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Perception of Alcohol and Alcoholism among Alaskan Communities

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Abstract

This study was conducted to learn something about how Alaskans perceive alcohol and alcoholism. The findings indicate that differences in attitudes toward and knowledge of alcohol are related to both urban/rural and native/non-native differences in our sample. The implications of our findings are discussed with respect to alcohol education programs.

Introduction

Alcohol abuse and alcoholism is the primary health and social problem in Alaska. The cost in social and economic terms is only beginning to be recognized (Kelso, 1977), together with an awareness that the problem needs to be confronted on a statewide basis. The extensive use of alcohol in Alaska has propelled Alaska to be the leading state with respect to per capita alcohol consumption. The national rate of alcohol use, about 2.90 gallons per person per year, is far exceeded in Alaska with its rate of 4.54 gallons per person. Alcohol has apparently been incorporated as a normative or customary function for a great many Alaskans, becoming well integrated into some of its peoples' social life.

Despite the widespread use of alcohol, little information is available regarding how alcohol and alcoholism is perceived. It would be interesting, for example, to determine if conflicting or uniform attitudes are held regarding an understanding of alcoholism, and how these perceptions may differ from region to region in Alaska. This study, part of an ongoing series of investigations exploring alcoholism in Alaska, focuses on providing some information about how a sample of adult Alaskans view alcohol and alcoholism.

Learning how the public views alcohol and alcoholism is particularly important in that public opinion on the etiology of alcoholism can influence how the problem is treated, especially from a legislative viewpoint. If, for example, public opinion perceives alcohol addiction as related to the availability of alcohol, the emphasis will be directed toward regulation of beverage alcohol. If, on the other hand, social conditions are believed to be a contributing cause, then a solution to the problem shifts from a legalistic and punitive approach to a human services orientation. The public attitude, however, is not generally consistent (Kinder, 1975), ranging from a demand for prohibition to the lowering of the drinking age in some states. Thus, it is important to not only assess prevailing attitudes toward alcohol and alcoholism in order to determine its implications for education,

prevention, and treatment, but to also evaluate how public opinion is likely to affect public policies. Additionally, knowledge of how alcoholism and alcohol abuse is perceived can aid in the development and implementation of educational campaigns focusing on alcohol education. Specifically, knowledge of how people view alcohol can contribute to the development of a strategy to maximize the effects of alcohol education campaigns. Since the state of Alaska has been exposed to an extensive media campaign on alcoholism, it would also be of interest to learn what impact this campaign might have had.

### Method

#### Sampling

An area probability sample of 512 households was conducted in nine different communities representing the diversity of Alaska's peoples. The sample sites represented the geographic and climactic differences, social and economic differences, and included representation of Alaskan ethnic groups, Eskimos, Indians, Aleut, and non-native. The communities of Barrow (n = 29) and Aniak (n = 18) were selected so as to have representatives of both Northern and Southern Eskimo. Fort Yukon (n = 29) and Beaver (n = 12) were included to represent the interior Athabascan Indian. Old Harbor (n = 20), Angoon (n = 25), and Hydaburg (n = 26) were

chosen to represent the Aleut, Tlingit and Haida respectively. Anchorage (n = 300) was selected since it is the largest city in the state, containing nearly half of the state's population. And finally, Valdez (n = 53) was included in our sample because it was one of the communities along the trans-Alaska pipeline corridor and went through a process of great change during the construction period. Drinking also takes place in all of these settings, although it is not always socially or legally sanctioned.

The person interviewed was an adult member of the household present at the time of the interview. Of the 512 respondents, 54% were women; 46% were men. The ethnic composition is as follows: 68% non-native, 8% Eskimo, 9% Tlingit-Haida; 3% Aleut, 7% Athabascan, 3% black and 2% classified as "other." Ages ranged from the late teens to above sixty, with a median age of 34.5 years. The median education level was 12.2 years. The selection of households in each community was done randomly.

#### Questionnaire

Each interviewee was asked to respond to a 47-item questionnaire containing a series of questions pertaining to alcohol and alcoholism, together with demographic data. Each question was asked by the interviewer and the answer recorded verbatim or by checking an appropriate category on the survey.

In some communities a translator was required, and in these cases special care was taken to ensure the reliability of responses by asking the respondent if what was recorded or scored represented the intended answer.

### Results

One section of the survey dealt with attitudes toward and knowledge of alcoholism. One of the items was whether the respondent approved or disapproved of drinking. Of 505 total answers, 68% (344) voiced approval, while 32% (161) did not. There is, however, significant variation in attitudes with the larger non-native communities (Anchorage and Valdez) accounting for 75% (260) of the total number of people (344) who expressed approval of drinking. Opinion among the remaining several communities was less supportive, with 54% (84) approving and 46% (73) disapproving.

A second question was "How would you define alcoholism?" The definitions which were obtained ranged from the very sophisticated, "a physical dependence on alcohol," to a functionally descriptive definition, "It's when you start drinking the after-shave lotion." Other responses were: "a person isn't capable of helping himself; " "a disease;" "a method of escaping existing reality;" "it's bad;" "a sickness;" and "not able to handle alcohol."

Each of the responses was categorized into one of four

classes of definitions derived by Peterson (1975). The classification and statistics for each category are: (a) Alcoholism related to excessive drinking--19% (102); (b) Alcoholism as a form of dependency--47% (244); (c) Alcoholism as a mental or physical illness--24% (126); and (d) Alcoholism defined as affecting a person's life style--10% (53).

The response to the question, "Do you think alcoholism is a disease?" resulted in 79% (406) saying "yes" with opinions equally divided between rural (80%) and urban (79%) areas. Respondents were also asked why they thought alcoholism was a disease. The most frequent answer was "because it cannot be controlled by the individual," given by half of the sample (50%, n = 237). Twenty-eight percent (146) answered that alcoholism is a disease "because it has physical repercussions." Other responses were quite varied, and too vague for categorization.

Several questions were also presented exploring personal attitudes and knowledge about drinking and about alcohol and alcoholism. Of these, the question, "What kinds of people become alcoholics?" obtained one predominate answer, "all kinds" (56%, n = 283), with "those lacking in will power" (22%, n = 114) second, followed by "those people being under pressure" (6%, n = 32), ranking third. Eighty-five percent (n = 407) of the respondents thought that alcohol is a drug,

and 83% (426) thought that there is a statewide drinking problem in Alaska, with 50% (256) thinking that people in Alaska drink more than people outside of Alaska, but 46% (232) of the sample thought that alcoholism is worse in Alaska than "Outside" (in the lower forty-eight states). Only 38% (195) thought that there would be fewer alcoholics if alcohol were harder to get, while 59% (303) thought not. Rural respondents agreed (52%, n = 83) with the above statement to a greater extent than did urban ones (32%, n = 112).

#### Discussion

Our findings indicate that although there is a general awareness about alcohol and alcoholism in Alaska, there is also much variation with respect to knowledge and attitudes toward alcohol and alcoholism. The recent extensive alcohol education campaign apparently contributed to inform about alcohol (e.g., alcoholism is a disease) but did not seemingly have a uniform effect. Some of the variation in the responses we obtained is related to rural-urban differences. For example, although alcohol is consumed all over the state, it is predominately the larger, urban, primarily non-native cities (Anchorage and Valdez) that express a greater approval of drinking than rural areas. While drinking does occur in the rural areas, it is not met with the same level of approval as indicated in Anchorage and Valdez. This differences seems to

suggest that alcohol may not be as well integrated into the rural, predominately native, communities as it is in the larger urban centers. Native communities may be expressing greater concern about drinking because alcohol is not handled well and thus is perceived with a great deal of ambivalence.

There is general agreement among respondents that alcoholism is a disease, but there seems to be little agreement and/or understanding as to why it is constituted as such. Yet, a large percentage of those interviewed believed that alcoholism is a problem in Alaska. Interestingly, those in the rural areas believed to a greater extent than those in Anchorage and Valdez that restrictions on the availability of alcohol would reduce the problem.

These results have an interesting implication for Alaska and for alcohol education campaigns. On the basis of this survey, in which we believe a representative sample of rural native communities was obtained, it appears that educational efforts, particularly directed at the native level, may have to change emphasis. There is ample recognition that alcohol is a problem, and that its reduction will curtail the problem, a view currently held by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and expressed by its director, Ernest Noble, Ph.D., M.D. Thus efforts might need to be directed toward furthering an understanding of how to deal

with the problem in terms of developing community awareness, and not focusing on individual drinking. Efforts to further an understanding of the nature of alcoholism may also be undertaken. In contrast, educational campaigns for larger centers, such as Anchorage and Valdez, might need emphasis on changing overall consumption patterns, that is, educating the general public that there is a relationship between availability of alcohol and incidence of alcoholism. Thus, it appears that in addition to any general alcohol education program, more specialized or tailored ones are needed which are directed toward specific target groups.

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Footnote

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Elements of this type of community response are used on American Indian Reservations in Indian Health Service Hospitals where the medicine man is used side-by-side with the modern physician in seeking holistic medical care of their target populations.

The Spirit Movement program does not support an unrealistic "going back" to an earlier time of life when satellites, television, telephones, and computers did not exist. It does advocate looking towards the elements of strength and spirituality that have sustained these peoples throughout the centuries as a way of surviving this cultural shock and combatting the trend toward cultural assimilation, by being proud of who Native peoples are and of the heritage that makes them special and unique.

There is a way of providing health and social services to Native communities without alienating them or imposing non-

traditional, threatening ways of treatment on them. It is by being aware of their historical roots and cultural differences and bringing the awareness into the type of medicine we practice.

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## VILLAGE ALCOHOL CONTROL: TRADITIONAL METHODS AND THE "LOCAL OPTION LAW"

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The primary immediate cause of death and significant injury in rural Alaska is alcohol-related behavior resulting in homicides, suicides, and accidents. This paper reports on the early implementation and consequences of a modern legal solution to this public health problem--the "local option law." Alaska's is one of many efforts to combat the loss of village residents due to abusive and problem drinking. Although too recent a law to evaluate its outcomes on village health and safety statistics, it is not too early to compare the law to purposes, history, culture, and social and political organization of the villages for whom the law was provided.

Alaska's local option law is a legal solution devised to assist villages in the exercise of greater local control over the availability of alcohol. The law provides an opportunity for villages to elect one of the following mutually exclusive "options": 1) prohibit the sale of alcohol unless sold under a single community liquor license, 2) prohibit the sale of alcohol with the exception of specific types of retailing, 3) prohibit the sale of alcohol, or 4) prohibit the sale and importation of alcohol. Due to the magnitude of the public health problem, the state government, through the local option law, granted to villages certain powers usually reserved to larger municipal powers; it also reinforced village options with the threat of state police enforcement.

The problems stemming from the use of alcohol in villages affect not only the drinking individual but the entire community. Due to their cultural, social, and economic origins, Alaska villages operate as large family units. Village populations are so small, interrelated, and interdependent that they become vulnerable to the entire array of negative effects associated with excessive drinking, including interpersonal violence, child neglect, loss of economic opportunity, demoralization, and physical deterioration. Therefore, the alcohol-related social impacts severely impair family and community morale, perpetuate a cycle of negative, even disastrous, events, and jeopardize the physical and cultural survival of the village.

Many villagers consider that the future of their culture is dependent solely on the traditional values and caliber of the future community leaders, that is, the young people of the community. The villagers' concern with alcohol is less a preoccupation with the personal health or moral implications of ingesting alcohol than with the death of village members, particularly death among

the young men. The deaths of young men, while terrible personal and family tragedies, also constitute a major cultural concern.

Banning alcohol importation and sale was justified in arguments for the local option law which suggested that the public health problem posed by alcohol was quite great and that there is a close and substantial relationship between the means (the local option law) and the ends (limiting the magnitude and tragedy of the public health problem). The prohibition of sale and importation becomes potentially more powerful under the local option law than under the limited prior authority available to villages in that:

- 1) the local option law extends village authority over all residents and visitors, who previously may have denied the authority of the village governing bodies to constrain the sale and importation;
- 2) the local option law extends village authority to a five mile boundary around the village;
- 3) the local option law requires compliance by commercial carriers, under severe penalty for violations;
- 4) the local option law requires compliance by all state-wide and regional alcohol distributors; and
- 5) the local option law implies some state law enforcement and judiciary response to violations.

In practice, the option banning sale and importation is by far the most popular choice, given village desires to limit severely, if not prohibit, access to alcohol. Many have translated their option to mean "prohibition." They (and many government agency personnel) talk about voting "dry" and having "dry" communities. To villagers, "dry" means no more alcohol, no more drinking, and no more drunks in the villages. Were it possible for village law to prohibit totally the manufacture or possession of alcohol and to search and seize persons and property for evidence, many villages would have chosen to do so. The fact that the United States Constitution denies villages these powers is inexplicable and frustrating to them, since their motive is to save human lives, entire communities, and entire cultures.

The new state law did not provide for: 1) real increases in police effort; 2) the cultural, social, and situational variety

among villages; 3) the village-desired prohibition of the manufacture, possession, or use of alcohol; or 4) alternative flexibilities of enactment or enforcement desired by villages in order to have the least intrusive law to solve their particular problems. Thus, in many villages, the law is and must be supplemented by the use of more traditional, ingenious, sensitive, extra-legal, culturally appropriate, and sovereign means to achieve desired ends. These supplemental means suggest that untapped self-controls are still available in villages or may be re-learned to enhance public health and safety while maintaining cultural integrity and continuity.

If power is known primarily through its exercise, then villages retain powers via extra-legal, unsanctioned elections and ordinances as well as local enforcement and adjudication; that is, the consequences of the exercise of power are real, even if the authority of the village is only apparent or achieved through the consent of the governed. There appears to be some implied consent to or support of village extra-legal methods by external authorities to accomplish ends desired by both the village and external authorities, as long as these methods become neither publicized nor challenged.

Some villages, having adopted an option under the local option law, find it necessary to pass implementing and supplementary ordinances dealing with public drunkenness, alcohol possession, search and seizure, involuntary commitment, and jail and financial penalties. These villages see the local option law as merely a back-up to other forms of local control, and an external threat to be used if local authority is violated. In some instances, these ordinances have been used to modify the terms of the elected option, even though they do not have the legal power to do so.

Some village cultures find the local option law inconsistent with their accepted modes of community problem-solving. Differences occur in the arena of who makes decision, how decisions are made, how interventions are made in the behaviors of others, the role of informing as a form of social control, the range of acceptable control mechanisms (e.g., embarrassment, isolation, exile, jail, internal versus external policing), and the degree of rigidity or flexibility that is desired in community-wide laws, enforcement, penalty, and rehabilitation.

The local option law, while empowering villages to control aspects of their own lives, still remains a Western law. It was not designed or written by rural people, and its purpose, intent, powers, procedures, language, limitations, and relationships to other parts of Western law and law enforce-

ment remain unclear to many rural people. Villagers also see that other, vaguely understood aspects of Western law formally prohibit villages from taking actions which would solve the very problems for which they are turning to the local option law. In order for them to utilize fully the local option law, they may wittingly or unwittingly violate other laws.

In effect, villages using the local option law are not writing their own law, consistent with the underlying elements that make aggregations of individuals and families into "communities." The writing of law comes from receiving or assuming generalized powers, then convening to draft, adopt, implement, and revise one's own laws to deal directly with self-perceived problems. The use of the local option law is less an exercise in the writing of law than in trying to solve a most difficult problem through the adoption of a pre-formulated and externally-designed option.

Given these conditions, the enactment of a new law facilitating local control over alcohol raises many questions. The most obvious question is whether the various legal options will significantly help communities over time, to reduce the incidence of negative and dangerous events. A less obvious but potentially more significant product may be the growth of local and indigenous management of problems and the personal internalization of community values and rules. In addition to the process of extra-legal modification of the law, some villages initiated a reinvestment of authority in more traditional local governance and in those social control methods which had proved acceptable and effective in the past. Thus, these villages appear to pursue their local objectives by relying on the threat of external force, the enhancement of local control authority, and the flexibility of action afforded by their remoteness and the consent of the governed.

Communities which believe that they have retained sovereign powers to control their internal affairs and their relationships with the outside world tend to expend more energy than other communities in the construction and enforcement of local laws. Since they do not derive their authority from larger governments or bodies of law, nor do they feel they can depend on outside law enforcement supports, they must exercise their authority continuously; it is likely that continuous exercise of authority makes it easier to continue. Characteristics of continuous law-making and enforcement in these communities include some of the following:

- signed commitment by each community member to support community laws and the actions of council

- members;
- commitment by each community member to support physically and psychologically the law enforcement effort;
- annual review, reconsideration, amendment, specification, rejection, and re-enactment of the law by the entire community;
- creation and maintenance of local law on a wide range of daily life matters, such as loose dogs, curfews, speed limits, truancy, drug use, drunken behavior, theft, threatening behavior, family neglect, gambling, fish and game salvage, and others;
- no assignment of enforcement to specific individuals, so that responsibility rests with each and every community member;
- enforcement by large numbers of persons (men, women, children, elders, council members) at the same time and place, creating mutual pride and support and re-individualization of the burden;
- formal investigation, trial, and punishment methods;
- no record kept of violators except in community memory, so that there is no long-term permanent reduction of future opportunities for individuals;
- formal methods of exile with hoped-for and encouraged returns and re-integrations;
- semi-permanent exile of consistent violators, particularly violent persons and substance distributors;
- increased, rather than decreased, enforcement of alcohol restrictions during major celebrations;
- extensive monitoring of luggage and freight at points of entry into the community;
- immediate destruction of prohibited substances at point of entry, as the basic fine (rather than later trial) for attempted importation and as the basic social embarrassment;
- more intensive enforcement of repeated violators' activities within and without the village (through villages' or relatives' reporting systems in other, particularly hub, communities);
- conviction of violators on the grounds of possession and use or using possession and use as *prima facie* evidence of illegal importation;

- exercise of controls over visitors as well as residents;
- illegal search, seizure, and destruction of alcohol from private homes based on observed and reported possession and use;
- unaltered policy of prohibition, but methods and penalties of enforcement renewed or otherwise modified to meet new needs; for example, penalties may be stiffened by reducing the amount of basic physical support provided by peers;
- non-reliance on outside enforcement entities or procedures, since these commonly result in after-the-fact actions; the village desires and achieves immediate behavior intervention and modification.

Thus, the local option law is only one mechanism of many which encourage more community self control.

There are communities which view the local option law as an unnecessary, redundant, and useless tool to reduce access to alcohol. These communities have had a long tradition of controlling access through internal formal governance (i.e., each community member sharing some of the active responsibility for controlling access and use). Some of the means used by these communities are legitimized by community consensus but may be illegal in that they violate the constitutional rights of residents; lack of complaint about violations is due, in large measure, to shared cultural community values, respect for traditional and community authority, and a desire to live within the protected confines of a conservative but healthy community.

The supports for the continuing tradition of enforced "dryness" appear limited in number:

- geographic remoteness;
- late contact with the outside world;
- strong religious values from the origins of the community;
- consensus about 1) the authority of the elected or traditional government and the community itself, 2) legal and/or traditional local sovereignty, 3) the merits of a conservative range of tolerated behaviors, and 4) absolute restrictions and strict enforcement being the only means to maintain the healthy lifestyle;
- remoteness from state-supplied law enforcement agencies;

- no tradition of extensive alcohol use, related problems, or tolerance of use;
- a tradition of local law-making, continuous law enforcement, and verified attachment to the substance and pre-eminence of the law;
- pride in having a good community reputation;
- ability to control or maintain distance to nearby industrial development;
- ability to control the behaviors of new Native and non-Native residents;
- a healthy continuing subsistence resource base;
- maintenance of distant relationships with government programs, resulting in reduced contact, few negotiated compromises, and greater self-determination;
- family and cultural obligations which require extensive visiting and, thus, close uniform scrutiny of private lives as a form of social control and support;
- members who cannot tolerate such close restriction emigrating or exporting their activities;
- members who refuse to abide strictly by community rules being closely watched, counselled, penalized, or exiled;
- members who violate the rules but whose behavior is not found troublesome being watched closely but not unduly punished;
- persons who wish a retreat from more permissive communities being allowed to immigrate and settle in the village;
- continuous discussion of, voting on, and enforcement of local restrictions;
- continuous monitoring of the bad events in other communities.

Some villages appear too divided or demoralized, at present, to organize themselves to utilize any of the options provided under state law or take other actions to control alcohol use and behaviors.

It appears that those communities that desire greater self-determination over aspects of their quality of life and whose traditional systems no longer suffice (for a variety of reasons) to meet these objectives are the most likely to look to the local option law and other tools to achieve their goals. In other words, the communities that are most likely to avail themselves of the local option law are those that are in a transition, returning to a healthier, self-controlling state; these may be commu-

nities that have experienced a twenty-year decline in quality of life due to factors mentioned earlier. Thus, it is suggested that the local option law does not create healthier communities but that healthier communities or communities that are becoming healthier are the ones most attracted to the local option law as an additional support. In general, the village attributes which are most likely to be predictive of successful local option law outcomes are:

- a secure, activist, and strong village or city council;
- a village council which is not itself typified by abusive use of alcohol;
- consolidation of or unanimity among all village power bases;
- a population marked by stability, in terms of racial composition, migration, economy, goals, and problem rates;
- a community desire and ability to identify problems, set goals, establish priorities, establish solutions, and take action as a community;
- other difficult goal-directed actions taken by the community which indicate that the community can exercise self-control.

Even in the most positively responding villages, the use of Western legal tools to meet community objectives is highly problematic. The contrasts which exist in the introduction of Western legal solutions to problems in the daily lives of geographically and culturally remote villages are predictive of unresolvable tensions, if not direct conflict. These contrasts are summarized in Table 1.

Given these complexities, it is worthwhile to ask, how well has the local option law served village public health and safety objectives? The immediate objective was to reduce the incidence of alcohol-related public behavior (such as violence and public drunkenness) and the community fear which accompanies it. Since the local option law elections, many villages have perceived a steep decline in visible drunken behavior. Whether or not this perception is correct (and it is likely to be correct), whether or not there is less actual drinking or drunkenness as distinct from visible or public drinking or drunkenness, are probably not relevant distinctions in the villagers' assessment of the quality of their daily lives.

There is no indication that the overall rates and volume of alcohol consumption have declined since the inception of the local option law. What, then, accounts for the perceived steep decline in alcohol-related

Table 1. Contrasts between local option law and Western legal system (non-local) in controlling alcohol in Alaska's villages.

| Local                               | Non-local                            |
|-------------------------------------|--------------------------------------|
| community power                     | state power                          |
| Native                              | non-Native                           |
| traditional                         | modern and Western                   |
| protective solutions                | punishing solutions                  |
| preventive solutions                | punishing solutions                  |
| person-oriented                     | law-oriented                         |
| rule by consensus                   | rule by constitution                 |
| decentralized solutions             | centralized solutions                |
| flexible solutions                  | inflexible solutions                 |
| pre-eminent rights of the community | pre-eminent rights of the individual |

problems and behaviors in the village? Findings suggest these changes are due to altered patterns of use by the using population, including:

- a) increased "privatization" of alcohol use and behaviors,
- b) altered and intermittent patterns of distribution and consumption,
- c) substitution of other substances, and
- d) externalization of the behaviors and problems from the villages to regional hubs and larger communities with large health care and public safety services.

What, then, is the benefit of the local option law? Some villagers are under the illusion that the law is self-executing, that by passing the law, the reality of daily life will automatically change. This

illusion is not totally without foundation. What appears to happen in some villages is that the vote on the local option constitutes an elaborate reaffirmation of village authority and rules. The threat of external force appears to support and mobilize the internal control mechanisms of the village and thereby produce modified behaviors among residents, including reduced drinking and improved morale. The longevity of these positive social health changes will depend, ultimately, on the continuing development of greater internal village controls and corresponding improvements in the perceived quality of life. What is achieved, ultimately, by the local option law may be less some formal control over alcohol than enhanced village self-control over vital aspects of community life, health, safety, and morale.

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forces in this rural environment contributed to the medical and mental health problems of the people, we believe that the dynamics of this rural system also contributed to the successful implementation of the linkage. The strong value accorded cooperation in this rural area affected systems collaboration positively. Additionally, the basic competence of professional and lay persons, a competence laced with a healthy pragmatism, promoted the interpersonal relationships that strengthened the cooperative effort.

The Mental Health Initiative concept was designed in the mid-1970s, but it has great relevance to the political and service realities of the 1980s. National emphasis is now being placed on the local delivery of services. The appropriate expectation is that community-based services shall be provided with a minimum of duplication and with maximum efficiency, achieved partly by interdisciplinary and interorganizational cooperation. Local health workers attuned to such a philosophy can comprehensively intervene with the family and the community systems where the patient lives and works.

The linkage project we describe is relevant to the 1980s. It was formally ended with a commendable

record after 14 months. Reduced Federal support for community programming has prematurely terminated this linking of primary health care and mental health services.

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## Self-Inflicted Gunshot Wounds Among Alaska Natives

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#### SYNOPSIS . . . . .

*Deaths by violence (accidents, homicide, suicide) have increased significantly among Alaska Natives who have a suicide rate three times that of the general U.S. population. Self-inflicted gunshot wounds comprised 75 percent of the suicides among Alaska Natives from 1976 through 1980. A review of psy-*

*chiatric consultations concerning 34 Alaska Natives who had survived a self-inflicted gunshot wound indicated some common characteristics.*

*Of the group, 28 were male, and 20 had been using alcohol at the time of the shooting. Interpersonal conflicts were cited by most persons as partial motivation for the shooting, and most shootings were impulsive rather than premeditated. Few patients had a psychiatric history or appeared impaired at the time of the consultation.*

*Cultural and intrapsychic factors that might contribute to this high rate of self-destructive behavior were examined. These include a proscription against verbal expression of negative affect and an increase of non-Native influences with subsequent social disorganization and cultural conflict.*

**F**OR SEVERAL DECADES, DEATH BY VIOLENCE has increased significantly among Alaska Natives. In the period from 1950 to 1974, mortality by violence

(accidents, homicide, suicide, alcohol) in this population grew from less than 20 percent to greater than 40 percent of all deaths. During the same pe-

riod, the death rate per 100,000 for suicides among Alaska Natives grew from less than 15 per 100,000 population to greater than 30. The rate for the non-Native United States population remained constant at slightly more than 10 per 100,000 (1).

A large number of deaths by suicide of Alaska Natives have been committed by self-inflicted gunshot wounds. It is probable that survivors of self-inflicted gunshot wounds are similar psychodynamically to those who died by this method, since most survivors sustained serious wounds to the trunk or head which would have been fatal if they had not been treated. Further, these persons are likely to differ qualitatively from people whose suicide attempts, such as a drug overdose, were less likely to result in mortality or significant morbidity. Drug overdose attempts are often accompanied by ambivalence and the knowledge that one will likely survive. This study attempts to explore and begin to understand factors contributing to the alarming rate of suicide by firearms of Alaska Natives.

### Methodology

The Alaska Native Medical Center in Anchorage serves as a source of primary care for Alaska Natives in the Cook Inlet region as well as the referral center for regional hospitals in rural and Bush Alaska (areas accessible only by plane). The center has an active psychiatry department staffed by psychiatrists and psychiatric nurse practitioners. This department provides consultation upon request for medical and surgical patients.

For the 6 years from July 1975 through June 1981, 34 consultations were completed concerning patients who were admitted for the treatment of a self-inflicted gunshot wound. Their charts were reviewed for information that might suggest factors contributing to these self-inflicted injuries. The non-systematic nature of the consultations in this retrospective study suggests an underreporting of potentially significant issues contributing to the shootings.

### Results

Table 1 is a summary of the cases. The 34 charts were reviewed for age, sex, Native group, alcohol intake at the time of the event, location of the wound, and alleged motive. Chi square analysis was employed to determine significance.

Of the 34 consultations completed, 5 self-inflicted wounds were felt to be accidental by the patient or consultant. In one of these events the patient was playing Russian roulette, while another patient re-

ported that he had been cleaning his weapon when it discharged. Six patients were female, and the remaining 28 were male. The ages ranged from 13 to 47 with a mean of 21.4 years. Fifty-nine percent had been using alcohol at the time of the shooting.

Interpersonal conflicts were cited in the majority of cases as partial motivation for the self-inflicted shooting. The conflict was usually within the family of origin or within a romantic relationship. Although an intrapsychic conflict might have been experienced and, indeed, could have been a major factor in the shooting, many patients attributed the act to the coexisting interpersonal conflict or to the fact that they had been drinking. Several patients reported the recent suicide of a close family member, often as a result of a gunshot wound.

### Case Reports

**Case A.** A 31-year-old single Eskimo male shot himself in the chest while intoxicated. The patient was not certain why he shot himself; "The gun was on the wall, not loaded, and I took it down and loaded it and just pulled the trigger . . . Can you figure out why I did that? Loneliness is all I can figure." At the time of the consultation it was noted that he was not depressed in affect and was reluctant to discuss what had occurred; "I can't think about killing or shooting myself anymore. Just forget it. It happened. It's over."

**Case B.** A 20-year-old single Eskimo male was admitted twice in 2 months, having shot himself in the abdomen with a 22-caliber rifle both times. The first incident occurred at a boarding school away from his home village, and the second at his parent's home, where he had returned to convalesce. Both episodes were alcohol related.

Two months before the initial admission, a brother of the patient had died after shooting himself. The patient mentioned dreams about his brother which increased while in the hospital. Each time he expressed remorse over his act and denied ongoing suicidal ideation. During the second admission another brother was killed in a snowmobile accident, resulting in this patient's early discharge to his village.

**Case C.** A 21-year-old Eskimo female separated from her husband shot herself in the abdomen with a 30.06 rifle. She was not drinking at the time. She had separated from her husband 3 months earlier and stated, as a motive for the shooting, an inability to choose between her boyfriend or her hus-

Table 1. Survey of consultations concerning 34 Alaska Natives with self-inflicted gunshot wounds

| Native group and sex | Alcohol related | Wound location | Motive or comment                                                                         |
|----------------------|-----------------|----------------|-------------------------------------------------------------------------------------------|
| Eskimo, M            | No              | Abdomen        | Brother beats him.                                                                        |
| Eskimo, F            | No              | Chest          | Marital problems.                                                                         |
| Eskimo, M            | Yes             | Abdomen        | Marital problems.                                                                         |
| Eskimo, M            | No              | Abdomen        | Ejected from home by father.                                                              |
| Aleut, M             | Yes             | Face and chest | 2 separate shootings 8 months apart.                                                      |
| Eskimo, M            | No              | Hand           | Mentally retarded. Considered accidental.                                                 |
| Eskimo, M            | Yes             | Abdomen        | Brother committed suicide by firearm several months earlier.                              |
| Eskimo, M            | Yes             | Axilla         | Despondent over girlfriend's marriage to another man.                                     |
| Eskimo, M            | Yes             | Abdomen        | Ejected from home by brother.                                                             |
| Eskimo, M            | Yes             | Abdomen        | No motive given. Remembered nothing.                                                      |
| Eskimo, M            | No              | Abdomen        | Not getting along with older brother.                                                     |
| Indian, M            | Yes             | Jaw            | Brother beats him.                                                                        |
| Eskimo, M            | Yes             | Thigh          | Argument with brother.                                                                    |
| Eskimo, M            | Yes             | Abdomen        | Conflict with a woman.                                                                    |
| Eskimo, M            | Yes             | Thigh          | Conflict with sister and brother-in-law.                                                  |
| Eskimo, M            | Yes             | Leg            | Father died 11 months earlier. Girlfriend marrying another man.                           |
| Eskimo, M            | Yes             | Head           | Playing Russian roulette. Claimed shooting was accidental.                                |
| Eskimo, M            | No              | Abdomen        | Felt to be accidental.                                                                    |
| Eskimo, M            | No              | Abdomen        | Stated he was cleaning gun and it discharged.                                             |
| Eskimo, F            | No              | Abdomen        | Could not choose between husband and boyfriend.                                           |
| Indian, F            | Yes             | Abdomen        | Multiple domestic problems.                                                               |
| Eskimo, M            | No              | Abdomen        | Argument with girlfriend.                                                                 |
| Eskimo, F            | Yes             | Abdomen        | Boyfriend in jail.                                                                        |
| Eskimo, M            | No              | Neck           | Older brother committed suicide by firearm 6 months earlier.                              |
| Eskimo, M            | No              | Abdomen        | Angry at others interfering in his life.                                                  |
| Eskimo, M            | No              | Forearm        | Marital discord.                                                                          |
| Eskimo, M            | Yes             | Face           | Brother committed suicide 5 years earlier. Patient stabbed self in heart 4 years earlier. |
| Eskimo, M            | No              | Leg            | Felt to be accidental.                                                                    |
| Indian, F            | No              | Leg            | Prior drug overdose.                                                                      |
| Eskimo, F            | Yes             | Arm            | Despondent over relationship with boyfriend.                                              |
| Eskimo, M            | Yes             | Abdomen        | Ex-girlfriend would not talk to him.                                                      |
| Indian, M            | Yes             | Face           | Problem with girlfriend. 3 suicides in family.                                            |
| Aleut, M             | Yes             | Chest          | Loneliness.                                                                               |
| Eskimo, M            | Yes             | Abdomen        | Fight with a girl. Brother committed suicide by gunshot 1 year earlier.                   |

NOTE: M male, F female.

band. She stated, "I was overwhelmed with personal problems and did not feel I could talk with anybody about them . . . I was only thinking about shooting myself and was touching the gun when it went off." She expressed a difficulty in being able to verbalize her problems.

At the time of the interview, she felt more able to handle her concerns and an increased openness and ability to communicate with her parents. She said that she felt like living again.

**Case D.** A 16-year-old Eskimo male shot himself in the abdomen with a low-caliber pistol. He had been drinking at the time and used this fact to explain the shooting: "It was an accident . . . I was drinking." The motive given was remorse following a fight with a girl he described as disliked by the majority of villagers: "I just couldn't get the bad feeling inside of me away . . . I wanted to get that feeling out."

Twelve months earlier a brother of the patient shot himself in the abdomen and died. The patient was close to this brother. The patient had recently expressed to friends that he felt alone and lonely. He had told someone at school that he had a pocketful of bullets and would be dead by the next day.

### Comparison with Total Alaska Population

Mortality data from death certificates were examined to identify deaths attributed to self-inflicted gunshot wounds among all Alaskans for the years 1976-80 to gather an impression on the magnitude of the problem. Computer printouts were obtained from the Office of Information Systems, Department of Health and Social Services, State of Alaska, Juneau. Deaths judged to represent suicide by firearm and accidental death by firearm were tabulated separately. Accidental deaths included those in

which someone other than the deceased discharged the weapon accidentally.

The Alaska State demographer supplied the following estimates for the State's population, based on the 1980 census, which were used to derive death rates per 100,000 population:

| Year | Total population |
|------|------------------|
| 1976 | 410,700          |
| 1977 | 413,100          |
| 1978 | 403,100          |
| 1979 | 400,600          |
| 1980 | 400,481          |

There were minor variations in the population from year to year, primarily among the non-Native population, but the variation was less than 10 percent from the highest to the lowest year. Death rates in all years were based on the 1980 census data (table 2). Components of the Alaska population in 1980 by race and group were as follows:

| Race or group              | Population | Percent of total <sup>1</sup> |
|----------------------------|------------|-------------------------------|
| Indian                     | 21,849     | 34.1                          |
| Eskimo                     | 34,135     | 53.3                          |
| Aleut                      | 8,063      | 12.6                          |
| Total Alaska Native        | 64,047     | 100.0                         |
| White                      | 308,455    | 91.7                          |
| Black                      | 13,619     | 4.0                           |
| Asian and Pacific Islander | 8,035      | 2.4                           |
| Other                      | 6,325      | 1.9                           |
| Total non-Native           | 336,434    | 100.0                         |

Statistics on suicide and accidental deaths by firearm for the Native and non-Native populations are presented in table 2. The mean rate for Natives was 24.0 and for non-Natives, 13.3. When deaths by firearm which were ruled accidental are compared, the 14.1 rate among Natives is remarkably greater than the 3.6 per 100,000 for non-Natives.

Total suicide deaths by all means were also observed (table 2). The higher rate of suicide among Natives as compared with non-Natives is maintained. Four of five deaths ruled to be suicide in Alaska resulted from firearms in these years.

Since 1978, deaths among Alaskan Natives were recorded by the decedent's group. The rate of suicide by gunshot wound in relation to total suicide deaths of Eskimos, Indians, and Aleuts are compared in table 3. No significant difference was observed ( $P > 0.3$ ).

## Discussion

Suicide attempts by firearm have a high potential for lethality. Many persons whose case records were reviewed required air evacuation to the Alaska Native Medical Center in Anchorage, and they arrived in a severely compromised physiological state. Without skilled surgical and medical intervention both before their journey and on arrival, they might not have survived. That they survived might have been due to the fortuitous course of the bullet; many do not survive such wounds long enough to receive medical care.

Table 2. Firearm deaths (suicides and accidents) and total suicides among Alaskans, by sex, 1976-80

| Year                         | Native |        |       |                   | Non-Native |        |       |                   |
|------------------------------|--------|--------|-------|-------------------|------------|--------|-------|-------------------|
|                              | Male   | Female | Total | Rate per 100,000  | Male       | Female | Total | Rate per 100,000  |
| Total suicides by firearm    | 60     | 17     | 77    | <sup>1</sup> 24.0 | 181        | 43     | 224   | <sup>1</sup> 13.3 |
| 1976                         | 12     | 3      | 15    | 23.4              | 32         | 9      | 41    | 12.2              |
| 1977                         | 17     | 1      | 18    | 28.1              | 43         | 10     | 53    | 15.8              |
| 1978                         | 12     | 3      | 15    | 23.4              | 46         | 8      | 54    | 16.1              |
| 1979                         | 8      | 4      | 12    | 18.7              | 25         | 7      | 32    | 9.5               |
| 1980                         | 11     | 6      | 17    | 26.5              | 35         | 9      | 44    | 13.1              |
| Accidental deaths by firearm | 37     | 8      | 45    | <sup>1</sup> 14.1 | 59         | 2      | 61    | <sup>1</sup> 3.6  |
| 1976                         | 5      | 2      | 7     | 10.9              | 17         | 2      | 19    | 5.6               |
| 1977                         | 3      | 1      | 4     | 6.2               | 7          | 0      | 7     | 2.1               |
| 1978                         | 3      | 1      | 4     | 6.2               | 14         | 0      | 14    | 4.2               |
| 1979                         | 12     | 1      | 13    | 20.3              | 6          | 0      | 6     | 1.8               |
| 1980                         | 14     | 3      | 17    | 26.5              | 15         | 0      | 15    | 4.5               |
| All suicides                 | 74     | 24     | 98    | <sup>1</sup> 30.6 | 220        | 55     | 275   | <sup>1</sup> 16.3 |
| 1976                         | 16     | 5      | 21    | 32.8              | 37         | 11     | 48    | 14.3              |
| 1977                         | 21     | 4      | 25    | 39.0              | 52         | 12     | 64    | 19.0              |
| 1978                         | 15     | 4      | 19    | 29.7              | 54         | 12     | 66    | 19.6              |
| 1979                         | 10     | 4      | 14    | 21.9              | 35         | 9      | 44    | 13.1              |
| 1980                         | 12     | 7      | 19    | 29.7              | 42         | 11     | 53    | 15.8              |

<sup>1</sup> Mean rate

Table 3. Suicide by firearms and total suicides, by Alaska Native group, 1978-80

| Year                      | Eskimo |                  | Indian |                  | Aleut  |                  |
|---------------------------|--------|------------------|--------|------------------|--------|------------------|
|                           | Number | Rate per 100,000 | Number | Rate per 100,000 | Number | Rate per 100,000 |
| Suicides by firearm ..... | 23     | 22.4             | 12     | 18.3             | 6      | 24               |
| 1978 .....                | 9      | 26.4             | 5      | 22.9             | 1      | 12               |
| 1979 .....                | 6      | 17.6             | 3      | 13.7             | 2      | 24               |
| 1980 .....                | 8      | 23.4             | 4      | 18.3             | 3      | 37               |
| All suicides .....        | 29     | 28.3             | 14     | 21.4             | 7      | 28               |
| 1978 .....                | 12     | 35.2             | 6      | 27.5             | 1      | 12               |
| 1979 .....                | 8      | 23.4             | 3      | 13.7             | 2      | 24               |
| 1980 .....                | 9      | 26.4             | 5      | 22.9             | 4      | 49               |

Only 8 of the 34 patients were wounded in an extremity. The other 26 shot themselves in the trunk or the head. It could reasonably be assumed that they resemble, psychodynamically, persons who completed suicide, and they are dissimilar from those who made less serious suicide attempts, or used less certain means, in which survival is the norm.

The profile resulting from the review of 34 cases was of a male Native in his second or third decade who shot himself in the abdomen with a low-caliber rifle, often under the influence of alcohol. He is unlikely to have a formal psychiatric history or be experiencing a major depression. The incident often followed a conflict with a family member or girlfriend. It is likely that a family member or friend had died by violence, often self-inflicted.

Suicide is a major cause of death among Alaska Natives. Recently, it has been second only to motor vehicle accidents as a cause of death. It has not always ranked so high. In the 1950s, suicide deaths in this group averaged fewer than five per year. An upward trend began to be noted in the 1960s (2). This trend is deplored by the Alaska Natives I have encountered. The high rate of suicide does not imply a positive social sanction. Many of the patients expressed a feeling of shame and feared nonacceptance in their village following their shooting. One patient stated, "The people in the village are angry at me. I don't know if I can face them now."

Historically among some Alaska Native cultures, specifically the Inupiat Eskimo, a traditional pattern of suicide has been recognized (3). Typically the person was a middle-aged or older man who was often ill or infirm and could not perform his usual roles in society. The suicide was undertaken after reflection and sometimes consultation with family members, who might assist in the final act. This form of suicide was positively sanctioned and had a cohesive effect upon the community.

That firearms are an important instrument of death in Alaska should come as no surprise. The concept of gun control in Alaska is relatively unpopular. Firearms are ubiquitous among Native and non-Natives alike, especially in rural and Bush areas. Guns are essential to those who hunt for part of their food, as do many Alaskans. Among American adolescents as a whole, the use of firearms as the instrument of suicide has been increasing (4). In addition to the acceptability and availability of guns in Alaska, the victims' frequent acquaintance with others who have used this weapon to kill or attempt to kill themselves is likely a major factor in its use. An association between victims of self-inflicted gunshot wounds to the face was noted among 18 such events reviewed at the University of New Mexico; 6 persons in this series were from the same pueblo (5).

Alcohol is a well-known adjunct to suicidal behavior. A significant correlation between recent interpersonal loss, and subsequent suicide had been observed in a series of alcoholics (6). The use of alcohol associated with suicidal behavior among Alaska Natives has been previously observed (7-3). Among the patients included in my study, some regarded the use of alcohol as an explanation for their act: "It was an accident. I was drinking."

It was more common for alcohol to function in a dissociative role. The patient became detached from the self-destructive act, as if it had occurred in another time and place and bore little relationship to the current reality: "My head was out there . . . nobody could have stopped me. It was like my mind wasn't a part of me."

Some are amnesic about the events and denied any recollection of suicidal feelings. One young man simply stated his only recollection as "I was pretty drunk," adding, "I feel stupid." However, upon further questioning of the patient a possible precipitant such as recent loss could often be found.

Another man said, "I can't remember why it happened . . . I was drunk." He later acknowledged, "I think about my brother who hung himself last year. It really bothers me . . . I guess maybe that was on my mind. I can't seem to forget it."

In the aggregate, the retrospective motives given for the shootings, while important to the patient, would not appear to warrant such a dramatic response. The clinician must wonder why one would raise a gun to oneself after a minor family fight. Most of the attempts described previously could be classified as impulsive; such impulsive attempts are believed to be motivated by the desire to reduce tension (7). The Alaska Native is uniquely beset by a combination of forces both intrapsychic and cultural that contribute to an alarming level of suicide.

While the explanation offered was often a conflict between the patient and others, this event contributes only in a small way to the suicide attempt. Far more important is the internal world that allows such conflicts to weigh so heavily. Tabachnik described two groups of suicide attempters, the interpersonal and intrapersonal among American Indians (8). The patients in my series appear to have features of both. Overt expression of anger is relatively proscribed in Alaska Natives. In her study of the Utku of the Canadian Arctic, an Eskimo group, Briggs addressed this subject. "As a warm, protective, nurturant, even-tempered person represents the essence of goodness, so an unkind, bad-tempered person represents the opposite. Expressions of ill temper toward human beings are never justified in anyone over the age of three or four" (9).

Such an attitude toward negative affect appears prevalent in Alaska Natives as well. A tendency to internalize anger, pain, and worry has been observed among other Native Americans (10). Suicidal activity appears to be related to a lack of culturally sanctioned techniques for acting out hostile affect (11).

A difference in the internal world of the Alaska Native can not explain the precipitous increase in suicide in recent decades. The external world, the society in which Alaska Natives find themselves, has changed dramatically. Kraus and Boffler noted: "... a process of acculturation which has been accelerating in its speed and intensity. For many Native Alaskans, especially the young, the breakdown of the organized, consistent, traditional relationships due to pressures from without has resulted in a reduced ability to find and hold a position of psychological integrity and centrality. Loneliness,

anxiety, frustration, continuing stress and at times despair characterize the lives of many Native Alaskans today" (1). The traditional village life and economy in Alaska has been forced to undergo major changes by external influences. The presence of non-Native influence and subsequent partial loss of control over their lives has been an ongoing feature in Native life since the 1800s, with the coming of missionaries, fur traders, and gold seekers. This trend intensified with Alaska's attainment of statehood in 1959 and more recently with the trans-Alaska oil pipeline of the 1970s and the Native Claims Settlement Act of 1971. A visitor to a Native village today will find many symbols of this change, perhaps exemplified by the satellite earth station providing convenient telephone communication and live network television. While many changes, such as improved communications, transportation, and health care have been welcome, none are without major social impact. Rapid, externally generated change has at times contributed to social disorganization, cultural conflict, and family disorder. These consequences in turn can precipitate low self-esteem, depression, and hopelessness which might trigger self-destruction.

Unfortunately, the problems I have described are not limited to Alaska Natives. Suicide and violent death trouble many other Native American groups (12). Others have described the relationship of suicide among Native Americans to cultural conflict (13-20). To various degrees and at various times, Native Americans and Alaska Natives have shared a common heritage of cultural disruption.

In order to prevent suicide, one needs either to identify those at risk and intervene individually or identify and effectively alleviate the social roots of this behavior. This series of cases of self-inflicted gunshot wounds is remarkable in a lack of ability to distinguish the victim from his or her peers. Most were not clinically depressed and made no statements of intent. Many suffered the recent loss of a loved one by violence, but such a loss unfortunately is not uncommon for the group, and it is in no way unique to those with suicidal behavior. Gun control in an environment where guns are common, necessary, and accepted would not be realistic.

Limiting the easy availability of alcohol would reduce the overall level of traumatic death. Currently some Native villages are considering measures to restrict the sale or importation of liquor. Of course if a person has demonstrated suicidal intent, individual treatment and prevention should be used. However, ultimately to reverse the tragic and dis-

proportionate hazard of suicide among Native Americans and Native Alaskans, the cultural causes will need to be addressed by Natives who have regained hope and control of their own lives.

Suicidal behavior, exemplified by the self-inflicted gunshot wound, continues to be a threat to young Alaska Natives. Its prevalence appears to be a function of increasing disruption and alienation, imposed upon a set of behavioral norms that limit one's ability to convey anger and pain.

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## A Study of Underreporting of Down's Syndrome on Birth Certificates in an Ohio County, 1970-78

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the Bureau of Community Health Services, Public Health Service. Tearsheet requests to Dr. Huether.

#### SYNOPSIS .....

In a previous statewide assessment in Ohio of the percentage reporting of Down's syndrome (DS) on birth certificates, it was found that 33.9 percent of the cases chromosomally analyzed were so recorded. The objectives of this study were to gain a greater understanding of the basis of this low reporting percentage by concentrating on Hamilton County births only, to compare these percentages among hospitals in the county, and to determine the commonality of

proportionate hazard of suicide among Native Americans and Native Alaskans, the cultural causes will need to be addressed by Natives who have regained hope and control of their own lives.

Suicidal behavior, exemplified by the self-inflicted gunshot wound, continues to be a threat to young Alaska Natives. Its prevalence appears to be a function of increasing disruption and alienation, imposed upon a set of behavioral norms that limit one's ability to convey anger and pain.

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## A Study of Underreporting of Down's Syndrome on Birth Certificates in an Ohio County, 1970-78

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the Bureau of Community Health Services, Public Health Service. Tearsheet requests to Dr. Huether.

#### SYNOPSIS

In a previous statewide assessment in Ohio of the percentage reporting of Down's syndrome (DS) on birth certificates, it was found that 33.9 percent of the cases chromosomally analyzed were so recorded. The objectives of this study were to gain a greater understanding of the basis of this low reporting percentage by concentrating on Hamilton County births only, to compare these percentages among hospitals in the county, and to determine the commonality of

SELECTED COMPUTATIONS ON  
ALCOHOL/DRUG RELATED COSTS

Tables

|                    |                                                                                                                                                  |                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1,2,3              | PUBLIC ASSISTANCE PAYMENTS:                                                                                                                      | 5,828,210          |
| 4                  | MEDICAL ASSISTANCE PAYMENTS:                                                                                                                     | 5,650,892          |
| 6                  | SOCIAL      Foster Care, Institutional care for children,<br>SERVICES:   Daycare, Protective Services, Homemakers<br>*(Some Drug costs included) | 8,718,444          |
| 8                  | MOTOR<br>VEHICLE:   Accidents, Fatalities, Injuries, Property Damage                                                                             | 31,903,460         |
| 13,14              | CRIMINAL<br>JUSTICE    Prosecution, Enforcement, Courts, Corrections<br>SYSTEM:                                                                  | 78,644,355         |
|                    | SOADA:                                                                                                                                           | 15,109,700         |
| 15,16,17,<br>18,19 | COSTS OF LOST PRODUCTION:                                                                                                                        | 19,870,000         |
| 20                 | ESTIMATED INSTITUTIONAL EXCESS COSTS, HEALTH AND<br>MEDICAL CARE:                                                                                | 19,569,000         |
| <u>TOTAL COSTS</u> |                                                                                                                                                  | <u>185,294,061</u> |

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|                      |                                                       |                   |
|----------------------|-------------------------------------------------------|-------------------|
| 12                   | Net Revenue to State from Licensure Fees and Taxation | <u>14,868,433</u> |
| <u>TOTAL REVENUE</u> |                                                       |                   |

---

|          |                                             |            |
|----------|---------------------------------------------|------------|
| 10,11,12 | Estimated Loss of Income to Alaska Families | 54,900,000 |
|----------|---------------------------------------------|------------|

|                 |                    |
|-----------------|--------------------|
| Cost            | 185,294,061        |
| Revenue         | (14,868,433)       |
| <u>NET COST</u> | <u>170,425,628</u> |

The State Spends \$12.46 on Services for Each \$1 of  
Revenue Collected for Alcohol Products.

\*\*\*Supporting calculations on following pages.

TABLE 1  
AID TO FAMILIES WITH DEPENDENT  
CHILDREN--ASSISTANCE PAYMENTS  
FY 84

| TOTAL<br>Average #<br>of AFDC<br>Cases per<br>Month | Percent<br>Estimated<br>Alcohol-<br>Related | Average #<br>of Alcohol-<br>Related<br>Cases per<br>Month | Average<br>Cost per<br>Case per<br>Month | Cost of all<br>Alcohol-Related Cases |             |
|-----------------------------------------------------|---------------------------------------------|-----------------------------------------------------------|------------------------------------------|--------------------------------------|-------------|
|                                                     |                                             |                                                           |                                          | Per Month                            | Per Year    |
| 2297                                                | 15%                                         | 345                                                       | \$564                                    | \$194,326                            | \$2,331,914 |

Source: Division of Public Assistance, Dept. of Health and Social Services

TABLE 2  
AID TO THE DISABLED--ASSISTANCE  
PAYMENTS, FY 84

| TOTAL<br>Average #<br>of AD Cases<br>Per Month | Percent<br>Estimated<br>Alcohol-<br>Related | Average #<br>of Alcohol-<br>Related<br>Cases Per<br>Month | Average<br>Cost Per<br>Case Per<br>Month | Cost of All<br>Alcohol-Related Cases |             |
|------------------------------------------------|---------------------------------------------|-----------------------------------------------------------|------------------------------------------|--------------------------------------|-------------|
|                                                |                                             |                                                           |                                          | Per Month                            | Per Year    |
| 2578                                           | 20%                                         | 516                                                       | \$202                                    | \$104,151                            | \$1,249,814 |

Source: Division of Public Assistance, Dept. of Health and Social Services

TABLE 3  
AID TO ADULT ASSISTANCE  
PAYMENTS, FY 84

| TOTAL<br>Average #<br>of Adult<br>cases per<br>Month | Percent<br>Estimated<br>Alcohol-<br>Related | Average #<br>of Alcohol-<br>Related<br>Cases Per<br>Month | Average<br>Cost Per<br>Case Per<br>Month | Cost of All<br>Alcohol-Related Cases |             |
|------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------|------------------------------------------|--------------------------------------|-------------|
|                                                      |                                             |                                                           |                                          | Per Month                            | Per Year    |
| 6,534                                                | 11.1%                                       | 725                                                       | \$189                                    | \$137,076                            | \$1,644,912 |

Source: Division of Public Assistance, Dept. of Health and Social Services

TABLE 4  
MEDICAID PAYMENTS RELATED  
TO ALCOHOL, FY 84

| Medicaid<br>Cost for<br>AD's Per<br>Year | Estimated<br>Percent<br>Alcohol-<br>Related<br>AD Cases | Medicaid<br>Alcohol-<br>Related<br>Costs for<br>AD's Per<br>Year | Medicaid<br>Cost for<br>AFDC &<br>Under 21<br>Per Year | Estimated<br>Percent<br>Alcohol-<br>Related<br>AFDC &<br>Under 21 | Medicaid<br>Alcohol-<br>Related<br>Costs for<br>AFDC &<br>Under 21<br>Cases Year | Total<br>Medicaid<br>Costs for<br>Alcohol-<br>Related<br>AFDC, 21<br>AD Cases<br>Per Year |
|------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 16,117,431                               | 20%                                                     | \$3,233,486                                                      | 16,182,708                                             | 15%                                                               | 2,427,406                                                                        | \$5,650,892                                                                               |

Source: Division of Medical Assistance, Dept. of Health and Social Services

TABLE 5  
MEDICAL AND PUBLIC ASSISTANCE AGGREGATED DIRECT COSTS ATTRIBUTABLE  
TO ALCOHOLISM AND ALCOHOL ABUSE, FY 84

| Category                                   | Cost of All<br>Alcohol-Related<br>Cases Per Year |
|--------------------------------------------|--------------------------------------------------|
| AFDC                                       | \$2,331,914                                      |
| AD                                         | 1,249,814                                        |
| Adult Programs                             | 1,644,912                                        |
| Medicaid                                   | 5,650,892                                        |
| Total Alcohol-<br>Related Assistance Costs | 10,877,532                                       |

Total of Tables 1, 2, 3, 4,

TABLE 6  
PROGRAM SERVICES AND SOCIAL SERVICES COSTS  
FOR ALCOHOL/DRUG RELATED CASES, FY '84

| Program                                                         | Foster<br>Care                | Institutional<br>Care for Children | Day<br>Care    | Protective<br>Services | Homemakers     | Total     |
|-----------------------------------------------------------------|-------------------------------|------------------------------------|----------------|------------------------|----------------|-----------|
| Total<br>State<br>Cost                                          | \$5,303,100                   | \$10,836,300                       | \$357,500      | \$244,200              | \$3,826,000    |           |
| % Attri-<br>butable to<br>Alcohol/Drug<br>Relatedness<br>& Cost | 44% <sup>b</sup><br>2,333,364 | 44%<br>4,767,972                   | 44%<br>157,300 | 44%<br>1,077,208       | 10%<br>382,600 | 8,718,444 |

The percent attributable to alcohol/drug related problems is based upon a weighted average, determined by a survey of actual cases reported by social workers which showed child neglect to be 47% alcohol-related and child abuse to be 32% alcohol-related. The resultant is 44%.

Source: Division of Family and Youth Service, DHSS

TABLE 7  
SUMMARY  
ECONOMIC COST OF SOCIAL SERVICES AND TRANSFER PAYMENTS  
ATTRIBUTABLE TO ALCOHOLISM AND ALCOHOL AND DRUG ABUSE  
ALASKA, FY 84

| Category            | Amount<br>(\$Millions) |
|---------------------|------------------------|
| Social Services     | \$8,718,444            |
| Assistance Programs | \$10,877,532           |
| Total               | \$19,595,976           |

Total of Tables 1 to 5

**TABLE 8**  
**ECONOMIC COSTS OF EXCESS MOTOR VEHICLE ACCIDENTS**  
**ATTRIBUTABLE TO ALCOHOLISM AND ALCOHOL ABUSE**  
**ALASKA, FY 84**

| Accident Type                                              | 1<br>Number | 2<br>Unit Cost<br>(dollars)   | 3<br>Total Cost<br>(dollars) | 4<br>EAA | 5<br>Excess Cost<br>(dollars) |
|------------------------------------------------------------|-------------|-------------------------------|------------------------------|----------|-------------------------------|
| Fatalities                                                 | 137         | \$306,000                     | \$44,662,000                 | 51.1%    | \$22,822,282                  |
| Injuries                                                   | 6,840       | 5,000                         | 34,200,000                   | 15.5%    | 5,301,000                     |
| Property<br>Damage                                         | 14,499      | Actual<br>Reported<br>Damages | 40,210,258                   | 9.4%     | 3,779,764                     |
| Total Excess<br>Cost Attri-<br>butable to<br>Alcohol Abuse |             |                               |                              |          | \$31,903,046                  |

**Source:**

- Column 1. Provided by Alaska Department of Public Safety and the Department of Highways.
- Column 2. Unit Costs for Alaska provided by Mr. Mike Lewis, Alaska Highway Safety Planning Agency
- Column 3. Product of Columns 1 and 2. Total Cost for Property damage accidents provided by actual reported damages.
- Column 4. Excess proportion due to alcohol abuse.
- Column 5. Product of Columns 3 and 4.

TABLE 9

**MEDIAN INCOME DIFFERENTIAL BY AGE GROUPINGS  
FOR ALCOHOL ABUSERS AND NON-ABUSERS  
IN ALASKA, 1984**

| Age   | 1<br>Family Median Income | 2<br>% Decrease in Income<br>Due to Alcohol Abuse | 3<br>Decrease in Income<br>Due to Alcohol Abuse |
|-------|---------------------------|---------------------------------------------------|-------------------------------------------------|
| 20-29 | \$21,736                  | 11.25                                             | \$2,445                                         |
| 30-39 | 32,159                    | 17.35                                             | 5,580                                           |
| 40-49 | 38,961                    | 22.85                                             | 8,903                                           |
| 50-59 | 41,101                    | 15.48                                             | 6,362                                           |

Column 1. Computed from Table 209, Alaska, U.S. Department of Commerce, Bureau of Census 1980.

Column 2. Results are from National Probability Samples of Social Research Group, School of Public Health, University of California, Berkeley, 1974 (unpublished paper), cited in Economic Cost, p. 47.

TABLE 10

**NUMBER OF FAMILIES WITH AN ALCOHOL ABUSING MALE AS HEAD,  
ADJUSTED FOR 1984**

| Age of Head | 1<br>Estimated Number of Families | 2<br>Percent of Families with Male Head | 3<br>Percent of Families with Alcohol-Abusing Male | 4<br>Estimated Number of Families with Alcohol-Abusing Male<br>(1 x 2 x 3) |
|-------------|-----------------------------------|-----------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------|
| 20-29       | 20,490                            | 93.9                                    | 21                                                 | 4,040                                                                      |
| 30-39       | 26,964                            | 93.9                                    | 13                                                 | 3,291                                                                      |
| 40-49       | 18,974                            | 93.9                                    | 12                                                 | 2,138                                                                      |
| 50-59       | 11,640                            | 93.9                                    | 11                                                 | 1,202                                                                      |

Column 1. From Table 239 in correlation with Table 174, Alaska, U.S. Department of Commerce, Bureau of Census, 1980. A determination was made as to the number of families per age group by graphing the information provided in the tables and readjusting the data for difference in age groupings, and population projections between 1980 and 1984.

Column 2. From Table 209, Alaska, Census 1980.

Column 3. Economic Cost, p. 47.

TABLE 11

LOST PRODUCTION COSTS AMONG FAMILIES WITH ALCOHOL ABUSING MALE HEADS  
BY AGE GROUPS AND TOTAL POPULATION

| Age<br>Income<br>Group | 1<br>Decrease in Median<br>Income Due to Alcohol<br>Abuse of Male Head<br>of Household | 2<br>Estimated Number<br>of Families<br>With Alcohol-Abusing<br>Male Head | 3<br>Estimate of Total<br>Lost Income<br>(millions) |
|------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------|
| 20-29                  | \$2,445                                                                                | 4,040                                                                     | 9.8                                                 |
| 30-39                  | 5,580                                                                                  | 3,291                                                                     | 18.4                                                |
| 40-49                  | 8,903                                                                                  | 2,138                                                                     | 19.1                                                |
| 50-59                  | 6,362                                                                                  | 1,202                                                                     | 7.6                                                 |
| Total                  |                                                                                        | <u>10,671</u>                                                             | \$54.9                                              |

Column 1. From Table 1, Column 3.

Column 2. From Table 2, Column 4.

Column 3. Product of Column 1 multiplied by column 2.

TABLE 12

NET REVENUE OF STATE REGULATION OF SALE  
AND CONSUMPTION OF BEVERAGE ALCOHOL FY '84<sup>a</sup>

| Source                                     | Amount<br>(Dollars)        |
|--------------------------------------------|----------------------------|
| Beverage Dispensary Fees                   | \$ 852,15                  |
| Wholesale Malt Fees                        | 17,00                      |
| Pub Fees                                   | ---                        |
| Restaurant Dispensary Fees                 | 61,850                     |
| Commercial Carrier Fees                    | 36,675                     |
| Club Fees                                  | 44,900                     |
| Application Fees                           | 101,850                    |
| Wholesale Licenses                         | 139,100                    |
| Retail Licenses                            | 373,300                    |
| Excise Tax                                 | 13,849,483                 |
| Wholesale Industry Income Tax <sup>b</sup> | 100,000                    |
| Multi State Tax                            | <u>5,000</u>               |
| GROSS STATE REVENUE                        | \$15,606,733               |
| Administrative Costs:                      |                            |
| Alcohol Beverage Control Office            | 667,500                    |
| Auditan Collection Division                | <u>70,800</u>              |
| Total Administrative Costs                 | \$738,800                  |
| NET STATE REVENUE                          | <u><u>\$14,868,433</u></u> |

<sup>a</sup>All figures provided by Department of Revenue, Division of Audit and Collections, except as noted.

<sup>b</sup>Review of the Wholesale Liquor Industry, State of Alaska Legislative Council, Subcommittee of Taxation and Revenue Report. Figure is an estimate; direct information is unavailable.

Source: Department of Revenue

TABLE 13  
EXPENDITURES OF THE CRIMINAL  
JUSTICE SYSTEM BY COMPONENT  
ALASKA, FY 84

| COMPONENT        | AMOUNT            |
|------------------|-------------------|
| Enforcement      |                   |
| State Troopers   | \$ 33,786,800     |
| Municipal Police | 54,354,701        |
| Prosecution      | 9,288,700         |
| Judicial         | 35,932,700        |
| Corrections      | <u>56,617,100</u> |
| TOTAL            | 189,980,001       |

Source: Budget expenditures obtained from Division of Budget and Management reports. Municipal expenditures obtained from Department of Public Safety.

Table 14  
ESTIMATED EXPENDITURES OF CRIMINAL JUSTICE SYSTEM ATTRIBUTABLE TO  
ALCOHOLISM AND ALCOHOL ABUSE AS A PROPORTION OF EACH AND ALL SYSTEM  
COMPONENTS, FY 84

| Component   | Total<br>Component<br>Expenditure | Alcohol<br>Related<br>Expenditures | Percent of<br>Expenditure<br>for each* | Percent of<br>Total<br>Expenditures |
|-------------|-----------------------------------|------------------------------------|----------------------------------------|-------------------------------------|
| Enforcement | 88,141,500                        | 40,016,241                         | 45.4%                                  | 23.8%                               |
| Courts      | 35,932,700                        | 5,569,568                          | 15.5%                                  | 3.2%                                |
| Corrections | 56,617,100                        | 33,058,546                         | 28.5%                                  | 13.4%                               |

\*Percent expenditures determined from survey of various agencies.

TABLE 15  
EXCESS DEATHS ATTRIBUTABLE TO ALCOHOLISM AND ALCOHOL ABUSE

|           | 1            | 2                     | 3             |
|-----------|--------------|-----------------------|---------------|
| Age Group | Total Deaths | Percent Excess Deaths | Excess Deaths |
| 20-24     | 109          | 19                    | 21            |
| 25-34     | 194          | 20                    | 39            |
| 35-44     | 155          | 40                    | 62            |
| 45-54     | 232          | 19.5                  | 45            |
| 55-64     | 327          | 12.3                  | 40            |

Sources:

Column 1. Alaska Bureau of Vital Statistics

Column 2. Economic Cost of Alcohol Abuse and Alcoholism, 1971,  
HMS 42-73-114, NIAAA

Column 3. Column 1 multiplied by column 2.

TABLE 16  
PERSON YEARS LOST DUE TO EXCESS DEATHS DUE TO ALCOHOLISM AND ALCOHOL ABUSE

| Age Group<br>of Death | AGE GROUP WHEN YEARS LOST |        |        |        |        |
|-----------------------|---------------------------|--------|--------|--------|--------|
|                       | 20-24                     | 25-34  | 35-44  | 45-54  | 55-64  |
| 20-24                 | 49.84                     | 196.96 | 191.36 | 179.04 | 153.28 |
| 25-34                 |                           | 102.34 | 200.56 | 187.38 | 160.18 |
| 35-44                 |                           |        | 222.12 | 421.56 | 360.00 |
| 45-54                 |                           |        |        | 112.42 | 189.35 |
| 55-64                 |                           |        |        |        | 93.12  |

Source: Economic Cost of Alcohol Abuse and Alcoholism, 1971, Hms 42-73-114  
NIAAA

TABLE 17  
MEDIAN TOTAL INCOME BY  
AGE FOR 1980

| AGE GROUP | MEDIAN TOTAL<br>INCOME |
|-----------|------------------------|
| 20-24     | 10,601                 |
| 25-34     | 14,662                 |
| 35-44     | 18,252                 |
| 45-54     | 17,029                 |
| 55-64     | 13,743                 |

Source: Department of Labor, 1980 Census report.

TABLE 18

UNDISCOUNTED COST OF LOST PRODUCTION DUE TO EXCESS  
MORTALITY ATTRIBUTABLE TO ALCOHOL ABUSE AND ALCOHOLISM (millions of dollars)

| Age Group<br>of Death | 20-24 | 25-34 | 35-44 | 45-54 | 55-64 |
|-----------------------|-------|-------|-------|-------|-------|
| 20-24                 | .528  | 2.887 | 3.492 | 3.048 | 2.106 |
| 25-34                 |       | 1.5   | 3.66  | 3.19  | 2.201 |
| 35-44                 |       |       | 4.054 | 7.178 | 4.847 |
| 45-54                 |       |       |       | 1.914 | 2.602 |
| 55-64                 |       |       |       |       | 1.279 |

Product of Table 18 Times Table 19

TABLE 19

THE FY 84 VALUE\* OF COSTS OF LOST PRODUCTION DUE TO  
EXCESS MORTALITY OF ALCOHOL ABUSERS (millions of dollars)

| Age Group<br>of Death | 20-24 | 25-34 | 35-44 | 45-54 | 55-64 | TOTAL        |
|-----------------------|-------|-------|-------|-------|-------|--------------|
| 20-24                 | .45   | 1.79  | 1.12  | .51   | .17   | 4.04         |
| 25-34                 |       | 1.11  | 1.39  | .93   | .22   | 3.65         |
| 35-44                 |       |       | 2.99  | 2.65  | .94   | 6.58         |
| 45-54                 |       |       |       | 1.39  | .99   | 2.38         |
| 55-64                 |       |       |       |       | .93   | .93          |
| Total**               |       |       |       |       |       | <u>17.58</u> |
| Adjusted total***     |       |       |       |       |       | <u>19.87</u> |

\*Discount rate of 7%

\*\*1980 dollar value

\*\*\*Adjustment from 1980 to 1983 dollar value based on 13% increase in  
consumer price index.

TABLE 20

ESTIMATED INSTITUTIONAL COSTS OF HEALTH AND MEDICAL CARE  
ATTRIBUTABLE TO ALCOHOLISM AND ALCOHOL ABUSE\*

|                               | Low<br>Estimate | High<br>Estimate | Average<br>(millions \$) |
|-------------------------------|-----------------|------------------|--------------------------|
| <b>Hospitals - Acute Care</b> |                 |                  |                          |
| Non-Native-Private            | 2,364,553       | 3,715,807        | 3.041                    |
| Public Health                 | 1,411,715       | 2,270,228        | 1.840                    |
| Military                      | 437,939         | 700,131          | .569                     |
| API                           | <u>828,599</u>  | <u>882,599</u>   | <u>.883</u>              |
| SUB-TOTAL                     | 5,096,806       | 7,568,765        | 6.333                    |
| <b>Physician's Services</b>   |                 |                  |                          |
| Non-Native and Military       | 5,341,125       | 15,435,000       | 10.388                   |
| Public Health Service         | <u>116,600</u>  | <u>856,069</u>   | <u>.487</u>              |
| SUB-TOTAL                     | 5,457,725       | 16,291,069       | 10.875                   |
| <b>Drug and Drug Sundries</b> |                 |                  |                          |
|                               | 546,840         | 614,960          | .581                     |
| <b>Nursing Services</b>       |                 |                  |                          |
|                               | 1,782,198       | 1,782,198        | 1.782                    |
| TOTAL                         | 12,883,573      | 26,256,494       | 19.569                   |

\*Update of previous estimate completed by Dennis Kelso, Ph. D., the Economic Impact of Alcoholism and Alcohol Abuse in Alaska, 1975 Volume I. pp. 63-99.

# FY85 ALCOHOLISM AND DRUG ABUSE GRANTS

| PROGRAM                                                                                                  | BRIEF DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FUNDING |                     |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------------|
|                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SOURCE  | FY 84 FY 85         |
| Tanana Chiefs Conference<br>1st & Hall Streets<br>Doyon Building<br>Fairbanks, AK. 999701                | The TCC Regional Prevention Project provides information, education, and preventive services in the northern region. This year the project is divided into five separate program components: Youth Prevention, Broadcast Services, Fetal Alcohol Syndrome Prevention, Village Local Option Support, and Provider Conferences.                                                                                                                                      | Drug    | \$150,000 \$150,000 |
| Fairbanks School District<br>P.O. Box 1250<br>Fairbanks, AK. 99707                                       | This program will implement the "Here's Looking at You Two" comprehensive drug/alcohol curriculum in the Fairbanks North Star School District. The groups which will be specifically targeted for instruction are Junior High School students, their teachers and their parents.                                                                                                                                                                                   | Drug    | \$10,000 - 0 -      |
| Craig Youth Center<br>Box 148<br>Craig, Alaska 99921                                                     | The Craig Youth Center offers its services to all area youth from ages 6-18 years of age. The specific service components offered are as follows: Structured and recreational activities; educational information to all area youths identified as "at risk" concerning alternatives to substance abuse; improved parenting skills presentations to youth and their families community awareness presentations targeted to community members and parents of youth. | Drug    | \$35,000 \$375,000  |
| Anchorage Behavioral Hlth.<br>Treatment Center<br>825 L Street<br>Pouch 6-650<br>Anchorage, Alaska 99502 | Through various sub-contracts the municipality provides the following drug abuse services: outpatient detox, methadone maintenance, drug-free counseling, intermediate care, residential drug-free therapeutic community, information/education, youth outpatient, youth residential treatment.                                                                                                                                                                    | Drug    | \$647,500 \$889,500 |
| NCA - Juneau<br>147 S. Franklin<br>Juneau, Alaska 99801                                                  | Provides a drug abuse prevention specialist for the school-age youth of Juneau to deliver prevention/education, intervention and outreach services. Also provides individual, vocational and educational counseling, and Alaska Safety Action (ASAP) services.                                                                                                                                                                                                     | Drug    | \$56,000 \$123,573  |

|                                                                                                      |                                                                                                                                                                                                                                         |      | <u>FY 84</u> | <u>FY 85</u> |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------|--------------|
| KILA, Inc.<br>3098 Airport Way<br>Fairbanks, AK. 99574                                               | Provides outpatient detox, methadone maintenance, outpatient drug free counseling, prevention education in Fairbanks area. Specially targeted groups are abusers of heroin, amphetamines and barbituates.                               | Drug | \$210,000    | \$237,400    |
| Fairbanks Native Assoc.<br>Youth Alternatives to<br>Drug Abuse<br>950 Cowles<br>Fairbanks, AK. 99701 | Provides prevention and education information regarding drug abuse to Fairbanks youth through a variety of delivery settings. Maintains drop-in center and provides drug-free recreation alternatives in 5 low income housing projects. | Drug | \$120,000    | \$128,165    |
| Ketchikan Youth Services<br>Box 7202<br>Ketchikan, AK. 99901                                         | KYS provides drug abuse prevention/education, information/referral and alternative activities for youth. Also maintains operation of youth drop-in center and related youth activities.                                                 | Drug | \$155,000    | \$157,494    |
| Petersburg Youth Program, Inc.<br>212 Indian Street<br>Petersburg, AK. 99833                         | Operates a drop-in center and provides special drug-free alternative activities and academic tutoring to high risk youth. Provides drug-abuse prevention information for area community and schools.                                    | Drug | \$ 89,000    | \$ 89,000    |
| Sitka Teen Service<br>Box 1714<br>Sitka, AK. 99835                                                   | Provides drug abuse prevention education through drug-free recreational alternatives and skill development to youth ages 13-19 in Sitka.                                                                                                | Drug | \$ 77,500    | \$ 80,000    |

| <u>PROGRAM</u>                                                                                            | <u>DESCRIPTION</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>Funding Source</u> | <u>FY 84</u> | <u>FY 85</u> |
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| Alaska Council on the Prevention of Alcohol and Drug Abuse<br>7521 Old Seward Hwy, Suite A<br>(Statewide) | The ACOPADA provides statewide prevention services via several programs. The "Here's Looking at You" alcohol education curriculum implementation project has been on going for three years and the evaluation continues each year. This project will be continued as well as Media and Alcohol Awareness Week efforts. The ACOPADA will also continue to provide technical assistance, materials, speakers, and public information as requested by other programs, groups or the general public on a staff/material available basis. Assistance to Employee Assistance programs will also be continued. | Alcohol               | \$800,000    | \$918,343    |
| Anchorage Behavioral Health Treatment System<br>825 L Street<br>Anchorage, AK. 99502                      | Provides for delivery of alcohol services in Anchorage through sub-contracts for the following services components: emergency care, outreach, intermediate care, outpatient care, aftercare, ASAP and justice system services, corrections services, corrections, information and education. Target groups include women, youth, parents of abused or neglected children, convicted OMVI offenders, alcohol abusers, chronic public inebriates, elderly and employed persons. (See back pages for list of subcontractors.)                                                                              | Alcohol               | \$2,900,000  | \$2,950,000  |
| Aleutian/Pribilof Islands Assoc. Inc.<br>1689 C Street<br>Anchorage, Alaska 99501                         | A/PIA is also providing training, travel and associated costs for one community paraprofessional from each community in the region. The trained individuals will return to their homes and provide outreach, consultation and education services to individuals, families and the community.<br><br>A/PIA also will provide for referral and transportation services from the Chain to Anchorage for individuals suffering from acute problems related to alcohol abuse and in need of emergency treatment.                                                                                             | Alcohol               | 111,100      | \$100,000    |

|                                                                                                       |                                                                                                                                                                                                                                                                                                                                                         | <u>Funding Source</u> | <u>FY 84</u> | <u>FY 85</u> |
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| North Pacific Rim<br>903 W. Northern Lights Blvd.<br>Suite 203<br>Anchorage, Alaska 99503-2496        | Provides community organization activities based on the community identified needs. Prevention of substance abuse using community developed strategies.                                                                                                                                                                                                 | Alcohol               | - 0 -        | \$ 10,000    |
| Barrow Alcohol Program<br>P.O. Box 69<br>Barrow, Alaska 99723                                         | Services include alcohol education, information and referral, EAP coordination and prevention, outpatient, aftercare counseling, ASAP and justice system services.                                                                                                                                                                                      | Alcohol               | \$205,000    | \$250,000    |
| Ikayugtut, Inc.<br>P.O. Box 730<br>Barrow, Alaska 99723                                               | Services - include outpatient counseling services, aftercare, consultation, treatment, family therapy.                                                                                                                                                                                                                                                  | Alcohol               | - 0 -        | \$ 8,000     |
| Bristol Bay Area Health Corporation<br>Box 10235<br>Dillingham, Alaska 99575                          | Provides service to 22 villages and the City of Dillingham in the form of outpatient counseling, follow-up, outreach, aftercare, ASAP and justice system services, referral, alcohol information school, information education and prevention.                                                                                                          | Alcohol               | \$160,000    | \$205,600    |
| Center for Alcohol & Addiction Studies<br>U of A<br>3211 Providence Avenue<br>Anchorage, Alaska 99504 | Provides quality control for Level I and II counselor certification training, curriculum orientations to residential trainers. Also provides specialized training to subcontractors, publishes a resource catalog of certification training materials, and conducts Annual School of Alcohol and Addiction Studies. Conducts special research projects. | Alcohol               | \$84,000     | \$840,000    |
| Chevak Alcoholism Program<br>Box 6083<br>Chevak, Alaska 94563                                         | Community education, individual, group and family counseling, crisis intervention, mental health and public health Antabuse Program, out-patient treatment, after care, outreach, prevention.                                                                                                                                                           | Alcohol               | - 0 -        | \$ 57,000    |

|                                                                                                                       |                                                                                                                                                                                                                                                                                                  | Funding      |              |              |
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|                                                                                                                       |                                                                                                                                                                                                                                                                                                  | <u>Level</u> | <u>FY 84</u> | <u>FY 85</u> |
| Cook Inlet Council on Alcoholism<br>Benco Building<br>Kenai, Alaska 99611                                             | Program includes ASAP and justice services, outpatient, aftercare, information/education, and youth alternative services. Serves both Homer, Kenai and Tyonek areas with emphasis on youth, women, misdemeanor/felony offenders.                                                                 | Alcohol      | \$180,000    | \$303,000    |
| Copper River Native Assoc.<br>Human Services Division<br>Copper Center, Ak. 99573                                     | Copper River Native Association offers alcoholism services such as: Outpatient counseling, referral, outreach aftercare, OMVI, information/education and crisis intervention. Eight villages are served by the program in the Copper River area.                                                 | Alcohol      | \$83,000     | \$ 88,810    |
| Cordova Community Services<br>Community Hospital<br>Cordova, AK. 99574                                                | Provides information, counseling, consultation, education outpatient treatment, aftercare, outreach and prevention education consultation.                                                                                                                                                       | Alcohol      | \$45,000     | \$ 58,000    |
| Fairbanks Native Assoc.<br>Comprehensive Alcoholism Program<br>First & Hall<br>Doyon Building<br>Fairbanks, AK. 99701 | Provides comprehensive alcoholism services such as: Emergency care, detox, short-term intermediate care, halfway house for men and women, ASAP and justice system services, outpatient, aftercare, outpatient counseling and education prevention services for Fairbanks area.                   | Alcohol      | \$950,000    | \$1,107,40   |
| Galena Alcoholism Program<br>P.O. Box 17<br>Galena, Alaska 99741                                                      | Provides outpatient counseling, aftercare, family therapy outreach, prevention education, consultation to residents of Galena.                                                                                                                                                                   | Alcohol      | \$54,000     | \$ 54,000    |
| Juneau Alcoholism & Drug Abuse Central Agency<br>210 Admiral Way<br>Juneau, AK. 99801                                 | The program provides comprehensive services such as emergency care, inpatient care, intermediate and long-term care, outreach, outpatient, aftercare, ASAP and justice system services, and prevention education to entire Juneau community. Prevention activities are aimed primarily at youth. | Alcohol      | \$675,000    | \$ 700,000   |

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| Ketchikan Comprehensive Alcoholism Program<br>3131 Tongass<br>Ketchikan, Alaska 99901                   | Program provides intermediate care services, emergency care, outpatient, outreach, aftercare, referral, quarterway, halfway house, prevention education, ASAP and justice system services, and employees assistance program.                                                                                                                                                                                                                          | Alcohol               | \$265,000    | \$ 350,800   |
| Kodiak Council on Alcoholism<br>Box 497<br>Kodiak, Alaska 99615                                         | Provides intermediate care, outpatient counseling (individual and group), family counseling, information and education diagnostic screening and referral, alcohol information school and ASAP and justice system services.                                                                                                                                                                                                                            | Alcohol               | \$265,000    | \$ 308,000   |
| Kuskokwim Native Assoc. Alcohol Abuse Awareness Program<br>P.O. Box 106<br>Aniak, Alaska 99557          | Provides alcoholism services for 11 villages served by corporation. Services include education/prevention, emergency services assessment and referral, outpatient program, alcohol abuse groups, aftercare/follow-up and support services. Services to the villages are provided on an itinerant basis to everyone with special targeting of episodic binge drinkers, chronic drinkers, women ages 14-30 and parents of abused or neglected children. | Alcohol               | \$92,000     | \$100,000    |
| Mat-Su Council on Alcohol- and Drug Abuse<br>Wasilla Business Park<br>Box 656<br>Wasilla, Alaska 99687  | Mat-Su Council offers outpatient counseling, aftercare, information, referral, ASAP and justice system services, alcohol information school, and outreach to residents of Mat-Su Valley.                                                                                                                                                                                                                                                              | Alcohol               | \$180,000    | \$272,300    |
| Northwest Regional Alcoholism Program<br>Maniilaq Association<br>P.O. Box 256<br>Kotzebue, Alaska 99752 | Services - Emergency care, outreach, outpatient care, aftercare, alternatives, residential treatment, prevention education and referral in surrounding villages.                                                                                                                                                                                                                                                                                      | Alcohol               | \$553,600    | \$700,700    |
| McGrath-Anvik Mental Health and Drug Abuse<br>Box 16 F<br>McGrath, AK 99627                             | Community Education, individual and group counseling, crisis intervention, outpatient, aftercare, outreach, prevention and Mental Health Services.                                                                                                                                                                                                                                                                                                    | Alcohol               | \$ 85,000    | \$100,000    |

|                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                            | <u>Funding Source</u> | <u>FY 84</u> | <u>FY 85</u> |
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| Norton Sound Health Corp.<br>Comprehensive Alcoholism Program<br>P.O. Box 966<br>Nome, Alaska 99762          | Serves Norton Sound area by delivering the following services: emergency detox, individual family group, outpatient, outreach, aftercare information, ASAP and justice system services, prevention/education and intermediate care. Specially targets women, youth, misdemeanor offenders and public inebriates.                                                           | Alcohol               | \$500,000    | \$629,000    |
| Inter-Cap<br>Box 00349<br>Nenana, Alaska 99760                                                               | Inter-Cap will provide a comprehensive and unique alcohol training curriculum. This training will provide Rural Alaska Natives with a community-based, culturally relevant prevention and treatment approach to alcoholism; coupled with college degrees and a working relationship with parent communities, we will begin to answer the documented needs of Rural Alaska. | Alcohol               | - 0 -        | \$ 19,890    |
| Petersburg Council on Alcoholism<br>215 Indian Street<br>Petersburg, AK. 99833                               | This program provides outpatient and group counseling, aftercare and outreach services to the community of Petersburg and residents of Mitkof Island as well as prevention education, ASAP and justice system services, information/referral, drop-in center.                                                                                                              | Alcohol               | \$71,000     | \$ 81,000    |
| Phillip Alcoholism Treatment Center<br>PACT Building<br>Box 388<br>Bethel, Alaska 99559                      | Provides services to Bethel areas that include: intermediate care, outpatient, outreach, aftercare, prevention education, misdemeanor/felony diversion and ASAP justice system services. Specially targets youth and chronic public inebriates.                                                                                                                            | Alcohol               | \$575,000    | \$621,000    |
| Rural Alaska Community Action Program (Rural CAP)<br>327 Eagle Street<br>Anchorage, AK. 99501<br>(Statewide) | Coordinates a community run, school based cultural heritage program for emphasizing that it is "good to be Native". Also provides technical support to AVAIL and publishes a statewide newsletter and operates a tele-conference series for village based counselors.                                                                                                      | Alcohol               | \$100,000    | \$ 83,000    |

|                                                                                                  |                                                                                                                                                                                                                                                                                                                         | <u>Funding</u><br><u>Source</u> | <u>FY 84</u> | <u>FY 85</u> |
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| Seward Life Action Council<br>502 Adams Street<br>Seward, Alaska 99664                           | Operates alcohol program services in combination with mental health program. Services include emergency care, outpatient, outreach, aftercare, ASAP and justice system services, information and referral, detox and recover, and prevention education for community of Seward.                                         | Alcohol                         | \$100,000    | \$123,000    |
| Sitka Council on Alcoholism and Other Drug Abuse<br>100 Katlian Street<br>Sitka, Alaska 99835    | Sitka Council provides a comprehensive alcoholism program which consists of an inpatient unit, intermediate care, outpatient, outreach, emergency care, aftercare, community information education, and ASAP and justice system services. Special target groups are women, youth, public inebriates and OMVI offenders. | Alcohol                         | \$350,000    | \$415,600    |
| Southeast Alaska Regional Health Corporation<br>2055 Jordan Avenue<br>Juneau, Alaska 99803       | Will provide education, referral and outpatient services in 7 villages. Target groups are youth, women, families, children and elderly in villages. Information and referral, crisis intervention, individual and group outpatient counseling, aftercare and family counseling.                                         | Alcohol                         | \$160,000    | \$160,000    |
| South Kachemak, Inc.<br>P.O. Box 197<br>Seldovia, AK. 99663                                      | Provides for travel for counselors from Port Graham and English Bay to Seldovia for training meetings. Also for supervisor's travel to communities and travel for board members to meetings. Program services currently funded by Indian Health Service.                                                                | Alcohol                         | \$7,000      | \$ 10,000    |
| Upper Tanana Regional Alcoholism Program<br>Box 155<br>Tok, Alaska 99780                         | Provides alcoholism treatment services to the populations of Tok, Tanacross, Tetlin, Dot Lake and Eagle. Services offered are outreach, outpatient, counseling, ASAP and justice system services, education and prevention, aftercare, and follow-up.                                                                   | Alcohol                         | \$50,000     | \$ 52,500    |
| Upper Yukon Behavioral Health Project<br>TCC/Ft. Yukon<br>Doyon Building<br>Fairbanks, AK. 99701 | Provides alcohol and mental health services for the community of Ft. Yukon and surrounding villages. Service delivery includes outpatient, aftercare and prevention education, outreach and referral.                                                                                                                   | Alcohol                         | \$78,000     | \$ 81,900    |

|                                                                                                               |                                                                                                                                                                                                                                                                                | <u>Funding<br/>Source</u> | <u>FY 84</u> | <u>FY 85</u> |
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| Valdez Counseling Center<br>P.O. Box 307<br>Valdez, Alaska 99686                                              | Program services are offered in a combined mental health program. Provides outpatient, outreach and aftercare, prevention/education, and ASAP and justice system services. Special target groups are misdemeanor/felony offenders, OMVI and family violence and youth.         | Alcohol                   | \$45,000     | \$ 67,000    |
| Wrangell Council on Alcoholism and Related Drug Abuse<br>216 Front Street<br>Wrangell, AK. 99929              | Provides information and referral, individual and group outpatient, aftercare, outreach, family counseling, Driver Alcohol Information School (DAIS), Alcohol Information School (AIS), youth education, emergency care, employee assistance and prevention education.         | Alcohol                   | \$67,000     | \$ 75,000    |
| Yakutat Alcoholism Program<br>Box 6<br>Yakutat, Alaska 99689                                                  | Program offers outpatient counseling, information, referral and alternative activities primarily to reach youth, women, public inebriates and accident victims in the Yakutat community.                                                                                       | Alcohol                   | \$40,000     | \$ 42,000    |
| Yukon-Kuskowkim Health Corp.<br>P.O. Box 528<br>Bethel, Alaska 99559                                          | Operates a program utilizing a group of village based counselors to provide alcoholism information and education, and limited counseling to residents of the Yukon-Kuskokwim Delta. Incorporates early intervention, referral, outpatient, prevention, and education services. | Alcohol                   | \$285,000    | \$285,000    |
| Fairbanks Native Assoc.<br>Northern Regional Training Program<br>950 Cowles Avenue<br>Fairbanks, Alaska 99701 | Provide level I and level II counselor certification training, plan technical assistance, internship program, specialized and education to community.                                                                                                                          | Alcohol                   | \$80,000     | \$102,000    |
| Alaska S.E. Regional Training Program<br>ASERT<br>Box 963<br>Sitka, Alaska 99835                              | Provide level I and level II counselor certification training, plan technical assistance, internship program, specialized and education to community.                                                                                                                          | Alcohol                   | \$80,000     | \$102,000    |

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| Southwestern Regional<br>Training Project<br>Box 528<br>Bethel, Alaska 99559 | Provides level I and level II counselor certification training, plan technical assistance, internship program, specialized training and education to community.                                                                                                                                                                                                                  | Alcohol                   | \$114,000    | \$114,000    |
| Nugens Ranch<br>Box 1545<br>Wasilla, Alaska 99687                            | Provide approximately 35 beds in a ranch setting which will allow treatment through work therapy, individual and group therapy, recreation therapy, nutritious foods, medical supervision and daily experience in group living. Also daily AA meetings. This facility is for the long term care and rehabilitation of those who are the most severely affected by alcohol abuse. | Alcohol                   | \$550,000    | \$550,000    |

\*Municipality of Anchorage Sub-contracts

|                                |                                                                                                                                                                                                                                                                                                                           |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Akeela House, Inc.             | Provides 45 adult residential treatment beds for substance abusers and provides adult outpatient counseling. Also provides outpatient counseling to youth and women as specific target groups.                                                                                                                            |
| Narcotic Drug Treatment Center | Provides outpatient detoxification, methadone maintenance, and outpatient substance abuse treatment to adults.                                                                                                                                                                                                            |
| Volunteers of America          | Provides a residential substance abuse treatment program for youth ages 12 to 16.                                                                                                                                                                                                                                         |
| Salvation Army                 | Provides community service patrol, detoxification services <u>20 beds</u> , substance abuse service in two Anchorage correctional facilities, women's residential program <u>12 beds</u> , <u>30</u> intermediate care treatment beds, transitional residential care unit (halfway house) and outpatient adult treatment. |
| Cook Inlet Native Assoc.       | Provides special outreach efforts in the Native community and provides 10 intermediate care beds in Eklutna.                                                                                                                                                                                                              |



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## The Association of Alcoholism Mortality with Legal Availability of Alcoholic Beverages

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**FOREWORD:** This article is a revised version of a paper presented at the 31st International Congress on Alcoholism and Drug Dependence which was held in Bangkok, Thailand on February 23-28, 1975 and is published with the permission of the Director of the International Council on Alcohol and Addictions.

The subject of legal controls for the use and availability of alcoholic beverages has frequently been of interest to legislators, crusaders, the liquor industry, and social drinkers, and there are many opinions and very few facts to back up any one point of view. The study of legal controls for alcoholic beverages is important because if in fact laws are associated with alcoholism, they can be much more easily regulated by society than can other factors such as unhealthy family styles or urbanization. Most frequently, however, legal controls are put into practice with very little (if any) data to show potential effectiveness and no provision to study the new measures before and after their institution. Canadian studies (Popham *et al.*, 1971) have shown that various controls such as government-controlled monopoly systems versus private enterprise, diversification of licensed drinking places (i.e. introduction of cocktail and dining lounges), hours of sale, and the number of outlets do not explain the variation in reported liver cirrhosis mortality in different geographical areas.

There have been some studies, though, where changes in availability have measurably influenced drinking behavior. A Finnish work (Kuusi, 1957) set out to study the change in drinking behavior in rural communities after the opening of state beer and wine package stores. The results were inconclusive because while beer and wine consumption increased, illicit liquor consumption decreased. The amount of absolute alcohol consumed probably did not change as much as its form.

Whitehead (1974) cites evidence to support the stance that removal or liberalization of alcohol control measures tends to increase per capita consumption. This was true in Finland when in 1969 medium strength beer (which had previously only been available in the State Monopoly System) was released for sale on the unrestricted retail market. The other legal control investigated by Whitehead was the lowering of drinking ages in several areas in North America. Both consumption and alcohol-related

traffic collisions increased for the group that were added to the legal drinking age group.

Most changes in legal availability controls have been in the direction of increasing the availability of alcohol. There are, however, a few documented instances of decreased availability, but this is a rarity. The American experience of prohibition is probably the best example of this. Cirrhosis rates dropped (Terris, 1967), and people drank more secretly and preferred distilled spirits because the alcohol was more concentrated (Room, 1971). The strike in the stores of the Finnish Alcohol Monopoly is also an example of an abrupt decrease in availability of alcoholic beverages (Makela, 1974). During this five week strike, there was a marked decrease in arrests for public drunkenness, driving under the influence arrests, crimes of violence, alcohol-related accidents, and hangover patients in outpatient clinics. Additionally in interviews with a representative sample of the population, over three-quarters regarded the strike as a matter of indifference to themselves and their families. Due to the fact that the duration of the strike was believed to be short, smuggling never really got organized, and it is impossible to know the extent to which this would have entered the picture given time.

The present study is an investigation of the association of the legal availability of alcoholic beverages with alcoholism death rates in the state of North Carolina. In North Carolina there is a very unusual system for the distribution of alcoholic beverages. For one thing, there is no "liquor-by-the-drink" in the state, which means that it is illegal to sell cocktails other than beer or wine. Distilled spirits may only be bought in state controlled A.B.C. (Alcoholic Beverage Control) stores, and a pint is the smallest amount available. Beer and wine may be bought in grocery stores and in restaurants which have special permits. The decision as to whether or not beer, wine, or distilled spirits will be legally available in a county is determined by local referendums. Each of these three types of alcoholic beverages is voted upon separately in the referendums, so there could be a number of combinations of types of beverages available in the various counties. In fact, there are five different availability classifications which will be described in the next section. This type of alcohol availability system provides an excellent natural setting with a relatively homogeneous population for a first analysis of the effect of legal control of alcoholic beverages on alcohol-related problems.

It would be unfair, though to study this problem without considering other environmental factors which are known to be associated with high rates of alcohol problems. Urbanization has frequently been found to be correlated with alcoholism and is also known to influence mortality rates in general. In their study *American Drinking Practices*, Cahalan *et al.* (1969) found that people with high rates of alcohol-related problems were more likely to be residents of cities and people who had moved from rural

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areas or from small towns to large cities. Sundby (1967) has also shown  
a remarkable urban/rural difference in Norway and estimates that from  
25.0% to 38.3% of Oslo's excess male mortality may be accounted for by  
the higher prevalence of alcoholism in Oslo.

Popham *et al.* (1971) found that the ratio of average cost of a gallon of  
alcohol to average disposable income is closely associated with alcohol  
consumption rates and liver cirrhosis mortality. The smaller the ratio is,  
the higher alcohol consumption and liver cirrhosis mortality are. We must  
consider the possibility then that the more affluent counties have more  
disposable income and might also tend to be the wet counties. Figures on  
the average disposable income for each North Carolina county are not  
available, so average per capita income can be used as a somewhat crude  
substitute to check for the effect of economy on alcohol death rate. The  
cost of distilled spirits is state controlled so it is the same in all counties.  
While prices of beer and wine vary slightly from store to store, the overall  
variation from county to county is negligible.

If we look at social stress theory, we would predict that in areas where  
there is rapid social change, there will be more stress and a higher risk  
of pathology (Dohrenwend, 1961). With this in mind, Smith (1973) has  
constructed an index of change for North Carolina counties which is  
"suggestive of the amount of change occurring in a social setting." No  
distinction was made between negative change and positive change; only  
the absolute amount of change was considered. The index is rather crude  
in that respect; nevertheless, it is the best measure of social change avail-  
able on a county basis. The variables included in this index are:

1. Percent change in population, 1960-1970
2. Change in percent nonwhite, 1960-1970
3. Change in rate of unemployment, 1965-1970
4. Change in per capita income, 1962-1970
5. Change in percent high school graduates joining the work force,  
1965-1970
6. Change in percent females ever married, now separated, widowed  
or divorced, 1960-1970

Lastly, the population of each county was considered as an independent  
variable on the theory that in less populous counties there might be more of  
a tendency to report alcohol deaths inaccurately. There is less anonymity  
in small counties, and there would be more of a tendency to protect fam-  
ilies from the stigma of an alcoholic death.

METHOD: All 1971 North Carolina death certificates were examined,  
and those with primary cause of death due to alcoholic cirrhosis, chronic  
alcoholism, and acute alcoholism (ICDA classifications 571.0, 303.2, and  
303.9) were counted as alcoholic deaths (N = 436). Age, race, and  
county of residence were also noted.

All 100 counties in North Carolina were classified according to legal

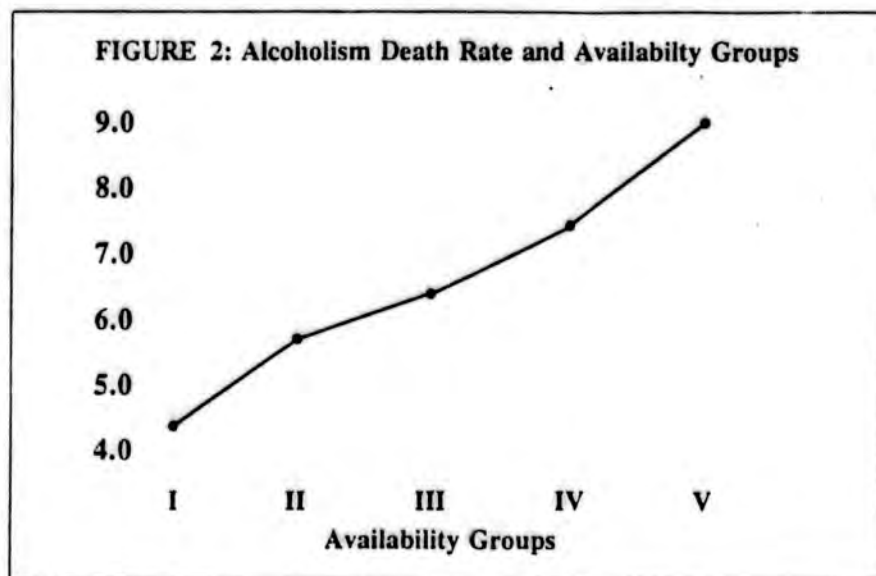
availability of alcoholic beverages in any part of that county for the year 1971. The five county groupings which resulted from the legal availability classification are:

- I. No beer, wine, or distilled spirits legally available (15 counties)
- II. Only beer and wine available (2 counties)
- III. Only distilled spirits available (5 counties)
- IV. Only beer and distilled spirits available (7 counties)
- V. Beer, wine, and distilled spirits all available (71 counties)

Death certificates were classified according to county of residence of the deceased, and then crude alcoholic death rates were calculated based on the populations at risk for each of the five county groupings listed above. Death rates were then adjusted for age and race using the direct method. Adjusted death rates were also calculated separately for each county for correlations with other variables. Figure 1 shows the distribution of adjusted death rates for all 100 counties. The majority of the death rates are less than 6.9 per 100,000, with 21% reporting no deaths. Only 5% had 19 or more deaths per 100,000.

In order to describe more extensively the relationship between alcohol death rate and other variables which might additionally be important in accounting for variations in the alcohol death rates, multiple regressions were performed with the following independent variables: percent of total county population living in urban areas, average per capita income, total population, and index of social change.

**RESULTS:** Table 1 shows alcoholic death rates that were obtained for the five groups. The adjusted death rates increase from 4.5 per 100,000 to 9.0 per 100,000 in an almost linear fashion. (See also Figure 2).



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 available (71 counties)

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 county groupings listed above.  
 race using the direct method.  
 separately for each county for  
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 the majority of the death rates  
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The results of the multiple regression analyses help to refine the relationship between alcohol death rate, legal classification, and the other variables of interest (social change, per capita income, population, and percent urban). For purposes of this analysis, the middle three legal groupings were combined (Groups II, III, IV—the only beer and wine, only distilled spirits, and only beer and distilled spirits). Three separate stepwise regressions were run on the data: one for the dry counties, one for the wet counties, and one for the middle groups.

For the dry counties, there were no significant predictors. Social change did, however, account for 19.9% of the variance and was inversely related to alcohol death rate. When all other variables are entered in, the multiple  $r$  only improves from 0.4466 to 0.5140.

For the wet counties, percent of the population living in urban areas was significant at the .05 level; however, it only accounted for 5.9% of the variance. Prediction only slightly improves with the addition of the other variables (multiple  $r$  goes from 0.2430 to 0.3294).

For the middle counties, the social change index is the only significant predictor ( $p < .05$ ) and accounts for 33.5% of the variance. Even though none of the other variables are significant, multiple  $r$  improves from 0.5785 to 0.7311, thus ultimately all the variables can account for 53.4% of the variance.

As a check to see if legal availability and the other factors contribute independently to alcohol death rate, a stepwise regression was performed for all 100 counties. The legal availability classifications were weighted as follows based roughly on the rank order of the percent alcohol of the types of beverages available:

|                 |     |
|-----------------|-----|
| Dry             | = 1 |
| Beer, wine      | = 2 |
| Distilled       | = 3 |
| Beer, distilled | = 4 |
| Wet             | = 5 |

Percent urban was the first factor to be entered and is significant at the .01 level ( $F = 8.43$ ). Legal Availability entered next; the overall regression remained significant ( $p < .01$ ), and the partial  $F$  for the contribution of legal availability is significant at the .05 level. These are the only significant predictors.

**DISCUSSION:** The present study does not enable us to presume a causal effect between alcoholism mortality and the legal availability of alcoholic beverages. We cannot answer definitely whether legislative control affects drinking behavior; however, the association that is found implies some intriguing explanatory hypotheses and some competing hypotheses can be ruled out.

Bias in death certificate reporting has always been a problem in working with alcoholism mortality, and there is a possibility that such a bias could account for part of the observed variability in this study. If there were such a bias, we would expect under-reporting in the "dry" counties and the least populous counties where there would probably be more of a stigma attached to an alcoholic death. The regression analyses showed that there was no relationship between alcoholic death rate and county population. In North Carolina, there is a Medical Examiner System whereby all death certificates are reviewed in a central office to eliminate as much as possible bias and inconsistency in reporting. By January 1, 1971, 67 of the 100 counties were operating under this system, another 17 came on during 1971, and 16 came on after 1971. During 1971, there were 21 counties that reported no deaths. It is these counties where we might expect the reporting during 1971 to be biased; however, of these 21 counties, 17, or 81% were on the Medical Examiner System before 1971, leaving only 4 that came on during or after 1971. Of the 15 "dry" counties, 11 or 73% were on the System before 1971. From these data, it can be concluded that there is no systematic bias in reporting deaths in the dry counties or the counties with no alcoholism mortality since a greater proportion of the possible "high-bias" counties (81% and 73%) were having records reviewed than the 67% of all the counties.

We must consider the possibility that distilled spirits are more toxic than beer and wine, thus explaining the fact that death rates are higher where distilled spirits are available. In other words, if two areas have the same number of drinkers, the area with the largest proportion of distilled spirits drinkers would have a higher alcoholism death rate. Gabriel (1935) did find that the overall death rate of distilled spirits drinkers was higher than the death rate among wine and beer drinkers, but it is likely that the more advanced alcoholics had switched to distilled spirits as their alcoholism progressed, thus inflating the death rate for distilled spirits drinkers. On the other hand, Wallgren and Barry (1970) concluded that type of beverage is not the crucial factor in the development of organic pathology. At this point, it can only be said that the question of differential death rates by type of beverage consumed remains open-ended.

The present study shows that alcohol deaths are not evenly distributed in North Carolina. Based on the regression for all 100 counties, alcohol deaths are more apt to occur in "wet" counties and urban counties. Even though these two factors are correlated ( $r = 0.3312$ ,  $p < .01$ ), the overall regression shows that they are independently significant predictors of alcohol death rate.

A possible explanation for the predominance of deaths in urban areas is that abusive drinkers tend to migrate to urban counties. In fact, Sundby (1967) summarizes a Norwegian study (Bratholm, 1964) which shows that when place of birth and place of residence were

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checked for all incarcerated vagrants on one particular day, both urban-  
borns and urban-immigrants were over represented. In the present  
study, this leads us to question whether urbanization itself as a stres-  
sor is important, or the fact that alcoholics migrate to urban and/or  
wet areas.

The regression analyses that were performed on each of the three  
legal groupings show that there are different groups. Availability is  
in itself an important factor, but it is also an indicator of social senti-  
ment and attitudes toward the use of alcoholic beverages. The voters  
in a county who would vote not to allow alcohol in that county would  
also exert strong pressure not to drink. For the dry counties in this  
study, no factors were found to be significant. Thus, availability, so-  
cial sentiment, and the interaction of these two (as reflected in the  
laws) appear to be the most important factors contributing to alcohol  
death rates.

In the middle counties, (Groups II, III, IV), the fact that social  
change is a significant predictor reinforces the fact that these counties  
have transitional laws and transitional attitudes. Where there is more  
social change the alcohol death rate is higher. Some weight is added  
to this theory when we look at changes in county availability laws from  
1971 to 1973. Four counties made changes during this time: three of  
the middle counties became wet, and one of the dry counties moved  
to the middle category.

In the wet counties where the laws and social sentiment permit and  
encourage drinking, we have the traditional finding that urbanization  
is the most important predictor of alcohol death rate.

Popham *et al.* (1971) show that the amount of excessive drinking in a  
population is directly proportional to the per capita consumption  
in that population. In other words, to lower or raise the per capita con-  
sumption would result in increasing or decreasing the number of ex-  
cessive drinkers. The data in this study could be taken as evidence that  
the legal availability and social sentiment concerning the use of alco-  
holic beverages in fact influences per capita consumption, and correspond-  
ingly influences the number of excessive drinkers and the number of  
alcoholic deaths.

**CONCLUSION:** The most important contribution of this paper is  
the identification of a new variable, legal availability of alcoholic bev-  
erages, which is associated with alcoholism mortality independently  
of urbanization. More variables need to be explored which will help  
in the development of a more extensive model to explain the variation  
of alcoholism mortality.

Whether legal availability has a direct causal relationship to per cap-  
ita consumption, attitudes toward use of alcoholic beverages, and al-

coholism death rates or vice versa is intriguing and leads into a fruitful area for research. More work needs to be done to separate the influences of law as a reflection or indicator of societal attitudes toward drinking versus availability. This will help to refine the cause-effect relationship. There is probably an interaction effect between attitudes (practice) and availability which will be important to examine closely because of the implications for alcoholism prevention. If attitude is the most important aspect, then education programs designed to raise the level of public awareness and change attitudes will be the best prevention strategies. If, on the other hand, availability is the crucial factor, then laws and other limitations such as taxation will be the best strategies.

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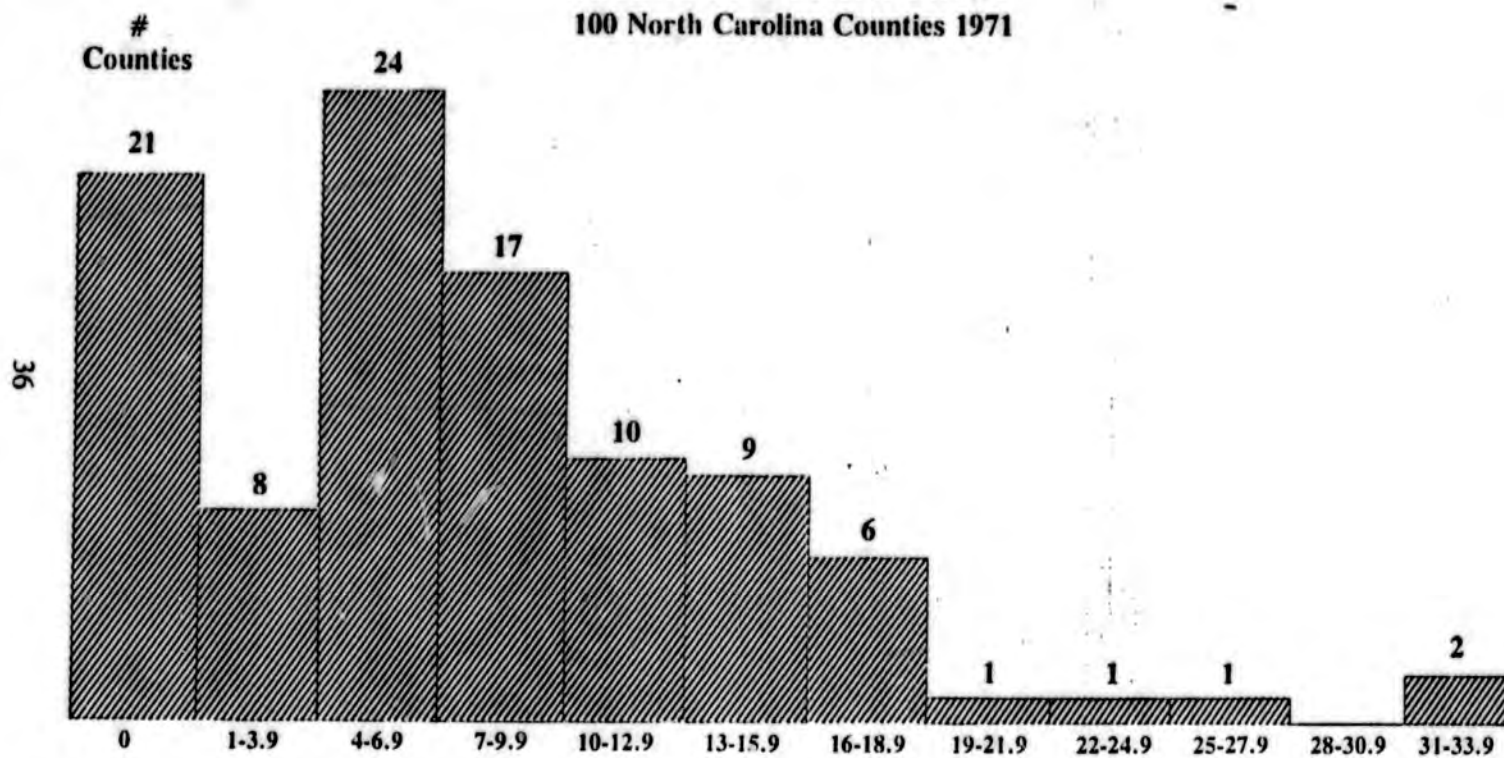
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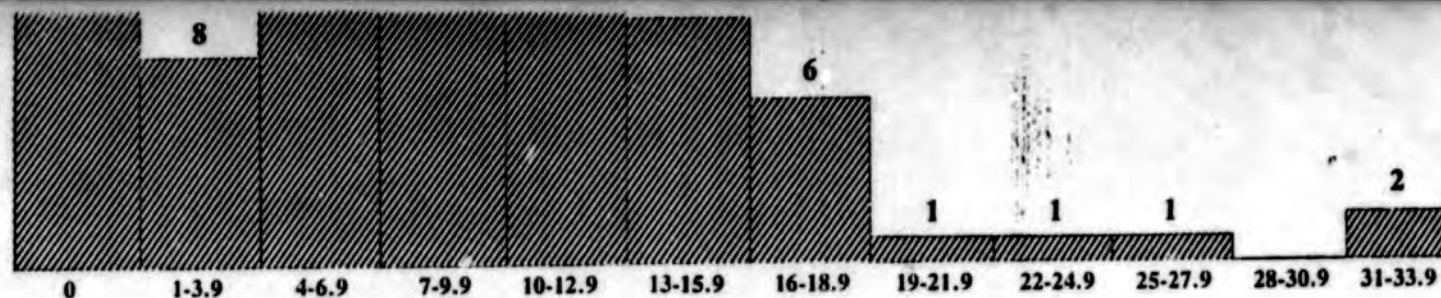
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**FIGURE 1**  
**ALCOHOLISM DEATH RATES\***  
**100 North Carolina Counties 1971**



\* per 100,000 and standardized for age & race.



\* per 100,000 and standardized for age & race.

TABLE I: ALCOHOLISM DEATH RATES BY COUNTY LIQUOR LAW

| Group | Counties | Beer | Wine | Distilled | Population<br>Total | Alcoholic<br>Deaths | Crude<br>Alc. D. R.<br>[(Alc. Deaths/<br>Pop. tot.) x<br>100,000] | Adjusted (for<br>Age and Race) Alc.<br>D.R. per 100,000 |
|-------|----------|------|------|-----------|---------------------|---------------------|-------------------------------------------------------------------|---------------------------------------------------------|
| I     | 15       | 0    | 0    | 0         | 413,437             | 13                  | 3.1                                                               | 4.5                                                     |
| II    | 2        | Yes  | Yes  | 0         | 57,363              | 4                   | 7.0                                                               | 5.7                                                     |
| III   | 5        | 0    | 0    | Yes       | 183,126             | 11                  | 6.0                                                               | 6.4                                                     |
| IV    | 7        | Yes  | 0    | Yes       | 310,996             | 22                  | 7.1                                                               | 7.5                                                     |
| V     | 71       | Yes  | Yes  | Yes       | 4,182,875           | 375                 | 9.0                                                               | 9.0                                                     |
| Total | 100      |      |      |           | 5,147,797           | *425                | 8.3                                                               |                                                         |

\*All out-of-state alcohol deaths are excluded.

## The Relationship of Availability of Alcoholic Beverages to Per Capita Consumption and Alcoholism Rates

Reginald G. Smart<sup>1</sup>

**SUMMARY.** A study of the relationship between availability of beverage alcohol and per capita consumption and alcoholism rates in the U.S.A. indicates that income and urbanism are more closely related to consumption and alcoholism rates than is availability.

**N**UMEROUS STUDIES have examined the effect of changes in the availability of alcoholic beverages on consumption (1, 2). Some changes appear to have little effect on consumption, e.g., selling alcohol by the drink (3) and increasing the number of outlets in areas where they already exist (1). On the other hand, large changes in numbers of outlets and lowering the legal alcohol-purchasing age do seem to increase consumption. Bruun et al. (2), in an important review of the field, concluded (p. 83) that "the availability of alcohol is an important factor in the general level of consumption." However, studies examining the total range of variables which may affect availability are difficult to find. Bacon (4) studied nine communities in five states and concluded that variations in availability had little effect on consumption. There appear to be no studies which have examined general availability in a wide variety of jurisdictions for effects on consumption.

The purpose of the present study was to examine the relationship between over-all availability of beverage alcohol and per capita consumption and alcoholism rates in the 50 U.S. states and the District of Columbia. The availability of alcoholic beverages was assessed by giving each state a score on 8 items concerning legal beverage control. These scores had been developed for a study

<sup>1</sup> Addiction Research Foundation, 33 Russell St., Toronto, Ont., Canada M5S 2S1. Received for publication: 28 April 1976. Revision: 2 December 1976.

of alcohol control laws.<sup>2</sup> Efforts were made to differentiate the effects of availability on consumption from those related to income and urban-rural differences in the various states.

### METHOD

The availability scores were developed to take account of all legal and control factors which might affect the availability of alcoholic beverages. Initially a 22-item list was developed; 8 items were then selected as more important than the others in influencing availability. The selection was made using expert judgments and a "Delphi" panel approach. The final 8 items were (1) minimal legal age for purchase; (2) limitations on availability for off-premise sales; (3) limitations on availability for on-premise sales; (4) density of outlets for on-premise purchase; (5) Sunday retail sales on premise; (6) weekday closing hours for on-premise sale; (7) Sunday retail sales off-premise; and (8) weekday closing hours for off-premise sale.

On each item each state was defined as falling in the high, medium or low category; values of 6, 4 and 2, respectively, were given to each category. Total scores could vary between 16 and 48, the latter indicating the greatest availability. No effort was made to weight any of the 8 factors more than the others.

The data on per capita consumption and alcoholism were taken from Efron et al. (5). Data on average income and percentage of urban population in each state were taken from the Statistical Abstract of the United States (6).

### RESULTS

Table 1 shows all of the data by state, while Table 2 illustrates the mean values of these data when the total sample of states is

TABLE 1.—*Availability Scores, Per Capita Consumption, Income, Urbanism and Alcoholism Rates in the 51 Jurisdictions*

| <i>Jurisdiction</i> | <i>Alcohol Availability Score, 1974</i> | <i>Per Capita Consumption, 1972*</i> | <i>Per Capita Personal Income (Dollars) 1972</i> | <i>% Population in Urban Areas, 1970</i> | <i>Rates of Alcoholism, 1970<sup>b</sup></i> |
|---------------------|-----------------------------------------|--------------------------------------|--------------------------------------------------|------------------------------------------|----------------------------------------------|
| Alaska              | 44                                      | 3.86                                 | 5162                                             | 48.4                                     | 3110                                         |
| Wyoming             | 42                                      | 2.85                                 | 4345                                             | 60.5                                     | 230                                          |
| Nevada              | 40                                      | 6.19                                 | 5215                                             | 80.9                                     | 6770                                         |
| Arizona             | 38                                      | 3.04                                 | 4300                                             | 79.6                                     | 3110                                         |
| Hawaii              | 38                                      | 2.48                                 | 4995                                             | 83.1                                     | 1780                                         |
| Louisiana           | 38                                      | 2.46                                 | 3528                                             | 66.1                                     | 3980                                         |
| Nebraska            | 38                                      | 2.50                                 | 4341                                             | 61.5                                     | 3087                                         |

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<sup>2</sup> MEDICINE IN THE PUBLIC INTEREST. A study in the actual effects of alcoholic beverage control laws. [Contract No. ADM 281-75-0002.] Washington, DC; 1976.

TABLE 1.—continued

| Jurisdiction         | Alcohol<br>Availability<br>Score, 1974 | Per Capita<br>Consumption,<br>1972 <sup>a</sup> | Per Capita<br>Personal Income<br>(Dollars) 1972 | % Population in<br>Urban Areas,<br>1970 | Rates of Alco-<br>holism, 1970 <sup>b</sup> |
|----------------------|----------------------------------------|-------------------------------------------------|-------------------------------------------------|-----------------------------------------|---------------------------------------------|
| New Jersey           | 38                                     | 2.91                                            | 5126                                            | 88.9                                    | 4930                                        |
| New Mexico           | 38                                     | 2.81                                            | 3656                                            | 69.8                                    | 3160                                        |
| Rhode Island         | 38                                     | 3.00                                            | 4399                                            | 87.1                                    | 6070                                        |
| California           | 36                                     | 3.24                                            | 5002                                            | 90.9                                    | 6610                                        |
| Delaware             | 36                                     | 3.17                                            | 4983                                            | 72.2                                    | 4040                                        |
| Michigan             | 36                                     | 2.77                                            | 4817                                            | 73.8                                    | 4460                                        |
| New Hampshire        | 36                                     | 5.42                                            | 4092                                            | 56.4                                    | 3660                                        |
| New York             | 36                                     | 2.86                                            | 5319                                            | 85.6                                    | 5500                                        |
| West Virginia        | 36                                     | 1.75                                            | 3574                                            | 39.0                                    | 3130                                        |
| Colorado             | 34                                     | 2.98                                            | 4449                                            | 78.5                                    | 4240                                        |
| Illinois             | 34                                     | 2.91                                            | 5126                                            | 83.0                                    | 5140                                        |
| Maryland             | 34                                     | 3.04                                            | 4897                                            | 76.6                                    | 4100                                        |
| Massachusetts        | 34                                     | 2.93                                            | 4870                                            | 84.6                                    | 5850                                        |
| Minnesota            | 34                                     | 2.50                                            | 4332                                            | 66.4                                    | 3400                                        |
| South Dakota         | 34                                     | 2.16                                            | 3716                                            | 44.6                                    | 2640                                        |
| Wisconsin            | 34                                     | 3.37                                            | 4207                                            | 65.9                                    | 5110                                        |
| District of Columbia | 32                                     | 6.54                                            | 6383                                            | 100.0                                   | 5430                                        |
| Indiana              | 32                                     | 1.89                                            | 4391                                            | 64.9                                    | 3940                                        |
| Iowa                 | 32                                     | 1.86                                            | 4318                                            | 57.2                                    | 2800                                        |
| Maine                | 32                                     | 2.60                                            | 3571                                            | 50.8                                    | 4290                                        |
| Missouri             | 32                                     | 2.28                                            | 4206                                            | 70.1                                    | 5090                                        |
| Montana              | 32                                     | 2.81                                            | 3897                                            | 53.4                                    | 3730                                        |
| Tennessee            | 32                                     | 1.74                                            | 3640                                            | 58.8                                    | 2920                                        |
| Texas                | 32                                     | 2.41                                            | 4045                                            | 79.7                                    | 2830                                        |
| Vermont              | 32                                     | 3.92                                            | 3865                                            | 32.2                                    | 4170                                        |
| Connecticut          | 30                                     | 2.73                                            | 5342                                            | 77.4                                    | 4940                                        |
| Kentucky             | 30                                     | 1.94                                            | 3601                                            | 52.3                                    | 3290                                        |
| North Dakota         | 30                                     | 2.69                                            | 3718                                            | 44.3                                    | 3570                                        |
| Oregon               | 30                                     | 2.67                                            | 4296                                            | 67.1                                    | 2610                                        |
| Alabama              | 28                                     | 1.65                                            | 3333                                            | 58.4                                    | 1830                                        |
| Arkansas             | 28                                     | 1.52                                            | 3357                                            | 50.0                                    | 2890                                        |
| Georgia              | 28                                     | 2.25                                            | 3846                                            | 60.3                                    | 2550                                        |
| Idaho                | 28                                     | 2.43                                            | 3635                                            | 54.1                                    | 1990                                        |
| Ohio                 | 28                                     | 2.71                                            | 4512                                            | 75.3                                    | 4340                                        |
| Pennsylvania         | 28                                     | 2.32                                            | 4447                                            | 71.5                                    | 4360                                        |
| Virginia             | 28                                     | 2.23                                            | 4258                                            | 63.1                                    | 2370                                        |
| Florida              | 26                                     | 3.23                                            | 4188                                            | 80.5                                    | 3590                                        |
| Mississippi          | 26                                     | 1.88                                            | 3063                                            | 44.5                                    | 2320                                        |
| Utah                 | 26                                     | 1.56                                            | 3745                                            | 80.4                                    | 2070                                        |
| Washington           | 26                                     | 2.71                                            | 4476                                            | 72.6                                    | 2910                                        |
| Kansas               | 18                                     | 1.72                                            | 4593                                            | 66.1                                    | 2490                                        |
| Oklahoma             | 18                                     | 1.80                                            | 3802                                            | 68.0                                    | 2140                                        |
| South Carolina       | 16                                     | 2.44                                            | 3448                                            | 47.6                                    | 2760                                        |
| North Carolina       | 16                                     | 1.93                                            | 3721                                            | 45.0                                    | 2050                                        |

<sup>a</sup> U.S. gallons of absolute alcohol consumed by population aged 15 and over (5, Table 2).<sup>b</sup> Per 100,000 adults aged 20 years and over (5, Table 13).

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| 48.4 | 3110 |
| 60.5 | 2300 |
| 80.9 | 6770 |
| 79.6 | 3110 |
| 83.1 | 1780 |
| 66.1 | 3980 |
| 61.5 | 3087 |

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divided into three subgroups (high, medium and low) according to alcohol availability scores.

To determine whether there were significant intergroup differences, mean scores on each variable were compared and *t*-ratios were calculated (Table 2). The low-availability states had a significantly lower average alcoholism rate and per capita consumption than the high- or middle-availability states. Furthermore, although the three groups did not differ significantly in their average percentage of urban population, the high-availability states did have a significantly higher per capita income than the low-availability states.

Partial correlation analyses were made in which the correlation between availability scores of states was correlated with per capita consumption and alcoholism rates, alone and with the correlation with average income and degree of urbanism controlled or partialled out. Tests for significance of the partial correlations were made with the *t* tests described by McNemar (7).

As shown in Table 3, the correlation between per capita consumption and availability is positive and significant. However, the correlation between per capita consumption and income is even greater, and that with urbanism is also positive.

The partial correlations show that much of the correlation between per capita consumption and availability is accounted for by income and urbanism. When income is controlled, the correlation is nonsignificant; however, with urbanism controlled availability and per capita consumption are still correlated ( $r = .362$ ,  $p < .01$ ).

TABLE 2.—Average Alcohol Availability Score, Per Capita Consumption and Income, Percentage of Population in Urban Areas and Rates of Alcoholism in States with High, Medium and Low Availability

| Availability       | Availability Score | Per Capita Consumption | Per Capita Income | % of Population in Urban Areas | Rates of Alcoholism |
|--------------------|--------------------|------------------------|-------------------|--------------------------------|---------------------|
| 1. High (N = 16)   | 38.00              | 3.21                   | 4553.38           | 71.49                          | 4106.06             |
| 2. Medium (N = 20) | 32.30              | 2.80                   | 4343.50           | 65.38                          | 4004.50             |
| 3. Low (N = 15)    | 24.53              | 2.16                   | 3894.93           | 62.49                          | 2710.67             |
| <i>t ratios:</i>   |                    |                        |                   |                                |                     |
| Groups 1 and 2     | 8.96*              | 1.14                   | 0.94              | 1.14                           | 0.24                |
| Groups 1 and 3     | 9.83*              | 3.42*                  | 3.30*             | 1.80                           | 3.26*               |
| Groups 3 and 2     | -6.04*             | -2.43*                 | -2.12             | -0.06                          | -4.10*              |

\*  $P < .05$ .

TABLE 3.—Correlations Between Availability Scores, Per Capita Consumption, Income, Urbanism and Alcoholism Rates

|                        | 1            | 2           | 3      | 4        |
|------------------------|--------------|-------------|--------|----------|
|                        | Availability | Consumption | Income | Urbanism |
| Availability score     |              | .41†        | .39†   | .25      |
| Per capita consumption |              |             | .60†   | .34*     |
| Income                 |              |             |        | .72†     |

$$r_{12.3} = .248, t = 1.78.$$

$$r_{12.4} = .362, t = 2.70.†$$

$$r_{12.34} = .244, t = 1.74.$$

|                    | 1            | 2          | 3      | 4        |
|--------------------|--------------|------------|--------|----------|
|                    | Availability | Alcoholism | Income | Urbanism |
| Availability score |              | .42†       | .39†   | .25      |
| Alcoholism rate    |              |            | .59†   | .53†     |
| Income             |              |            |        | .72†     |

$$r_{12.3} = .251, t = 1.80.$$

$$r_{12.4} = .345, t = 2.57.†$$

$$r_{12.34} = .265, t = 1.93.$$

$$* P < .05. † P < .01.$$

When the correlation is controlled for both urbanism and income, availability and consumption are unrelated.

Similar results are obtained for alcoholism rates, which are also positively related to availability, but more strongly to income and urbanism. When the effects of income, and income and urbanism together, are controlled, availability scores and alcoholism rates are not significantly correlated.

# DISCUSSION

It appears that over-all availability of beverage alcohol, as indicated by control laws, has, at best, a spurious correlation with both per capita consumption and alcoholism rates. The positive correlation disappears when the effects of average income and degree of urbanism are partialled out. This suggests that slight changes in availability may have relatively little effect on either consumption or alcohol problems, provided neither income nor urbanism are changed.

Certain cautionary notes are in order. The availability scores are constructed to give each element (e.g., opening hours, legal age) the same score and this may not be the most realistic weighting. Unfortunately, price has not been included as an item in the availability scores since all of the elements relate to laws. Also, the range of per capita consumption is not very great in the 51 jurisdictions studied. Cross-national comparisons of a variety of countries with widely differing availabilities and levels of per capita consumption might give different results.

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## Consumption and Rates of Alcoholism Availability

| Population<br>Urban<br>Areas | Rates of<br>Alcoholism |
|------------------------------|------------------------|
| 71.49                        | 4106.06                |
| 55.38                        | 4004.50                |
| 32.49                        | 2710.67                |

|      |        |
|------|--------|
| 1.14 | 0.24   |
| 1.80 | 3.26*  |
| 0.06 | -4.10* |

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## Alcohol Availability, Alcoholic Beverage Sales and Alcohol-Related Problems<sup>1</sup>

Jerome Rabow, Ph.D. and Ronald K. Watts, Ph.D.<sup>2</sup>

**SUMMARY.** *A theoretical integration and an empirical test of the sociocultural model and the distribution of consumption model of alcohol problems is made for 51 California counties. In the counties of California, the kinds and number of outlets of alcoholic beverages are differentially related to the social area characteristics and to arrest rates for public drunkenness, misdemeanor and felony drunken-driving arrest rates and cirrhosis mortality rates.*

Two sociological perspectives have dominated the theoretical and empirical literature on drinking behavior and alcohol-related problems in the past several decades. The older of the two, the sociocultural model, has provided the impetus for over four decades (1, 2). This model emphasizes the structure of social norms as manifested in different populations or subgroups. The second perspective, developed more recently, is the distribution of consumption model and, while being similar to the sociocultural model in the attempt to examine differences in consumption and problems across subgroups, it also focuses on the overall level and rate of consumption in a society: rates of alcohol problems or damage are seen here as being inexorably tied to rates of consumption (3-6). This model has been used by some researchers who have examined the physical availability of alcohol and its relationship to alcohol problems. Thus, rates of alcoholic beverage outlets have

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<sup>2</sup> Authorship is alphabetical. Our work the past 3 years has been a collaborative effort.

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been substituted or added to the original model of rates of consumption, and these have been examined in relation to a problem indicator; e.g., liver cirrhosis mortality, or to consumption itself (7-10).

The models have been treated as competing, when, in fact, a synthesis is possible in which the normative structure of subgroups may be seen to be reflected in differential consumption and consequent alcohol-related problems. Frankel and Whitehead (11), using path analysis, tested an integrated model with data from 68 societies and found relatively more support for the distribution of consumption model.

Although they made an important contribution to theoretical and empirical analysis of alcohol problems, Frankel and Whitehead (11) tested their model with data from whole societies, most of which were small and of greatest interest to anthropologists. We propose an alternative model that may be tested within one large-scale industrial society: the United States. Our model is based on two assumptions: (1) that different normative patterns with respect to drinking behavior and possible alcohol-related damage may be operationalized by referring to various subgroups which manifest those norms; and (2) that alcohol consumption may be operationalized by the differential distribution of various types of alcoholic beverage outlets.

The recent concern over the issue of availability and its effects on consumption and alcohol problems grew out of the work of Bruun et al. (12). They found that large changes in the number of alcoholic beverage outlets and lowering the legal age for purchase of alcoholic beverages appeared to increase consumption. They concluded that "the availability of alcohol is an important factor in the general level of consumption" (12, p. 83). More recently, several researchers tested hypotheses about availability and its effects on both consumption and liver cirrhosis mortality. Smart (7), using an 8-item scale of availability, found that income and urbanization were more closely related to consumption and alcoholism rates than was availability. Parker et al. (9), using essentially the same data but substituting a more narrowly defined measure of availability (rates of on-premise and off-premise sales outlets), found strong effects of beverage availability on both per capita consumption and alcoholism rates in states not having restrictions on the number of outlets per unit of population. Harford et al. (10), using only rates of on-premise outlets, found that when consumption and income

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were controlled, outlet rates and urbanization were significantly related to rates of alcoholism in 38 states and the District of Columbia.

These analyses used aggregate data of states and the District of Columbia to examine the relationships among alcohol problems while controlling for relevant sociodemographic variables. These research findings are important starts at investigating the relationships between alcohol availability and consumption; however, they have generated results that are at times conflicting. On at least one point, they can be considered deficient since they do not account for tourism: travel to the various states and the District of Columbia is differentially distributed and accounts for more variation in consumption of alcoholic beverages than does availability, urbanism or income (13).

Another problem with analyzing state aggregate data is that the considerable heterogeneity within states with respect to outlet rates, consumption and sociodemographic features is not tapped. Clearly what is needed are more "refined" indicators to allow more extensive testing of a number of hypotheses for which, at present, the evidence is contradictory and confusing.

Although both Parker et al. (9) and Harford et al. (10) were critical of Smart's (7) use of an 8-item index as a measure of availability, the internal properties of which they claimed had not been tested, and although they restricted definitions of availability to the presence of outlets, both on- and off-premise (9) and on-premise only (10), they proceeded to use the same unit of analysis as had Smart. They thereby continued to "mix" conceptions of availability, while other factors, such as hours of sale and whether beverage alcohol was sold on Sundays, may be influencing consumption and alcohol-related problems. Although the analyses are useful in pointing out the role of outlet availability in influencing consumption and problems, we also believe that it would be more useful to examine relationships within a state where there is no (or little) local control over the licensing of alcoholic beverage outlets. Our study presents data for 51 of the 58 counties in California and concentrates on the sociodemographic characteristics of counties in conjunction with the rates of several types of on-premise and off-premise outlets.<sup>3</sup> By examining specific types of alcoholic beverage

<sup>3</sup> Smart (8) has suggested that there are other aspects of availability that need to be investigated. Given the type of data we have employed in our analysis, we could not follow

outlets in conjunction with sociodemographic characteristics of the counties, we can sort out their relative effects on selected alcohol-related problems.

In particular, we were interested in comparing the relative merits of hypotheses derived from the two approaches to alcohol problems. By employing correlation and regression techniques we examined the effects of selected sociodemographic and outlet characteristics on the dependent variables of interest.

### *Hypotheses*

Previous research (14-16) has shown that social rank is negatively related to alcohol problems, although there is some contrary evidence (17), while urbanization and minority race-ethnicity are positively related to alcohol problems (15, 18, 19). On the basis of this research, we tested the following hypotheses:

1. Social status is inversely related to alcohol-related problems.

That is, social status as measured by a number of indicators, such as income, education and occupation, is negatively associated with alcohol-related problems such as arrests for alcohol-related offenses and cirrhosis mortality.

2. Urbanization is positively associated with alcohol-related problems.

That is, the more urbanized an area, the greater the level of alcohol-related arrests and cirrhosis mortality. To the extent that some minorities (e.g., Spanish-Americans, Blacks and American Indians) may have norms that differ from those of the dominant group, the degree to which their relative populations vary across units of analysis is positively related to alcohol-related problems.<sup>4</sup> Therefore, the following hypothesis was considered:

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Smart's suggestions. We considered taxable retail sales of packaged liquor stores only in the bivariate correlations.

<sup>4</sup> Of course one could plausibly argue that these groups are no more likely than others to experience alcohol-related damage, but are merely more subject to the scrutiny of the police (in the case of public drunkenness arrests or misdemeanor drunken driving), or whose deaths are more likely to be attributed to cirrhosis. However, this is not the premise upon which many Black leaders operate when they call for controls over certain types of alcoholic beverage outlets in their communities.

3. Minority status is positively related to alcohol-related problems of the types considered in the present analysis.

The degree to which people are integrated into a familial and community setting, it is theorized by the socioculturalists, should be inversely related to the extent to which alcohol-related damage occurs. Accordingly, the following hypothesis was investigated:

4. Household and family structure and familism are inversely related to alcohol-related problems.

Alcohol-related damage should be directly related to the extent to which alcohol is both available and consumed. The distribution of consumption advocates have argued that alcohol consumption is positively associated with a particular type of medical complication, liver cirrhosis, and that this relationship holds across societies and populations. Much attention has been addressed recently to the issue of alcohol consumption and policies directed at controlling consumption through the limitation of physical availability. The two methods in question are price manipulation (12, 20).<sup>5</sup> and limitations on the number of outlets per given unit of population (21). Accordingly, on the basis of previous research, the following hypothesis was tested:

5. The physical availability of alcohol and its consumption are positively related to alcohol-related damage.

Both consumption of alcoholic beverages and their physical availability should not be randomly distributed across social areas. That is, both availability and consumption should be in part determined by the area's social characteristics. Therefore, the following hypothesis was tested:

6. Outlet types, or the physical availability (both on- and off-premise sales) of specific types, are related in specific ways to the population characteristics of the units of analysis.

That is, some types of outlets, such as those located in bona fide eating places, are likely to be relatively more common in areas of

<sup>5</sup> LAU, H.-H. Consumption of alcoholic beverages in Canada—a reply to Lidman. Ottawa: 1977.

higher social rank, nonminority areas and relatively more urbanized areas.

#### METHOD

Recently Donnelly (17) demonstrated the usefulness of the Mental Health Demographic Profile System (MHDPS) (22, 23) in analyzing alcoholic beverage sales and alcohol-related problems in Pennsylvania (a monopoly state) within the framework of social area analysis (24). The present study replicates and extends Donnelly's approach to the counties of California. It replicates his use of selected county social profile characteristics in the analysis of alcoholic beverage sales and alcohol problems. It extends his analysis by considering specific types of arrests—public drunkenness, misdemeanor drunken-driving and felony drunken-driving—each of which is hypothesized to be differentially related to social area characteristics. Donnelly's use of total arrests may have obscured differential relationships between specific types of arrests and both social area characteristics and beverage sales. Furthermore, our analysis extends both Donnelly's work and the work of Parker and Harmon (6), Smart (7), Parker et al. (9) and Harford et al. (10) by examining types of on-premise and off-premise outlets and their relationships both to social area profile characteristics and to specific alcohol-related problems.

#### *The Data*

As a nonmonopoly state California regulates alcoholic beverage outlets through a licensing process performed by the state Alcoholic Beverage Control board (ABC). In 1976, there were 54,450 fiscal- and calendar-year licenses in force in California. The great majority of these licenses (90%) were of 2 off-premise and 5 on-premise outlet types.

To test whether sociodemographic variables in conjunction with availability and consumption variables influence selected indicators of alcohol problems, a data system was developed from several sources and is similar to the one used by Donnelly (17).

*Availability.* Information on the number of 7 specific types of outlets was obtained from the state ABC for the years 1976 and 1977 for all counties in the state. Of 25,563 fiscal-year licenses in force in 1976, 89% were retailers' type off-premise sales outlets: Type 20, beer and wine only, 11,929; and Type 21, general (all types of alcoholic beverages), 10,937. Of 28,887 calendar-year licenses in force in 1976, 91% were of 5 types of on-premise outlets: Type 40, beer only, 6069; Type 41, beer and wine for bona fide eating places, 3113; Type 42, beer and wine for public premises, 1751; Type 47, general for bona fide eating places, 6836; and Type 48, general for public premises, 4586.

*Consumption.* Donnelly obtained alcoholic beverage sales information for state-operated outlets in Pennsylvania and created a per capita sales variable as an indicator of consumption; however, it did not include beer sales since state-run outlets in Pennsylvania only sell distilled spirits and

wine. Our indicator of consumption is based on taxable retail sales information of packaged liquor stores (Type 21), licensed to carry distilled spirits, wine and beer. Unfortunately, in California other taxable items are marketed through packaged liquor stores. Bunce<sup>6</sup> concluded that approximately 75% of taxable retail sales in packaged liquor stores consists of alcoholic beverages. Thus, taxable retail sales may be considered as a rough indicator of consumption at the county level. Taxable retail sales were gathered for years 1971-75 for 51 of the 58 counties in California.<sup>7</sup>

**Alcohol-Related Problems.** Selected indicators were gathered from the State Office of Alcoholism.<sup>8</sup> They included adult arrests (aged 18 and over) for public drunkenness (California Criminal Code, section 647f), misdemeanor drunken driving (856m) and felony drunken driving (850f). The latter is drunken driving where an injury has occurred resulting from an accident. Cirrhosis mortality counts for the years 1970-74 were also obtained from the state Office of Alcoholism for the 51 counties.

Rates were created to remove the gross effects of differences in population size across counties, using as the denominator persons aged 15 and over on 1 April 1970. The basic rates for the counties are: (1) Seven types of retail beverage outlets for 1976 and 1977 per 1,000 persons; (2) per capita taxable retail sales for the years 1972-75; (3) several types of arrests for the years 1972-75 per 1,000 persons; and (4) cirrhosis mortality 1970-74 per 100,000 persons. These rates were averaged over the years available to reduce the effects of year-to-year fluctuations.<sup>9</sup>

**Mental Health Demographic Profile System (MHDPS).** The MHDPS was created by the National Institute of Mental Health (22, 23) from the second and fourth counts of the 1970 Census as a tool for the analysis of social areas in health planning. The initial efforts of the institute were directed toward identifying demographic and ecological dimensions that would be useful in differentiating among residential subareas of American cities and that could also be derived from census data. Of particular concern was the desire to identify areas "with high risk populations, that is, populations with those characteristics which past studies have shown to be associated with high rates of mental illness and/or high incidence of social disorganization or disruption" (22).

<sup>6</sup> BUNCE, R. Meanings and interrelationships of alcohol-related problems and indicators. Berkeley; University of California, Social Research Group; n.d. [Mimeographed.]

<sup>7</sup> Although the State Board of Equalization reports taxable retail sales of all kinds for most county (and city) jurisdictions, it does not release taxable sales figures for jurisdictions where there are only a few outlets. Doing so would reveal information about individual businesses. Casual inspection of their reports suggests that four is the number of reporting permits below which information on sales is withheld. Seven counties (Alpine, Calaveras, Colusa, Mariposa, Modoc, Sierra and Trinity) were eliminated from the analysis.

<sup>8</sup> MAXFIELD, T. and KLAUS, A. An in-depth analysis; alcohol-related arrest data, 1971-75. Sacramento; California State Office of Alcoholism; n.d. [Mimeographed.]

<sup>9</sup> Though these data were obtained for different years, we felt reasonably safe in assuming that the cross-sectional nature of the relationships in the data would be revealed with any similar set of data from the recent period.

The principal theoretical underpinning of this type of research lies in the concept of "social area analysis" first proposed by Shevky and Bell (24) and Greer (25). Greer suggested that social area analysis is based on the notion that "residence-related behavior can be understood and accounted for in terms of three types of society-wide population characteristics or dimensions: social rank, life-style or urbanization, and ethnicity." Greer provided definitions for these dimensions: (1) Social rank "indicates the 'objective' factors of social class: occupation, education and income"; (2) life-style "refers to the way of life chosen by the population, whether the 'family-committed life' in the single-dwelling-unit area, or the life of the working couple in the apartment-house areas"; (3) Ethnicity refers to "the differentiation of population by racial and cultural background; the proportion and kinds of minority groups to be found in the neighborhood."

Social area analysis grew out of the ecological analysis of area units and has had a venerable tradition in the social sciences, particularly sociology.<sup>10</sup>

## RESULTS

Table 1 presents the basic data for the 51 counties analyzed in the state of California. Before presenting the results of the correlation and regression analyses, we briefly discuss the salient features of the system of alcohol-related variables.

The first point that should be made about Table 1 is that there are 17 counties with less than 50,000 persons aged 15+ in 1970. A perusal of the table suggests that it is often the smaller counties which have relatively higher outlet rates, with Mono County having the highest rate for 5 of the 7 outlets (Types 20, 21, 40, 41, 47) and the smallest population (2995).

With respect to per capita taxable retail sales of packaged liquor stores, two counties, Mono (\$182.00; 2995 persons aged 15+) and Inyo (\$132.00; 11,458 persons aged 15+) have the highest per capita sales. However, inspection of the sales of other small counties suggests that county size is not positively related to sales. This will be shown more clearly when we discuss the relationships between these variables and the MHDPS.

Two jurisdictions, Fresno and Yuba, had public drunkenness arrest rates (53.4 and 63.7 per 1000 persons, respectively) several standard deviations above the mean while Napa County had an arrest rate somewhat greater than one standard deviation below the

<sup>10</sup> Durkheim (26) was one of the first to study area characteristics and relate them to suicide rates.

TABLE 1.—Rates of On- and Off-Premise Alcoholic Beverage Outlets, Per Capita Taxable Retail Sales of Packaged Liquor Stores, Alcohol-Related Arrests, and Cirrhosis Mortality, by 51 Counties in California\*

|                | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8)    | (9)   | (10)   | (11)  | (12)  | (13) | (14)    |
|----------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|------|---------|
| Alameda        | 0.645 | 0.819 | 0.269 | 0.509 | 0.110 | 0.311 | 0.438 | 97.20  | 14.80 | 12.525 | 4.230 | 27.56 | 3.25 | 703.126 |
| Amador         | 2.736 | 1.751 | 0.930 | 1.313 | 0.328 | 2.408 | 1.478 | 41.13  | 7.53  | 9.148  | 0.323 | 17.00 | 1.97 | 913.36  |
| Butte          | 1.372 | 0.712 | 0.550 | 0.718 | 0.233 | 0.427 | 0.324 | 78.95  | 5.51  | 9.793  | 0.224 | 15.53 | 2.20 | 77.258  |
| Contra Costa   | 0.798 | 0.605 | 0.226 | 0.437 | 0.055 | 0.388 | 0.316 | 87.37  | 5.20  | 11.649 | 0.214 | 17.08 | 2.85 | 391.525 |
| Del Norte      | 3.046 | 1.376 | 0.442 | 0.737 | 0.098 | 0.688 | 0.737 | 84.18  | 5.13  | 22.402 | 0.530 | 28.12 | 2.55 | 101.78  |
| El Dorado      | 2.288 | 0.747 | 0.794 | 1.478 | 0.187 | 0.731 | 0.140 | 58.54  | 10.94 | 16.821 | 0.273 | 28.03 | 2.68 | 321.30  |
| Fresno         | 1.650 | 0.736 | 0.780 | 0.446 | 0.172 | 0.408 | 0.341 | 79.79  | 53.37 | 11.671 | 0.484 | 65.53 | 3.69 | 290.216 |
| Glen           | 1.413 | 1.334 | 0.785 | 0.628 | 0.275 | 0.471 | 0.706 | 70.35  | 6.53  | 30.199 | 0.504 | 36.94 | 1.86 | 127.41  |
| Humboldt       | 1.344 | 1.198 | 0.340 | 0.582 | 0.312 | 0.547 | 0.721 | 47.32  | 13.01 | 18.030 | 0.594 | 31.63 | 2.69 | 721.55  |
| Imperial       | 2.594 | 1.005 | 1.733 | 0.574 | 0.185 | 0.592 | 0.400 | 75.59  | 26.88 | 41.701 | 0.594 | 69.15 | 3.96 | 87.604  |
| Inyo           | 1.020 | 1.484 | 0.742 | 1.527 | 0.305 | 0.873 | 0.524 | 132.90 | 20.51 | 11.143 | 0.149 | 32.60 | 2.97 | 227.340 |
| Kern           | 1.474 | 0.684 | 0.607 | 0.367 | 0.288 | 0.109 | 0.345 | 96.69  | 21.72 | 10.774 | 0.101 | 28.91 | 2.56 | 437.37  |
| King           | 1.669 | 0.686 | 0.816 | 0.343 | 0.080 | 0.411 | 0.354 | 69.35  | 15.12 | 13.617 | 0.177 | 28.91 | 2.56 | 437.37  |
| Lake           | 3.632 | 1.671 | 1.043 | 1.029 | 0.366 | 1.029 | 0.332 | 90.29  | 12.37 | 17.962 | 0.276 | 30.63 | 2.70 | 155.56  |
| Lassen         | 1.744 | 1.581 | 0.459 | 0.642 | 0.184 | 1.239 | 0.688 | 18.58  | 13.86 | 7.139  | 0.329 | 21.33 | 1.84 | 108.97  |
| Los Angeles    | 0.610 | 0.701 | 0.367 | 0.399 | 0.118 | 0.368 | 0.221 | 95.81  | 15.58 | 22.452 | 0.257 | 38.32 | 3.32 | 514.870 |
| Madera         | 2.245 | 0.686 | 0.960 | 0.900 | 0.103 | 0.514 | 0.309 | 73.59  | 21.82 | 26.167 | 0.683 | 51.69 | 3.09 | 291.73  |
| Martin         | 0.514 | 0.729 | 0.156 | 1.024 | 0.027 | 0.563 | 0.245 | 62.33  | 2.97  | 14.622 | 0.164 | 17.76 | 2.31 | 159.000 |
| Mendocino      | 2.098 | 1.372 | 0.551 | 0.982 | 0.134 | 0.929 | 0.847 | 56.25  | 14.01 | 13.895 | 0.316 | 28.22 | 3.00 | 371.80  |
| Merced         | 1.711 | 0.686 | 0.912 | 0.474 | 0.191 | 0.452 | 0.410 | 85.51  | 13.55 | 23.566 | 0.251 | 37.37 | 2.49 | 707.25  |
| Mono           | 7.513 | 5.342 | 2.003 | 6.845 | 0.0   | 5.809 | 0.334 | 182.51 | 17.78 | 12.980 | 0.952 | 31.71 | 2.67 | 299.5   |
| Monterey       | 0.982 | 0.609 | 0.488 | 0.971 | 0.145 | 0.493 | 0.252 | 80.15  | 17.60 | 13.210 | 0.185 | 31.04 | 1.93 | 182.005 |
| Napa           | 1.048 | 0.659 | 0.423 | 0.761 | 0.135 | 0.634 | 0.482 | 54.85  | 0.47  | 15.256 | 0.201 | 15.93 | 3.35 | 591.38  |
| Nevada         | 1.383 | 1.443 | 0.647 | 1.393 | 0.199 | 1.742 | 0.771 | 70.72  | 10.05 | 17.856 | 0.184 | 28.09 | 3.58 | 299.96  |
| Orange         | 0.631 | 0.685 | 0.291 | 0.585 | 0.132 | 0.560 | 0.129 | 96.52  | 9.63  | 12.305 | 0.188 | 22.12 | 1.44 | 982.315 |
| Placer         | 1.323 | 1.190 | 0.595 | 0.835 | 0.240 | 0.746 | 0.506 | 56.08  | 10.34 | 9.661  | 0.233 | 20.25 | 2.66 | 56.299  |
| Plumas         | 4.162 | 4.394 | 1.272 | 1.503 | 0.0   | 2.639 | 1.676 | 53.56  | 13.87 | 12.872 | 0.201 | 27.24 | 4.02 | 86.49   |
| Riverside      | 1.201 | 0.632 | 0.664 | 0.667 | 0.128 | 0.616 | 0.150 | 88.69  | 12.06 | 17.722 | 0.279 | 30.08 | 2.54 | 329.991 |
| Sacramento     | 0.844 | 0.633 | 0.377 | 0.523 | 0.219 | 0.441 | 0.331 | 49.68  | 17.05 | 17.683 | 0.255 | 34.99 | 3.11 | 445.317 |
| San Benito     | 1.749 | 0.795 | 0.636 | 0.795 | 0.040 | 0.705 | 0.954 | 79.07  | 17.95 | 17.864 | 0.203 | 36.02 | 2.70 | 12.460  |
| S. Bernardino  | 1.101 | 0.593 | 0.632 | 0.409 | 0.143 | 0.242 | 0.242 | 79.22  | 6.69  | 19.363 | 0.272 | 26.33 | 2.85 | 478.709 |
| San Diego      | 0.780 | 0.619 | 0.375 | 0.473 | 0.189 | 0.501 | 0.202 | 70.54  | 10.55 | 17.866 | 0.109 | 28.53 | 2.78 | 997.022 |
| S. Francisco   | 0.619 | 1.814 | 0.253 | 0.904 | 0.040 | 0.950 | 1.002 | 90.70  | 26.63 | 6.014  | 0.074 | 32.72 | 7.71 | 583.107 |
| S. Joaquin     | 1.313 | 0.751 | 0.457 | 0.462 | 0.251 | 0.421 | 0.505 | 77.35  | 29.15 | 10.719 | 0.180 | 50.05 | 3.68 | 296.022 |
| S. Luis Obispo | 1.556 | 0.711 | 0.631 | 1.030 | 0.055 | 0.509 | 0.366 | 90.45  | 7.53  | 12.259 | 0.324 | 20.21 | 2.97 | 81.585  |

continued —

TABLE 1.—Rates of On- and Off-Premise Alcoholic Beverage Outlets, Per Capita Taxable Retail Sales of Packaged Liquor Stores, Alcohol-Related Arrests, and Cirrhosis Mortality, by 51 Counties in California\*

|                | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8)    | (9)   | (10)   | (11)  | (12)  | (13) | (14)    |
|----------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|------|---------|
| Alameda        | 0.645 | 0.819 | 0.260 | 0.509 | 0.110 | 0.311 | 0.438 | 97.20  | 14.80 | 12.525 | 6.230 | 27.56 | 3.25 | 793,128 |
| Alameda        | 2.736 | 1.751 | 0.930 | 1.313 | 0.328 | 2.408 | 1.478 | 41.13  | 7.53  | 9.148  | 0.323 | 17.06 | 1.07 | 91,366  |
| Butte          | 0.372 | 0.712 | 0.550 | 0.718 | 0.233 | 0.427 | 0.324 | 78.95  | 5.51  | 9.703  | 0.224 | 15.53 | 2.20 | 77,258  |
| Contra Costa   | 0.798 | 0.605 | 0.259 | 0.437 | 0.055 | 0.368 | 0.316 | 87.37  | 5.20  | 11.649 | 0.214 | 17.06 | 2.85 | 391,525 |
| Del Norte      | 3.046 | 1.378 | 0.442 | 0.737 | 0.098 | 0.688 | 0.737 | 84.18  | 5.13  | 22.402 | 0.530 | 28.12 | 2.55 | 101,778 |
| El Dorado      | 2.288 | 0.747 | 0.794 | 1.478 | 0.187 | 0.731 | 0.140 | 58.54  | 10.94 | 16.821 | 0.273 | 28.03 | 2.68 | 321,300 |
| Fresno         | 1.650 | 0.736 | 0.780 | 0.446 | 0.172 | 0.408 | 0.341 | 72.79  | 53.37 | 11.671 | 0.484 | 36.94 | 1.88 | 290,218 |
| Glenn          | 1.413 | 1.334 | 0.785 | 0.628 | 0.275 | 0.471 | 0.706 | 79.35  | 6.53  | 30.190 | 0.296 | 30.94 | 1.88 | 127,411 |
| Humboldt       | 1.344 | 1.199 | 0.340 | 0.582 | 0.312 | 0.547 | 0.721 | 47.32  | 13.01 | 18.030 | 0.594 | 31.63 | 2.69 | 72,155  |
| Imperial       | 2.594 | 1.005 | 1.733 | 0.574 | 0.185 | 0.502 | 0.400 | 75.59  | 26.89 | 41.761 | 0.594 | 69.15 | 3.98 | 48,768  |
| Inyo           | 1.020 | 1.481 | 0.742 | 1.527 | 0.305 | 0.873 | 0.524 | 112.90 | 20.51 | 11.443 | 0.149 | 31.80 | 5.93 | 11,458  |
| Kern           | 1.474 | 0.684 | 0.697 | 0.367 | 0.288 | 0.499 | 0.335 | 96.69  | 21.72 | 10.774 | 0.101 | 32.60 | 2.97 | 227,300 |
| Kings          | 1.669 | 0.686 | 0.846 | 0.343 | 0.080 | 0.411 | 0.354 | 69.35  | 15.12 | 13.617 | 0.177 | 28.91 | 2.56 | 43,737  |
| Lake           | 3.632 | 1.671 | 1.033 | 1.029 | 0.386 | 1.029 | 0.932 | 99.29  | 12.37 | 17.982 | 0.276 | 30.63 | 2.70 | 155,586 |
| Lassen         | 1.744 | 1.581 | 0.459 | 0.642 | 0.184 | 1.231 | 0.688 | 18.58  | 13.86 | 7.139  | 0.329 | 21.33 | 1.81 | 10,897  |
| Los Angeles    | 0.610 | 0.701 | 0.367 | 0.399 | 0.118 | 0.368 | 0.221 | 95.81  | 15.58 | 22.452 | 0.257 | 38.32 | 3.32 | 514,570 |
| Madera         | 2.245 | 0.686 | 0.960 | 0.900 | 0.103 | 0.514 | 0.309 | 73.59  | 21.82 | 26.187 | 0.683 | 51.69 | 3.08 | 20,173  |
| Marin          | 0.514 | 0.729 | 0.156 | 1.024 | 0.027 | 0.563 | 0.245 | 62.33  | 2.97  | 14.622 | 0.164 | 17.76 | 2.31 | 159,893 |
| Mendocino      | 2.098 | 1.372 | 0.551 | 0.982 | 0.134 | 0.928 | 0.847 | 56.25  | 14.01 | 13.895 | 0.316 | 28.22 | 3.00 | 37,180  |
| Merced         | 1.711 | 0.686 | 0.912 | 0.474 | 0.191 | 0.452 | 0.410 | 85.51  | 13.55 | 23.566 | 0.251 | 37.37 | 2.49 | 70,725  |
| Mono           | 7.513 | 5.342 | 2.003 | 6.845 | 0.0   | 5.509 | 0.334 | 162.51 | 17.78 | 12.980 | 0.952 | 31.71 | 2.07 | 29,955  |
| Monterey       | 0.992 | 0.669 | 0.488 | 0.971 | 0.145 | 0.499 | 0.252 | 80.15  | 17.66 | 13.210 | 0.165 | 31.04 | 1.93 | 182,305 |
| Napa           | 1.048 | 0.659 | 0.423 | 0.761 | 0.135 | 0.634 | 0.482 | 54.85  | 0.47  | 15.256 | 0.201 | 15.93 | 3.35 | 50,138  |
| Nevada         | 1.393 | 1.443 | 0.647 | 1.393 | 0.199 | 1.712 | 0.771 | 70.72  | 10.05 | 17.856 | 0.184 | 28.09 | 3.58 | 209,796 |
| Orange         | 0.631 | 0.685 | 0.291 | 0.585 | 0.132 | 0.560 | 0.129 | 58.52  | 9.63  | 12.305 | 0.188 | 22.12 | 1.44 | 982,315 |
| Placer         | 1.323 | 1.190 | 0.595 | 0.835 | 0.240 | 0.746 | 0.506 | 56.08  | 10.34 | 9.681  | 0.233 | 20.25 | 2.60 | 56,299  |
| Plumas         | 4.102 | 4.394 | 1.272 | 1.503 | 0.0   | 2.659 | 1.676 | 53.56  | 13.87 | 12.872 | 0.201 | 27.24 | 4.62 | 86,419  |
| Riverside      | 1.201 | 0.632 | 0.664 | 0.667 | 0.128 | 0.618 | 0.150 | 88.69  | 12.08 | 17.722 | 0.279 | 30.08 | 2.54 | 320,981 |
| Sacramento     | 0.844 | 0.633 | 0.377 | 0.523 | 0.219 | 0.441 | 0.331 | 48.68  | 17.05 | 17.683 | 0.255 | 34.99 | 3.11 | 445,337 |
| San Benito     | 1.749 | 0.795 | 0.636 | 0.795 | 0.040 | 0.705 | 0.954 | 79.07  | 17.95 | 17.664 | 0.203 | 36.08 | 2.70 | 125,860 |
| S. Bernardino  | 1.101 | 0.503 | 0.632 | 0.409 | 0.143 | 0.473 | 0.242 | 79.22  | 6.69  | 19.363 | 0.272 | 26.33 | 2.85 | 476,709 |
| San Diego      | 0.780 | 0.619 | 0.375 | 0.473 | 0.189 | 0.591 | 0.202 | 70.51  | 10.55 | 17.868 | 0.109 | 26.53 | 2.78 | 997,922 |
| S. Francisco   | 0.619 | 1.814 | 0.253 | 0.904 | 0.040 | 0.950 | 1.002 | 90.70  | 26.63 | 6.014  | 0.074 | 32.72 | 7.71 | 583,107 |
| S. Joaquin     | 1.313 | 0.751 | 0.457 | 0.462 | 0.251 | 0.421 | 0.505 | 77.35  | 39.15 | 10.719 | 0.180 | 50.05 | 3.68 | 209,022 |
| S. Luis Obispo | 1.526 | 0.711 | 0.631 | 1.030 | 0.055 | 0.509 | 0.398 | 90.45  | 7.53  | 12.259 | 0.324 | 20.21 | 2.97 | 81,585  |

continued —

TABLE 1.—continued

|               | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8)   | (9)   | (10)   | (11)  | (12)  | (13) | (14)   |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|------|--------|
| San Mateo     | 0.620 | 0.502 | 0.232 | 0.609 | 0.048 | 0.455 | 0.272 | 86.52 | 4.73  | 13.885 | 0.217 | 18.81 | 2.59 | 409186 |
| Santa Barbara | 0.823 | 0.646 | 0.510 | 0.653 | 0.120 | 0.505 | 0.187 | 94.95 | 7.78  | 13.625 | 0.179 | 21.58 | 2.57 | 192058 |
| Santa Clara   | 0.697 | 0.644 | 0.257 | 0.570 | 0.073 | 0.486 | 0.272 | 92.22 | 7.15  | 10.619 | 0.203 | 17.97 | 2.45 | 735967 |
| Santa Cruz    | 1.205 | 0.812 | 0.446 | 1.035 | 0.154 | 0.605 | 0.504 | 99.92 | 9.32  | 12.914 | 0.355 | 22.50 | 3.35 | 94224  |
| Shasta        | 2.077 | 0.811 | 0.957 | 0.856 | 0.282 | 0.456 | 0.547 | 69.13 | 13.25 | 17.062 | 0.269 | 30.58 | 3.79 | 54879  |
| Siskiyou      | 1.759 | 2.598 | 0.593 | 0.839 | 0.205 | 1.084 | 0.941 | 74.62 | 10.97 | 11.637 | 0.177 | 22.78 | 3.03 | 24410  |
| Solano        | 0.846 | 0.720 | 0.398 | 0.540 | 0.163 | 0.343 | 0.435 | 64.72 | 3.09  | 17.092 | 0.270 | 20.45 | 2.51 | 119412 |
| Sonoma        | 1.050 | 0.881 | 0.313 | 0.791 | 0.279 | 0.632 | 0.565 | 58.05 | 8.02  | 8.354  | 0.221 | 16.60 | 3.28 | 148619 |
| Stanislaus    | 1.555 | 0.627 | 0.475 | 0.471 | 0.127 | 0.370 | 0.388 | 83.47 | 17.06 | 16.826 | 0.423 | 34.31 | 2.19 | 137907 |
| Sutter        | 1.552 | 0.597 | 0.648 | 0.273 | 0.085 | 0.222 | 0.546 | 36.40 | 6.53  | 9.040  | 0.186 | 15.76 | 1.64 | 29317  |
| Tehama        | 1.837 | 1.002 | 0.692 | 0.453 | 0.429 | 0.575 | 0.239 | 71.88 | 9.94  | 11.561 | 0.155 | 20.66 | 2.00 | 20962  |
| Tulare        | 1.963 | 0.644 | 0.679 | 0.357 | 0.077 | 0.418 | 0.288 | 66.57 | 17.63 | 17.717 | 0.231 | 35.58 | 2.32 | 130421 |
| Tuolumne      | 2.192 | 1.599 | 1.007 | 1.244 | 0.178 | 1.333 | 1.125 | 59.97 | 11.56 | 11.174 | 0.407 | 23.14 | 4.03 | 16883  |
| Ventura       | 0.712 | 0.698 | 0.395 | 0.419 | 0.126 | 0.474 | 0.245 | 82.17 | 8.20  | 12.125 | 0.195 | 20.52 | 2.03 | 150857 |
| Yolo          | 1.039 | 0.643 | 0.359 | 0.718 | 0.120 | 0.426 | 0.336 | 69.81 | 14.62 | 20.208 | 0.192 | 35.02 | 2.21 | 66867  |
| Yuba          | 1.500 | 1.134 | 0.884 | 0.333 | 0.150 | 0.567 | 0.784 | 36.01 | 63.72 | 21.120 | 0.179 | 85.02 | 3.00 | 29993  |
| Mean          | 1.63  | 1.11  | 0.63  | 0.85  | 0.16  | 0.78  | 0.51  | 76.11 | 14.38 | 15.38  | 0.28  | 21.47 | 2.94 | 282186 |
| SD            | 1.14  | 0.89  | 0.36  | 0.92  | 0.10  | 0.82  | 0.33  | 25.21 | 11.45 | 6.18   | 0.16  | 91.65 | 1.04 | 737741 |

(1) Type 20: Mean off-premise sales, beer and wine, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(2) Type 21: Mean off-premise sales, general outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(3) Type 40: Mean on-premise sales, beer-only outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(4) Type 41: Mean on-premise sales, beer and wine for bona fide eating place outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(5) Type 42: Mean on-premise sales, beer and wine for public premises outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(6) Type 47: Mean on-premise sales, general for bona fide public eating place outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(7) Type 48: Mean on-premise sales, general for public premises outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.

(8) Mean taxable retail sales of packaged liquor stores (Type 21), 1972-75, per capita of persons aged 15+ on 1 April 1970.

(9) Mean public drunkenness arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.

(10) Misdemeanor drunken-driving arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.

(11) Felony drunken-driving arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.

(12) Mean total alcohol related arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.

(13) Mean cirrhosis mortality, 1970-74, per 100,000 persons aged 15+ on 1 April 1970.

(14) Population aged 15+ on 1 April 1970.

\* Alpine, Calaveras, Colusa, Mariposa, Modoc, Sierra and Trinity counties were eliminated from the analysis.

mean (0.47). Imperial County possessed the highest misdemeanor drunken-driving arrest rate of all counties (41.8) while San Francisco County had the lowest (6.0). That San Francisco had the lowest rates for both misdemeanor and felony drunken-driving arrests is not surprising; a relatively larger proportion of the population in San Francisco uses public transportation than in other counties. In cirrhosis mortality, however, San Francisco assumed the lead (7.7 per 100,000 persons) and Inyo was second (5.9).

To test our hypotheses about bivariate relationships between variables, we obtained the correlations and partial correlations (controlling for urbanization and income) for the arrest rates, cirrhosis mortality rates, outlet rates and the MHDPS variables.

*Arrest Rates, Cirrhosis Mortality Rates and the MHDPS Variables.* Table 2 reports the correlations and partial correlations (controlling for urbanization and income) between the alcohol-related problems and the social indicator variables of the MHDPS. We found confirmation of the first hypothesis that social rank varies inversely with alcohol-related problems. Most of the social-rank variables are correlated with the arrest rates in the expected directions. Median income, for example, is correlated most strongly with public drunkenness arrest rates ( $r = -.30$ ) and is weakest with both felony drunken-driving arrest and cirrhosis mortality rates ( $r = -.08$ ),<sup>11</sup> while only the percentage of families in poverty is consistently and significantly related to arrest rates after controls for urbanization and income were made. However, although hypothesized to be inversely associated with cirrhosis mortality, none of the social rank variables was significantly related to cirrhosis death rates after controlling for urbanization and income.

We found very little support for our hypothesis that urbanization is positively related to alcohol-related problems. The only moderate correlations obtained were between the percentage of persons residing in places with populations of less than 2500 outside urban areas<sup>12</sup> and felony drunken-driving arrest rates ( $r = .40$ ), and between the percentage of single-family detached dwelling units

<sup>11</sup> Rather than use asterisks to flag coefficients significant at the .05 level in the correlation tables, we have chosen to indicate significance by showing the minimum correlation coefficients required to achieve significance (one-tailed test) at the .05 level, for both zero-order and partial correlations. Coefficients required are listed in the footnotes to the tables.

<sup>12</sup> Donnelly (17) employed the same measure of urbanization, which is actually a measure of "ruralization."

(6) Type 47. Mean on-premise sales, general for bona fide public eating place outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.  
(7) Type 48. Mean on-premise sales, general for public premises outlets, 1976-77, per 1000 persons aged 15+ on 1 April 1970.  
(8) Mean taxable retail sales of packaged liquor stores (Type 21), 1972-75, per capita of persons aged 15+ on 1 April 1970.  
(9) Mean public drunkenness arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.  
(10) Misdemeanor drunken-driving arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.  
(11) Felony drunken-driving arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.  
(12) Mean total alcohol-related arrests, 1972-75, per 1000 persons aged 15+ on 1 April 1970.  
(13) Mean cirrhosis mortality, 1970-74, per 100,000 persons aged 15+ on 1 April 1970.  
(14) Population aged 15+ on 1 April 1970.

\* Alpine, Calaveras, Colusa, Mariposa, Modoc, Sierra and Trinity counties were eliminated from the analysis.

TABLE 2.—Correlations (and Partial Correlations Controlling for Urbanization and Income) between Alcohol-Problem Indicators and Mental Health Demographic Profile System Variables (N = 51)\*

|                                                                                                         |           | Public<br>Drunkenness<br>Arrest<br>Rates | Misdemeanor<br>Drunken-Driving<br>Arrest Rates | Felony<br>Drunken-<br>Driving<br>Arrest<br>Rates | Cirrhosis<br>Mortality |
|---------------------------------------------------------------------------------------------------------|-----------|------------------------------------------|------------------------------------------------|--------------------------------------------------|------------------------|
| <b>Social Rank</b>                                                                                      |           |                                          |                                                |                                                  |                        |
| Median income of<br>families and unrelated<br>individuals                                               | (MHH5C07) | -.30                                     | -.21                                           | -.08                                             | -.08                   |
| % Families living<br>below poverty line                                                                 | (MHH5C08) | .52<br>(.50)                             | .44<br>(.45)                                   | .26<br>(.32)                                     | .10<br>(.06)           |
| % Employed<br>males aged 16 + :<br>operative, service<br>workers and laborers,<br>including farmworkers | (MHH5C09) | .32<br>(.27)                             | .29<br>(.27)                                   | .22<br>(.05)                                     | .01<br>(-.08)          |
| % Employed<br>males aged 16 + :<br>professional, technical<br>and kindred workers<br>and managers       | (MHH5C10) | -.29<br>(-.20)                           | -.33<br>(-.30)                                 | -.14<br>(.01)                                    | .02<br>(.09)           |
| Median years of<br>school completed<br>by persons aged 25 +                                             | (MHH5C11) | -.32<br>(-.25)                           | -.54<br>(-.52)                                 | -.28<br>(-.24)                                   | -.04<br>(-.01)         |
| <b>Urbanization</b>                                                                                     |           |                                          |                                                |                                                  |                        |
| % Residents outside urban<br>areas in towns of<br>less than 2500 inhabitants                            | (MHH6C90) | -.05                                     | -.01                                           | .40                                              | .03                    |
| % Single-family<br>detached dwellings                                                                   | (MHH5C19) | -.11<br>(-.12)                           | .18<br>(.21)                                   | .21<br>(.01)                                     | -.50<br>(-.60)         |
| Population,<br>1 April 1970                                                                             | (MHH5C01) | .00<br>(.02)                             | .10<br>(.14)                                   | -.10<br>(.08)                                    | .05<br>(.07)           |