, Chugach, Cook Inlet, and Koniag regional corporations.

- the highest overall rate of death for a regional corporation occurred in Koniag (6.81), and for a health systems agency in the Southeastern Region (5.36), compared to a statewide rate of 4.61;
- the highest Native death rate occurred in Aleut Regional Corporation (11.59), and in the Northern Region (9.22), compared to a statewide Native death rate of 7.36;
- the highest death rate among non-Natives occurred in Chugach regional corporation (7.08), and in the Southeastern Region (4.77), compared to a statewide non-Native mortality rate of 3.51.

Given the previously mentioned known associations among alcohol consumption, alcoholism and alcohol abuse, and excess mortality, the identification of these distribution patterns and subpopulational rates will hopefully prove useful in future planning and prevention efforts aimed at reducing alcohol-related excess mortality. Major efforts were required to enable the re-compilation of mortality data for the preceding regional distribution of mortality information. Further analysis on the basis of the data for only one year is not justified, particularly in view of the small numbers in each cell.

However, one item is noteworthy, at least in passing. Although the information only covers one year, the number of Native deaths due to alcoholism and liver cirrhosis was disproportionately greater for Natives in the Sealaska Regional Corporation (Southeastern Health Systems Agency) than any other corporation regions or Health Systems Agencies. This region had approximately 16% of the Native population in 1974, yet accounted for 40% of all Native deaths due to these two causes. Further, 17% of all Native deaths in the Southeast HSA were accounted for by alcoholism and liver cirrhosis, compared to 4% and 6% for the Northern and Southcentral HSA's.

#### E. SUMMARY

The present discussion of mortality in Alaska has been undertaken to focus attention on the relationship between alcohol consumption and excess mortality due to alcoholism and alcohol abuse. As stated at the beginning, the specific purposes in mind were to identify that excess mortality as it occurs in Alaska, to delineate its characteristics across a variety of mortality categories, and to understand its relationship to the statewide (and behind that, both the national and international) background of alcohol consumption.

What has been obtained by this effort, is best described as a sense of context. Without being able to pin-point or specify, it has been possible to generally ascertain and describe the involvement of alcohol consumption in the state's various forms of mortality.

This has been possible, most directly of all, through recognition of the definitive contribution that alcohol consumption--or, at least, excessive alcohol consumption--makes to social problems in general, and specifically to mortality. In this respect, the fact that the United States (eighth among nations in alcohol consumption) and especially Alaska (probably first among all states) have extremely high and rapidly increasing annual levels of consumption, indicates that the involvement of alcohol in excess mortality--always significant--is, in Alaska's case, probably tremendous.

This is supported, of course, by the fact that Alaska annual level of per capita alcohol consumption is nearly double that of the nation (4.54 gallons of absolute alcohol per person in 1975, compared to the nation's 2.90). It is also supported by the fact that Alaska's rate of deaths due to violent causes--a mortality category always greatly influenced by alcoholism and alcohol abuse--ranges anywhere from

two to five times the national rate, depending on the specific cause of death. The strength of correspondence between the dramatic and rapidly increasing rates of alcohol consumption and mortality rates for liver cirrhosis and alcoholism, direct indicators of prevalence of alcoholism, confirms the pervasive influence of excess consumption.

Given the linkages, then, that national and international studies have established between alcohol abuse and the various specific-cause categories of mortality, it is evident that Alaska's mortality rates (overall, cause-specific, subpopulational) and patterns (trends, increases, distribution) provide valuable and significant clues to the nature and character of excess mortality in the state due to alcohol.

With respect to the most important specific causes of death, it turns out that violent causes (including cirrhosis)--which presume the greatest extent of indirect alcohol involvement--account for almost 40% of all deaths in the state. A very important consideration in regard to these deaths and one very relevant to Alaska and its peculiar lifestyle is that over 68% of all accidental deaths in the state (1975) were linked to transportation--in one form or another (water transportation, motor vehicles, aircraft, drownings). It is known that at least 46% of all motor vehicle fatalities involved alcohol.

With respect to the human consequences of (alcohol-related) excess mortality, it results that the younger and middle age-ranges of the population suffer the highest rates of death--a fact doubly significant if it is remembered that by 1970 almost 85% of the state-wide population was under age 44, and that the 15-44 age-bracket stands as the very most "at risk" of all age groups in the state with respect to alcoholism and alcohol abuse, and death, particularly violent death.

With respect to such "risk populations" in general, specific-cause mortality data show that two subpopulations in Alaska are characterized by especially high mortality: (1) the young, as mentioned above, and (2) the state's Native population, whose overall rate of death in Alaska is more than twice that of non-Natives (1974).

Finally, the regional distribution of fatalities in Alaska (in 1974) indicated that overall death rates were highest in the less populous regions of the state, but that overall mortality was concentrated in the Southeastern Region. The pattern of mortality distribution also shows that Native death rates were greatest in the Northern Region (least densely populated region in the state), while the highest non-Native rate of mortality occurred in the Southeastern Region.

In the aggregate, these trends and apportionments of mortality in Alaska suggest a confluence with other, known characteristics of the effects and consequences of excessive alcohol consumption in the state. With respect to known patterns and levels of consumption in Alaska, as with respect to the known patterns and characteristics of alcoholics and alcohol abusers, alcohol-related excess mortality in Alaska provides yet one more way of estimating and understanding the overall and specific effects of alcohol on the state, and its various sub-systems. In the parts of this Volume to follow, other such indicators will be adduced and examined in an effort to capture still other possible perspectives on alcohol's impact on Alaska.

FOOTNOTES

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2. Jan de Lint and Wolfgang Schmidt. "Alcoholism and Mortality." In B. Kissen & H. Begleiter (Eds.), The Biology of Alcoholism, Vol. IV, Plenum, New York, 1975.
3. P. Nichols, G. Edwards, and E. Kyle. "A Study of Alcoholics Admitted to Four Hospitals. II. General and Cause Specific Mortality During Follow-up." Quarterly Journal of Studies on Alcohol, 35, 841-855, 1974.
4. de Lint and Schmidt, op. cit.
5. U. S. Department of Health, Education and Welfare: National Institute on Alcohol Abuse and Alcoholism. Second Special Report to the U. S. Congress on Alcohol and Health, from the Secretary of Health, Education and Welfare. (DHEW Publication No. (ADM) 75-212) Washington, D. C.: U.S. Government Printing Office, 1975, pp.80.
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7. U. S. Department of Commerce, Bureau of Census. Statistical Abstracts of the U.S., 1975.
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9. The Economic Cost of Alcohol Abuse and Alcoholism, 1971. Prepared for the National Institute on Alcohol Abuse and Alcoholism by Policy Analysis, Inc. Boston, Mass. 1974.
10. Alcohol and Health, 1974, pp. 97-110.
11. Schmidt and Popham, "Alcohol Consumption and Physical Health", p. 11
12. de Lint and Schmidt, op. cit.
13. *ibid.*
14. *ibid.*
15. *ibid.*

16. Schmidt and Popham, op. cit., p.20.
17. de Lint and Schmidt, op. cit.
18. Alcohol and Health, 1974, pp. 53-75.
19. U. S. Department of Commerce, Bureau of Census. Statistical Bulletin, April, 1973.
20. Statistical Abstracts of the U. S., 1975, op. cit.
21. National Council on Alcoholism-Alaska Region. Facts on Alcoholism in Alaska, Anchorage, 1974.
22. Schmidt and Popham, op. cit.
23. Robert Kraus. "Suicidal Behavior in Alaska Natives". Alaska Medical Journal, 1974.
24. The Economic Cost of Alcohol Abuse and Alcoholism, op. cit.

## PART VI: ALCOHOL-RELATED CRIMES AND THE CRIMINAL JUSTICE SYSTEM

### A. INTRODUCTION

In Alaska it is a widespread belief, almost considered a truism, that the greatest majority of crime committed in the state is alcohol-related. This is to say that either the offender or the victim, or both, had been drinking heavily before or during the commission of the crime, and that their general behavior would be considered by most to be "drunken behavior".

In public testimony collected during the spring of 1976, for example, the Criminal Justice Planning Agency found that the general public ranked alcohol abuse as the primary cause of crime in the state, in both urban and rural settings.\* Consistently, witnesses linked alcohol abuse to such social and criminal problems as juvenile crimes, public inebriation, child abuse, homicides, rape, assault, other violent crimes, etc., and called for additional rehabilitation programs to help deal with these alcohol-related problems. In particular there seemed to be considerable agreement at the hearings--especially among representatives of urban centers and rural cities\*\*, that court sentencing, particularly for offenders convicted for multiple OMVI offenses and violent crimes, should be more severe and more swift than is currently imposed.

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\*Except in Anchorage, where alcohol was ranked behind poverty and personal character deterioration as major causes of crime.

\*\*Urban centers include Anchorage/Spenard, Fairbanks, Juneau, Ketchikan, and Alaska State Trooper Detachment C (surrounding Anchorage). Rural cities include Cordova, Haines, Homer, Palmer, Petersburg, Sitka, Valdez, Wrangell, and Kenai. See following pages for discussion of this typology.

Similar feelings were reported in responses to a statewide sample survey conducted that same spring by the Rowan Group, Inc., an Anchorage-based research corporation. Also sponsored by the Criminal Justice Planning Agency, the survey queried some 245 urban and rural respondents, and 72 "bush" residents, aged 16 to 65, about their feelings regarding criminal activity and the involvement of alcohol in crime. Results showed that almost 75% of the urban population sampled--and over 95% of the rural respondents--felt that most crimes committed in Alaska are related to alcohol abuse and drug abuse.<sup>2</sup> Further, these respondents believed that crimes against persons (robbery, homicide, rape, assault) constitute the major category of alcohol-related crime.<sup>3</sup> Echoing the earlier public testimony, results of the survey also showed that the overall public surveyed rated the job being done by Alaskan courts as poor, and that they considered leniency in sentencing as the criminal justice system's major problem.<sup>4</sup>

It is not surprising that the public feels this way. Given the attention devoted to crime and violence by the media, and repeated statements by government and public officials that alcohol is the state's number one health and social problem, it is understandable in the extreme that alcohol abuse and crime should be linked in the public consciousness. Add the known association between alcohol and crime as borne out by numerous criminal justice studies, and the fact that in 1975 there were an estimated 30,000 or more alcohol abusers and alcoholics in the state\*, the perceived accompaniment of crime and alcohol abuse in Alaska becomes a belief almost unassailable in its prima facie veracity.

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\* See Part II of this Volume

Clearly, reliable and valid information is needed. While no one can seriously doubt the fact of alcohol's involvement in crime, the nature and extent of that involvement, though most important, is what is least understood. The nature and extent of public opinion regarding the relationship of alcohol abuse and crime is clear. However, little is known about the relationship between alcohol abuse and particular types and frequency of criminal offenses.

#### Purpose

It is the purpose of this Part, therefore, to examine the nature and the extent of alcohol-related crime in Alaska.

The focus of the analysis is on the impact of alcohol-related crime on the criminal justice system--law enforcement, prosecution, judicial, and corrections. The analysis thus reflects the nature and the extent of alcohol-related crime on the system, rather than the impact of the adverse consequences of alcohol-related criminal acts on victims or society in general.

A further consideration that must be noted at the onset is the forced emphasis on the impact of alcohol-related crime on the law enforcement component of the criminal justice system throughout the following analysis. The nature of the available data requires this emphasis. Unless a reported actual crime is cleared by arrest, the impact of that criminal behavior on the criminal justice system is extremely difficult to measure.

In addition, the data regarding nature and extent of the impact of alcohol-related crime on other components of the criminal justice system--activities after arrest, become even more obscure as a case moves from arrest to final disposition. For all these reasons the analysis must focus

on law enforcement arrest activity. Nevertheless, an attempt is made to at least indicate the scope of the impact of alcohol-related arrests on the remainder of the criminal justice system. In addition, a detailed description of the estimated economic impact of alcohol-related crime on each and all components of the criminal justice system is presented in Volume I, Part V, of this report.

B. ALCOHOL-RELATED CRIME AND LAW  
ENFORCEMENT IN ALASKA

Because law enforcement functions represent the initial point of contact between all forms of crime and the criminal justice system, they provide the most direct and specific information regarding the relative impact of alcohol-related crime. It thus becomes useful to compare national and statewide reported criminal offenses and crime rates, and to attempt to establish with some specificity the portion of them which is due to alcoholism or alcohol abuse.

The primary source for data on reported crimes in the nation is the FBI Unified Crime Reporting Program, under the terms of which law enforcement agencies throughout the nation tally all crimes as they become known. Since a very large number of offenses go unreported each year, however, it is difficult to estimate the total volume of crime for almost any given period or specific offense. Unified Crime Reporting Program information is therefore accepted by criminal justice authorities only as a valid indicator of crime trends and patterns. Even on such a basis, however, such information becomes indispensable for understanding crime in Alaska; and, more specifically, alcohol-related crime.

The Uniform Crime reporting Program is divided by offenses known as the Crime Index Offenses. Part I crimes are divided into "violent" crimes and "property" crimes. The former include such offenses as criminal homicide, forcible rape, robbery, and aggravated assault. The latter include such offenses as burglary, larceny-theft, and auto-theft. Part II crimes, which are "non-violent" in nature, include all other offenses.

In the present report, attention will be focused on the "violent" crimes of Part I (homicide, rape, robbery, assault), and selected (i.e., alcohol-related) offenses classified as Part II crimes. The "property" crimes (included in Part I offenses), and Part II crimes not related to alcohol will not be discussed, except by way of reference.

#### Violent Crime in Alaska

From the perspective of the impact of alcohol use and abuse on the criminal justice system, this analysis is focused on the distribution of actual arrests for the various crime index categories of offenses--on cases which allow at least some sort of determination of alcohol involvement. While it may be largely correct to associate the use or abuse of alcohol with the commission of a major portion of violent crimes, as is reflected in public opinion studies, it is important to distinguish between the number of violent crimes reported to have occurred and the actual number of arrests made for those offenses, for the purpose of analysis. There is no known reliable way to investigate the extent of alcohol involvement in the commission of reported offenses.

The most important point to be made at first is that total arrests for violent crimes account for only a small portion of the total number of arrests

for all categories of offenses. Various indicators of crime are used to reflect crime trends. Part I crimes are typically reported in terms of the crime rate index, or the victim rate index, which is the number of reported offenses (Part I type offenses) per 100,000 population. In terms of this crime index, reported Part I crime has increased steadily in Alaska in the period from 1973 to 1975 and the index is greater than the national average. As can be seen in Table VI-1, the crime rate for violent crimes (personal crimes) in Alaska was greater than the national average in 1973 and 1974, but dropped below the national average in 1975. However, the overwhelming proportion of Part I crimes is composed of property crimes, as opposed to violent (personal) crimes. Reported violent crimes accounted for about six percent of the total reported Part I crimes, for each year from 1973 to 1975.

TABLE VI - 1  
CRIME RATES FOR REPORTED PART I OFFENSES, ALASKA AND U.S., 1973-1975

|             | Crime Index <sup>a</sup><br>Total Part I | Violent Crime Rate<br>(without robbery) <sup>b</sup> | Robbery<br>Rate | Property Rate<br>(without robbery) |
|-------------|------------------------------------------|------------------------------------------------------|-----------------|------------------------------------|
| <b>1973</b> |                                          |                                                      |                 |                                    |
| Alaska      | 4,943.3                                  | 317.5                                                | 67.0            | 4,558.8                            |
| U. S.       | 4,129.7                                  | 232.7                                                | 182.6           | 3,714.4                            |
| <b>1974</b> |                                          |                                                      |                 |                                    |
| Alaska      | 5,239.8                                  | 364.8                                                | 88.4            | 4,786.6                            |
| U. S.       | 4,850.4                                  | 252.3                                                | 208.8           | 4,389.3                            |
| <b>1975</b> |                                          |                                                      |                 |                                    |
| Alaska      | 5,413.7                                  | 347.9                                                | 116.7           | 4,949.1                            |
| U. S.       | 5,281.7                                  | 263.3                                                | 218.2           | 4,800.2                            |

a. Number of reported Part I crimes per 100,000 population  
b. Robbery is considered to include aspects of both personal and property crimes.

Source: Calculations based on information provided in Alaska Criminal Justice Plan, 1977, Volume I, p.8., prepared by the Criminal Justice Planning Agency.

Another index of criminal activity, which also reflects impact on the criminal justice system, is the number of actual arrests for the various types of criminal offenses. Review of actual arrest information for all arrests and for Part I and Part II offenses, as presented in Table VI-2, shows that arrests for violent crimes accounted for only about three-to-four percent of the total number of arrests made during each of the years from 1973 to 1975. Arrests for all types of Part I offenses accounted for about 22-23 percent of all actual arrests during the same period.

TABLE VI - 2  
ARRESTS FOR VIOLENT CRIMES, BY SPECIFIC OFFENSE, IN  
RELATION TO ALL PART I AND PART II TYPE  
ARRESTS, ALASKA, 1973-1975

| Arrest Category       | 1973   |                     | 1974   |                     | 1975   |                     |
|-----------------------|--------|---------------------|--------|---------------------|--------|---------------------|
|                       | Number | Percent<br>of Total | Number | Percent<br>of Total | Number | Percent<br>of Total |
| Part I Offenses       |        |                     |        |                     |        |                     |
| Violent Crimes        |        |                     |        |                     |        |                     |
| Homicides             | 29     | *                   | 49     | *                   | 44     | *                   |
| Rape                  | 49     | *                   | 56     | *                   | 67     | *                   |
| Aggravated<br>Assault | 338    | 2%                  | 469    | 3%                  | 504    | 2%                  |
| Robbery               | 98     | *                   | 99     | *                   | 151    | *                   |
| Property Crimes       | 2,836  | 19%                 | 3,376  | 19%                 | 3,951  | 19%                 |
| Total Part I          | 3,342  | 22%                 | 4,049  | 23%                 | 4,717  | 23%                 |
| Total Part II         | 11,801 | 78%                 | 13,917 | 77%                 | 16,008 | 77%                 |
| All Arrests           | 15,143 | 100%                | 17,966 | 100%                | 20,725 | 100%                |

\* Less than one percent

Source: See reference tables at end of this Part.

The distribution of actual arrests for Part I and Part II type offenses, which can be seen to be rather stable, shows that only a small proportion of law enforcement activity is reflected in actual arrests for violent crimes. This is important to keep in mind when discussing the role or involvement of alcohol use and abuse on the criminal justice system. As indicated earlier, a good deal of public attention and government response seems to be focused on violent or personal crimes. Although the crime rate for violent crimes is well above the national average, it is important not to lose sight of the fact that persons arrested for violent crimes represent only a very small portion of the total number of arrests made for all categories of offenses. Arrests for criminal offenses in Alaska are predominantly and consistently for Part II type offenses.

#### Violent Crime and Alcohol Involvement

The role that alcohol consumption plays in the commission of a criminal act is as yet mainly undefined. Several researchers have, however, noted the consumption of alcohol immediately before or at the time of the commission of a variety of criminal offenses. Available research has shown significant relationship between the consumption of alcohol and the commission of violent crimes--criminal homicide, assaults, forcible rape, and other sex offenses. The relationship between alcohol consumption and violent crime does not, however, indicate a causal relationship. It is clearly understood that the consumption of alcohol does not in itself lead to violence, but increasing circumstantial evidence seems to link alcohol consumption to crime. Only the major studies that demonstrate the relationship between alcohol consumption and violent crime are presented in this section.

The most reliable and generally accepted estimate of the relationship between alcohol consumption and criminal homicide comes from a four-year study by M. E. Wolfgang. During the study period from 1948 to 1952, alcohol was found to be present in either victim or offender, or both, in 64% of the 588 cases investigated.<sup>5</sup> Close support for this estimate comes from a 1951 Baltimore study by Fisher, in which 69% of homicide victims showed evidence of alcohol consumption.<sup>6</sup> While no definitive national study yet exists, other national findings have confirmed this general level of alcohol involvement.<sup>7</sup> In Alaska, case information presented to the Alaska Parole Board during 1974-75 indicated that alcohol was involved in approximately 69% of the homicides considered.<sup>8</sup> In the absence of any other more specific information, it is likely that alcohol is involved in approximately 64% of all criminal homicides in Alaska.

With respect to forcible rape, the most reliable estimates of alcohol-related involvement came from an extensive study in 1967 by M. Amir, in which alcohol was found to be directly involved in 34% of 646 investigated rape cases.<sup>9</sup> Other, less comprehensive evidence of alcohol involvement in forcible rape offenses comes from a study reported in 1971 by L. Shupe, in which 45% of rape cases studies involved persons with a B.A.C. level of more than .10%.<sup>10</sup> Finally, an informal study during 1974-75 by the Alaska Parole Board indicated that 67% of the rape offenders seeking parole during that time had been drinking at the time of their offense.<sup>11</sup> Thus, a reasonable estimate of alcohol involvement in Alaskan rape cases would be approximately 34%.

Regarding aggravated assault, the extent of alcohol-related involvement is also significant, though not quite as great as in homicide or rape cases.

Findings by the District of Columbia Crime Commission in 1966, for example, found alcohol to be involved in 35% of the offenders and 41% of the victims of felonious and other assaults;<sup>12</sup> a 1964 study in St. Louis by Pittman and Handy found that alcohol was present in approximately 25% of all assaults studied.<sup>13</sup> Similarly, the National Commission on the Causes and Prevention of Crime has estimated that 24% of all violent crimes, including aggravated assault, involve the use of alcohol.<sup>14</sup> Thus, a reasonable estimate would be that approximately 35% to 41% of all aggravated assaults in Alaska are alcohol-related.

Research evidence regarding the extent of alcohol involvement in robbery cases is very conflicting, although an informal study conducted by the Alaska Parole Board indicated that 57% of the convicts seeking parole during 1974-1975 had been drinking at the time of the commission of their offense.<sup>15</sup> No good, reasonable estimate of alcohol involvement, however, is considered justifiable at this time.

In brief summary, a review of the national and Alaska findings indicates that reasonable estimates of alcohol involvement in the various kinds of violent crimes in Alaska are: criminal homicides--64%; forcible rape--34%; and, aggravated assault--41%. No estimate is judged reliable for robbery offenses. Although the number of annual arrests for violent crime offenses in Alaska represent only a very small proportion of the total number of actual arrests, the extent of alcohol involvement for these offenses would appear to be very high.

Part II Crimes and Alcohol Involvement

As previously indicated, arrests for Part II offenses in Alaska during 1973 to 1975 represented approximately 77% of the annual total arrests for all offenses. Given such a preponderance, it becomes necessary to determine the nature and extent of alcohol involvement among the multiple classifications of offenses designated within the Part II category of offenses.

Among all Part II offenses, there are six specific offense classifications which are conventionally regarded as virtually "100% alcohol-related".\* These offenses are: driving while intoxicated, drunkenness,\*\* violation of liquor laws,\*\*\* disorderly conduct, other (non-aggravated) assaults and vagrancy. The first three of these offenses are legally defined by virtue of involvement with alcohol. The latter three--disorderly conduct, assaults and vagrancy, are commonly regarded as more often-than-not associated with the use and misuse of alcohol, and often tend to be employed as alternative charges for drunken behavior.

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\* The Economic Cost of Alcohol Abuse and Alcoholism, 1971, Final Report, HSM, 42-73-114(NIA), March, 1974. pp. 120-136. Prepared for the National Institute on Alcohol Abuse and Alcoholism by Policy Analysts, Inc.

\*\* In spite of the adoption of the Uniform Act in 1972, which decriminalized drunkenness (among other provisions), arrests for drunkenness are still made and recorded.

\*\*\*Typically, violation of sales, distribution, and other regulatory laws-- sales to minors, violation of closing hours, unauthorized sales.

Table IV-3 shows the number and percentage of annual arrests in Alaska during 1973 to 1975 for each of the "100% alcohol-related" offenses, in relation to all arrests for all Part II offenses, as well as Part I arrests and total arrests.

TABLE VI-3  
"100% ALCOHOL-RELATED" ARRESTS IN RELATION TO ARRESTS FOR  
PART I AND PART II TYPE OFFENSES AND ALL OFFENSES,  
ALASKA, 1973-1975.

|                                 | 1973   |                  | 1974   |                  | 1975   |                  |
|---------------------------------|--------|------------------|--------|------------------|--------|------------------|
|                                 | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Total Part I Arrests            | 3,342  | 22%              | 4,049  | 23%              | 4,717  | 23%              |
| Total Part II Arrests           | 11,801 | 78%              | 13,917 | 77%              | 16,008 | 77%              |
| "100% alcohol-related" arrests: |        |                  |        |                  |        |                  |
| DUI                             | 2,267  | 15%              | 2,107  | 12%              | 3,157  | 15%              |
| Disorderly conduct              | 1,257  | 8%               | 1,328  | 7%               | 1,476  | 7%               |
| Liquor laws                     | 862    | 6%               | 1,033  | 6%               | 1,746  | 8%               |
| Other assaults                  | 788    | 5%               | 1,010  | 6%               | 1,384  | 7%               |
| Drunkenness                     | 609    | 5%               | 1,545  | 9%               | 278    | 1%               |
| Vagrancy                        | 61     | *                | 17     | *                | 40     | *                |
| Sub-total                       | 6,054  | 40%              | 7,040  | 39%              | 8,072  | 39%              |
| All Other Part II Arrests       | 5,747  | 38%              | 6,877  | 38%              | 7,936  | 38%              |

\* Less than one percent

Source: See reference tables at end of this Part.

As can be seen, arrests for these "100% alcohol-related" offenses accounted for at least 39% of the total annual arrests during each of the years shown. Arrests for the three offense classifications defined in terms of involvement with alcohol, accounted for about 25% of the annual total arrests. In different terms, arrests for these six characteristic "100%