Digitized Theses

Digitized Special Collections

1987

The Effects Of Problem Drinking On The Utilization Of Physicians In Canadian Family Practice

Brian Robert Rush

THE EFFECTS OF PROBLEM DRINKING
ON THE UTILIZATION OF PHYSICIANS
IN CANADIAN FAMILY PRACTICE

by

Brian R. Rush

Department of Epidemiology and Biostatistics

Submitted in partial fulfilment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
London, Ontario
February, 1987

ABSTRACT

This study was concerned with the extent to which the abuse of alcoholic beverages is associated with the frequency of use of physicians in Canadian family practice and the type of morbidity presented to the doctor. The study group was composed of 108 problem drinkers identified in two family medical practices in London, Ontario. The utilization of their family physician was compared to a matched control group over a two-year period. Utilization by the spouses and children living with the problem drinkers was also examined. Data were obtained retrospectively from a problem oriented, patient classification system and other aspects of the medical records. The main dependent variables were the average number of patient-physician contacts per year and the type of diagnoses made during each contact.

The results showed that problem drinkers were in contact with their family physician twice as often as matched control patients. They were also more likely to be diagnosed as having neoplastic disease, endocrine/nutrition disorders, mental health problems, drug or tobacco abuse, respiratory, digestive and skin disease, vague signs, symptoms and ill-defined conditions, traumatic injuries and social/marital/family problems. The higher rate of

utilization was due primarily to the higher prevalence of psychosocial problems and traumatic injuries.

Spouses of the problem drinkers did not differ significantly from their matched controls on the frequency of utilization, although visits were more common for mental health problems and problems associated with social/marital/family relationships. No differences in utilization emerged when the overall sample of children of problem drinkers was compared to their control group. However, index children between the ages of six and eleven were more frequent attenders and had more psychosocial problems.

The findings of this investigation are discussed in terms of the development of case finding procedures to detect familial alcohol abuse and the planning of future studies into the efficacy of therapeutic interventions with these families.

Foundation, and Dr. Robert Brook, the former director, for their confidence in my abilities and for the opportunity to pursue my dissertation while employed with the organization.

Thanks are accorded to my wife, Wendy and to Mrs. Barb Keogan for typing this manuscript and for preparing the many tables with such skill and patience. Thanks also to Mrs. Jackie Boyd-McAllister for her help with some of the figures and other secretarial assistance.

Finally, a very special acknowledgement goes to my wife Wendy for her understanding and support and for helping me in so many ways reach the conclusion of this work.

TABLE OF CONTENTS

ix

LIST OF TABLES

x

LIST   OF   FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

The use of alcoholic beverages is an aspect of human behaviour that is firmly entrenched in modern day society. Recent survey estimates show that between 80-85% of the adult population in Ontario drank some alcohol in the previous year (Smart & Adlaf, 1984). Although it is further estimated that the alcohol consumption of the large majority of drinkers is primarily of a social or recreational nature, about 15-25% of the drinking population report that their use of alcohol has resulted in adverse consequences in some important aspect of their life (e.g., family, social, medical, legal, employment) (Smart et al., 1980; Polich, 1981; Bland & Orn, 1985). This segment of the population would be categorized as problem drinkers or alcohol abusers using current categorical typologies of alcohol problems (American Psychiatric Association, 1980). Between 3-5% of the drinking population show signs of severe alcohol dependence and would be considered to be "alcoholic" as the phenomenon is traditionally understood by clinicians and the layman. In Ontario, the broader problem drinking group is estimated to be between 1 and 1.5 million adults (Simpson & Rush, 1985), of which about 250,000 may be severely alcohol dependent or "alcoholic".

Given the sheer magnitude of the problem in our society, it is easily appreciated that the economic costs are high. Since the impact of alcohol abuse may cut across all dimensions of an individual's private and public life, the economic impact is felt in many different sectors at the macro level. In Ontario, during 1983, the cost of specialized alcohol treatment services totalled approximately $49 million (Rush & Timney, 1985). Data for 1980-81, indicate an additional $23 million for alcoholism treatment in mental health services, $142 million to treat alcoholism and alcohol-related disorders in Ontario general hospitals, $78 million for physician services and about $116 million to provide service to persons with alcohol problems in social counselling, social welfare and correctional counselling (Rush & Brook, 1981). The estimated cost of reduced labour productivity in 1976 was $172 million (Marshman, 1978). Projecting these various cost estimates to 1986 dollars results in a staggering $746 million and even this may be viewed as an underestimate since some additional costs are not included (e.g., court costs and the costs of incarcerating offenders of alcohol-related crime). Further, these dollar estimates do not reflect the economic and personal costs to family members and others who have been indirectly affected by alcohol abuse.

The family physician has been viewed as being ideally situated in the health care system to play an active role in the prevention, identification and treatment of alcohol problems (e.g., Babor et al., 1986; Skinner & Holt, 1983). Second only to Alcoholics Anonymous, medical doctors are most frequently cited by the general public as a source of help for alcohol problems.[1] Thus, they are well placed to identify such problems in their formative stages before the onset of serious biomedical consequences.

There is evidence that the involvement of the family physician in the identification and treatment of alcohol abusing patients falls short of this potential for secondary prevention. For example, a population survey in the U.S. revealed that only 45% of serious problem drinkers who had been seen by a physician, were in fact asked about their drinking. Further, only 25% were either encouraged to cut down or told about the health hazards and only 3% were referred to some organized treatment program (Hingson et al., 1982). In Ontario, less than 0.4% of O.H.I.P. payments to physicians in 1971 were for the treatment of a diagnosis of alcoholism (Spasoff et al., 1975, cited in Marshman, 1978), despite the fact that some estimates of the prevalence of alcohol dependence range as high as 11-17% of general practice patients (Malla & Mersky, in press). This

---

[1]Unpublished data available from the author.

large discrepancy suggests that physicians may not be effectively identifying drinking problems among their patients, counselling those who are identified and/or recording the diagnosis for billing purposes.

Findings such as these have stimulated a large research effort aimed at increasing our understanding of physicians' involvement with persons with alcohol problems. Some studies have focused on the prevalence of alcoholism in the patient population and the ability of various procedures to aid in its detection (e.g., Wilkins, 1974, Vande Creek et al., 1982; Skinner et al., 1984; Skinner et al., 1986). Research has been aimed at the attitudes and beliefs held by family practitioners and medical students concerning alcoholics, alcoholism, and alcoholism treatment (e.g., Casswell & McPherson, 1982; Kinney et al., 1982). Other research has focused on the nature and extent of the utilization of the family physician by patients with alcohol problems (e.g., Buchan et al., 1981; Roghmann et al., 1981; Putnam, 1982a).

The present study builds on this previous research and is concerned with the utilization of family medical practitioners by problem drinkers and their co-habiting family members. The group of problem drinkers under study are those who had been previously identified by their physicians in two family practices in London, Ontario.

Their average number of contacts per year with the physician and the nature of the diagnosis made during these contacts are compared to a matched control group. Using similar measures, spouses and children living with the problem drinkers are compared to the spouses and children of the control patients.

The research is aimed at three general objectives. First, if it can be demonstrated that problem drinkers and/or their family members are particularly high users of physician services, and if reasonable arguments can be made for inferring that these associations are causal, more determined interventions for alcohol abusing patients will be indicated. Such findings would also provide baseline data for future studies to assess whether these interventions will ultimately reduce the level of use of the family physician. This issue is important from the perspective of health care costs, since the cost of providing treatment may be offset by the reduction in future health care expenditures. The planning of studies to examine the cost-offset of alcohol treatment in a family medical setting requires good baseline data on utilization by problem drinkers in that setting and some insight into differences in utilization among different sub-groups of the problem population (e.g., age, gender, social class, problem severity).

A second objective underlying this research is to gain an understanding of the utilization behavior of persons known to have a drinking problem in the belief that this information will help physicians detect such problems in families where it is covered by a veil of denial and secrecy. Considerable research has evaluated the utility of laboratory tests and psychosocial indicators for the detection of alcohol abuse (Skinner et al., 1981; Holt et al., 1981). Only recently has the importance of clinical signs and medical history been emphasized (Bashir et al.,1982; Skinner et al., 1986; Babor et al., 1985). The present research was designed to show the main features which distinguish the clinical record of identified problem drinkers and to demonstrate how well these features might perform as indicators of the problem in cases where alcohol abuse remains undetected.

A third objective in studying the association between problem drinking and the utilization of family physicians is to consider the importance of conceptualizing alcohol abuse as a family problem. The alcohol field has tended to neglect the fact that the spouse and children who are living with a problem drinker may have their own unique problems and be deserving of special care regardless of the cooperation received from the problem drinker him/herself. A study of the utilization of family physicians by the

members of problem drinkers' families may show the need to extend treatment efforts to these significant others. In addition, if the spouses and children of identified problem drinkers tend to present with a characteristic profile of utilization and morbidity, this family profile may also provide valuable clues for detecting familial alcohol abuse in other cases.

Chapter 2 provides a review of relevant literature and concludes with the specific questions to be addressed in this study. The research design and procedures are outlined in Chapter 3. In Chapters 4 and 5, the results are presented for the problem drinkers and their family members, respectively. In the final·chapter, these results are discussed and their implications for program planning and future research are delineated.

CHAPTER 2

REVIEW OF THE LITERATURE

Many factors influence a person's decision to seek care from a medical practitioner and a large body of scientific literature has developed in the past three to four decades which seeks to understand behavior associated with this decision-making process. This research has focused on a wide variety of explanatory factors such as patient socio-demographic characteristics (e.g., gender) (Cleary et al., 1982); the social-psychological make-up of patients such as health beliefs (Rosenstock, 1966; Becker & Mainan, 1975) or level of introspection (Mechanic, 1986); the mental and physical health status of patients (Mechanic et al., 1982); the characteristics of the physician (Preston-Whyte et al., 1983); the characteristics of the doctor-patient interaction (Ross & Duff, 1982); and the organizational features of the health care delivery system, including method of payment (Dutton, 1979). Although some research has focused on the sequencing of visits to the physician (Beland, 1982) most studies have been concerned with documenting and explaining the amount of services utilized. The stated purpose has usually been to identify factors

8

associated with over or under-utilization and to develop interventions appropriate to the needs of high risk groups.

The focus of the present literature review is on studies which are relevant to the general issue of whether the use of alcohol is an important determinant of the nature and extent of utilization of family physicians. These studies fall into six general categories: (a) studies conducted outside the context of primary health care services but which nevertheless have examined the association between alcohol use and various types of morbidity; (b) population surveys which have examined the association between self-reported alcohol consumption or alcohol-related problems and variables related to the utilization of physicians; (c) studies which have focused on high versus low attenders in general medical practice and which have compared these groups on variables related to their use of alcohol; (d) studies which have contrasted the utilization of physicians and the presenting morbidities of known problem drinkers to that of matched controls; (e) studies of family members of problem drinkers which are conducted outside the context of primary health services but which have examined the association between alcohol abuse and their health; and (f) studies which have compared the utilization of physicians and the presenting morbidities of the family members of problem drinkers to that of matched controls.

2.1 Studies examining the association between the use of alcohol and various types of morbidity.

It is beyond the scope of this review to provide an exhaustive summary of the research examining the association between alcohol consumption and health status. However, a brief summary of this literature is required to underscore the fact that the present research is a study of morbidity only insofar as it is presented to and diagnosed by the family physician. Selected studies will be reviewed here which have examined morbidity in a drinking population, outside the context of a primary health care resource.. Exhaustive reviews of this research are provided by Schmidt and Popham (1975/76), Brody and Mills (1978) and Popham et al. (1984). These reviews also evaluate research concerned with excess mortality attributed to the use of alcohol, a topic not covered in detail in the present review.

Studies of alcohol use and morbidity have generally been of two types - population surveys which inquire about health problems as well as alcohol consumption and studies which have focused on the prevalence of disease among samples of known heavy drinkers. Some of the latter studies have selected this sample from specialized alcoholism treatment agencies, while others have utilized a non-treatment population (e.g., employee groups, general hospital patients).

The Canada Health Survey (Health and Welfare Canada, 1981) is a recent example of a large scale population survey which examined the association between health and alcohol consumption. Two studies based on secondary data analysis have examined the association in detail (Richman & Warren, 1985a; 1985b; Adrian & Layne, 1986).

Richman and Warren (1985a) defined health status with a composite of four variables: days spent in bed or as a patient, lost activity days, reduced activity days and visits to a physician. A dichotomous measure was employed based on individuals reporting either "none" or "one or more" of these incidents during the 2-week reporting period. With respect to the frequency of drinking occasions in the past year, there was a relatively strong inverse relationship with health status. That is, the more frequent consumers reported better health status than expected on the basis of their demographic characteristics alone. . "Former drinkers" showed the only large positive difference in morbidity. In terms of quantity of alcohol intake in the past week, a higher morbidity rate was evident at the two extremes of the continuum - zero drinks and over 35 drinks. These findings were generally consistent with the hypothesis of a U-shaped dose-response relationship. The results also suggest that there is a threshold of quantity/frequency of alcohol consumption over which the deleterious consequences

to health increase rapidly. In a subsequent report, the U-shaped function was shown to be strongest for beer drinkers and drinkers with no established beverage preference (Richman & Warren, 1985b). Specific types of morbidity were not examined in these studies other than the finding of a clear dose-response relationship between the quantity of alcohol consumed per week and the probability of accidents. This association was used to help validate the measures of alcohol consumption.

Adrian and Layne (1986) have also analysed special tabulations of relevant data from the Canada Health Survey. They compared current light drinkers and current heavy drinkers[2] on the number of health problems reported in the survey and the prevalence of particular illnesses. Unfortunately, adjustments were not made in their analysis for potentially confounding differences between the two groups (e.g., age, gender). A greater number of health problems was reported by the heavy drinkers, but the difference was not large in an absolute sense (1.1 versus 1.3 problems per person). When selected medical conditions were examined, excess morbidity among heavy drinkers was shown for traumatic injuries (44%), mental disorders (42%),

---

[2] For males, light drinkers = 1 to 5 drinks per week; heavy drinkers = over 14 drinks per week. For females, light drinkers = 1 to 3 drinks per week; heavy drinkers = over 9 drinks per week.

circulatory system disease (40%), and respiratory illness, especially asthsma (93%), and bronchitis and emphysema (67%). Although these differences are not exceedingly large[3], the findings are generally consistent with other population studies which show that, among drinkers, higher rates of health problems occur for the heaviest consuming group.

A major limitation of the Canada Health Survey and other similar population-based studies is that the sampling frame excludes populations in which heavy drinkers are over-represented (e.g., hospital patients, individuals in residential alcoholism treatment centres, people with no residence, inmates of correctional institutions). This factor results in conservative estimates of "heavy" consumption being adopted for analytical purposes and the end result is likely to be conservative estimates of health risks at the higher consumption levels. Other problems with population survey data arise with the under-reporting of alcohol consumption (Pernanen, 1974) and varying response rates among individuals differing in the quantity and frequency of alcohol consumption and health status.

One large scale population study avoided some of the pitfalls of survey data by using a biochemical marker that

---

[3]A two or three-fold difference is often used as a rough rule of thumb to indicate "large," practically significant differences in epidemiological research.

is sensitive to alcohol consumption (gamma-glutamyl transferase or GGT) as a means of classifying individuals on an index of alcohol severity (Kristenson & Hood, 1984). GGT is a hepatic enzyme whose blood level is influenced by chronic alcohol consumption. Groups of individuals classified on the basis of GGT levels were compared on various measures of morbidity. Disability ratios were calculated for the highest versus the lowest decentile of the GGT distribution using sickness days per year as the unit of analysis. The highest ratios obtained were for injuries (5.5:1) and mental disorders (4.3:1). Men with the highest GGT levels had five to six times more fractures and paid 7-13 times more visits to orthopaedic surgeons. Risk of death was six to seven times greater in men in the high GGT group. These risk levels for particular health problems appear to be greater than those estimated in other population studies which use self-reports of alcohol consumption.

The use of an indirect measure of alcohol consumption such as GGT levels is one means of avoiding the pitfalls associated with self-reported alcohol consumption. Studies of selected samples of known problem drinkers or alcoholics also contribute to our understanding of the health risks related to the use of alcohol by focusing on a population of heavy, often chronic, daily drinkers.

Pell and D'Alonzo (1968) provide the classic study of chronic health problems among a group of problem drinkers drawn from a non-treatment population. Recorded medical histories were used to describe the health status of industrial employees who had been diagnosed as problem drinkers by company physicians. The largest difference between this group and matched controls was a greater prevalence of hypertension and cirrhosis of the liver among the former. Significant, positive associations with alcohol abuse were also shown for peptic ulcer, asthma, diabetes mellitus, gout, neuritis and, to a less extent, cerebrovascular and heart disease. A negative association was found for kidney stones.

Another benchmark study was that of Observer and Maxwell (1959). They compared identified problem drinkers in an industrial setting to matched controls and found about 2.5 times the rate of absenteeism for injury and illness, 3.6 times the rate of accidents and 3.0 times the cost in sick benefits received.

Heavy drinkers participating in alcoholism treatment programs have been shown to display a complex and extensive profile of morbidity. Ashley et al. (1981) obtained a lifetime medical history of inpatient alcoholics and constructed a profile of physical disease characteristics. At admission, only 6.5% were disease free, although 33% had

disease which was asymptomatic. When all lifetime illness events were classified by body system, the most common were liver disease (23%), gastrointestinal and respiratory illness (17% each), and nervous system disease (15%). Trauma, and peptic ulcer were also major medical problems, especially for individuals in their early years of heavy drinking. These results are typical of those found in a variety of other studies of alcoholics treated in inpatient and outpatient settings (e.g., Wilkinson et al., 1971).

A similar profile of morbidity has been obtained in studies of patients admitted to general hospitals with alcohol-related diagnoses. For example, Adrian and Layne (1986) compared the medical conditions being treated for Ontario hospital patients who were admitted with an alcohol-related diagnoses (mostly alcohol dependence, non-dependent alcohol abuse, and alcoholic psychosis) to that of patients with no such diagnoses. For cases treated with a primary alcohol-related diagnosis, there were more secondary diagnoses than expected for diseases of the blood (510%), endocrine, nutritional and metabolic diseases (355%), mental disorders (276%), skin disease (53%), ill-defined conditions (75%), nervous system diseases (25%) and digestive system diseases (14%).

Kolb and Gunderson (1981) compared hospital admission histories for groups of alcohol abusers and controls, both

of which were selected from U.S. Navy personnel. The alcohol group constituted individuals either hospitalized with a primary diagnosis of alcoholic psychosis or alcoholism or who were treated in an alcohol rehabilitation facility. This group had a significantly higher mean number of hospital admissions and days hospitalized for conditions other than alcoholism. The most notable differences between groups were the higher rates of admission among the alcohol abusers for mental disorders, digestive system diseases, and traumatic injury. Similar results have been obtained in other studies of hospital admissions (e.g., Kristenson et al., 1982).

A consistent pattern emerges from these various studies examining the association between the use of alcohol and health problems, as observed outside the context of primary health care services. The common profile of morbidity appears to be a higher risk of mental health problems, liver ailments, digestive disorders, circulatory and respiratory disease, endocrine and nutritional deficiencies, certain cancers, some skin diseases, traumatic injuries, and vague signs/symptoms of ill-health such as fatigue. For some of these health problems (e.g., fatty liver, liver cirrhosis, cardiomyopathy, peptic ulcer, gastritis, gout, some skin disorders, and accidents), the causal role of heavy alcohol consumption is directly implicated in the above studies and

other bio-medical and epidemiological research. For health problems such as bronchitis, and perhaps other respiratory diseases, as well as certain cancers such as cancer of the mouth, larnyx and esophagus, the use of alcohol and tobacco products are probably additive risk factors (Schmidt & Popham, 1981).

Based on the strong associations between heavy alcohol use and various types of morbidity it is reasonable to hypothesize a higher rate of use of primary health care services such as the family physician among heavy drinkers. However, more frequent illness does not necessarily imply more frequent use of health services given the many social, personal, and other factors that influence the seeking of care (Mechanic, 1986). For example, some research has shown that alcoholics' perception of the seriousness of illness in general is attenuated compared to heroin addicts and normal controls (Dudley et al., 1974). This may lead to a reduced likelihood of seeking assistance. Also, individuals receiving alcoholism treatment who view themselves as frequently ill have been shown to be less likely to complete their treatment regimen (Calsyn et al., 1983). In that study, the authors speculated that frequently ill patients may seek treatment only when they are most concerned about their health and then leave when they are feeling better and their fears allayed. Although such findings may be idiosyncratic

to a particular sample of alcoholics and treatment programs, they do serve as a caution against making direct assumptions about more frequent use of health care based on evidence of more frequent illness.

2.2 Studies comparing self-reported alcohol consumption to variables concerned with the utilization of physicians.

Pope (1982) examined the relationship among health status, three variables related to lifestyle (alcohol consumption, smoking, and physical activity), and the use of medical care services for broad categories of morbidity. In this study, seven years of data on utilization were linked with survey data concerned with lifestyle and health status that were obtained from a large probability sample of adults in an American Health Maintenance Organization (HMO). With respect to the use of alcohol, results revealed negative but generally low and non-significant correlations between physical and mental health status and a quantity-frequency index of alcohol consumption. The relationships between drinking behavior and the use of medical care services also approached zero or were negative. Thus, there was little evidence to suggest that, as a group, heavy drinkers in this study were in poorer health and used more medical services than their lighter drinker counterparts.[4] These findings,

----

[4]As with the Canada Health Survey, a rather conservative estimate of "heavy drinking" was used in this study. Heavy drinking was defined as drinking once per week with at least one occasion per week of six or more drinks per sitting.

however, did not hold for all age groups, especially young adults. For males under the age of 35, drinking status was positively related to the rate of medical care contacts for diseases with a high emotional component, for symptoms of undiagnosed disease and for trauma. For females under the age of 35, drinking was positively associated with the rate of contact for diseases which generally required hospitalization.

These predominantly negative findings from survey research stand in contrast to those from studies which were designed specifically to compare high and low attenders in family medical practice. In these studies the abuse of alcoholic beverages has been implicated as an important factor in patients who are high utilizers of family practitioners.

2.3 Studies comparing high and low attenders in medical practice.

Many studies have examined the characteristics of patients in general medical practice with high rates of consultation (e.g., Hood & Farmer, 1974; McCardle, 1974; Browne et al., 1982; Westhead, 1985; Nighswander, 1984). The recurring theme among these studies has been the poor physical health and the high prevalence of social and psychological problems among high attenders. The results of the Canadian study by Browne and her colleagues reflect

these general findings. The most frequent attenders were more physically, socially, and emotionally distressed; tended to suffer from problems of low self-esteem, social isolation, and family dysfunction; were more likely to be unemployed and to have a low income and presented more often with emotional and gastrointestinal complaints. As with most other studies in this area, Browne's research did not directly examine the differences between groups on alcohol consumption or alcohol-related problems. However, alcohol abuse is indirectly implicated because of its well-known association with many of these distinguishing characteristics (e.g., low self-esteem, family problems, stomach disorders).

Two studies concerning high and low attenders specifically cited alcohol abuse as an important factor discriminating the two groups. Westhead (1985) compared high and low attenders in a general practice surgery in Great Britain on several social, physical, and mental health characteristics. The commonly found pattern emerged with the most frequent attenders having a higher prevalence of chronic physical and psychological illness, often accompanied by marital problems. Alcoholism, however, was cited as a major distinguishing feature among male patients and was intimately connected to psychiatric morbidity and marital breakdown.

At a Native medical centre in Alaska, Nighswander (1984) found that alcoholism, with its traumatic and chronic consequences was the condition most closely associated with the highest rates of utilization for both men and women. Further, during the six year study period, one of every four men and one of every 10 women in the high-utilization group died. Alcoholism was associated with one-half of these deaths.

In summary, studies comparing high and low attenders implicate alcohol abuse as an important factor underlying high utilization of family physicians.

2.4 <u>Studies examining the utilization of physicians by problem drinkers identified in medical practice</u>.

The nature and extent of utilization of primary health care services by alcoholics has been examined within American HMO's (Buyajy, 1978; Putnam, 1982a; Roghmann et al., 1981) and in one British family practice setting (Buchan et al., 1981). These studies provide important background for the present research and thus will be examined in more detail than the studies previously reviewed.

The first research to focus specifically on utilization of primary health care by identified alcoholics was that undertaken by Boyajy (1978). He gathered data from four separate HMO's on a variety of topics, including the extent

to which identified alcoholics had utilized services provided within the health plans. Controlling for age, the overall rate of utilization of alcoholics was 22% higher than that of the general population. Further, alcoholics were more likely to make unscheduled and expensive visits and had high rates of utilization of physician and emergency services. Excluding alcoholism, the most frequent types of presenting problems were hypertension, upper respiratory tract infection, influenza, trauma, gastritis, gout, anxiety, contusion and liver cirrhosis. These results, however, were not compared to the presenting problems of matched controls.

The HMO study by Roghmann et al. (1981) investigated the differences in utilization between alcoholics currently known within the HMO and a group of matched controls. Alcoholics were identified for the study either on the basis of a diagnosis of alcoholism made within the centre or through Blue Cross claims for inpatient treatment. A group of "high risk" enrollees were also included and were selected on the basis of responses to drinking-related questions asked during their health assessment. The average age for the study group was 40.4 years. No estimate of the sex ratio can be made from their published report but it would be expected that a large majority would be male. Compared to their controls, both the alcoholic and the "high

risk" groups had about 23% more outpatient encounters.[5]
Results were also presented by age group and showed the
larger differences between study and control groups to be
for younger patients, aged 15-24. For this sub-group, two
to three-fold differences in outpatient utilization rates
were evident. Results were not shown for various categories
of morbidity other than to reflect higher rates of utiliza-
tion among the study groups for "illness" as compared to
injury, maternity care, and health assessments.

In Putnam's research (Putnam, 1982a), the population
under study had been identified in the HMO counselling
service with a primary problem of alcohol abuse. Variables
related to the utilization of all HMO services were compared
between this group and a group of matched controls.
Alcoholics in this research were slightly younger than those
studied by Roghmann and colleagues (mean age = 37.3 years)
and 30% of the group was female. Results showed that the
alcoholic group received significantly more of all types of
care provided by the organization. For example, they had
twice as many inpatient encounters and 43% more outpatient
non-counselling visits. As with the Roghmann et al. study,
these outpatient visits would include visits to physicians

----

[5]These outpatient services also include a wide range of
ambulatory services other than physician care - e.g.,
dental, nursing, x-ray, nutritional counselling, physio-
therapy.

but also dentists, outpatient physiotherapists and other in-house health services. Rates of utilization for all classes of morbidity except skin disease were higher for the alcohol group. Of particular note were the elevated relative risks for psychosocial problems (4.1), digestive problems (3.6), endocrine disorders (6.6), vague symptoms and ill-defined conditions (4.0), and neoplasms (4.8). The alcoholics were 20% more likely to use outpatient services for accidents and related problems but this comparatively small difference was influenced by the 400% greater likelihood of inpatient admissions for such problems.

Buchan et al. (1981) undertook a study within a general practice setting in Great Britain, to compare the type and frequency of consultation with physicians by problem drinkers. Subjects for this research were those previously identified in the practice as being a problem drinker, this having been recorded on the patient's problem list and noted in a reference file which covered the entire practice. Based on this procedure, it is likely that the subjects selected for study represented a wider spectrum of severity of problem drinking than used in the HMO studies. About 87% of the subjects were male. An age breakdown was not provided. Results showed that, as a group, the problem drinkers had an annual rate of consultation which was twice that of controls. They were also more likely to present

with social, psychiatric, gastro-intestinal, smoking, and accident-related problems.

This small set of studies provides a fairly consistent pattern of results. Problem drinkers were shown to be heavier users of physician services in various medical settings in the United States and Great Britain and they were distinguished by more frequent visits for several specific kinds of problems; in the context of both outpatient and inpatient care, the results are also consistent with the general hypothesis that problem drinkers use more physician services because they are less well physically and emotionally.

Despite the consistency in these results, the studies have been limited in many respects. One limitation of these findings is the fact that the magnitude of the effect of problem drinking on rates of utilization varies considerably for the different medical settings which have been studied. In the American HMO studies, two to four-fold differences are evident for the utilization of inpatient services but only 20-40% differences in the use of outpatient services. As shown in Putnam's study (1982a), the close availability of inpatient services can affect the rate of outpatient utilization for particular problems (e.g., accidents). In the British study, a two-fold difference was evident for outpatient contacts for all problems combined. Would

similar results be obtained in Canadian family practice settings thereby highlighting the need for interventions aimed at reducing high rates of utilization by alcohol abusers? Given the variability in the findings from other types of medical practices, baseline data seeking to justify such interventions should be collected within the health care setting in which the interventions are being considered.

Another major limitation of these studies is the lack of control for social class at either the design or analysis stage of the research. It is well known that social class is related to the type and rate of health care utilization (e.g., Browne et al., 1982) as well as alcohol consumption, and the seeking of specialized treatment for-alcohol-related problems (e.g., Smart & Adlaf, 1984; Edwards et al., 1974; Schmidt et al., 1968). Calsyn et al., (1983) found that alcoholics in treatment who viewed themselves as being frequently ill tended to come from a lower socio-economic background. Bias may have been introduced in the above studies concerned with the utilization of the family physician if the problem drinkers who were selected were drawn largely from a lower class population, but tended to be matched to persons of a higher social position. If so, the difference in social position may partially or entirely explain the higher rates of utilization typically observed for the problem drinking group.

A third limitation of the research for the purposes of program development is the overall lack of attention paid to the level of severity of the alcohol problem and to differences among demographic sub-groups. Roghmann et al. (1981) provide the only study to even partially address the issue of problem severity by including a separate "high-risk" alcohol group as well as a group of diagnosed alcoholics. There was some evidence that the effect on outpatient utilization for illness was greater for the diagnosed alcoholics. More research which would treat alcohol problems on a broader continuum is clearly needed.

With respect to demographic subgroups, again only Roghmann and colleagues (1981) have published the results of any attempt to highlight particular sub-groups of the problem drinking population that may deserve special consideration in program efforts. They examined the differences between problem drinkers and controls among different age groups and found the largest differences among young adults. This would corroborate the findings of Pope (1982) in his population study. No study has explored gender differences, despite the well-known tendency for females to be more likely to seek medical care (Cleary et al., 1982) and the suggestion in the alcohol literature that the health of women may be more susceptible to the harmful effects of alcohol (Ashley et al., 1977). If the latter is

true, one would hypothesize that the difference in the rate of utilization between problem drinkers and controls would be greater for alcohol abusing women than for men.

Finally, the few studies directly comparing problem drinking patients with matched controls have not examined the inter-relationship of alcohol abuse, psychiatric problems, and the utilization of family physicians. Westhead's (1985) study showed that, especially among his male patients, alcoholism and psychiatric problems such as chronic anxiety and depression were the distinguishing features of the most frequent attenders in the practice. It has been well documented that problem drinkers have a higher risk of psychiatric difficulties (e.g., Pell & D'Alonzo, 1968; Weissman et al., 1980). Putnam (1982a) speculated at the conclusion of her HMO study that in a group of problem drinking patients these difficulties may be more directly associated with their consultation of physicians than their abuse of alcohol per se.

Patients with mental health problems in Canadian family practice have been shown to have high utilization rates and a rather distinctive profile of demographic characteristics and morbidity (Brennan & Noce, 1981). In that study, patients with mental health problems had higher rates of digestive disorders and more frequent family problems, two findings which are commonly observed in

studies of alcoholics. Godkin and Rice (1981) studied the utilization of primary care physicians by anxious and depressed patients and, as with Brennan's research, many of the features distinguishing these groups from the overall patient population have also been found in studies of alcoholics (e.g., higher consultation rates and abdominal disorders). The similarities of these findings across the alcohol and mental health literature, and the known predisposition of problem drinkers to have mental health problems, raises the question about the actual role of alcohol abuse in their utilization of family physicians. The major concern from a treatment and planning point of view is the likelihood that problem drinkers' utilization of the family physician, and the associated costs, will not decline following alcohol treatment unless there is a concomitant improvement in mental health status generally.

2.5 <u>Studies examining the association between alcohol abuse and various types of health-related problems among co-habiting family members</u>.

It is beyond the scope of this review to provide an exhaustive summary of research concerned with the health status of family members living with an alcoholic. However, as with the earlier section concerned with the alcoholics themselves, (Section 2.1) a brief review of selected studies is necessary in order to underscore the fact that the

present study is concerned only with health problems
presented to and diagnosed by the family physician. Other
similar areas of research, have shown that differences in
health care utilization among dysfunctional families may or
may not. reflect differences in actual morbidity. For
example, studies have shown a higher prevalence of
respiratory illness among children of parents who smoke
(Bonham & Wilson, 1981) but a lower rate of health care
consultation for such problems (Vogt, 1983).

In general, families with an alcoholic member have
been characterized as being disrupted. by psychosocial and
emotional turmoil which contributes to a wide range of
problems among family members. Orford (1984) reviews the
theoretical perspectives which seek to explain the causal
mechanisms which underly alcohol abuse in the family and the
emergence of problems among family members. Two
perspectives now dominate the literature - the stress-victim
perspective and the systems perspective.

The stress-victim perspective holds that the
social, mental and physical dysfunction of the spouse and
children of an alcoholic is directly related to the level of
stress in the home. In particular, this perspective has
dominated the literature concerned with the children of
alcoholics. Stress in the home is thought to arise most
often as a result of irrational and inconsistent parenting

behavior and actual or threatened family violence (e.g., Cork, 1969; Wegscheider, 1981; Mayer & Black, 1977). This perspective is well linked to a larger body of research on the relationships among psychosocial stress, illness, and illness behavior (e.g., Andrews et al., 1978; Godkin & Rice, 1981; Dohrenwend & Dohrenwend, 1981).

The systems perspective has been more concerned with the relationship between the alcoholic and his/her spouse and recognizes that family members are not only affected by alcohol abuse, but also may contribute to the development and maintenance of the problem (e.g. Steinglass, 1981.; Jacob, 1986). This perspective is well linked to general systems theory of family dynamics (e.g., Hoffman, 1981).

Regardless of the perspective used to explain family dysfunction, clinical impressions and empirical research suggest strong associations between alcoholism in the family and health problems experienced by family members. In a summary of her clinical experience, Wegsheider (1981) noted that spouses of active alcoholics frequently presented for treatment with stress-related conditions such as digestive problems, ulcers, colitis, headache and backache, nervousness, irritability and depression. These clinical impressions are corroborated by analytical and comparative studies.

Steinglass (1981) found a strong relationship between the social consequences of the partner's drinking and the psychiatric symptomatology of the non-alcoholic spouse. The more often the alcoholic had experienced personal, family, social, and work problems, the more severe the spouse's psychiatric dysfunction. In other earlier studies, fewer psycho-physiological symptoms have been reported among women whose husbands were <u>recovered</u> problem drinkers than among women whose husbands were currently drinking (Bailey, 1967; Haberman, 1964). Moos <u>et</u> <u>al</u>. (1982) compared a group of spouses of alcoholics who had relapsed after treatment to two other groups - one composed of spouses of recovered alcoholics and the other being controls drawn from the general community. Results showed that spouses of relapsed alcoholics experienced more mood and health-related dysfunction than spouses of the community controls or of recovered alcoholics. For example, the spouses whose partners were drinking more alcohol and had more drinking problems were more depressed and anxious. These spouses also complained of more physical symptoms and medical conditions. In addition, the results showed that the impact on the spouse was also related to other characteristics of the alcohol abusing partner (e.g., poor occupational functioning) as well as the number of negative life events (e.g., loss of income), the degree of family conflict, and the nature of the spouse's own coping response.

With few exceptions, studies of children living with an alcoholic parent have shown the detrimental effects of this experience. Clinical observations and descriptive studies, such as the classic work by Cork (1969), paint a picture of negative behavioral, emotional, social and physical consequences. These effects are believed to be attributable, at least in part, to the stress caused by constant fighting and quarreling between parents, unpredictable and inconsistent parenting behavior, and the social isolation of the family as a whole (Wegsheider, 1981). In many such families, these problems are compounded by physical abuse, neglect and incest (e.g., Mayer & Black, 1977).

Compared to the large number of observational studies and case narratives concerning these children, there have been few analytical studies which evaluate the effect of parental alcoholism. Nylander (1960) found that, compared to a group of normal control children, children of alcoholic fathers displayed more physical and mental signs of illness and presented to hospitals more often for stomachaches, tiredness and headaches for which no underlying organic condition could be found. Follow-up research revealed two other major findings. First, it was shown that school difficulties and other social/behavioral dysfunction which were also characteristic of the children of alcoholic

families were evident regardless of the socio-economic status of the family (Nylander & Rydelius, 1982). Second, it was found that as these children grew into adulthood the psychosomatic symptoms and behavioral problems were compounded and they experienced more illness episodes and surgical and hospital visits as young adults (Rydelius, 1981). Similar effects on children during pre-adolescent or adolescent years were noted by Herjanic et al. (1977), Lund and Landesman-Dwyer (1978), and Biek (1981).

The question is often raised whether the impact of familial alcohol abuse on the children is greater or less than the impact of parental psychiatric illness or other problems which disrupt family life. It has been shown, for example, that parental psychiatric disorder is also associated with increased psychopathology in the children (e.g., Cantwell & Baker, 1984) especially if they are physically abused (Kashani et al., 1985). Also, children in one-parent families tend to suffer more health problems, have higher rates of hospitalization and a higher rate of consultation with their general practitioner than children living with two parents (Jennings & Sheldon, 1985). Is the role of alcohol abuse per se that critical or is it perhaps modified, mediated or confounded by other factors such as psychiatric illness, physical abuse or family breakdown?

When children living with an alcoholic parent are compared to a group of children from other dysfunctional families, equivocal results have been obtained. Fine et al. (1976) compared children of alcoholics to children of parents with psychiatric disorders and found the former to be more emotionally detached, impaired in the use of their senses and socially aggressive. In contrast, a similar study by El-Guebaly et al. (1978) found little difference in the psychosocial adjustment of the children of alcoholic, depressed, or schizophrenic parents. Recently, Jacob and Leonard (1986) found no difference in psychosocial functioning of children of alcoholic versus depressed fathers although both groups were impaired relative to normal controls.

Chafetz et al. (1971) selected children of alcoholics and a control group from within the same child guidance clinic and found few differences in the presenting complaints of the parents. However, the past history of the children of alcoholics revealed more frequent school problems, problems with police, and incidents of serious illness or accidents. Many of these problems were much more common among children of alcoholic parents who had separated, compared to those living with intact families. Family breakdown was hypothesized to be an important mediating variable.

Schuckit and Chiles (1978) also examined the modifying effect of having a broken versus intact home, but found that the co-existence of a broken home with parental alcoholism did not increase the rates of psychosocial disturbance exhibited by the children. In Cork's descriptive study, all children were from intact families yet a host of problems were identified among these children. Thus, there is ample clinical and research evidence to suggest that family breakdown is not a necessary factor intervening between the association of family alcohol abuse and problems among the children.

Finally, it should be noted that many children of alcoholic parents do not develop physical or psychosocial problems; nor as adults are they all likely to become alcoholic. Rutter (1970) has studied children of emotionally disturbed parents and identified factors such as the child's temperment, intelligence and coping skills which mediate his/her response to stress. Research on the children of alcoholics has only recently been aimed in a similar direction with results similar to those reported in the mental health literature (e.g., Werner, 1986).

In summary, the weight of the evidence from studies concerned with the impact of parental alcoholism on children in the home, suggests a negative impact primarily on psychosocial functioning. Negative effects on physical

health have also been reported especially psychosomatic complaints such as headache and upset stomach and lowered resistance to infection and contagious disease. Although the nature of the causal mechanisms and the potential role of intervening variables such as family breakdown remain to be clarified, it is reasonable to hypothesize more frequent contact between these children and their family physician especially for stress-related problems and behavioral disorders.

2.6 Studies examining the utilization of physicians by members of a family living with a problem drinker.

In their study of the utilization of HMO services by alcoholics and "high-risk" alcohol users, Roghmann et al. (1981) also studied the use being made of the health plan by their family members. The design of the study was such that each family member was not matched one-to-one with a control patient. Instead, each alcoholic and high risk case was matched to a control and their family members were compared as a group to the family members of the control patients. Results showed that the family members of the alcoholic and the high risk cases had significantly lower rates of both outpatient and inpatient encounters. This finding held for all age groups, for all years studied, and for all categories of morbidity, including psychiatric consultations. The lack of interaction with age suggests that both

spouses and the children had lower rates of utilization, although this was not specifically examined in the analysis. In the discussion of these findings, a parallel was hypothesized between the situation of alcoholic families and that of young mothers who, when under stress, were more likely to be ill but less likely to seek care (Roghmann & Haggerty, 1973).

The children and spouses of problem drinkers were also included in the aforementioned study by Buchan et al. (1981) in a British general practice. As with the Roghmann study there was no one-to-one match between family members and a control patient, but rather a comparison of the alcohol and control families as a group. The rate of consultation for spouses was only slightly higher than that for controls (6.5 compared to 5.1 visits per year) and the rates for the two groups of children were almost identical (3.4 versus 3.1 visits per year). The spouses of problem drinkers did, however, consult more often for psychiatric, genito-urinary, circulatory, and smoking-related problems and the most striking difference between the two groups of spouses was for visits concerning family difficulties. Results for various categories of morbidity were similar for the two groups of children (Buchan, personal communication, 1986).

Roberts and Brent (1982) examined utilization and illness patterns among the family members of alcoholics

registered at a fee-for-service family medical clinic at an American university teaching center. Patients were selected for the study by having physicians review patient lists and identify those who belonged to a family which included at least one alcoholic. Unlike the studies by Roghmann et al. (1981) and Buchan et al. (1981) a one-to-one matching strategy was employed for the family members in this study. Thus, each family member was matched on the basis of age, gender, and other characteristics to another patient who was not living with an alcoholic. Results showed that, during the study period, family members of alcoholics averaged 33% more visits than controls (9.7 per year compared to 6.5 per year). They also had more frequent diagnoses of trauma and stress-related disease such as gastro-intestinal problems, neurosis and other mental health problems. However, these differences in utilization rate and diagnoses were found only among female family members. Unfortunately, no breakdowns were made in the data to differentiate between the spouses and children in these families.

There is no overall consistency in these findings. The results of the Roghmann et al. study (1981) are in stark contrast to those of Roberts and Brent (1982) and, to a lesser extent, Buchan et al. (1981). The discrepancy in the findings may be at least partly due to the methodology of the matching process in the study. The one-to-one matching

employed by Roberts and Brent provides the most stringent control in the design for potentially confounding variables. The procedure, however, results in the disaggregation of the alcoholic family units for purposes of analyses. Thus 90 family members from 51 families were compared to 90 family members from 90 'families. The other studies retained the family units, aggregated cases and control families into groups and achieved two groups approximately balanced on key variables such as age and gender. Results could, however, have been biased by some unknown factors on which the groups were not equated (e.g., social class).

In two of the above studies, the spouses and children were not separated for analytical purposes and this is a major limiting factor in the utility of findings. ' Since there are different program implications for the results for each of these groups, there is little justification for aggregating all family members into one group for analysis, without providing subsequent sub-group breakdowns.

Finally, these studies are not consistent in the manner in which spouses who also had an alcohol problem were treated for research purposes. In the study by Roghmann et al. (1981), it is not indicated whether spouses who both had alcohol problems were both excluded from the study, were included as separated cases or whether only one was included. Buchan et al. (1981) also fail to address the

issue, although the graphical presentation of their results indicate that a small proportion of spouses did visit for alcohol problems. These may, however, have been for consultations regarding their husband's or wife's problem. Of 51 alcoholic families included in the Roberts and Brent study, as many as 20 families (39%) had two alcoholics, usually both parents. Since a large proportion of the children came from families where both parents were alcoholic, this could account for the larger effects on utilization observed for the family members as a group in this study.

In summary, our knowledge concerning the effects of alcohol abuse on the utilization of physicians by other non-problem drinking family members is limited. Based on research concerned with the effects of familial alcohol abuse on emotional and physical health status, one might reasonably hypothesize that both children and spouses of a problem drinker would have more frequent contact with their family physician, especially for stress-related problems. However, the inconsistent findings to date would warrant a careful evaluation of this hypothesis within more health care settings, especially those in which relevant program initiatives were to be considered for family members of problem drinkers.

2.7 Objectives of the present research.

This research is not aimed at testing specific hypotheses which flow from theoretical models concerning the etiology, treatment or prevention of alcohol problems. With the exception of the stress-victim perspective on the effects of alcohol abuse on family members, the prevailing theoretical models provide little guidance for specifying hypotheses in this area of research. In general terms, the purpose of this research is to increase our limited knowledge concerning the association between the abuse of alcoholic beverages and the utilization of the family physician by the problem drinker and co-habiting family members. More knowledge about the strength and nature of this association is required to (a) support and contribute to program initiatives within the context of family medicine and (b) to provide background information for future research studies into the cost-offset of these initiatives.

The specific research questions to be addressed are:

1. Is the positive association between problem drinking and the frequency of use of family physicians that has been shown in American and British studies, also evident in Canadian family practice settings, and when social class is controlled through the design of the study? Further, is there evidence of a dose-response relationship between frequency of utilization and the severity of problem drinking?

2. What kinds of health-related problems distinguish the clinical record of problem drinkers and how well would these problems perform as indicators of alcohol abuse in a case-finding checklist?

3. If the problem drinking patients are more frequent attenders, can this be attributed to more frequent visits for particular types of health-related problems or to a general increase in utilization that is independent of the nature of the problem?

4. To what extent is the association between problem drinking and the frequency of physician utilization modified by or confounded by co-existing mental health dysfunction?

5. Is there evidence that the effects of problem drinking on the utilization of the family physician are the same for both genders and for persons of different age and social position.

6. Are spouses of problem drinkers in more frequent contact with their family physician than matched controls and do they present with different types of health-related problems?

7. Are children of problem drinkers in more frequent contact with their family physician than matched controls and do they present with different types of health-related problems?

CHAPTER 3

METHODS

The method of research adopted to address the above questions was similar in design to an epidemiological, retrospective cohort investigation. In such research, individuals are assigned to study groups and comparison groups on the basis of their prior exposure to an hypothesized causal factor. Following assignment to these groups, and often a matching on some potential confounding variables, the groups are then monitored over time to observe differences between groups in the hypothesized outcome. In this study, the hypothesized causal factor was problem drinking and the hypothesized effect was the utilization of family physicians.

The study group was composed of patients identified as problem drinkers in either of two family practices. The frequency of contacts with clinic physicians and the type of diagnoses made by the physician were compared to those of a matched comparison group, over a two year period. Similar comparisons were made between study/comparison groups of spouses and study/comparison groups of children. This chapter describes the procedures involved in implementing this design.

45

3.1   The study sites.

Two family medical centres in London, Ontario were utilized as sites for the study - the Family Medical Centre of Victoria Hospital and the Byron Family Medical Centre. The Victoria hospital centre is located in an older, eastern section of the city and serves a predominantly blue collar, low to middle income population.   The Byron centre is located in the far western section of the city and serves a predominantly white collar, middle to upper income population.   Both centres provide a full range of medical services for all members of the family.   The two facilities are affiliated with the Department of Family Medicine at the University of Western Ontario and full-time physicians have additional responsibilities for teaching, research and administration.   Residents taking their specialty in Family Medicine provide most of the clinical services.

One full-time physician at each of these medical centres consented to their practice participating in the study.   At the practice from the Victoria centre, the size of the active patient population, 18 years of age and over, was estimated at 682 as of December 31, 1984 (320 males and 362 females).   Unfortunately, no estimate could be made of the size of the active patient population at the practice participating from the Byron centre, since inactive patients had not been routinely removed from the patient files.

The medical record compiled for each patient register-
ed in these two practices was used as the source of data for
the study. The medical record employed at these practices
is usefully conceptualized as having four components. These
components are listed below and were used at various stages
in group assignment and data collection. Appendix A
provides examples of these materials.

1. A labelled, keysort card, known as the BJS card.[6]
The face of this card is used to classify and
register patient data. Included are demographic
characteristics, major risk factors, chronic and
recurrent symptoms, significant history, chronic
organic and psychological problems, and long-term
drug therapies. Use of the BJS system at the Byron
clinic was discontinued during the study period and
patient data were computerized. For the latter part
of the study period at Byron, the information was
accessed via computer.

2. A problem list which is attached to the front of the
patient chart. This lists all significant problems,
risk factors and long-term medications which have
continued, or are likely to continue, for three or
more months.

3. Progress notes which summarize presenting Symptoms,
Objective findings, Assessment of problem areas and
the Plan for management (i.e., the SOAP record) for
each visit to the clinic.

4. Additional case material such as record-release
forms, correspondence, copies of emergency admission
forms and hospital discharge forms, and records from
previous physicians.

---

[6] The card is named after its developers, Dr. Michael
Brennan, Dr. Jeffery Jackson, and Dr. Linda Spano.

3.2 Definition and identification of problem drinkers at the study sites.

In this section a comment on terminology is first required. The terms alcoholism and alcoholic have traditionally been used when discussing alcohol-related phenomena in clinical and research endeavors. These words, however, do not adequately convey the diversity of problems associated with alcohol use. When these terms are utilized, it diverts attention away from those individuals who have experienced difficulty with alcohol in some life areas (e.g., social, legal, medical) but whose alcohol "problem" is not of a chronic, relapsing or severely debilitating nature.

The terms "problem drinker" and "problem drinking" are used in describing this study and the findings.[7] These terms seek to capture a wider range of alcohol-related phenomena that may impact on health. Problem drinking is a sufficiently broad term so as to include drinking-related behaviors which constitute personal or social problems (e.g., driving while impaired or being abusive to one's spouse when intoxicated) as well as phenomena clearly indicative of physical dependence on alcohol (e.g., withdrawal symptoms or loss of control over one's alcohol consumption).

----

[7] However, as is in the above review of the literature, the terminology of the original study is used when other research is being cited.

Research has shown that the higher the average daily level of alcohol consumption, the higher the risk of alcohol-related problems (e.g., Hingson et al., 1980). Although the threshold of alcohol use which constitutes a hazard to health or social functioning has not been precisely determined, evidence suggests that the majority of individuals who report adverse consequences related to their drinking, consume on average over four standard drinks per day (Hingson et al., 1980). Further, a study of problem drinkers in treatment found that four drinks, consumed on at least three days per week, was the level at which these individuals moved from a problem-free status to experiencing difficulties with their drinking (Sanchez-Craig & Israel, 1985). Thus, although the participating clinics do not routinely record the typical quantity and frequency of alcohol consumption by their patients, it is likely that persons identified as problem drinkers are consuming at least four drinks per day on average. Observations by the author during the abstraction of the data for the study, suggest that the actual level of consumption was much higher in most instances.

The BJS system used to record and classify patient information in the participating practices includes a code for alcohol problems (Item #17, under patient risk factors).

The alcohol problem is recorded on the problem list in the patient's chart and then punched on the BJS card. The problem list is usually prepared by the residents and the BJS card is typically punched by the nursing or medical records staff.

The BJS manual requires that patients be coded positive on the alcohol item "... <u>if the use of alcohol interferes with the person's physical, psychological or social well-being or achievement of need satisfaction, or that of significant others, to the extent that it is identified by the person, his health care attendant or others as a problem</u>" (Brennan and Spano, 1975, p.63). Instructions to the clinic's residents and nurses, also require the alcohol problem code to be applied "<u>where alcohol is health threatening for the patient or significant others</u>." This instruction allows patients to be coded if they are drinking at a high risk level (usually interpreted as a minimum of four drinks per day) or a high risk pattern (e.g., heavy weekend consumption) without the patient necessarily <u>admitting</u> to problems being related to his/her consumption.

Each practice includes an intake procedure which asks questions about alcohol use and it is at this point that the alcohol problem code is usually applied. Although there are some long-term patients in both practices which have not had a formal intake assessment, intake is usually completed within the first few visits.

In addition to using information from the patient's intake assessment, a patient may be classified as a problem drinker based on information obtained from previous medical records such as hospital discharge summaries, (e.g., the patient was discharged from specialized treatment), reports from significant others (e.g., spouse complains about his/her drinking), or patient behaviors/problems that arise subsequent to the intake procedure (e.g., patient requests specialized treatment). Of cases selected for this study, the large majority had their alcohol problem coded within five visits (81.5%). This is very consistent with previous research at an American family practice setting (Roberts & Brent, 1982) where 82% were diagnosed within the first five visits.

Some inconsistency, however, is to be expected in the manner in which the BJS definition of a drinking problem is applied. For example, the physicians who do the intake assessments are residents and are replaced every six to twelve months. Some of these physicians are recent graduates from medical school while others have several years experience. Thus, some may be more adept than others at breaking through the denial commonly associated with problem drinking. As well, some physicians may be more consistent than others in recording identified drinking problems on the problem list. It must be noted, therefore,

that the results of this study are based on those individuals identified by clinic personnel as having a problem associated with their drinking and who have this problem recorded on the problem list of their chart.

3.3 ; Selection of identified problem drinkers for the study.

At the Victoria practice, the BJS cards were sorted on the basis of the alcohol problem code (#17). This provided the initial list of potential subjects (n=108). To check for problem drinkers who had been identified in the practice, but who for some reason were not coded on the BJS card, the nursing staff independently listed all problem drinkers known to them in the practice. There was considerable overlap with the original list, but 27 new names were added as possible cases. The problem list in the chart of all potential subjects was then examined. For patients identified through either the BJS cards or by the nursing staff, the problem drinking code had to be confirmed on the problem list in the chart for that person to be considered for the study. Fourteen potential subjects were rejected when their problem list was checked. Almost all of these were from the nurses' list since they had been asked to note anyone whom they had ever remotely suspected as having a drinking problem. One case was noted as "suspect-ed" alcoholism in the problem list and was excluded. A

total of 121 patients remained as potential subjects. Excluding inactive patients, this represented 15.8% of the adult patient population as of Dec. 31, 1984 (20.3% of adult males and 9.9% of adult females). Within the middle age range (40-49), the prevalence of identified problem drinkers was 27.0% (32.7% of males and 20.5% of females).

A similar procedure for selecting cases was used at the Byron clinic with the exception that a computer listing was generated to augment the initial list obtained from a sorting of the BJS cards. A total of 36 patients were identified and 14 new cases were added after the nursing staff and head physician independently listed the problem drinkers in the practice. When the problem list was checked in their charts, seven individuals were rejected. A total of 43 cases remained as potential subjects. Without a reasonable estimate of the size of the active patient population, an estimate of the prevalence of identified problem drinking was not possible for this practice. It was clear, however, that the prevalence of identified cases was lower at Byron than at the Victoria clinic. It could not be fully determined whether this lower rate reflects a real difference in prevalence among patients at the Byron clinic or a difference between practices in the detection and/or recording of cases.

Following the verification of the drinking problem on the problem list in the patient's chart, the eligibility of all potential subjects from both practices (121 + 43 = 164) was considered against several criteria. These criteria and their rationale are listed below.

(i)   Living with another problem drinker. The study is concerned with the effects of being a problem drinker as well as the effects on the spouse who is living with a problem drinker. In order to be able to separate these two effects, families in which both spouses were identified as problem drinkers were excluded. Seventeen potential cases were excluded on this basis.

(ii)   Living in a health care facility or retirement home. This criterion was incorporated since such persons are provided ongoing medical care at their place of residence. Three cases were excluded on this basis.

(iii)   Known to have moved away from London for part of the study period. This criterion excludes persons not "at risk" of using their family physician during a major part of the study period. It excluded, for example, people known to have moved out of town and those individuals who winter every year in Florida. Four cases were excluded by this criterion. Regular vacation time away from London was not known and it is assumed that this was equally distributed across study and comparison groups.

(iv)   First contact with the practice was after Dec. 31, 1982. The final list of potential cases was determined using cases identified in the practice as of December 31, 1984. Since the utilization data were to be collected over a two-year period, patients making their first contact with the clinic during 1983 or 1984 had to be excluded. This applied to eleven potential cases.

(v)   Patient was inactive. In both of the participating practices, a patient is considered inactive if no family member has made a visit within two years or if the patient's records have been transferred to another physician. A total of 13 such inactive cases were excluded.

(vi) No matched control. Eight cases were excluded because no control subject could be found in the same practice of the same age, sex and social position.

Following the application of these eligibility criteria, 108 cases remained for the study: 79 from Victoria clinic and 29 from Byron. The ratio of eligible to ineligible cases was the same at both practices.

A comparison was made of the age, gender, social position and marital status of the eligible and ineligible cases. The only significant difference observed was age (x^2 = 12.01, df = 4, p<.05), there being a greater proportion of ineligible cases from the middle age range (40-49). This difference was due largely to the exclusion of cases who were living with another problem drinker.

The criteria for inclusion in the study limit the generalizability of the findings to problem drinkers attending family practice who are non-transient, non-institutionalized and who are not living with another problem drinker.

3.4 The issue of false negatives.

Previous research concerning physicians and alcohol abuse clearly suggests that some problem drinkers in general practice remain unidentified and/or their problems in this area are unrecorded in the patient record. At the family

practices involved in this research, physicians make a standard attempt to screen for problem drinking during the intake assessment. Thus, there is a more active attempt at case identification than is typically found in general medical practice. Although the prevalence of identified cases at one of the clinics is in the range to be expected from population surveys (15%), it is unlikely that all problem drinkers in the participating practices will be coded as such in the BJS system and on their chart's problem list. In other words, a small proportion of non-problem drinkers in the practices will be "false negatives".

The most serious difficulty that could arise with false negatives would occur if they were selected through the matching procedure for the control group. If the control group is contaminated with undiagnosed problem drinkers, then those differences across the groups that are related to alcohol abuse will tend to be diminished. Although this effect is preferable to a misclassification error that increases group differences, such false negatives are clearly undesirable.

Although no fool-proof method could be devised to screen out false negatives in the control group, an attempt was made to reduce the likelihood of such contamination. Prior to their inclusion in the study, a review of the medical record was undertaken for each potential member of

the control group, to search for recorded notes pertaining to alcohol abuse. In addition, members of the physician's team were queried as to their knowledge of alcohol abuse by the control candidate. Any information that supported a suspicion about alcohol abuse by the control candidate, or a family member, was sufficient cause to exclude the potential control from the study.

3.5 Description of alcohol-related behaviors/problems of the selected cases.

Given the heterogeneity of behaviors and problems associated with the abuse of alcohol, it was important to describe the cases selected for study along these dimensions. The charts of the selected cases were combed for references to alcohol up to the beginning of the study period. When summarized, the information obtained from this detailed audit of the charts provided a useful description of the alcohol-related behaviors/problems presented to the physicians by the selected cases. This description would facilitate generalizations to a broad range of problem drinkers. In addition, it provided information on which to base a classification of problem severity.

As shown in Table 1, the selected cases presented a wide variety of alcohol-related behaviors and problems to the clinic physicians. Five of the seven primary behaviors and problems that are listed in the table are major criteria

TABLE 1. Number and percentage of selected cases with various alcohol-related behaviors/problems noted in their chart.

	n	% of total cases (n=108)
PRIMARY BEHAVIORS/PROBLEMS		
Health problems from chronic drinking	26	24.1
Diagnosis of alcoholism and treatment in inpatient setting	13	12.0
Blackouts	6	5.6
Withdrawal reaction	6	5.6
Participation in Alcoholics Anonymous	6	5.6
Refuses advice/treatment for alcohol problems	5	4.6
Diagnosis of alcoholism and treatment in outpatient setting	4	3.7
SECONDARY BEHAVIORS/PROBLEMS		
Injuries or acute health problems from episodes of intoxication	36	33.3
Problems with spouse due to drinking (not physical abuse)	25	23.1
Admits concern about drinking too much	22	20.4
Has tried to cut down drinking	22	20.4
Intoxicated/alcohol on breath at hospital	18	16.7
Denies apparent problems related to alcohol	15	13.9
Binge drinking associated with problems	14	13.0
Excessive weekend consumption associated with problems	14	13.0
Intoxicated/alcohol on breath at clinic	13	12.0
Been in fights while intoxicated	11	10.2
Been arrested while intoxicated	9	8.3
Physical abuse of spouse while drinking	6	5.6
Problems at work due to drinking	6	5.6
Drinks to relieve stress at home/work	6	5.6
Denies excessive consumption of alcohol but evident through collateral source	6	5.6
Threatened suicide while intoxicated	5	4.6
Drinks regularly to help sleep	4	3.7
Drinks to forget problems	3	2.8
Social activities revolve around drinking	2	1.9
Lost job because of drinking	2	1.9
Problems with other family members due to drinking	2	1.9
Requests treatment/advice to decrease consumption	2	1.9
General hospital admission related to drinking	2	1.9
Problems with friends due to drinking	1	.9
Had to change address due to drinking	1	.9
Unwanted pregnancy due to drinking	1	.9
Had to leave school due to drinking	1	.9
TERTIARY BEHAVIORS/PROBLEMS		
No recorded problems related to heavy weekend consumption	7	6.5
No recorded problems related to 5-8 drinks per day[1]	6	5.6
No recorded problems related to 2-4 drinks per day[1]	1	.9

[1]Number of drinks per day was coded only if no problems or other signs were recorded. All cases with a consumption level over 8 drinks per day had some problems recorded.

for the diagnosis of alcoholism adopted by the National Council on Alcoholism (1972). The remaining two criteria were either inpatient or outpatient treatment with a formal diagnosis of alcoholism. The most frequently noted factors were health problems from chronic drinking and the participation in alcoholism treatment programs. Many other secondary problems were also noted in the charts, most of which are cited as minor criteria in the NCA diagnostic schema. These represent an array of alcohol-related disabilities. The most common behaviors/problems were an acute problem or injury due to an episode of intoxication, problems with the spouse due to drinking, visiting the clinic intoxicated or with alcohol on the breath, expressing concern about their own drinking, and the denial of apparent alcohol problems. For a small number of cases (n=14), there were no specific problems related to alcohol recorded in the chart, the alcohol code having been applied on the basis of a high risk level or a high risk pattern of consumption.

A classification of the severity of the alcohol problem was developed using the behaviors/problems listed in Table 1. The severity rating was determined as follows:

"Alcohol dependent" = at least one primary criterion from Table 1

"Non-dependent problem drinker" = no primary criteria, but at least one secondary criteria

"At-risk drinker"

= no primary or secondary criteria noted, but high risk level or pattern of consumption recorded

The classification resulted in 44 cases (40.7%) being classed as "alcohol dependent",[8] 50 cases (46.3%) as "non-dependent problem drinkers" and 14 cases (13.0%) as "at-risk drinkers". It should be noted that this classification schema is a conservative procedure since alcohol-related problems that are not recorded are assigned a negative value. This may result in alcohol dependent cases being assigned a less severe rating which, in turn, would reduce the magnitude of a dose-response relationship between problem drinking and variables concerned with utilization.

During the audit of the charts any notes pertaining to the improvement of the alcohol problem during the study period were also abstracted. The most common example occurred when the physician reported that the patient had cut down on his/her alcohol consumption. Given the relapsing nature of problem drinking, recorded notes such as these do not necessarily reflect "remission" of the alcohol problem. It was important, however, to note cases who had made some improvements, since such improvements may

----

8
The terms alcohol dependent, non-dependent problem drinker and at-risk drinker are meant to imply severe, moderate or mild alcohol abuse and do not necessarily imply levels of alcohol dependence as currently measured, for example, by the Alcohol Dependence Scale (Skinner & Allen, 1982).

attenuate the association between problem drinking and utilization. Twenty-three cases (21.3%) were coded as having made improvements with their alcohol problem during the study period. Twelve of these cases had been classified as alcohol dependent, ten were non-dependent problem drinkers and one was classed as an at-risk drinker.

3.6 Matching cases and controls.

Cases selected for the study were matched to a control patient within their own practice. Cases were matched on the basis of four variables: age, gender, social position, and living arrangements. An attempt was also made to match on family size.

Age: An attempt was made to match exactly on age. However, the limited size of the patient pool dictated that some cases were matched only within a five year age range.

Gender: Cases were matched to a control patient of the same gender.

Social Position: Social position was determined using the patient's occupation during the study period.[9] Social

_____

[9] In the event of an occupation change during the study period, the occupation at the end of the period was used to code social position. For the categories used in the data analyses, the change in occupation did not result in any patient moving from one broad category of social position to another.

position was coded according to the Blishen occupation codes I to VI (Blishen & McRoberts, 1976). The BJS recording system that is used in the participating practices, adds one code at the bottom of this scale for individuals on public assistance. This additional code was used. The social position of females was coded according to their spouse's occupation. Retired persons were coded according to their former occupation.

Living Arrangements: Given the size of the patient pool, it was not possible to match on the usual categories of marital status (single, married, widowed, separated, divorced). However, some matching on living arrangements was necessary to achieve matched pairs of spouses for the analysis of the data for spouses. In lieu of a full but impractical match on marital status, subjects were matched on living arrangements during the study period and coded as: (1) living with a spouse or under a common-law arrangement and, (2) not living with a spouse or under a common-law arrangement.

Family Size: When there were children under the age of 18 living at home, an attempt was made to match the subjects to a control patient who also had children and who had an equal number of children. This was not always possible but

if more than one match was found for a case with children,
the one with the best match on family size and age of
children was the one selected.

Table 2 describes the problem drinkers and their
controls on these matched variables and compares them on
other potentially significant characteristics that were not
matched across the groups. As dictated by the design, there
were no differences on the matching variables. For the
unmatched variables, the two groups did not differ on racial
origin or the duration of time that the family had
participated in the practice. The groups did, however,
differ on smoking status, there being a greater proportion
of current smokers in the problem drinking group.

3.7   Mental health problems.

An objective of this study was to determine the
extent to which the association between problem drinking and
the frequency of physician utilization may be confounded or
modified by mental health problems among problem drinkers.
The BJS system used at the participating clinics broadly
classifies mental health problems. In the system, these
problems are referred to as intrapersonal problems and are
included as one of five types of psychosocial problems. The
other four psychosocial problems are family problems, social

TABLE 2. Comparison of problem drinkers and their controls on matching variables and other relevant characteristics.

	PROBLEM DRINKERS (N=108)	CONTROL PATIENTS (N=108)	STAT SIG
MATCHED VARIABLES			
GENDER:			NA
MALE	75	75	
FEMALE	33	33	
SOCIAL POSITION			NA
I	3	3	
II	8	8	
III	11	11	
IV	15	15	
V	17	17	
VI	24	24	
P.A	30	30	
AGE :			NA
MEAN (YEARS)	39.4	39.2	
STANDARD DEVIATION	14.5	14.4	
RANGE	18-71	18-71	
LIVING ARRANGEMENT:			NA
WITH SPOUSE	59	59	
NO SPOUSE[1]	49	49	
FAMILY SIZE:			NA
MEAN	2.40	2.40	
STANDARD DEVIATION	1.47	1.13	
RANGE	1-8	1-6	
UNMATCHED VARIABLES			
SMOKING STATUS:			p < .001
SMOKER	86	48	
NON-SMOKER	22	51	
DON'T KNOW	0	9	
RACIAL ORIGIN:			N.S
CAUCASIAN	103	104	
NATIVE INDIAN	3	2	
NEGRO	2	1	
OTHER	0	1	
DURATION OF FAMILY IN PRACTICE:			N.S
MEAN (MONTHS)	47.2	44.9	
STANDARD DEVIATION	41.5	40.7	
RANGE	0.1-147.5	0.3-147.3	

[1]For problem drinkers with no spouse, 21 were single, and 28 were separated/divorced/widowed. For controls with no spouse, 24 were single and 25 were separated/divorced/widowed.

[2]Significance of the difference on continuous variables was assessed with a correlated t-test. McNemar's test of proportions was used for the categorical variables. na = not applicable due to matching, n.s. = not significant at ~ = .05.

problems, material problems and psychosexual problems. As
with alcohol, these psychosocial problems are coded on the
patient's problem list.

The general definition of a psychosocial problem in
the BJS system is any long term (i.e., not less than three
months) "emotional, social or environmental situation that
interferes with the person's achievement of need
satisfaction in any area of his living and is identified by
the person and/or his health care attendant as a problem"
(Brennan and Spano, 1975, p.55). Under this general
definition of psychosocial problem, intrapersonal problems
are defined as any personal attribute which results in the
inability to achieve his/her own need satisfaction. These
definitions of psychosocial and intrapersonal problems are
closely aligned with Maslow's need heirarchy (Maslow, 1968).
Examples of intrapersonal problems include psychoses,
neuroses, behavioral personality and/or learning disorders.
Thus, this system provides a working definition of "mental
health status" that is sufficiently broad so as to include
emotional state and personality characteristics, in addition
to standard diagnostic categories which traditionally
identify psychiatric illnesses.

Although the term "intrapersonal" problem purpose-
fully encompasses a wide variety of mental health problems
it should be noted that it is a term unique to the BJS

classification system used at the participating clinics and
not a recognized aspect of psychiatric nomenclature. One
conceptual problem which may arise when relating the various
intrapersonal problems to standard diagnostic categories is
that both trait and state conditions are subsumed by the
broad term used in this research.

In order to demonstrate the range of problems
included in this classification scheme, the charts of all
cases and their controls were audited for references to
intrapersonal problems. The audit covered the three years
prior to the study period if the patient had been registered
with the practice during that period. Problems that were
noted on the problem sheet as being resolved were excluded.
Table 3 lists the several types of intrapersonal problems
that were recorded in the chart and coded for each subject
and his/her control.[10]

Table 3 shows that subjects and controls were also
coded on the basis of hospitalization or outpatient care for
these mental health problems during the three year audit
period. This information was used to develop a severity
rating of intrapersonal problems in order to explore and
if necessary control for group differences in severity. The
severity rating was determined as follows:

----

[10] The various types of problems are summarized as they were
listed in the patient charts and may not conform to accept-
ed terminology in the field of psychiatry (e.g., dual
personality). Comparisons between the problem drinkers and
their controls concerning the types of intrapersonal problems
are made in a subsequent section (p.g., 104 and Table 16).

TABLE 3. Types of intrapersonal problems coded from the patient charts and level of care received.

TYPES OF PROBLEMS
Attempted suicide/Suicidal gestures
Suicidal ideation
Manic-depressive
Depression
Personality disorder
Hysterical personality
Dual personality
Schizophrenia
Anxiety related to specific event (e.g., bereavement)
Chronic anxiety
Anti-social behavior/Impulsive/Violent temper
Poor self image/Low self esteem
Trouble relating to peers
LEVEL OF CARE
No inpatient or outpatient psychiatric care
Inpatient psychiatric care
Outpatient care by psychiatrist or psychologist without hospitalization

No problem	=	no intrapersonal problems recorded
Moderate severity	=	at least one of the problems fro███ Table 3 recorded but no specia███ed inpatient or outpatient treatmen███
Major severity	=	at least one of the problems from Table 3 with specialized inpatient or outpatient treatment

As with the rating of the severity of problem drinking, this procedure is a conservative one since information missing in the chart is assumed to be negative.

This resulted in the following breakdown for the problem drinkers as a group: 54.6% no intrapersonal problem, 29.6% "minor" problem, and 15.7% "major" problem. Respectively, this compared to 74.1%, 17.6%, and 8.3% for the control patients.

3.8   Spouses selected for the study.

Of the 108 problem drinkers included in the study, 59 (54.6%) were married or living common-law. Of these 59 cases, 49 had spouses who were also registered at the practice and thus were also included in the research. Of the 49 spouses, seven were male and 42 were female. As a result of the matching procedure for the problem drinkers, each spouse was matched to a control spouse on the basis of gender, social position and, to the extent possible, family size. For the unmatched variables, the two groups of

spouses did not differ on age, duration of time the family
had been in the practice, or smoking status (see Table 4).

3.9   Children selected for the study.

Following the selection of the problem drinkers and
the matching to their controls, 149 children were eligible
for the study.   There were 78 children included in the study
from 41 families with a problem drinker.   Seventy-one
children were also included from 41 control families.   Table
5 shows that the two groups of children were similar in
terms of age, gender, social position and the duration of
the family in the practice.   There was a very small, but
statistically significant difference in average family size
— $\bar{x}=4.1$ for the children of problem drinkers and $\bar{x}=3.8$ for
the control children.

3.10   The selection of study years.

The study design called for the abstraction of data
concerning all patient-physician contacts over a two year
study period.   The initial plan was to use the years 1981
and 1982 as the standard study period for all subjects.
Pilot work, however, revealed many potential subjects who
either left the clinic or began attending during these
years.   For either reason, these potential subjects would
have been ineligible.   In order to maximize the sample size

TABLE 4. Comparison of the spouses of problem drinkers and their controls
on matching variables and other relevant characteristics.

		SPOUSES OF PROBLEM DRINKERS (N=49)	CONTROL SPOUSES (N=49)	STAT SIG [1]
MATCHED VARIABLES				
GENDER				
	MALE	7	7	NA
	FEMALE	42	42	
SOCIAL POSITION				
	I	3	3	NA
	II	6	6	
	III	5	5	
	IV	9	9	
	V	13	13	
	VI	10	10	
	PA	3	3	
FAMILY SIZE				
	MEAN	3.2	3.2	NA
	STANDARD DEVIATION	1.23	.95	
	RANGE	2-6	2-5	
UNMATCHED VARIABLES				
SMOKING STATUS				
	SMOKER	22	18	N.S
	NON-SMOKER	23	24	
	DON'T KNOW	4	7	
AGE				
	MEAN (YEARS)	40.4	40.7	N.S.
	STANDARD DEVIATION	11.3	13.7	
	RANGE	16-61	17-69	
DURATION OF FAMILY IN PRACTICE (MONTHS)				
	MEAN	41.3	40.4	N.S
	STANDARD DEVIATION	38.6	36.9	
	RANGE	0.1-129	0.3-147.3	

[1] Significance of the difference on continuous variables was assessed with a
correlated t-test. McNemar's test of proportions was used for the categorical
variables. NA = not applicable due to matching, N.S. = not significant at $\alpha = .05$.

TABLE 5. Comparison of the children of problem drinkers and the children
of matched controls on demographic and other characteristics.

	CHILDREN OF PROBLEM DRINKERS (N=78)	CHILDREN OF MATCHED CONTROLS (N=71)	STAT SIG[1]
GENDER			
% MALE	52.6	57.7	N.S
% FEMALE	47.4	42.3	
SOCIAL POSITION.			
% CATEGORY I	5.1	5.6	N.S
% CATEGORY II	10.3	11.3	
% CATEGORY III	0.0	1.4	
% CATEGORY IV	17.9	14.1	
% CATEGORY V	20.5	21.1	
% CATEGORY VI	21.8	21.1	
% PUBLIC ASSISTANCE	24.4	25.4	
AGE			
MEAN (YEARS)	8.5	8.1	N.S.
STANDARD DEVIATION	4.56	5.27	
RANGE	0.1-16	0.2-17	
DURATION OF FAMILY IN PRACTICE:			
MEAN (MONTHS)	40.9	35.9	N.S
STANDARD DEVIATION	37.01	30.18	
RANGE	0.1-129	0.3-120	
FAMILY SIZE.			
MEAN	4.1	3.8	P<.05
STANDARD DEVIATION	1.00	.77	
RANGE	2-6	2-5	

[1]Significance of the difference on continuous variables was assessed with an
independent t-test. The chi-square test was used for categorical variables.
N.S. = not significant at α = .05.

for the study, the years 1979-1984 were used as the overall time frame and a two year period was selected within this time frame for the analysis of the utilization data for each subject.

Subjects who were identified during the pilot phase as being eligible for the 1981/82 study period were assigned to this period since considerable data concerning employment status, living arrangements and family size, had already been collected. For subjects not identifed for the 1981/82 study period during the pilot work, a random selection of the other study periods was made. For example, if a potential subject joined the clinic in July of 1981, he/she would be eligible for study period 1982/83 or 1983/84. If a matched control was also available for these two time periods, the selection of one of these periods was made by a coin toss. A choice to be made among three or more study periods was determined by a random numbers table. Data for the problem drinker and his/her control were always drawn from the same study period.

3.11 Measures of utilization.

The main comparisons of the problem drinkers and their controls were made using two dependent variables related to physician utilization.

The first dependent variable was the utilization rate, defined as the average number of patient-physician encounters per year, over the two-year study period. An encounter was defined as a face-to-face contact with a physician. The contact could take place either at the medical centre, at the patient's home or at the hospital.

The diagnosis of the problems that were presented during each patient-physician encounter was coded using the coding system of the International Classification of Health Problems in Primary Care (Classification Committee of WONCA, 1979). These diagnoses for each recorded encounter provided the second dependent variable for this research, namely the type of health problem diagnosed. To facilitate the data analysis and make the results as comparable as possible to previous research (Roberts & Brent, 1982), the ICHPPC categories were collapsed into 26 sub-categories (see Appendix B).

In addition to these two main utilization variables, data were collected regarding the frequency of utilization of hospital emergency departments and the number of no shows/cancelled visits for each patient. The number of distinct episodes of traumatic injury were also recorded.

3.12   Reliability of the coding of patient diagnoses.

The utilization data for all cases, controls, and family members were abstracted and coded by the author

(B.R.). A check was made on the reliability of the data abstraction and coding process by randomly selecting a number of charts and having another person repeat the process independently. The independent coder (J.K.) was a Registered Nursing Assistant employed at the Victoria medical practice and highly experienced with the ICHPPC coding manual. The charts of 16 individuals were randomly selected - five problem drinkers with three additional family members and five controls with three family members.

Each of the two coders counted 208 visits for these 16 patients for an error rate of 0.0% in tabulating visit frequency.

With respect to the diagnoses of presenting problems, B.R. coded 345 distinct problems and J.K. coded 285 of these problems exactly the same (82.6%). Of the 60 differences, 28 problems were not coded by J.K. Many of these were for one patient presenting with a long series of visits for both depression and anxiety. J.K. coded only one of these two problems. The remaining 32 discrepancies were almost always differences between close diagnostic categories (e.g., fractured humerus (#8120) versus dislocation (#8390)). These discrepancies did not influence the data when they were grouped into the broader diagnostic categories used in the analyses. Of the 345 problems coded, there were only five instances where a difference between the two coders

remained after the categories were aggregated. This yields an error rate of 1.5%.

3.13 Methods of data analysis.

There were 108 matched pairs of problem drinkers/ controls and 49 matched pairs of spouses/controls. For these groups, paired t-tests were used to assess the statistical significance of differences in the mean number of patient-physician contacts per year. Groups were compared on the type of diagnoses using McNemar's test of proportions for matched samples. The specific comparison for each ICHPPC category was in terms of the proportion in each group that had at least one diagnosis in the category. Thus, repetitions of the same diagnosis on different occasions did not figure in the main analysis.

The two groups of children were treated as independent samples and compared using unpaired t-tests for the frequency of patient-physician contacts. Chi-square tests were used for the diagnostic data. The alternative to treating the groups as independent samples would have been to combine children into family sets and match sets of children from problem drinking families to sets of children from control families. This procedure, however, would not have allowed for the exploration of age and gender differences in the effects of problem drinking on the children. Treating the

samples as independent is a conservative measure since it does not take into account any increased efficiency gained through the parental matching.

The data concerning the frequency of patient-physician contacts were highly skewed for each sub-group in the study - problem drinkers, spouses and the children. Consequently, the distribution of the patient-physician contacts was normalized by a logarithmic transformation prior to the the t-tests of group differences.

A check was made on the statistical power associated with these analyses given a fixed sample size of problem drinkers, spouses, and children eligible for the study (see Appendix C for details). A clinically meaningful difference was considered to be a two-fold difference between cases and controls in the frequency of patient-physician contacts and in the proportion of patients per group with each diagnosis. Calculations showed that using two-tailed tests with $\alpha=.05$, $\beta=0.20$ (i.e., 80% power) and the available sample sizes, it should have been possible to detect a true difference of about two patient-physician contacts per year and differences of about 15 to 20 percentage points in the proportion of patients with a particular diagnosis. Thus, the analyses stood an acceptable chance of detecting differences of a magnitude that would be clinically meaningful.

Differences between the problem drinking group and controls on the frequency of utilization and types of morbidity were also modelled using multiple logistic regression for matched data. These analyses were primarily aimed at detecting the most important, but independent, features of the clinical record that distinguished the problem drinking group. Other related questions were also addressed with logistic analyses. In all logistic analyses, the standardized regression coefficient was used to assess the statistical significance of the contribution of each variable to the discrimination between problem and controls. The computer program reported by Breslow and Day (1980), and compiled at U.W.O. computer services, was used for all logistic analyses.

For problem drinkers (N=108 per group) and the children (N=78 and 71 per group) sample size was considered to be sufficient to warrant the analysis of sub-group differences. These analyses were exploratory and not aimed at a rigorous test of specific hypotheses.

For the problem drinkers, sub-group differences by gender, age, social position and problem severity were examined by calculating a difference score for each matched pair on the frequency of contacts per year (i.e., the number of contacts by the problem drinker minus the number by his/her control). These differences scores were then

compared across the sub-groups. This approach was also used to check for differences across the two medical centres involved in the research and also across the various study periods that were employed. Almost all comparisons across various sub-populations involved comparing groups with widely differing variances in the outcome variable. Thus, comparisons among sub-groups of problem drinkers were made with non-parametric tests (e.g., Mann-Whitney U Test, Kruskall-Wallis One-way ANOVA).

As noted previously, the two groups of children were analysed as independent samples. Therefore, analysis of variance was used to examine the modifying effects of age, gender, social position, and parent's severity on the frequency of the child's contact with the family physician. For these analyses, a parametric ANOVA was employed since the homogeneity of variance assumption was not violated.

CHAPTER 4

COMPARISON OF PROBLEM DRINKERS AND THEIR CONTROLS

In this chapter, the results of comparisons between problem drinkers and controls on the frequency of utilization are first presented. The types of health-related problems which distingushed the problem drinking group are then summarized, followed by data showing the relationship between the type of problem diagnosed and the frequency of utilization. Comparisons are then made between the cases and controls on episodes of traumatic injury and the use of hospital emergency services. The potential influence of intrapersonal problems and smoking on the frequency of contact with the physician is then analysed. Finally, exploratory analyses examine age, gender and social class differences on the frequency of utilization and the nature of the health-related problems that were diagnosed.

4.1 Frequency of patient-physician contacts.

Table 6 compares the problem drinkers and their controls on the average number of patient-physician contacts per year. As a group, the problem drinkers averaged approximately 6.0 contacts per year compared to 3.1 for their matched controls. This two-fold difference was

Table 6. Comparison of problem drinkers and their matched controls on the average number of patient-physician contacts per year by location of contact.

GROUP

	Problem Drinkers (n=108)			Matched Controls (n=108)			STAT SIG.[1]
	X̄	SD	RANGE	X̄	SD	RANGE	
CENTRE	5.75	5.12	0-33.5	3.06	4.81	0-41	P<.001
HOME	.07	.28	0-2.5	.01	.05	0-.5	P<.01
HOSPITAL	.18	.59	0-4.0	.07	.45	0-4.5	(P<.05)
TOTAL	5.99	5.17	.0-35	3.13	5.19	0-46	P<.001

[1]The difference in the mean number of contacts per year between the two groups was assessed with a correlated t-test. Data were subjected to a logarithmic transformation to normalize the distribution prior to the calculation of the t-test.

2

MICROCOPY RESOLUTION TEST CHART
NBS 1010a
ANSI and ISO TEST CHART No. 21
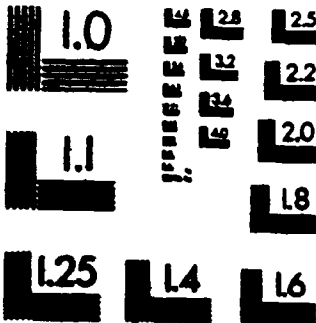
statistically significant when assessed with a t-test on the log-transformed data (t=7.75, df=107, p<.001). As one would expect, the vast majority of contacts, for both groups, were at the medical centre. However, the increase in the frequency of contacts for the problem drinkers occurred whether the contact was during the patient's visit to the centre (p<.001), or a doctor's visit to hospital (p<.06) or the patient's home (p<.01).

These findings were similar for the two clinics participating in the study; the problem drinkers averaging about three more visits per year. At the Victoria centre, the study group averaged 6.3 contacts per year compared to 3.5 per year for their controls. At the Byron centre, problem drinkers averaged 5.0 contacts per year compared to 2.1 per year for their controls. The mean difference between cases and controls across the two centres did not differ significantly (z= -.20, p>.05, using the Mann-Whitney U-test). In addition, the mean difference in the frequency of utilization between problem drinkers and controls did not differ significantly across the various two-year periods over which utilization was averaged (x^2=1.7, df=107, p>.05, using the Kruskal-Wallis One-way ANOVA).[11] Problem drinkers were also sub-classified into two groups on the basis of the

----

11

  The six case/control pairs examined in 1979/80 and the two
  pairs examined in 1980/81 were combined for this analysis.

number of visits to the clinic prior to the identification of their alcohol problem (five visits or less and over 5 visits). There was no significant difference between these two groups in the effect of alcohol abuse on the frequency of utilization ($z=$ -.81, $p>.05$, using the Mann-Whitney U-test).

Patients' drinking problems were rated in terms of their severity by the method described in a previous section (see page 59). This rating resulted in the classification of 14 patients as "at-risk" drinkers, 50 patients as "non-dependent problem drinkers" and 44 patients as "alcohol dependent". The association between the severity of the drinking. problem and the frequency of utilization was examined, and a positive relationship was observed. The mean difference between matched pairs, in the mean number of contacts per year, increased almost linearly across the three levels of severity ($\bar{d}=.8$, 2.0, and 4.5 for "at-risk", "non-dependent", and "dependent" problem drinkers, respectively). A significant statistical association between problem severity and the frequency of doctor-patient contacts was confirmed using the Kruskal- Wallis One-way ANOVA ($X^2=9.0$, $df=2$, $p<.01$).

The problem drinkers and controls were also compared on the frequency with which they failed to show for or cancelled their appointment at the clinic. On average, the

problem drinking group had 1.1 no shows/cancelled visits per year compared to .4 per year for their matched controls (t=4.7, df=107, p<.001). This difference held for both genders, for all age groups, and all levels of social position. Cancelling or failing to show for appointments was, however, related to the severity of problem drinking with the alcohol-dependent cases having more frequent occurrences ($X^2=7.5$, df=2, p<.05 based on the Kruskal-Wallis One-way ANOVA).

4.2 Type of problems diagnosed by the physician.

Problem drinkers and their controls were compared on each category of health-related problems. Table 7 shows that of the 23 categories of problems employed in the analysis, there were no occurrences for either group within two categories - congenital anomalies and perinatal conditions. A comparison on a third category, alcohol abuse/dependence, was not relevant since a difference between groups was pre-determined by the nature of the study. For the remaining 20 diagnostic groupings, a statistically significant difference was evident for the 10 categories highlighted in the table -- neoplasms, endocrine-/nutrition/metabolic, mental health, drug abuse (incl. tobacco), respiratory, digestive, skin/subcutaneous tissue, signs/symptoms/ill-defined conditions, injuries/adverse

TABLE 7. Comparison of problem drinkers and their matched controls on the health-related problems diagnosed during the contacts with their physician.

GROUP

Category of Health-Related Problems	Problem Drinkers (n=108)		Matched Controls (n=108)		Odds Ratio[1]	95% C.L.	
	n	%	n	%			
Infective and parasitic	26	24.1	19	17.6	1.4	.6 .	3.3
Neoplasms	15	13.9	2	1.9	7.5**	1.7 ,	49.C
Endocrine/nutrition/metabolic	28	25.9	12	11.1	2.6**	1.2 .	-6.0
Blood	5	4.6	1	.9	5.0	.6 ,	249.C
Mental health	54	50.0	30	27.8	2.7***	1.4 ,	5.3
Alcohol abuse/dependence	48	44.4	0	0.0	---	---	-.-
Drug abuse (incl. tobacco)	29	26.9	7	6.5	5.4***	2.0 ,	15.7
Nervous system/sense organs	43	39.8	35	32.4	1.4	.7 ,	2.1
Circulatory	30	27.8	20	18.5	1.8	.8 ,	4.0
Respiratory	57	52.8	36	33.3	2.5**	1.3 ,	4.9
Digestive	46	42.6	25	23.1	2.8**	1.4 ,	4.9
Genitourinary	15	13.9	12	11.1	1.3	.5 .	3.1
Obstetrical	15	13.9	12	11.1	1.3	.5 ,	3.3.
Skin/subcutaneous tissue	44	40.7	23	21.3	3.3***	1.5 ,	7.9
Musculoskeletal/connective	38	35.2	27	25.0	1.6	.9 ,	2.9
Congenital anomalies	0.0	0.0	0.0	0.0	---	---	---
Perinatal	0.0	0.0	0.0	0.0	---	---	---
Signs, symptoms, ill-defined	31	28.7	9	8.3	4.7***	1.9 ,	13.3
Injuries/adverse effects	60	55.6	31	28.7	3.4***	1.8 ,	7.2
Preventive/family planning	49	45.4	48	44.4	1.1	.5 ,	2.1
Social/marital/family	55	50.9	24	22.2	3.8***	1.9 ,	8.1
Administrative	4	3.7	4	3.7	1.0	.2 ,	4.5
Miscellaneous	1	.9	0	0.0	---	---	---

[1] The odds ratio is a maximum likelihood estimate (MLE) equal to the ratio of discordant pairs, $\hat{\psi} = {}^{n}10/{}^{n}01$ (Breslow & Day, 1980, p.165). The difference in the proportion in each group with at least one encounter in the diagnostic category was assessed with McNemar's test of proportions for matched samples. Statistical significance is indicated by * = p <.05, ** = p <.01, and *** = p <.001.

These are exact 95% confidence limits calculated for matched data.

effects and social/marital/family problems. Table 7 also shows the odds ratio calculated for each diagnostic category and the corresponding 95% confidence limits. For the ten categories on which cases and controls were significantly different, the odds ratio was usually close to three or higher. Thus, these differences between groups were reasonably large and clinically relevant.

It is important to note that the odds ratio for blood disorders is 5.0 (the third highest) but not statistically significant because of the low frequencies. Thus, statistical significance is determined by the magnitude of the odds ratio as well as the baseline frequency of the conditions. The upper and lower 95% confidence limits provide an indication of the reliability of the odds ratio and, for blood disorders, clearly show the influence of the low frequencies.

The 23 broad diagnostic categories shown in Table 7 are made up of about 360 specific diseases and patient problems, grouped together in the ICHPPC coding manual. For the 10 broad categories which showed a significant difference between problem drinkers and controls, it is of interest to examine more specific health-related problems subsumed by the category. Appendix D provides a detailed numerical breakdown of the differences between problem drinkers and controls on these specific health-related conditions.

Neoplasms. Of 15 problem drinkers visiting the clinic at
least once during the study period for neoplasms,
there were two cases with lung tumours and one case
each of breast, uterine, parotid and prostrate cancer
(all benign). The remaining nine cases all presented
with a variety of papillomas, moles or other skin
cancers. Thus, the difference observed between groups
on neoplastic disease was due primarily to more
frequently diagnosed benign skin disease.

Endocrine/Nutrition/Metabolic. The difference between
groups in this category was primarily attributable to
a higher proportion of problem drinkers presenting
with acute gout and obesity. Of the problem drinkers,
6.5% presented with gout compared to zero percent of
the controls. Interestingly, all but one of the seven
cases of gout among the problem drinkers were from the
upper social strata. With respect to obesity, 17.6%
of the problem drinkers presented with a weight
problem compared to 11.1% of controls.

Mental Health. With the exception of psychotic disorders
such as organic psychosis and schizophrenia, there was
a trend for the problem drinkers to present more often

than controls for many types of mental health
problems. Problems such as sleep disturbances,
tension headaches and personality/character disorders
were slightly more common among the problem drinkers.
The major difference between groups, however, was on
neurotic disorders such as chronic anxiety and
depression.

Drug Abuse (including tobacco). The difference between
groups on this category was primarily a reflection of
more frequent abuse of tobacco by the problem
drinkers. In addition to the difference on smoking,
there were eight problem drinkers in contact with
their physician at least once concerning drugs other
than tobacco... The substances being abused were
tranquilizers (5 cases), analgesics (1 case),
marijuana (1 case), and laxatives (1 case).

Respiratory. The difference between groups with respect to
respiratory illness arose primarily from a greater
proportion of problem drinkers being diagnosed with
serious respiratory problems such as pneumonia,
chronic obstructive lung disease, bronchitis, and
bronchospasms. The groups were more comparable with
respect to less serious upper respiratory infections

(e.g., colds, sore throats) and symptoms such as cough.

Digestive. The problem drinkers differed from controls primarily on three types of digestive disorders (a) ulcers in the mouth and diseases of the teeth and gums such as gingivitis; (b) diseases of the stomach and esophagus such as esophagitis, peptic ulcers and gastritis; and, (c) diseases of the liver such as cirrhosis and alcoholic hepatitis. The groups were comparable on digestive symptomatology (e.g., abdominal pain, heartburn or nausea).

Skin/Subcutaneous Tissue. Three subcategories of skin disease accounted primarily for the difference between groups on this broad category. Problem drinkers were more likely to present with (a) skin problems such as boils, cellulitis, and skin abscess; (b) pruritis and related conditions such as neurodermatitis; and, (c) other problems such as skin lesions and dry skin. Also, as noted above with respect to neoplastic disease, groups were markedly different on the frequency of diagnosis for skin moles and benign skin tumors.

Signs/Symptoms/Ill-defined Conditions. The difference
between groups on this category arose primarily from
differences in the proportion presenting to their
doctor with chest pain, general malaise and edema.
Groups were not different with respect to weight loss
or generalized symptoms such as excessive sweating.

Injuries/Adverse Effects. Problem drinkers were more often
diagnosed as having fractures and sprains as well as
other trauma such as burns, lacerations, bruises and
concussion. Insect bites and adverse effects such as
a drug overdose (deliberate or accidental) were
included in this broad category but the groups did not
differ on these two factors.

Social/Marital/Family. This category included a wide
variety of problems related to the patient's
financial, housing, educational, occupational, family/
marital and other social problems (e.g., isolation).
Of these various problems, the one factor most
responsible for the overall difference between groups
on the broad category was family/marital dysfunction.

The main purpose of identifying the various kinds of
health-related problems that are associated with heavy

drinking in a sample of known problem drinkers is to highlight the particular kinds of morbidities that may signal the presence of alcohol abuse among other patients where the problem remains undetected. Although the above list of ten broad categories of morbidity provides a checklist of indicators from the clinical record which will assist in flagging an alcohol problem, additional analyses with a multivariate approach could establish the relative importance of each type of health-related problem in distinguishing between problem drinkers and controls. Further, once the most important, independent associations are identified, an algorithm can be developed for classifying problem drinking status on the basis of this smaller sub-set of morbidities. This classification scheme can then be tested with the problem drinkers and controls involved in this study to determine its sensitivity (i.e., ability to correctly classify true cases of problem drinking), its specificity (i.e., ability to avoid inappropriate classification of non-problem drinkers), and its predictive value (i.e., the probability that a patient is a problem drinker given positive or negative results on the case-finding checklist).[12]

----

[12] It is recognized that the efficiency of a classification algorithm will always be higher in the population from which it was developed than when applied in a new population. However, at least the upper limits of efficiency are established when it is applied to the same population from which it was drawn.

A useful first step in this process was to examine the correlation matrix of the ten categories of health-related problems to identify the kinds of problems which tended to cluster together, either for the problem drinkers (Table 8) or the controls (Table 9). With respect to the problem drinking group (Table 8) some correlations in the 0.2-0.3 range were evident. For example, respiratory problems and vague signs/symptoms such as chest pain were associated with drug problems (.24 and .22 respectively). These drug problems were primarily smoking-related. The highest correlation was between mental health and social problems (.39).

For the control patients (Table 9) some of the same associations emerged; for example, the relationship between vague signs/symptoms and respiratory ailments (.28), mental and social problems (.22), and drug abuse/smoking, and social problems (.22). Other noteworthy associations were between mental health problems and digestive problems (.36) and between digestive and respiratory ailments (.22).

The next step in this analysis was to evaluate a regression model relating the dichotomous variable - problem drinking versus non-problem drinking - to the various health problems that were diagnosed. In the regression analysis, problem drinking status was used as the dependent variable for analytic purposes, and the various kinds of health

TABLE A. Correlation matrix[1] for problem drinkers of the ten categories of health-related problems that were associated with problem drinking status in bivariate analysis.

	Neoplasms	Endocrine	Mental	Drug	Respiratory	Digestive	Skin	Vague Signs	Accidents	Social
Neoplasms										
Endocrine	.13									
Mental	.08	.04								
Drug	.12	.12	.15							
Respiratory	.06	.18	.12	.20						
Digestive	.02	.05	.07	.15	.10					
Skin	.10	.24	.15	.01	.14	.16				
Vague Signs	.16	.14	.06	.27	.11	.07	.10			
Accidents	.07	.02	.07	.09	.20	.02	.17	.20		
Social	.04	.08	.39	.18	.04	.10	.10	.09	.05	

[1]Correlations are phi correlation coefficients between each dichotomous category of health-related problem.

TABLE 9., Correlation matrix[1] for the control patients of the ten categories of health-related problems that were associated with problem drinking status in bivariate analysis.

	Neoplasms	Endocrine	Mental	Drug	Respira-tory	Digestive	Skin	Vague Signs	Accidents	Social
Neoplasms										
Endocrine	.05									
Mental	.09	.18								
Drug	.04	.15	.09							
Respiratory	.10	.00	.00	.13						
Digestive	.08	.02	.36	.12	.22					
Skin	.07	.18	.08	.05	.02	.09				
Vague Signs	.04	.00	.11	.19	.28	.07	.08			
Accidents	.09	.03	.06	.08	.07	.06	.12	.04		
Social	.09	.02	.22	.22	.14	.18	.06	.08	.09	

[1]Correlations are phi correlation coefficients between each dichotomous category of health-related problems.

problems were treated as independent variables. No underlying dynamics are suggested whereby alcohol abuse is caused by these health problems. The analysis does, however, provide a means of assessing the relative importance of each diagnostic category in discriminating between problem drinkers and controls using the ten variables that had been significant in the bivariate analysis (see Table 10).

Table 11 shows the unadjusted odds ratio for each category obtained in the previous bivariate analyses. This odds ratio is shown here to reiterate the strength of the association between problem drinking status and each category of morbidity, when each category was considered separately.[13] The adjusted odds ratio shows the strength of the association that remained between problem drinking status and each category of morbidity when all categories were included in the analysis. Based on these adjusted odds ratios and their standardized regression coefficients, only three categories of health-related problems were independently associated with problem drinking at a level of conventional statistical significance (p<.05). These categories were (1) injuries/adverse effects, (2) social/

13

   The same odds ratios are obtained with bivariate analysis
   as with a series of logistic regression analyses each
   including only one category of morbidity. This equality
   in the odds ratios occurs because the multivariate logis-
   tic approach is grounded in the statistical method and
   theory of the bivariate procedure.

Table 10. List of variables and variable names used in the
multiple logistic regression analysis.

Variable Description	Variable Name in Analysis

DIAGNOSTIC VARIABLES

Neoplasms (1)Yes (2)No	NEOP
Endocrine/Nutrition/Metabolic (1)Yes (2)No	ENDO
Mental health problems (1)Yes (2)No	MENTAL
Drug abuse/smoking. (1)Yes (2)No	DRUG
Respiratory (1)Yes (2)No	RESP
Digestive (1)Yes (2)No	DIGEST
Skin/Subcutaneous tissue (1)Yes (2)No	SKIN
Signs, Symptoms, Ill-defined cond. (1)Yes (2)No	SIGNS
Injuries/Adverse effects (1)Yes (2)No	INJUR
Social/Marital/Family (1)Yes (2)No	SOCIAL

TABLE 11. Unadjusted and adjusted odds ratio and confidence limits based on logistic regression analysis relating problem drinking status to the ten categories of health-related problems that were significant on the bivariate analysis.

Category of Health-Related Problems	Unadjusted Bivariate Odds Ratio	(95% C.L.)	Adjusted Odds Ratio [1]	(95% C.L.)	Standardized Regression Coefficient [2]
Neoplasms	7.5	(1.7, 49.0)	5.0	(.8, 32.5)	1.66
Drug abuse (incl. tobacco)	5.4	(2.0, 15.7)	1.9	(.6, 6.4)	1.02
Signs, symptoms, ill defined	4.7	(1.9, 13.3)	2.5	(.7, 9.1)	1.39
Social/marital/family	3.8	(1.9, 8.1)	3.0	(1.2, 7.9)	2.27*
Injuries/adverse effects	3.4	(1.8, 7.2)	5.5	(2.1, 14.6)	3.39***
Skin/subcutaneous tissue	3.3	(1.5, 7.9)	2.0	(.7, 5.8)	1.29
Digestive	2.8	(1.4, 4.9)	3.7	(1.2, 11.4)	2.25*
Mental health	2.7	(1.4, 5.3)	1.3	(.5, 3.3)	.46
Endocrine/nutrition/metabolic	2.6	(1.2, 6.0)	2.2	(.7, 6.8)	1.40
Respiratory	2.5	(1.3, 4.9)	2.0	(.8, 4.9)	1.50

[1] The adjusted odds ratio equals the exponent of the beta coefficient in the logistic regression equation with all ten categories of problems included.

[2] The coefficient evaluates the null hypothesis that the adjusted odds ratio equals 1. Statistical significance is indicated by *p<.05, ***p<.001.

marital/family problems, and (3) digestive disorders. Thus, of all the categories of morbidity considered in this analysis, these three represented the most important, independent types of problems that distinguished the problem drinkers from their controls.

Also of particular interest in Table 11 was the low odds ratio and standardized coefficient for mental health problems, which showed a strong association with problem drinking in the bivariate analyses. This decline in importance resulted from the moderately high correlation between mental health problems and social/marital/family problems. Of these two types of problems, the latter appeared to have the strongest association with problem drinking.

The results of the logistic analysis were used to re-classify problem drinkers and controls on the basis of these health-related problems diagnosed by the family physician. This re-classification was used to establish the upper limits of sensitivity and specificity that one would expect if these results were employed to identify undetected problem drinkers in another patient population.

Table 12 shows the accuracy of re-classifying problem drinkers and controls based on the regression coefficients of the logistic model that incorporated the ten categories of health-related problems. For each individual in the

study, a probability was calculated which reflects the likelihood that he/she is a problem drinker based on their morbidity profile. The classification required that some criterion or cut-off point be selected for assigning the individual to the problem drinking group. Different cut-off points result in different levels of sensitivity and specificity. Table 12 shows the results for three different cut-off points, 0.5, 0.7 and 0.9. Appendix E provides an example of the calculations underlying these results.

Using the first cut-off probability level (0.5) is about the equivalent of asking whether the individual has presented with a problem in any one of the ten categories during the past two years. Under this condition, 103 of the actual cases were correctly classified and the sensitivity of the algorithm equalled 95.4%. However, only 22 control patients were correctly classified and specificity was quite low at 20.4%. This resulted from a large proportion of control patients presenting at least once in the two year study period with a problem in one of the 10 categories. Thus, if a problem checklist incorporating all 10 of these broad categories of morbidity were used to screen for problem drinkers it may successfully identify almost all the cases but would have inappropriately classified about 80% of non-problem drinkers.

TABLE 12.   Results of re-classification of problem drinkers and controls
            based on logistic regression model using the ten categories of
            health-related problems and three probability levels (p>.5,.7 or .9)

A.   Probability of being a problem drinker set at greater than .5

| | ACTUAL STATUS | |
PREDICTED STATUS	PROBLEM DRINKER	CONTROL PATIENT
Problem Drinker	103	86
Control Patient	5	22
TOTAL	108	108

SENSITIVITY = 103/108 = 95.4%

SPECIFICITY = 22/108 = 20.4%

B.   Probability of being a problem drinker set at greater than .7

| | ACTUAL STATUS | |
PREDICTED STATUS	PROBLEM DRINKER	CONTROL PATIENT
Problem Drinker	101	74
Control Patient	7	34
TOTAL	108	108

SENSITIVITY = 101/108 = 93.5%

SPECIFICITY = 34/108 = 31.5%

C.   Probability of being a problem drinker set at greater than .9

| | ACTUAL STATUS | |
PREDICTED STATUS	PROBLEM DRINKER	CONTROL PATIENT
Problem Drinker	84	37
Control Patient	24	71
TOTAL	108	108

SENSITIVITY = 84/108 = 77.8%

SPECIFICITY = 71/108 = 65.7%

Part B of Table 12 raises the probability level to 0.7. This level is about the equivalent of requiring that the individual has presented with either (a) any one of neoplasms,[14] vague signs/symptoms, social or family problems, accidents or digestive problems or (b) any combination of two of the ten categories (e.g., endocrine problem such as gout and a mental health problem such as chronic anxiety). Using this slightly more stringent criterion, the sensitivity of the classification remained high (93.5%). Specificity remained low (31.5%) but was slightly improved from that obtained with the 0.5 cut-off.

Finally, the probability level was set at 0.9 which required that for an individual to be classified as a problem drinker, he/she must have presented with (a) some combination of two of the more important problems (e.g., digestive disorders and social/family problems) or (b) some combination of three or more of any of the 10 problems (e.g., social/family problems, endocrine/nutrition disorders such as gout or obesity and vague signs/symptoms such as chest pain or edema). Under this stringest criterion, 84 of the problem drinkers and 71 of the control patients were correctly classified (i.e., sensitivity = 77.8% and specificity = 65.7%). Thus, using a positive response to a combination of two or three of the ten problem categories

_____

14

Recall that in this study, the identified neoplasms were predominately benign skin cancers.

improved the specificity to a more acceptable level without completely sacrificing the sensitivity of the problem checklist.

One difficulty that may arise with using the ten categories of health-related problems to identify problem drinkers, is that they cover such a wide range of specific problems and morbidities. Also it would be difficult to commit the checklist of 10 broad categories to memory so that it could be easily recalled during a chart review. In Table 11, it was shown that three categories of problems were most important in distinguishing between problem drinkers and controls. Since simplicity and parsimony are important objectives in developing a screening algorithm, a logistic model was fitted to the data using only these three categories of morbidity as the independent variables to predict problem drinking status. Table 13 shows the results of using the regression coefficients obtained in this analysis to re-classify the problem drinkers and controls. As in Table 12, three probability levels (0.5, 0.7 and 0.9) were employed.

The results of the classification were the same using either the 0.5 or the 0.7 cut-off. In practical terms, either cut-off point meant that an individual presenting with a problem within any one of the three categories during the two-year study period was classified as a problem

TABLE 13. Results of re-classification of problem drinkers and controls based
on logistic regression model using three[1] categories of health-related
problems and three probability levels (p=.5, .7 or .9)

A. *Probability of being a problem drinker set at greater than .5*

ACTUAL STATUS

PREDICTED STATUS	PROBLEM DRINKER	CONTROL PATIENT
Problem Drinker	94	63
Control Patient	14	45
TOTAL	108	108

SENSITIVITY = 94/108 = 87.0%

SPECIFICITY = 45/108 = 41.7%

B. *Probability of being a problem drinker set at greater than .7*

ACTUAL STATUS

PREDICTED STATUS	PROBLEM DRINKER	CONTROL PATIENT
Problem Drinker	94	63
Control Patient	14	45
TOTAL	108	108

SENSITIVITY = 94/108 = 87.0%

SPECIFICITY = 45/108 = 41.7%

C. *Probability of being a problem drinker set at greater than .9*

ACTUAL STATUS

PREDICTED STATUS	PROBLEM DRINKER	CONTROL PATIENT
Problem Drinker	51	14
Control Patient	57	94
TOTAL	108	108

SENSITIVITY = 51/108 = 47.2%

SPECIFICITY = 94/108 = 87.0%

[1]The three categories were accidents, social/marital/family problems and
digestive disorders.

drinker. This resulted in the accurate classification of 87% of the problem drinkers in the study, a level of sensitivity that is only slightly lower than that obtained using all ten categories as predictors (95.4% or 93.5% as in Table 12). Moreover, using only the three categories of morbidity improves the level of specificity over that obtained with the larger model (41.7% compared to 20.4% at p<0.5 and 31.5% at p<0.7).

Part C of Table 13 shows the results of setting the cut-off point at .9 when using only the three categories. This cut-off point is roughly equivalent to a requirement that the individual have presented with a problem within any combination of two of the three categories (e.g., accidents and social/marital problems). Under this condition, specificity is the highest yet achieved (87.0%) but this is with a sacrifice in sensitivity (47.2%). Thus, if the briefer checklist for case identification were to be adopted, but with a positive response required within any two of the three categories, the number of false positives would be effectively reduced. At the same time, however, about half the true cases would be missed.[15]

15

   If vague signs/symptoms are added to this brief checklist of categories and any two of the four categories are required for a classification of problem drinking, then sensitivity is increased to 54.6% and specificity is 82.4%

In summary, the purpose of these analyses has been to evaluate how efficiently a problem checklist, used during a chart review, would identify problem drinking patients. Results vary considerably depending on the criterion or, in statistical terms, the probability level, that is used for considering whether an individual is a problem drinker. The best combination of sensitivity and specificity levels that was obtained was with the simpler predictive model based on only three categories of problems - accidents, social/family problems and digestive disorders. When having presented with any one of the three categories was used as the criterion for classifying a patient as a problem drinker, sensitivity was high, but specificity was low. If two of the three conditions were required, specificity was high, but sensitivity was low.

Sensitivity and specificity are important characteristic of a diagnostic procedure but they do not fully describe the usefulness of the procedure for detecting the target condition in a given patient population. Sackett et al. (1985) show how the performance of diagnostic tests varies with the prevalence of the target condition; the gain is diagnostic efficiency being largest when prevalence is between 40-60% of the population. The prevalence of the condition in the population reflects the probability that the patient has the condition, without any further

diagnostic tests being performed or any screening questions asked. This is sometimes referred to as the "pretest" probability. Knowing the results of the diagnostic procedure, the probability then changes that the patient does or does not have the condition. This "post-test" probability is called the predictive value of the diagnostic procedure.

In the present study, the positive predictive value is the proportion of patients who would pass the screening criterion (e.g., have presented with at least one of the key health-related problems) and who are in fact problem drinkers. The negative predictive value is the proportion of patients who would not pass the screening criterion but who are indeed problem drinkers.[16] The difference between the initial pretest probability and the predictive value shows the gain in diagnostic performance achieved by the procedure. This gain is a measure of the clinical usefulness of the diagnostic procedure and the amount of gain is directly related to the initial prevalence of the target condition.

Since the prevalence of problem drinking was different between the two centres involved in this study, it is

----

[16] The negative predictive value is also sometimes expressed as the proportion of the patients who would not pass the screening criteria and who do not have the target condition. The end result of this approach is the complement of that obtained by the method used in this study.

important to show, for a range of prevalence rates, the gain in diagnostic efficiency that would be achieved using a checklist of health-related problems to identify problem drinking patients.

Tables 12 and 13 have shown the sensitivity and specificity levels of several different combinations of health-related problems if they were used as a screening checklist in this patient population. As noted above, using the criterion of any one of the three categories of accidents, social/family problems and digestive problems to indicate problem drinking, resulted in sensitivity and specificity values of 87% and 41.7%, respectively. The predictive values and the gain in diagnostic performance with this criterion are shown in Table 14. For comparative purposes the same calculations were made for the criterion whereby any two of the three problems are required for a problem drinking diagnosis (sensitivity=47.2% and specificity=87%). As suggested by Sackett et al. (1985) all results are calculated for a hypothetical population of 1000 patients. All calculations are shown in Appendix E.

The predictive values of the screening criteria were calculated for prevalence rates of .05, .10, .20, and .30. The lower end of this range probably reflects the situation in the Byron centre, while the middle to upper end more

TABLE 14. Clinical usefulness of two different criteria for predicting problem drinking status in patient populations where prevalence of problem drinking ranges from 5, 10, 20 to 30%.

Criterion for Positive Problem Drinking Status

Prevalence (Pre-test probability)	Any ONE of accidents, family/social or digestive problems[1]				Any TWO of accidents, family/social or digestive problems[2]			
	Positive Predictive Value	CHANGE FROM PRETEST	Negative Predictive Value	CHANGE FROM PRETEST	Positive Predictive Value	CHANGE FROM PRETEST	Negative Predictive Value	CHANGE FROM PRETEST
5%	7.4%	(+2.4)	1.5%	(-3.5)	16.3%	(+11.3)	3.1%	(-1.9)
10%	14.2%	(+4.2)	3.3%	(-6.7)	28.7%	(+18.7)	6.3%	(-3.7)
20%	27.2%	(+7.2)	7.2%	(-12.8)	47.5%	(+27.5)	13.2%	(-6.8)
30%	39.0%	(+9.0)	11.8%	(-18.2)	60.8%	(+30.8)	20.7%	(-9.3)

[1] With this criterion, sensitivity = 87.0% and specificity = 41.7% (See Table 13).

[2] With this criterion, sensitivity = 47.2% and specificity = 87.0% (See Table 13).

adequately describes the situation at the Victoria centre, especially for patients in the middle age categories.

In Table 14 the change from the pretest probabilities for each level of estimated prevalence is of most interest. When the criterion of any one of the three problems was used to indicate problem drinking and when prevalence was set at the highest level (30%), passing the screening criterion increases a patient's probability of being a problem drinker by 9% and failing the criterion decreases the probability by 18.2%. These are only modest gains in predictive ability and result from the low level of specificity and the corresponding high number of false positives that are identified. The low level of specificity also results in very low gains in predictive ability with positive test results when prevalence is in the range of 10 to 20%. Gains in this range are between 4-7%. When prevalence is very low (5%), adopting this criterion for problem drinking (i.e., any one of the three problem areas) results in little improvement at all in diagnostic ability (2.4%).

Larger gains in predictive ability are observed when the more stringent criterion for problem drinking was employed (that is, being positive on any two of the three key problem indicators). Even at the lowest level of prevalence there was an 11.3% gain in prediction with having passed the criterion. When prevalence was estimated at 30%,

there was an additional 30% gain in predictive ability with such positive results. With this criterion, sensitivity is going to be low (47.2%) and thus many true cases will be missed. However, because of the higher level of specificity (87%), positive and negative results on this screening criterion would be much more useful to the clinician than the results of the criterion based on only one of the three problems.

4.3   Relationship between the type of problem diagnosed and frequency of contact.

Up to this point the analysis has shown that problem drinkers had about twice as many contacts with their physician in the two year study period as their matched controls, and that they were more likely to have received diagnoses during these visits across a broad spectrum of problems and morbidities. Two questions arise from these data. First, are specific types of health-related problems closely associated with the higher rate of utilization? Second, for persons presenting with the same type of problem, does the frequency of utilization for that problem differ for problem drinkers versus controls?

The first question concerning the types of health problems which were most closely related to the rate of utilization was initially addressed by tallying the total number of patient contacts for each diagnostic category and

comparing these totals between problem drinkers and controls. As shown in column five of Table 15; there were three categories for which there were much more frequent contacts for the problem drinkers - social/marital/ family problems, mental health problems and injuries/adverse effects. The group of problem drinkers had 194 more contacts for social/marital/family problems and 184 more contacts for mental health problems./ The difference between groups for injuries was also very high, being diagnosed for the problem drinkers on 137 more visits than their controls. The remaining categories, which tended to be for organic illness (e.g., endocrine, skin, respiratory and digestive disease) were also important in terms of the difference between groups on the total number of contacts per category. These morbidities, however, were less important in distinguishing between the two groups than the psychosocial problems and acute injuries.

The importance of mental health, social/family problems and traumatic injury in the higher rate of physician contacts for the problem drinkers was also observed by reviewing the charts of cases with the highest rates of utilization. The charts of all cases which differed from their controls by over ten visits per year were examined. There were ten such cases and in every instance mental health problems, such as chronic anxiety or

TABLE 15. Comparison of the total number and average number of patient-physician contacts by problem drinkers and matched controls for the ten categories of problems with the largest difference between groups.[1]

Diagnostic Category	Contacts for Problem Drinkers		Contacts for Controls		Difference Between Groups	
	Total Number	Average per Person[2]	Total Number	Average per Person	Total Number	Average per Person
Social/marital/family	234	4.3	40	1.7	194	2.6
Mental health	369	6.8	185	6.2	184	.6
Injuries/adverse effects	196	3.3	59	1.9	137	1.7
Endocrine/nutrition	128	4.6	45	3.8	83	.8
Skin/subcutaneous tissue	130	2.9	60	2.6	70	.3
Respiratory	147	2.6	84	2.3	63	.3
Digestive	117	2.5	55	2.2	62	.3
Signs/symptoms/ill-defined	58	1.9	16	1.8	42	.1
Drug abuse (incl. tobacco)	54	1.8	19	2.7	35	-.9
Neoplasms	28	1.9	2	1.0	26	.9

[1]These 10 categories were also those that were significantly different between groups on the proportion having received the diagnosis at least once during the two year study period (Table 7).

[2]This is the average number of contacts for this category of problems for all people presenting at least once with this type of problem. The denominator is taken from Table 7.

depression, were major factors in the higher number of visits to the clinic. In all but two cases, family/marital dysfunction played a key role, and for about half of these cases there was also a series of visits resulting from at least one accident. For example, a 46 year old, female problem drinker averaged 35 visits per year. In one year she·presented for 16 visits with problems of depression and chronic anxiety and 20 visits for marital problems. Fractures, back pain and joint pain were also common. This case was matched to a patient with a history of schizo-phrenia who also visited quite often. However, during the study years, the problem drinking patient averaged over 22.5 visits per year more than her control.

Another problem drinker, a 31 year old male, averaged 21 visits per year. In one year, he presented 15 times with difficulties related to his personality disorder and insomnia and 16 times for social problems. Many visits for back strain also occurred. This case averaged over 18 visits more than his matched control.

Thus, social/family/marital problems, mental health difficulties and traumatic injuries were closely connected to the high rate of utilization by the most frequent users in the problem drinking group.

The second question concerning the relationship between the type of problem diagnosed and the frequency of

utilization was whether, for those persons with a given type of health-related problem, the rate of utilization for this problem differed between the two groups. This was addressed by calculating the average number of contacts for each category of health problem, for those cases and controls presenting at least once with the problem. As shown in the last column of Table 15, for all but two categories there was a very similar rate of utilization among problem drinkers and controls who presented with problems in the same general category. For example, 54 problem drinkers made 369 contacts for mental health problems (average = 6.8) compared to 185 such contacts made by 30 control patients (average = 6.2). Thus, the higher average rate of patient-physician contact for the problem drinking group (as was shown in Table 6) arose in large part from more frequent presentation of various kinds of problems, rather than a higher rate of contact for these problems once they were presented.

Two exceptions to this pattern were observed, namely the somewhat higher rates of contact by problem drinkers for social/marital/family problems and traumatic injuries. Problem drinkers averaged 2.6 more contacts per person for social/marital/family problems and 1.7 more contacts for injuries than did the control patients. However, considering that these differences in frequency of utilization

appear to be confined to only two categories of problems, the overall difference between groups in frequency of utilization is likely to be small when group variation on the prevalence of all types of health-related problems is controlled in the analysis. Indeed, in a multivariate logistic analysis, the frequency of utilization no longer contributed significantly to the discrimination between problem drinkers and controls when entered into the analysis following the various categories of health-related problems (standardized regression coefficient for rate of contacts = 1.71, p>.05).

An implication of these findings is that if the past medical record was being used to aid in the detection of problem drinking, then consideration of the past overall rate of contact with the family physician would add little to this detection process beyond that provided by the nature of the morbidities presented during the patient's visits.

In summary, the data presented in Table 15, and a summary of selected case histories have shown that three categories of health-related problems were most closely associated with the high frequency of contact for the problem drinking group - social/marital/family problems, mental health dysfunction and accidental injuries. However, compared to controls with the same types of problems, the average rate of utilization was quite similar. Thus, the

higher rate of contact with the physician appeared to be related primarily to the problem drinkers seeking attention for a wider range of health-related problems but for which they then attended at about the same rate as other patients.

4.4 Differences between groups concerning episodes of traumatic injury and the use of hospital emergency services.

The data in Table 7 showed that problem drinkers were significantly more likely than controls to visit their family physician at least once during the two year study period for traumatic injuries. Also, such problems did contribute to the higher utilization rate of the problem drinking group (Table 15). To complement these findings, comparisons were made between the study and control groups on the number of distinct episodes of traumatic injury presented to the family physician and the number of visits to the emergency department at local hospitals.

It is of interest to examine the number of distinct episodes of traumatic injury since a single accident can result in a long series of contacts with the physician. Thus, a higher rate of utilization for injuries may not necessarily reflect a higher rate of separate incidents of injury. In terms of the number of distinct episodes of traumatic injury, comparison showed that the group of problem drinkers averaged .13 per year compared to .06 for

the control patients (t=4.58, df=107, p<.001). The subset of problem drinkers who had at least one accidental injury (n=56) averaged just less than one separate incident per year ($\bar{x}$=.85). This was similar to the results obtained for the subset of controls (n=25) who had at least one injury ($\bar{x}$=.78). Thus, the difference between groups on the overall number of episodes of injury was due to a greater proportion of the problem drinking group with at least one incident.

With respect to the use of emergency services the question of interest here was whether the higher rate of contact with their family physician by the problem drinkers was offset by a lower rate of contact with emergency services, where care can also be received on an as-needed basis. A lower rate of utilization of emergency services would be expected for the control patients given the lower proportion with at least one episode of traumatic injury. However, if the control patients did tend to be higher users of emergency services for other kinds of problems, this may at least partially account for the lower utilization of their family physician.

When the study and control groups were compared on the frequency of their use of local emergency services, the group of problem drinkers was shown to attend more frequently. On average, the group of problem drinkers made 0.3 visits per year to the emergency department compared to

an average of 0.1 visits per year for their matched controls (t=3.75, df=107, p>.001). The subset of problem drinkers who used local emergency services at least once (n=36), averaged approximately one visit per year ($\bar{x}$=0.94). This compared to 0.6 visits per year (or about one visit every two years) for the subset of controls who used the emergency department. Thus, there was no evidence that the use of emergency services by the control patients substituted for visits to their family physician.

Sub-groups of problem drinkers that were particularly high in the utilization of their family physician (see below) tended also to be more frequent users of emergency services. For example, there was a trend for the youngest and oldest groups of problem drinkers to have particularly high rates of contact with their physician, compared to their controls. This U-shaped relationship between age and utilization was also quite evident in the use of emergency services. Thus, the use of emergency services by the problem drinkers clearly added to, rather than substituted for, the use of health care services obtained from the family physician.

4.5 The influence of intra-personal problems on frequency of contact.

Results up to this point have demonstrated that, on average, problem drinking patients visit their family

physician twice as often each year as matched control patients. Is this difference attributable only to a higher prevalence of mental health dysfunction among the problem drinking group and are these mental health problems more directly responsible for the increased rate of utilization than the abuse of alcohol per se? Two specific questions need to be addressed. First, is mental health status confounding the association between problem drinking and utilization?[17] Second, is mental health status modifying this association so that, in a multiplicative manner, the effect of alcohol abuse on utilization is greater for problem drinkers with co-existing mental health problems than for those without?

In the patient classification system used at the two participating practices, patients are classified on the basis of intrapersonal problems - i.e., serious mental health problems which have lasted for a duration of three months or more (see section 3.7 and Table 3 in Chapter 3). Cases and controls were first compared on (a) the proportion of patients in each group that were classified by a clinic physician as having intrapersonal problems and (b) the severity of these problems.

----

[17]
   As will be discussed in the discussion section, analyses of potential confounding by mental health dysfunction also address the issue of whether the effect of alcohol abuse on utilization is mediated only through mental health dysfunction.

Forty-nine (45.4%) of the problem drinkers compared to 28 (25.9%) of controls were classified as having intrapersonal problems. McNemar's test showed that the association between problem drinking and intrapersonal problems was significant for the overall group ($X^2=9.3$, df=1, p<.01) and for male patients separately ($X^2=7.5$, df=1, p<.01). There was no significant difference in the proportion of female patients in the problem drinking versus the control group who were classified as having intrapersonal problems ($X^2=1.23$, df=1, p<.05).

The types of identified intrapersonal problems for the problem drinkers and their matched controls are shown in Table 16. The main differences between groups were on depression, chronic anxiety, poor self image, attempted suicide/suicidal gestures, personality disorders and anti-social/violent behavior. A small but approximately equal number of patients in each group suffered from serious psychotic illness (e.g., schizophrenia, manic-depression). A similar pattern in the comparison of problem drinkers and controls emerged for both sexes, with the exception that male problem drinkers were more likely than their controls to have a personality disorder and to have exhibited anti-social, violent behavior. For both sexes, a slightly larger proportion of patients in the problem drinking group had received specialized inpatient or outpatient psychiatric care.

TABLE 16. Types of intrapersonal problems recorded in the patients' charts and level of care received by group.

| | | GROUP | | |
| | | Problem Drinkers (N=108) | | Matched Controls (N=108) | |
		n	%	n	%
TYPES OF PROBLEMS	Attempted suicide/suicidal gestures	7	6.5	0	0.0
	Suicidal ideation	4	4.6	3	2.8
	Manic-depression	1	.9	0	0.0
	Depression	27	25.0	10	9.3
	Personality disorder	13	12.0	4	3.7
	Hysterical personality	3	2.8	1	.9
	Dual personality	1	.9	0	0.0
	Schizophrenia	1	.9	3	2.8
	Anxiety related to specific event (e.g., bereavement)	6	5.6	4	3.7
	Chronic anxiety	27	25.0	17	15.7
	Anti-social behavior/impulsive/violent	5	4.6	1	.9
	Poor self image/low self esteem	10	9.3	0	0.0
	Trouble relating to peers	0	0.0	1	1.0
LEVEL OF CARE RECEIVED	No inpatient/outpatient psychiatric care	91	84.2	99	91.6
	Inpatient psychiatric care	10	9.3	6	5.6
	Outpatient psychiatric/psychological care	7	6.5	3	2.8

This information concerning the level of psychiatric care that had been received formed the basis of a severity rating (see Section 3.7). Based on this rating, 15.7% and 29.6% of the problem drinkers were rated as having "major" and "minor" intrapersonal problems compared to 8.3% and 17.6% of the control patients.

Given the higher prevalence of mental health problems in the problem drinking group and the more serious nature of these problems, the analysis sought to determine the influence of these factors on the association previously obtained between problem drinking and the frequency of contacts with the family physician. This issue was examined with a multivariate analysis assessing the difference between groups on frequency of utilization with differences on intrapersonal problems either controlled or considered as a modifying variable. This multivariate analysis also controlled for the differences between groups on the severity of intrapersonal problems.

A logistic regression model was fitted to the data, predicting problem drinking status with three variables - CONTACTS or the average number of patient-doctor contacts per year (log transformed); MENTSEV coded as 0 = no intrapersonal problem, 1 = minor intrapersonal problem, 2 = major intrapersonal problem; and the interaction term CONTACTS X MENTSEV. Results are shown in Table 17. Of

TABLE 17. Results of multiple logistic regression analysis relating
frequency of utilization to problem drinking status, controlling
for mental health problems and interaction term (A=total sample,
B=males only).

Relationship to Problem Drinking Status

A TOTAL SAMPLE (N=108)

VARIABLES IN ANALYSIS[1]	REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT[2]
1. CONTACTS	3.83	5.20***
2. CONTACTS	3.72	4.94***
MENTSEV	.23	.79
3. CONTACTS	4.27	4.58***
MENTSEV	.97	1.41
CONTACTS X MENTSEV	-1.09	-1.21

B MALES ONLY (N=79)

VARIABLES IN ANALYSIS	REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT
1. CONTACTS	5.24	4.39***
2. CONTACTS	5.07	4.19***
MENTSEV	.38	.85
3. CONTACTS	4.87	3.78***
MENTSEV	-.15	-1.09
CONTACTS X MENTSEV	.85	.41

[1]See Table 10 for description of variables.

[2]This t-test evaluates the null hypotheses that the beta coefficient which reflects
the association of each variable to problem drinking status equals 0. Statistical
significance is indicated by * = p < .05, ** = p < .01, and *** = p < .001.

interest first is the finding that the association between problem drinking and frequency of contacts with the family physician remained strong and positive despite the introduction of MENTSEV as a controlling variable (standardized regression coefficient = 4.58, p<.001). Thus, the strong relationship between problem drinking and frequency of utilization shown previously was independent of the higher proportion of individuals with mental health problems among the problem drinking group and the more severe nature of these problems.

The interaction term did not contribute significantly to the model indicating that the relationship between problem drinking and frequency of utilization was not modified in the sub-set of cases with or without co-existing mental health dysfunction. In other words, regardless of the existence of mental health dysfunction, problem drinkers were significantly higher users of their physician.

These analyses were repeated for males only, since the differences between groups on intrapersonal problems were larger for this sub-set of cases. As shown in the lower part of Table 17, similar results were obtained as with the total sample.

In summary, previous research suggested the need to determine the strength of the association between problem drinking and frequency of utilization of the family

physician, while controlling for co-existing mental health dysfunction. The results showed that, although mental health problems were more common among the problem drinking group (especially among males) and were somewhat more severe in nature, these problems did not confound or modify the strong, positive association between problem drinking and the frequency of utilization of the family physician.

4.6 The influence of smoking on frequency of contact.

The smoking status of problem drinkers and controls was also abstracted from the BJS patient classification system and it was found that, compared to their controls, a significantly higher proportion of problem drinkers were current smokers ($X^2=16.7$, df=1, p<.001). For the identified smokers, information was not consistently recorded concerning the amount smoked and thus could not be included in this analysis. However, the higher proportion of smokers in the problem drinking group raised a question about the influence of smoking on the observed association between problem drinking and frequency of utilization. Given the relationship between the use of tobacco products and morbidity, it might be expected that the problem drinkers would attend more frequently for neoplastic disease such as lung or throat cancer and for respiratory problems. Visits may also be more likely for advice/counselling on the need to decrease tobacco consumption.

Table 8 showed that indeed the problem drinkers were more likely to be diagnosed as having neoplastic and respiratory disease and to visit for drug abuse, of which tobacco was the most commonly abused substance. The difference on neoplastic disease was not, however, due to more common lung or throat cancers, but rather to more frequent benign and malignant skin cancers. There were·no instances of a long series of physician visits for lung or throat cancer that might have been attributed to heavy smoking.

Table 15 showed that while problem drinkers and controls differed on the proportion diagnosed as having respiratory disease and drug (tobacco) abuse, these two diagnostic categories did not account for large differences between the groups in the frequency of contacts with the family physician. For example, the problem drinking group made 63 more visits than controls for respiratory problems and 35 more visits for all drug abuse problems, including tobacco. Although such differences will contribute to the general finding of about three visits per year separating the two groups, the differences were small compared to the many more visits for psychosocial problems and traumatic injuries.

Finally, in a multivariate logistic analysis, the difference between groups on the proportion who smoke was

controlled statistically and the association between problem drinking status and frequency of utilization remained strong and positive (standardized regression coefficient = 3.36, $p < .05$).

Thus, there was no evidence that the higher proportion of smokers in the problem drinking group accounted for the doubling in the frequency of their visits to the family physician.

4.7   Exploration of sub-group differences.

4.7.1   Inter-relationship of patient demographic character-istics.

Before the relationships among patients' gender, age, and social position and the variables related to utilization can be explored, it was important to determine the extent to which the demographic characteristics were independent of each other.   Although associations among these character-istics would not influence comparisons between cases and controls, they would have to be taken into account when assessing the extent to which the relationship between problem drinking and utilization interacts with demographic characteristics, such as age and gender.   Along the same line of reasoning, it was also important to examine the relationship among these demographic characteristics and the severity of the drinking problem.

A detailed breakdown of the inter-relationships among gender, age, social position and alcohol problem severity is provided in Table 18.

Cross-tabulation of gender with age · revealed no significant association between these variables (X^2=3.6, df=2, p>.05). There was, however, a tendency for more females in the younger age group. There was no significant relationship between gender and problem severity (X^2=2.1, df=2, p>.05), but there was a strong association between gender and social position (X^2=0.4, df=2, p<.01). There was a significantly greater percentage of female problem drinkers in the lowest strata of social position - public assistance. Of male cases, 18.7% were on some form of public assistance such as disability pensions or welfare, compared to 48.5% of females. Males were more likely to be drawn from social strata V-VI which represents skilled and unskilled workers (44.0 compared to 24.2% for females). The proportions of male and female problem drinkers in social strata I-IV (managers, professionals) were 37.3% versus 27.3%, respectively.

As noted above, age was not significantly related to gender, nor was age associated with social position (X^2=0.72, df=4, p>.05). There was, however, a significant relationship between problem severity and age (X^2=10.6, df=4, p<.05) with alcohol dependent cases more likely to be

TABLE 18. Inter-relationships among problem drinkers' gender, age, social position and alcohol problem severity.

		GENDER			
	Males			Females	
	n	%		n	%
AGE 18 - 29	19	25.3		12	36.4
30 - 55	38	50.7		18	54.5
55 +	18	24.0		3	9.1
	75	100.0		33	100.0
SOCIAL POSITION					
Upper-middle (I - IV)	28	37.3		9	27.3
Lower (V - VI)	33	44.0		8	24.2
Public Assistance (PA)	14	18.7		16	48.5
	75	100.0		33	100.0
PROBLEM SEVERITY.					
At-risk	12	16.0		2	14.3
Non-dependent	34	45.3		16	32.0
Dependent	29	38.7		15	34.1
	75	100.0		33	100.0

	AGE					
	18 - 29		30 - 55		55+	
	n	%	n	%	n	%
SOCIAL POSITION:						
Upper-middle (I - IV)	9	29.0	20	35.7	8	38.1
Lower (V - VI)	13	41.9	20	35.7	8	38.1
Public Assistance (PA)	9	29.0	16	28.6	5	23.8
	31	99.9	56	100.0	21	100.0
PROBLEM SEVERITY:						
At-risk	6	19.4	6	10.7	2	9.5
Non-dependent	18	58.1	27	48.2	5	23.8
Dependent	7	22.6	23	41.1	14	66.7
	31	100.1	56	100.0	21	100.0

	PROBLEM SEVERITY					
	At-risk		Non-dependent		Dependent	
	n	%	n	%	n	%
SOCIAL POSITION						
I - IV	5	35.7	19	38.0	13	29.5
V - VI	8	57.1	18	36.0	15	34.1
PA	1	7.1	13	26.0	16	36.4
	14	99.9	50	100.0	44	100.0

over age 55, and "at risk" cases and "non-dependent problem drinkers" more likely to be under age 30.

Social position was not associated with problem severity ($X^2=5.4$, df=4, p>.05) and, as noted above, was independent of patient's age but related to patient's gender.

A consequence of these relationships among the demographic characteristics is that gender differences must be explored cautiously given the differences between males and females on social position. Similarly, analyses of age differences must also consider differences in problem severity.

4.7.2 Sub-group differences in the frequency of utilization

With respect to the frequency of patient-physician contacts, the dependent variable being compared across levels of the various demographic variables was the mean difference between problem drinkers and controls on the mean number of visits per year ($\bar{d}$). If this mean difference varied significantly between levels of the independent variable (e.g., gender) this was interpreted as evidence of an interaction between that variable and the association between problem drinking and the frequency of utilization. In other words, the effect of problem drinking on frequency of utilization varied across levels of the independent variable (e.g., a greater effect for males only).

As noted previously, these sub-group differences were examined with non-parametric statistical tests due to unequal variances across groups. In these non-parametric analyses, the effect of the variable was examined over all other sub-groups combined, and then within each level of the remaining variables. For two sample comparisons (e.g., males versus females), the Mann-Whitney U-test was employed. Comparisons of three or more groups (e.g., age) were made with the Kruskal-Wallis one-way ANOVA.

Table 19 shows the average number of patient-physician contacts per year for the problem drinkers and controls for each level of gender, age, and social position. The tables in Appendix F show a more detailed, two-way breakdown of sub-group means and standard deviations.

The results of the non-parametric statistical tests and an examination of the sub-group means showed a lack of large variation in the effect of problem drinking across the demographic sub-groups. There was no significant difference between males and females in the relationship between problem drinking and the frequency of patient-physician contacts ($Z = .63$, $p > .05$). As shown in Table 19, the difference between problem drinkers and their controls was slightly smaller, on average, for females compared to males (2.3 contacts per year compared to 3.1 contacts). This trend was independent of the patient's age, social position

TABLE 19. Difference in the average number of patient-physician contacts
per year between problem drinkers and controls by gender, age, and
social position.

SUB-GROUP	PROBLEM DRINKERS $\bar{x}$	CONTROL SUBJECTS $\bar{x}$	Average Difference Between Pairs $(\bar{d})$	Standard Deviation of $\bar{d}$
GENDER				
Male (n=75)	5.2	2.1	3.1	4.4
Female (n=33)	7.8	5.6	2.3	10.7
AGE				
18-29 (n=31)	6.1	2.9	3.2	4.8
30-55 (n=56)	5.7	3.3	2.4	8.7
over 55 (n=21)	6.7	3.1	3.5	3.7
SOCIAL POSITION [1]				
Upper/middle (n=37)	5.4	2.2	3.2	3.9
Lower (n=56)	6.3	2.8	3.5	6.0
Public assistance (n=30)	6.4	4.8	1.6	10.2
TOTAL GROUP (n=108)	6.0	3.1	2.9	6.9

[1]Upper/middle = Blishen codes I - IV. Lower = Blishen codes V - VI.

and level of problem severity. The average difference between cases and controls was, however, highly influenced by some extremely large difference scores for particular matched pairs and the variability in these scores was much higher for women. For example, one pair of female patients differed by 39 visits, with the control patient being the more frequent attender. Another pair of females differed by 28 visits, with the problem drinker having the higher attendance.

As with gender differences, there was no statistically significant difference in the effect of problem drinking on frequency of utilization across the three levels of patient age (x^2=.66, df=107, p>.05). As shown in Table 19, however, there was a trend towards a U-shapéd relationship with the younger age group and the older group showing the larger differences between cases and controls ($\bar{d}$=3.2, 2.4, and 3.5, for groups 18-29, 30-55, and over 55, respectively). This relationship was stronger for males but still did not reach a level of conventional statistical significance (x^2=1.97, df=74, p>.05) when males were analysed alone. Since age and problem severity were inter-related, age differences were examined separately for each level of severity. The younger group (18-29) showed the largest effects of problem drinking at each level.

There was no statistically significant difference in the average difference between problem drinkers and matched controls across the three levels of social position ($x^2=.28$, df=107, p>.05). Neither was there any significant effect of social position when each gender was examined separately. As shown in Table 19, however, there was a clear tendency for persons on public assistance to show the smaller differences between matched pairs, i.e., a smaller effect of problem drinking. This tendency held for both genders, for two of the three age groups and for all levels of problem severity.

In summary, the data showed higher rates of utilization by the problem drinkers compared to matched controls for all levels of age, gender and social position. All groups, except persons on public assistance, averaged around two to three more contacts per year. Analyses with non-parametric tests and a detailed tabulation of the sub-group means showed that there were trends for smaller effects of problem drinking for females, for middle-aged persons and for those receiving public assistance. Exploration of these various trends revealed several outliers (i.e., extremely large differences between cases and matched controls resulting from one member of the pair having a very high rate of contact). These few extremes exerted quite an influence on average differences across the various sub-groups. This factor plus the small sample size

when the overall group was so finely stratified inhibit the testing of specific hypotheses among these sub-groups. Thus, the above analyses must be considered as exploratory in nature.

4.7.3 Sub-group differences in types of problems diagnosed by the physician.

As shown previously in Table 7, an odds ratio was calculated for the total sample for each category of health-related problems in order to highlight the degree of association between problem drinking and the morbidities subsumed by the various categories. To explore interactions between the demographic characteristics of patients and this association, a statistical procedure was used which assesses the consistency in the odds ratio across levels of the demographic variable of interest. This is a procedure recommended for matched data by Breslow and Day (1980) and involves the discordant pairs that arise from the case-control comparisons of each category of health problems. With M levels of a demographic variable, the frequencies of discordant pairs are arranged in a 2 X M table and a chi-square statistic calculated which tests for independence between the demographic variable and the ratio of discordant pairs.[18]   As with the previous section on sub-group

----

18
The reader is referred to pg. 167 of Breslow and Day (1980) for more details.

comparisons, these analyses should be viewed as exploratory in nature due to sample size limitations.

Results of chi-square tests calculated for each diagnostic category, for each variable of interest (i.e., gender, age, and social position) revealed only one significant modifying effect of a demographic variable on the odds ratio for a specific disease category (Appendix G provides a detailed breakdown of these data). The difference in traumatic injury between problem drinkers and controls was significantly lower for persons of the highest social position (Blishen I-IV) (x^2=8.55, df=2, p<.05). Since patient's social position was also associated with gender, this modifying effect of social position with respect to traumatic injury was examined for males and females separately. Although small cell frequencies inhibited statistical analyses for each gender, an examination of trends in the data showed that the lower risk of traumatic injury for problem drinkers of higher social position was evident for both males and females.

Despite the general lack of statistically significant interactions between the demographic characteristics of patients and the associations between problem drinking and the various classes of health-related problems, there were some interesting trends. For example, it is of interest to note which specific categories of morbidity tended to remain

consistently high over all sub-groups. There were three categories of morbidity for which their associated risk levels remained consistently high for almost all levels of age, gender, and social.position. Consistency in the risk of social/marital problems was the most noteworthy, with all patient sub-groups being over two and a half times as likely to be diagnosed as having problems in this area than their controls. The risk of smoking/drug problems was also consistently high for all groups, as was the risk of being diagnosed with vague, signs/symptoms that could not be clearly linked with organic illness. In addition to these three problem categories - social/marital, drug/tobacco abuse, vague signs/symptoms - the very high risk of traumatic injury across all sub-groups other than those of higher social position should be noted. For the lower levels of social position and all age and gender sub-groups, the risk of traumatic injury was always over two and a half times that of controls and usually four to six times as high.

In the next chapter, attention is focused on various comparisons of the spouses and children of the problem drinkers and their controls. Following these comparisons the results of all three study groups - problem drinkers, spouses, and children - will be integrated and the implications for program planning and future research discussed.

CHAPTER 5

COMPARISON OF FAMILY MEMBERS AND THEIR CONTROLS

5.1   Comparison of spouses and their controls.

5.1.1   Demographic and other relevant characteristics.

Of the 108 problem drinkers included in this study, 59 (54.6%) were married or living common-law during the study period. Of these 59 cases, 49 had spouses who were also registered at the practice.   As a result of the matching of the problem drinkers to their controls, these 49 spouses were precisely matched to a control spouse on the basis of gender (42 females, 7 males) and family social position (23 in social strata I-IV, 23 in social strata V-VI and three on public assistance).   Groups were also matched on family size (3.2 persons) and age (40.4 years compared to 40.7 years). The two groups of spouses also did not differ on the proportion that were current tobacco smokers, or the length of time that the family had been registered in the practice (see Table 4).

Of the 49 spouses of problem drinkers, there were 19 living at home with a problem drinker classed in this study as "alcohol-dependent", 24 were living with a "non-dependent" problem drinker and six were living with an "at-risk" drinker. The two groups of spouses did not differ

significantly on the proportion whose co-habitant was classed in this study as having mental health problems although there was a clear trend for a higher proportion in the problem drinking group (42.9% versus 14.3%).[19]

5.1.2 Frequency of patient-physician contacts.

Before comparing the two groups of spouses it was important to evaluate the differences between their corresponding problem drinkers and matched controls and to assess the comparability of the findings for this sub-set of married/common-law cases to the overall group analysed in Chapter 4. Results showed that, as with the overall sample, the sub-set of problem drinkers who were living with their spouse were in contact with their physician an average of 3.3 more times per year than their matched control. As well, the evidence for a positive relationship with the severity of the alcohol problem that was previously obtained for the overall sample, was also found for this sub-set of married or common-law cases ($Z = -2.19$, $p < .05$). Thus, the problem drinkers with whom the spouses in this study were co-habiting did not stand out as a unique sub-group of cases with respect to the frequency of contact with their family physician.

----
[19]

The statistical difference between these two proportions is assessed using only the discordant pairs with the McNemar test of proportions. The difference between groups is smaller than that implied by these overall proportions.

Table 20 shows the comparison of the spouses of the problem drinkers and their matched controls on the average number of patient-physician contacts per year. A small difference emerged in the mean number of contacts per year in favour of the spouses of the problem drinkers ($\bar{x}=6.5$ compared to $\bar{x}=5.3$). Based on a correlated t-test on the log-transformed data, this difference just failed to reach statistical significance at the conventional p=.05 level (t=1.89, df=48, p=.065). Regardless of a statistical confirmation of a difference between the two groups, the size of the effect was not large and is probably of marginal clinical significance.

Since other research has found differences between family members of problem drinkers and controls only for females, the frequency of contacts was examined for male and female spouses separately. For the 42 pairs of female spouses, the spouses of the problem drinkers averaged 6.7 contacts per year compared to 6.0 for their matched controls, a non-significant difference (t=1.15, df=41, p>.05). Although the small number of pairs of male spouses (n=7) prevent useful comparisons between males and females with statistical tests, it is noteworthy that the average number of contacts per year for the male spouses of problem drinkers was 5.8 compared to 1.4 for the male spouses of controls. Thus, there was a trend for the male spouses to

TABLE 20. Comparison of the spouses of the problem drinkers and their matched controls on the average number of patient-physician contacts per year by location of contact.

GROUP

LOCATION OF CONTACTS	Spouses of Problem Drinkers (n=49)			Spouses of Matched Controls			STAT SIG.[1]
	X̄	SD	RANGE	X̄	SD	RANGE	
CENTRE	6.17	4.52	0-16	5.14	5.01	0-21	N.S
HOME	.06	.20	0-1	.04	.17	0-1	N.S
HOSPITAL	.31	.82	0-4.5	.14	.53	0-3.0	N.S
TOTAL	6.54	4.70	0-17	5.33	5.38	0-22	N.S (P=.065)

[1]The difference in the mean number of contacts per year between the two groups was assessed with a correlated t-test. Data were subjected to a logarithmic transformation to normalize the distribution prior to the calculation of the t-test.

show a greater effect of problem drinking than the female spouses.

The relationship between the severity of their marital partner's drinking problem and the frequency of contact with the family physician by the spouse was examined. The average difference between case and control spouses was compared across the levels of severity. Since there were only six "at-risk" drinkers for these comparisons, the analyses were undertaken with these cases either excluded or recoded to the next level of severity. For both analyses, there was a trend for the largest difference between case and control spouses to occur for the most serious problem drinkers. However, in neither instance did this difference reach statistical significance. For example, with the six "at-risk" cases excluded, the spouses of the non-dependent problem drinkers averaged .3 visits less than their matched controls whereas the spouses of the alcohol dependent cases averaged 2.4 visits more than their controls. A comparison of the two groups of spouses with the Mann-Whitney U-test was not statistically significant (z=-1.21, p>.05). Thus, while there was a tendency towards a positive relationship between the severity of problem drinking and the frequency of utilization by the spouse, it may have arisen by chance.

. The spouses of problem drinkers and controls were also compared on the frequency of cancelled visits and missed appointments as well as on the number of visits to local emergency services. Although there was a tendency for .more cancelled visits/missed appointments per year for the spouses of problem drinkers compared to controls ($\bar{x}=.8$ versus $\bar{x}=.6$), this difference was not statistically significant (t=1.42, df=48, p>.05). There was, however, a difference of borderline statistical significance in the frequency of utilization of emergency services with the spouses of the problem drinkers, as a group, averaging .25 visits per year compared to .10 visits for the control group (t=1.96, df=48, p=.058). This difference, however, was restricted to female spouses (t=2.07, df=41, p<.05).

5.1.3 Types of problems diagnosed by the physician.

Table 21 shows the comparison of the two groups of spouses on the proportion receiving a diagnosis at least once in the two-year study period within the 23 broad categories of health-related problems. Clearly the differences between the two groups on the diagnostic data were not as wide-ranging as those observed for the problem drinkers themselves. A greater proportion of spouses of the problem drinkers visited the clinic for mental health problems ($x^2=5.8$, df=1, p<!05) and social/marital/family

TABLE 21   Comparison of the spouses of problem drinkers and their matched controls on the health-related problems diagnosed during the contacts with their physician.

GROUP

Category of Health-Related Problems	Spouses of Problem Drinkers (n=49)		Spouses of Matched Controls (n=49)		Odds Ratio[1]	95% C.L.[2]
	n	%	n	%		
Infective and parasitic	9	18.4	5	10.2	1.8	.5 , 6.8
Neoplasms	5	10.2	5	10.2	1.0	.2 , 5.4
Endocrine/nutrition/metabolic	13	26.5	8	16.3	2.3	.6 , 9.9
Blood	1	2.0	0	0.0	---	-- , ---
Mental health	32	65.3	19	38.8	3.2*	1.2 , 9.6
Alcohol abuse/dependence	0.0	0.0	0.0	0.0	---	-- , ---
Drug abuse (incl. tobacco)	5	10.2	1	2.0	5.0	.6 , 248.9
Nervous system/sense organs	17	34.7	25	51.0	.5	.2 , 1.4
Circulatory	17	34.7	12	24.5	1.8	.6 , 6.0
Respiratory	23	46.9	21	42.9	1.2	.5 , 2.6
Digestive	17	34.7	15	30.6	1.2	.5 , 3.3
Genitourinary	10	20.4	11	22.4	.9	.3 , 2.5
Obstetrical	24	49.0	20	40.8	1.5	.6 , 4.2
Skin/subcutaneous tissue	16	32.7	15	30.6	1.1	.4 , 2.9
Musculoskeletal/connective	23	46.9	18	36.7	1.5	.8 , 4.1
Congenital anomalies	1	2.0	0.0	0.0	---	-- , ---
Perinatal	0.0	0.0	0.0	0.0	---	-- , ---
Signs, symptoms, ill-defined	11	22.4	8	16.3	1.4	.5 , 4.5
Injuries/adverse effects	21	42.9	16	32.7	1.4	.6 , 3.3
Preventive/family planning	23	46.9	29	59.2	.7	.3 , 1.5
Social/marital/family	27	55.1	13	26.5	4.5**	1.5 , 18.2
Administrative	1	2.0	0.0	0.0	---	-- , ---
Miscellaneous	0.0	0.0	1	2.0	---	-- , ---

[1] The odds ratio is a maximum likelihood estimate (MLE) equal to the ratio of discordant pairs, $\hat{\psi} = n_{10}/n_{01}$ (Breslow & Day, 1980, p.165). The difference in the proportion in each group with at least one encounter in the diagnostic category was assessed with McNemar's test of proportions for matched samples. Statistical significance is indicated by * = p <.06, ** = p <.01.

[2] These are exact 95% confidence limits calculated for matched data.

problems ($x^2 = 7.7$, df=1, p<.01). The most common mental health problems were depression, chronic anxiety, and "other" problems such as sexual dysfunction. Within the broad category of social/marital/family problems, groups differed predominantly on marital dysfunction. Similar findings were obtained when the seven male spouses were excluded and results examined only for females.

Table 22 shows the comparison of the actual number of contacts during which each particular type of problem was diagnosed. Visits for social/marital/family problems were most important in distinguishing the spouses of problem drinkers from their controls (151 contacts versus 30 contacts), as well as circulatory problems such as hypertension (105 versus 50 contacts). For these two categories of problems - social and circulatory - the average rate of contact per patient was considerably higher for the spouses of problem drinkers. Thus, the small difference between the two groups of spouses on average frequency of contact with their family physician (Table 20) was attributable primarily to more frequent visits for these two types of problems. In contrast, mental health problems were important in distinguishing the two groups on total contacts, but when only those spouses were considered who presented at least once for mental health problems, the average rate of contact for these problems was virtually

TABLE 22. Comparison of total number and average number of patient-physician contacts for each category of health related problem by spouses of problem drinkers and matched controls.[1]

Category of Health-Related Problems[2]	Contacts for Spouses of Problem Drinkers		Contacts for Control Spouses		Difference Between Groups	
	Total Number	Average per Person[3]	Total Number	Average per Person	Total Number	Average per Person
Social/marital/family	151	5.6	30	2.3	121	3.3
Circulatory	105	6.2	50	4.2	55	2.0
Mental health	118	3.7	73	3.8	45	-.1
Endocrine/nutrition	57	4.4	37	4.6	20	-.2
Injuries/adverse effects	45	2.1	30	1.8	15	.3
Signs/symptoms/ill-defined	30	2.7	16	2.0	14	.7
Musculo-skeletal/connective	91	4.0	77	4.3	14	-.3
Genito-urinary	28	2.8	21	1.9	7	.9
Respiratory	66	2.9	59	2.8	7	.1
Skin/subcutaneous tissue	41	2.6	36	2.4	5	.2
Infective and parasitic	16	1.6	11	2.2	4	-.6
Neoplasms	12	2.4	8	1.6	4	.8
Digestive	87	5.1	88	5.9	-1	-.8
Obstetrical	105	4.4	108	3.2	-3	-1.0
Nervous system/sense organ	52	3.0	81	3.2	-29	-.2
Preventive	38	1.6	68	2.3	-30	-.7

[1]Categories for which either the number of cases or controls presented with the problem less than five times are excluded because the average number of contacts would fluctuate considerably with a small change in number.

[2]Categories are ordered in terms of the size of the difference between groups on total number of contacts.

[3]This is the average number of contacts for this category of problems for all people presenting at least once with this type of problem. The denominator is taken from Table 19.

identical between groups. The greater frequency of contacts for these social/family, mental health and circulatory problems by the spouses of problem drinkers was offset by their lower frequency of contacts for preventive reasons (38 contacts versus 68 contacts) and nervous system problems (52 contacts versus 81 contacts).

Previous research has shown that female family members living with a problem drinker visit their family physician more often than controls for traumatic injury and vague signs and symptoms that are not clearly associated with organic illness, but which are thought to have a high emotional component (e.g., chest pain, abdominal pain, fatigue) (Roberts & Brent, 1982). Results for these types of health problems in this study were in the same direction as in this previous research, but the differences were not large from a statistical or practical viewpoint. There was only a 6% difference in the proportion diagnosed with vague signs/symptoms, and a 10% difference in injuries/adverse effects. The exclusion of the seven male spouses did not alter these proportions.

5.2   Comparison of children and controls.

5.2.1· Demographic and other relevant characteristics.

The group of children from problem drinking families consisted of 78 children drawn from a total of 40 families.

Fifty-one (65.4%) were from the Victoria centre, the remainder from the Byron centre. The control group was made up of 71 children also drawn from 40 families. Forty-eight children (67.6%) were from Victoria, the remainder from Byron.

As shown previously in Table 5, the two groups of children did not differ significantly on the length of time the family had been registered at their medical centre. There was a small but statistically significant difference in family size ($\bar{x}=4.1$ persons versus $\bar{x}=3.8$ persons for problem drinking families and controls, respectively). The age and sex distributions of the two groups were similar. The average age of the children from the problem drinking families was 8.5 years compared to 8.1 years for control children. In each group, age ranged from approximately 0.1 years to 17 years. For the children of problem drinkers, 52.6% were male compared to 57.7% of controls. As a result of the parental matching, the two groups of children were approximately equal in terms of social position and parent's age. The groups were also approximately equal in terms of the marital status of their parents. Of the children of a problem drinker, 76.9% had married/common-law parents, the remainder were living with only one parent (single, separated/divorced, widowed). This compared with 73.2% of the control children living with both parents and 26.8% living in a one-parent household.

Children living with a problem drinking parent were somewhat more likely to have a parent (or parents) who were current smokers. For problem drinking families, where both parents were living together, 68.4% of the children lived in a home where one or both parents smoked, compared to 58.1% of the control children. For single parent families, 62.1% of the children of problem drinkers had a parent who smoked compared to 37.9% of the control children.

The mental health status of the problem drinking parent and his/her matched control was compared between the two groups of children. Thirty of the index children (38.5%) had a problem drinking parent who was classified positive on the clinic's intrapersonal problem classification. The problems were primarily depression, chronic anxiety, and personality disorder. This compared to 15.5% of the control children.

With respect to the alcohol problem in the family, 28 or 35.9% of the children had a mother with a drinking problem, compared to 50 or 64.1% whose father had the problem. In terms of problem severity, 8 (10.3%) had a parent classified as "at-risk", 53 (67.9%) had a parent classified as a "non-dependent problem drinker" and 17 (21.8%) had a parent classified as "alcohol-dependent".

5.2.2 Frequency of patient-physician contacts.

As shown in Table 23, there was no difference in the frequency with which the two groups of children made contact with their family physician during the study period. On average, the children of the problem drinkers made 3.2 contacts per year and the control children made 3.6 contacts' (t= -.13, df=147, p>.05). The similarity in the frequency of contacts with the physician was evident for visits to the centre, as well as contacts at home and at the hospital. The two groups of children were also similar in the number of visits to local emergency services (t=1.3, df=147, p>.05).

The effect of parental problem drinking on the frequency of children's contacts with the physician was examined for each of the three levels of severity of the parental drinking problem. There was no evidence of a positive relationship. Employing the average number of contacts per year as the dependent variable, the interaction term in a 2X3 ANOVA (group x severity) was clearly non-significant (F=.19, df=2,143, p>.05). Moreover, the trend in the group means was such that only the children living with an "at risk" parent had higher utilization rates than the controls ($\bar{x}$=3.8 visits per year compared to $\bar{x}$=2.8). For the two higher levels of problem severity, the effect was reversed and it was the control children having slightly

TABLE 23. Comparison of the children of problem drinkers and the children of matched controls on the average number of patient-physician contacts per year by location of contract.

GROUP

LOCATION OF CONTACTS	Children of Problem Drinkers (n=78)			Children of Matched Controls (n=71)			STAT SIG.[1]
	x̄	SD	RANGE	x̄	SD	RANGE	
CENTRE	3.05	3.10	0-15.0	3.50	3.80	0-19.0	N.S.
HOME	.03	.11	0- .5	.01	.08	0- .5	N.S.
HOSPITAL	.08	.28	0- 1.5	.04	.15	0- 1.0	N.S.
TOTAL	3.16	3.24	0:15.5	3.55	3.84	.0-19.0	N.S.

[1]The difference in the mean number of contacts per year between the two groups was assessed with an independent t-test. Data were subjected to a logarithmic transformation to normalize the distribution prior to the calculation of the t-test.

more physician contacts per year (e.g., $\bar{x}$=2.4 for children of alcohol dependent parents versus $\bar{x}$=2.7 for their controls). Thus, there was no evidence that the severity of parental alcohol abuse was associated with more frequent contact between children living in the same home and the family physician.

5.2.3 Types of problems diagnosed by the physician.

Table 24 shows that no statistically significant differences emerged between the two groups of children for the diagnoses received during their encounters with the physician. There was, however, a non-significant tendency for the children of problem drinkers to be more likely to be diagnosed as having mental health problems and social/family problems, and to be less likely to visit for preventive reasons.

5.2.4 Sub-group differences.

Analysis of variance was used to examine the modifying effect of the child's age, gender, and social position on the relationshp between parental alcohol abuse and frequency of physician contacts by the children. Of these three demographic characteristics, the only significant interaction observed was for children's age (F=4.6, df=2,142, p<.01). As shown in Table 25, children of

TABLE 24. Comparison of the children of problem drinkers and the children of matched controls on the health-related problems diagnosed during the contacts with their physician

GROUP

Category of Health-Related Problems	Children of Problem Drinkers (n=78)		Children of Matched Controls (n=71)		Odds Ratio	95% C.L.
	n	%	n	%		
Infective and parasitic	24	30.8	22	31.0	1.0	.5 , 2.0
Neoplasms	1	1.3	1	1.4	.9	.1 , 14.8
Endocrine, nutrition/metabolic	3	3.8	4	5.6	.7	.2 , 3.1
Blood	1	1.3	0	0.0	---	-- , ---
Mental health	14	17.9	7	9.9	2.0	.8 , 5.3
Alcohol abuse, dependence	0	0.0	0	0.0	---	-- , ---
Drug abuse (incl. tobacco)	1	1.3	1	1.3	.9	.1 , 14.8
Nervous system/sense organs	31	39.7	30	42.3	.9	.5 , 1.7
Circulatory	3	3.8	4	5.6	.7	.2 , 3.1
Respiratory	42	53.8	33	46.5	1.3	.7 , 2.6
Digestive	17	21.8	10	14.1	1.7	.7 , 4.0
Genitourinary	2	2.6	6	8.5	.3	.1 , 1.5
Obstetrical	5	6.4	2	2.8	2.4	.5 , 12.8
Skin/subcutaneous tissue	31	39.7	23	32.4	1.4	.7 , 2.7
Musculoskeletal/connective	8	10.3	6	8.5	1.2	.4 , 3.8
Congenital anomalies	1	1.3	0	0.0	---	-- , ---
Perinatal	0	0.0	0	0.0	---	-- , ---
Signs, symptoms, ill-defined	6	7.7	4	5.6	1.4	.4 , 5.2
Injuries/adverse effects	29	37.2	30	42.3	.8	.4 , 1.6
Preventive/family planning	30	38.5	37	52.1	.6	.3 , 1.1
Social/family	15	19.2	9	12.7	1.6	.7 , 4.0
Administrative	1	1.3	1	1.3	.9	.1 , 14.8
Miscellaneous	2	2.6	1	1.4	1.8	.2 , 20.7

The odds ratio is the empirical odds ratio, = ad/bc (Breslow & Day, 1980, p 130). The difference in the proportion in each group with at least one encounter in the diagnostic category was assessed with a chi-square test. None of the differences reported are significant at the conventional = .05 level.

These are the 95% logit confidence limits

a problem drinking parent between the ages of 1-5 and 12-17 had slightly lower rates of utilization than their controls. In contrast, children between the ages of 6-11 had about twice as many contacts per year than their controls ($\bar{x}=3.0$ versus $\bar{x}=1.7$). Children of both genders and in each of the three levels of social position averaged slightly lower rates of utilization than their controls.

The gender of the problem drinking parent was also examined as a potential modifying variable but was not a significant interacting factor in the association between problem drinking and the frequency of the childrens' contact with their physician ($F=.01$, $df=2,145$, $p>.05$).

In terms of type of diagnoses, children's age again seemed to be important with the middle age group (6-11 years) showing large differences between groups on mental health problems (25.8% versus 4.8%) and social/family problems (22.6% versus 4.8%). The other age groups were approximately equal on these categories of morbidity. There was also a trend for diagnoses of mental health problems and social/family problems to be more likely for male children of problem drinkers than for female children. Thus, the trend observed for the overall group of children of problem drinkers to be more likely to be diagnosed with mental health problems and social/family problems arose primarily within a specific sub-group of children - males, between the ages of six and eleven.

TABLE 25. Average number of patient-physician contacts per year by group by child's age, gender and family social position.

| | GROUP | | | | Significance of Interaction Term |
| | Children of Problem Drinkers | | Children of Matched Controls | | |
	N	$\bar{x}$	N	$\bar{x}$	
AGE:					
1-5	24	4.1	28	5.6	
6-11	31	3.0	21	1.7	p < .01
12-17	23	2.4	22	2.8	
GENDER:					
Male	41	3.0	41	3.4	N.S.
Female	37	2.6	30	4.8	
SOCIAL POSITION:					
I-IV	26	3.2	23	3.9	
V-VI	33	3.6	30	3.7	N.S.
PA	19	2.4	18	2.8	

[1] The 2-way ANOVA's testing sequentially for AGE X GROUP, GENDER X GROUP and SOCIAL POSITION X GROUP interactions were based on the log transformation of the mean contacts per year. The means shown in the table are for the untransformed data. N.S. = not significant at α = .05.

CHAPTER 6

DISCUSSION

In this section, the results will be integrated to respond to each of seven research questions stated at the conclusion of Chapter 2.

To facilitate the flow of the discussion these questions have been grouped into three sub-sections: (a) those concerned with the frequency of utilization of the family physician; (b) those concerned with the nature of the health-related problems diagnosed by the physician; and (c) those concerned with the frequency and nature of the contacts with the family physician by co-habiting family members.

In each of these three sub-sections, the results will be summarized and, if appropriate, their comparability with previous research discussed. The main focus of the discussion will be the implications of the results for the identification and treatment of alcohol abuse in family practice settings and for research into the cost-offset or cost-effectiveness of these interventions. Other issues such as gender differences in the effects of alcohol on health and the inter-relationship of alcohol abuse and psychiatric dysfunction are also briefly discussed.

The final section discusses the limitations of the study and briefly notes some recommendations for future research.

6.1   Frequency of utilization of the family physician.

6.1.1   Overall group differences on rate of contact.

The first question of interest was whether "the positive association between problem drinking and frequency of use of family physicians that has been shown in American and British studies, is also evident in Canadian family practice settings, and when social class is controlled through the design of the study".

Findings from a small number of studies in the U.K. and in the U.S.A. have indicated that problem drinkers enrolled in ambulatory health care services are more frequent attenders than matched control patients (Putnam, 1982a; Roghmann et al., 1981; Buchan et al., 1981). The present research clearly replicates and extends these findings. As a group, the problem drinkers in this study had twice as many contacts per year with their physician as did their matched controls. This more frequent utilization occurred despite a higher rate of no-shows/cancelled visits to the medical centre, and despite a higher frequency of use of local emergency services for additional medical care.

The research by Putnam (1982a) and Roghmann et al.
(1981) was undertaken in American Health Maintenance
Organizations and the rate of utilization was calculated in
such a way so as to include outpatient visits for a wide
variety of services, including medical, dental, x-ray,
nutrition counselling and optical services. In these HMO
settings the problem drinking group made about 20-40% more
contacts than their matched controls.

The work by Buchan et al. (1981) was done in a
general practice surgery in Great Britain, a medical care
setting more like the family practices employed in this
research. In the British study, problem drinkers averaged
twice the annual rate of contact of the matched controls.
This doubling in the rate of contact was also evident in
both the medical practices involved in the present research
and thus appears to be a robust finding across family
practice settings.

An important question addressed in this study was
whether those differences in the frequency of utilization
between problem drinkers and matched patients that had been
observed in other studies would remain if social class was
controlled. Research has shown social position to be
related to the type and rate of health care utilization
(e.g., Browne et al., 1982) and to the frequency of alcohol

consumption (e.g., Smart & Adlaf, 1984). Thus, social position was a potential confounding variable whose effect had yet to be considered in this area of inquiry. In the present research, the problem drinkers and the control patients were matched on social position, and the expected differences in the frequency of utilization were still very evident. Thus, concerns that have been expressed in the literature about the potential confounding effects of social position appear unfounded (Putnam, 1982a) .

In previous research only Roghmann et al. (1981) have made an attempt to examine differences in the rates of utilization for different levels of severity of the alcohol problem. They distinguished between two groups: (1) alcoholics who were diagnosed as such by either an HMO physician or by personnel of a specialized alcoholism treatment program; and, (2) high risk cases who reported daily drinking and who responded positively to one of three related questions in the intake interview (i.e., people's comments on their drinking; their own promises to stop drinking; their drinking-related problems). About 14% of the patient population were considered high risk by this criterion. There was some evidence that the effect of problem drinking on outpatient utilization was greater for the diagnosed alcoholics. This was especially true for visits made for reasons of illness. Although this suggests

that the severity of the alcohol problem was an important determinant of the rate of utilization of the family physician, additional research with more than two levels of severity and in different medical settings was clearly needed.

In the present study, the problem drinking group was sub-divided into three levels of severity based on an audit and classification of the case notes and related case materials which made reference to alcohol. The difference between problem drinkers and controls on the frequency of utilization was shown to increase as the severity of the alcohol problem increased. Thus, there was a strong, positive association between the severity of the alcohol problem and the frequency of utilization of the family physician.

6.1.2 Linking the rate of contact to type of health-related problem.

Having established that the problem drinkers were more frequent attenders than matched controls, it was important to ask whether this difference resulted from particular kinds of health-related problems. Specifically, the following question was posed. "If the problem drinking patients are more frequent attenders, can this be attributed to more frequent visits for particular types of health-related problems, or to a general increase in

<u>utilization that is independent of the nature of the</u>

<u>problem?"</u>

The problem drinkers and controls were compared on the frequency of contact for different kinds of health-related problems. It was evident that the problem drinking group had more visits for all the categories of health-related problems and that the largest differences occurred for social/marital/family problems, mental health problems and traumatic injury. Thus, the higher overall rate of contact was due primarily to more frequent visits for psychosocial difficulties and for accidental injury rather than for diseases with an underlying organic basis.

These data alone, however, do not fully account for the higher rate of utilization. The difference between groups for any given problem could result from either of two factors: (1) a higher prevalence of the condition between groups (i.e., many more cases visiting at least once with the problem compared to controls who never visited with the problem), or (2) a general increase in utilization for any given problem (i.e., for cases and controls who presented with the same kind of problem, the cases attended more often).

Results showed that a higher prevalence of the various health-related problems was the more likely explanation of the higher overall rate of utilization. When

comparing problem drinkers and controls who had both presented at least once with a given problem, the frequency of attendance for that problem did not differ substantially. Small differences in the rate of attendance were evident for social/family/marital difficulties and traumatic injury. However, in a multivariate analysis, no overall difference in frequency of utilization was observed when the group differences in prevalence of the various health-related problems were controlled. Thus, the increased utilization of the problem drinkers was due primarily to their more frequent presentation of several different kinds of health-related problems (in particular ███chosocial and injuries) rather than a general increase in utilization once a problem was diagnosed by the physician.

6.1.3 Sub-group differences.

The third research question concerned sub-group differences. Specifically, "is there evidence that the effects of problem drinking on the utilization of the family physician are the same for both genders and for persons of different age and social position?"

Limitations of sample size when the overall group was stratified by these demographic characteristics prevented the rigorous testing of specific hypotheses with respect to age, gender or social class differences. It was expected,

however, that one major trend would be evident in the data.

It was expected that the difference in utilization between problem drinkers and controls would be larger for women compared to men. Ashley et al. (1977) compared the morbidity profiles of male and female alcoholics seeking inpatient treatment and found that the females were in equally poor health, but that they had a much briefer drinking history. Smart (1979) also studied male and female admissions to various treatment facilities and found the females to be in poorer physical health despite a briefer history of problematic drinking and a lower level of daily consumption. These studies suggest that women's health may be more susceptible to the harmful effects of alcohol. It was on this basis that it was expected that a greater increase in utilization of the family physician would have been observed for the female problem drinkers in this study. Clearly, however, there was no trend in this direction. Indeed, the differences between problem drinkers and controls were consistently smaller, rather than larger, for the female patients.

Without an accurate drinking history on all patients in the study, the absence of this expected gender difference cannot be fully explained. However, the female problem drinkers in this study tended to be younger than those studied by Ashley et al. (1977) ($\bar{x}=36.9$ years compared to

$\bar{x}=44.8$ years). This resulted in part from the exclusion of female problem drinkers who were living with another alcohol abuser. Perhaps the divergence from the expected findings in this study are a result of age differences between female problem drinkers that participate in specialized treatment programs and the sample of women drawn from the participating medical centres.

Finally, the higher rate of utilization for the problem drinkers was evident for all of the demographic sub-groups that were examined. The magnitude of the effect of problem drinking was also very consistent, with an approximate doubling in visit frequency being the norm across almost all sub-groups. The exceptions to this pattern were females (as noted above) and persons on public assistance, for whom the problem drinkers averaged about 1.4 times the number of visits per year. The smaller effect for females was consistent across social strata. As well, the smaller effect for the lowest level of social strata held for both males and females.

Women and individuals from the lower socio-economic strata tend to be the most frequent attenders in general medical practice (Browne et al., 1982), and this was observed in the present study for both the problem drinkers and controls. Thus, it would seem that the effect of alcohol abuse on the frequency of utilization tends to be

smallest for that sub-set of patients who are already presenting with a higher than average rate of contact with the physician.

6.1.4 The role of mental health dysfunction.

The final, research question concerning the association between problem drinking and the frequency of utilization of the family physician was "to what extent is this association modified by or confounded by co-existing mental health dysfunction?"

The results of this study clearly showed that the problem drinkers were more likely than the controls to be coded in the patient classification system as also having mental health problems. In the medical practices participating in the research, this classification is applied only if a mental health problem has lasted for a duration of at least three months. Groups differed primarily on the basis of depression and chronic anxiety. A further sub-classification that was developed for this research suggested that the mental health dysfunction of the problem drinking group was also more severe than that of the control patients. In the data analysis, an attempt was made to assess the strength of the association between problem drinking and frequency of utilization while controlling for these group differences.

To assist in the interpretation of the results it is important to note that alcohol abuse may be interwoven with psychiatric difficulties in a variety of ways. Longitudinal and retrospective research suggests that, for the majority of individuals with drinking problems, the heavy drinking was the antecedent to mental health problems such as depression, chronic anxiety and sociopathy (Vaillant, 1983; Bowen et al., 1984). However, it is also generally acknowledged that for a smaller proportion of problem drinkers, heavy drinking may follow the onset of psychiatric problems such as manic-depression and be used as a form of self medication (Reich et al., 1974; Ritzler et al., 1977). Finally, alcohol and mental health problems can coexist with no common etiology (Meyer & Hesselbrock, 1984).

Figure 1 provides an overview of various ways in which the relationships among alcohol abuse, psychiatric problems and increased utilization can be conceptualized. In the first example, the abuse of alcohol contributes to a wide cross-section of health-related problems, and thereby increases contact with the family physician to assist with these difficulties. In this example, mental health dysfunction is considered to be but one of many types of problems caused by alcohol abuse and it is accorded no special status as a major explanatory factor with respect to increased utilization. In example B, alcohol abuse and

FIGURE 1   The nature of various hypothetical associations among alcohol
            abuse, mental health dysfunction and utilization of the family
            physician
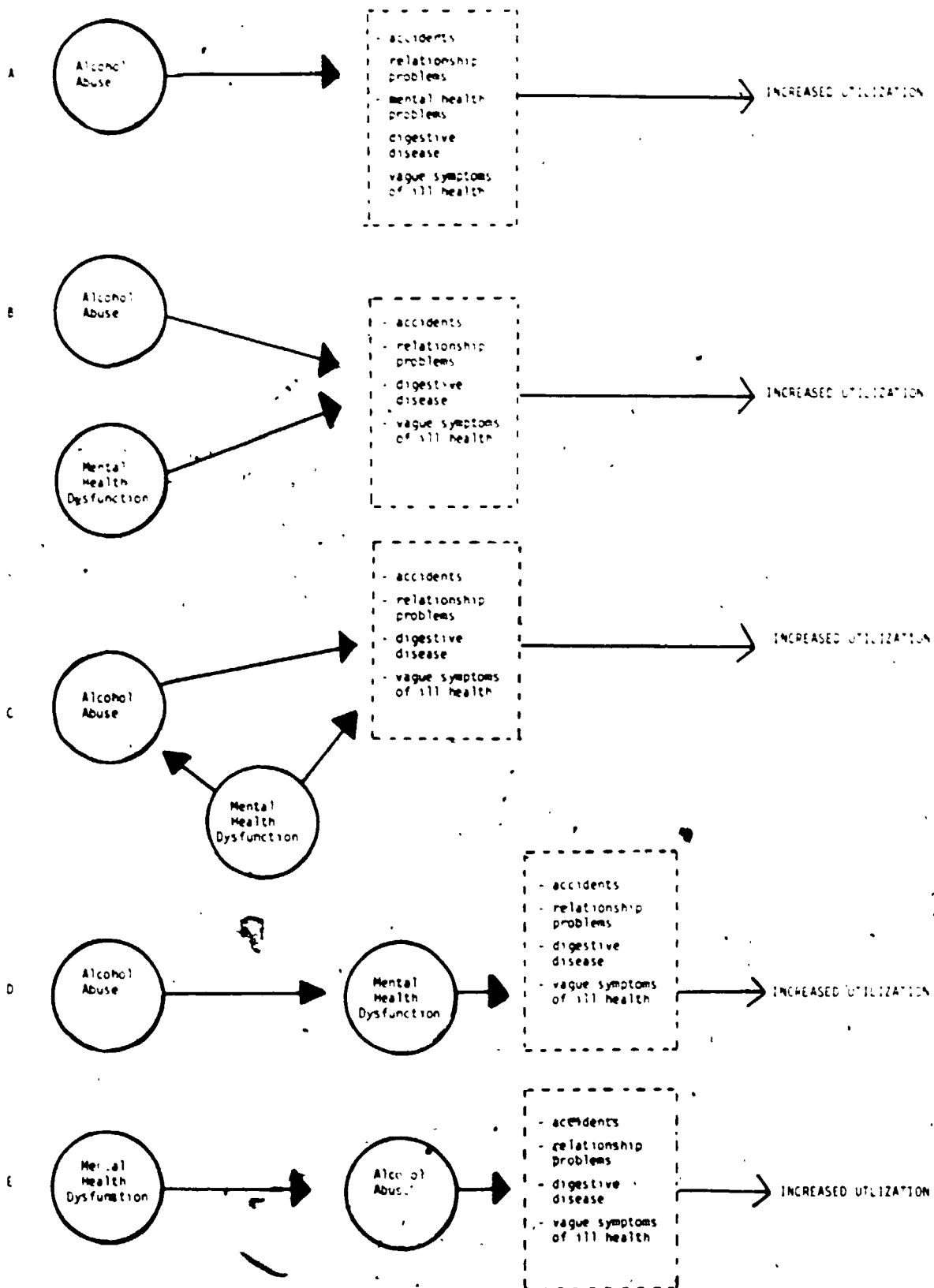
mental health dsyfunction are both considered as major determinants of utilization, contributing independently to a variety of patient difficulties which increase the rate of contact with the family physician. In this situation, however, the effect of alcohol abuse could be larger or smaller depending on the co-existence of mental health dysfunction (i.e., it may be a modifying variable). In example C, an association between alcohol and utilization is observed only because of their joint association with mental health dysfunction (i.e., it may be a confounding variable). In example D, the effects of alcohol abuse on utilization are exerted indirectly only through increased mental health dysfunction (i.e., it may be the mediating variable). Finally, in example E, alcohol abuse is the mediating factor between mental health dysfunction and increased utilization.

In a multivariate analysis, a strong positive association remained between problem drinking and the frequency of utilization when the higher prevalence and severity of mental health dysfunction was controlled in the analysis. This rules out the situation in example C, where mental health dysfunction is the confounding factor. Statistically controlling for the prevalence and severity of mental health problems in this manner also rules out the situation in example D, where mental health dysfunction is considered to be the mediating factor between alcohol abuse

and increased utilization. Thus, the difference between groups on frequency of utilization did not depend solely on the differences between groups on mental health disorder.

The multivariate analysis also tested for the potential modifying effect of mental health dysfunction, and no significant interaction was found. The magnitude of the effect of problem drinking on utilization did not depend on the coexistence of mental health problems. Therefore, if the inter-relationships described in example B prevail, the joint effects of alcohol abuse and mental health dysfunction are not multiplicative.

The analysis does not rule out the situation shown in example E where alcohol abuse is the mediating factor. Longitudinal research would suggest that this pattern of relationships is unlikely in the majority of alcohol abusers (Vaillant, 1983) and, therefore, it is not likely to account for the findings in the present study.

To summarize, of the various sets of inter-relationships between alcohol abuse, psychiatric dysfunction, and increased utilization depicted in Figure 1, situations A and B remain as the most credible. The model summarized in A is the most parsimonious view of the results of the present study.

With respect to these findings, it should also be noted that the differences between problem drinkers and

controls on the prevalence and severity of mental health .dysfunction were largest for male patients. In contrast to males, the female problem drinkers showed no excess of intrapersonal problems. This complements Westhead's (1985) observation that for male patients who are the highest attenders in general practice, alcohol abuse and psychiatric problems play a major role in their seeking of health care services. In the present study, when males were examined separately through a multivariate analysis, their high rate of contact with the physician was independent of the higher prevalence of psychiatric problems and probably due to the alcohol abuse contributing directly to marital/family dysfunction and accidental injury. These two factors were also noted by Westhead in his male patients who were the highest attenders.

6.1.5 Program and research implications.

The four research questions that have been addressed in this section all concern the frequency with which problem drinkers make contact with their family physician. The results provide strong evidence that the relationship between problem drinking and the frequency of utilization of the family physician is a causal association in the epidemiological sense. The association remained strong and positive following the control of several potential

confounding variables through either the design of the study or through the data analysis. The "dose-response" relationship with problem severity also adds support to a causal interpretation, as does the consistency of the results over the two medical centres involved in the research and other family practice settings where similar research has been undertaken (Buchan et al., 1981).

This research, however, was not intended to assess in a definitive manner whether increased utilization was due primarily to a poorer health status resulting from heavy drinking or to a greater tendency for the problem drinkers to seek refuge in a sick role for social/psychological reasons. For example, such factors as lower levels of social support, a higher degree of psychological introspection, or varying perceptions of the severity of illness (Mechanic, 1986) could underly the more frequent contact. It is important to underscore the fact that differences in health care behavior do not necessarily reflect differences in health status and that there are several factors that prompt or inhibit the seeking of health care.

There is good evidence, however, that the higher utilization rates for the problem drinkers in this study reflect a poorer health status that has resulted from the heavy use of alcohol. The diagnoses that characterized the problem drinkers bore a very close resemblance to the

health-related problems characteristic of problem drinkers in the general population (Pell & D'Alonzo, 1968; Adrian & Layne, 1986). From other research in the alcohol field, there is also strong evidence of a causal relationship between alcohol use and almost all of these problems. For example, heavy drinking is known to be positively related to psychosocial problems and traumatic injury (see Mäkelä, 1978; Nobel, 1978; Moessner, 1979, for reviews of the relevant literature) and these were the morbidities most closely linked to the higher rate of utilization by the problem drinking group. Similarly, most of the organic illnesses that contributed to the higher attendance of the problem drinkers (i.e., digestive disorders of the stomach, esophagus and liver, certain skin disorders, and endocrine problems such as gout) have also been shown to be closely associated with the heavy use of alcohol (e.g., Schmidt & Popham, 1975/76; Popham et al., 1984; Whitfield, 1981; Sharpe, 1984).

The fact that the problem drinkers were more often in contact with their family physician at their own home and at the hospital also suggests that they were in poorer health than the control patients. Home and hospital visits are probably being made for more serious health problems.

Finally, it was shown that the more frequent utilization of the family physician by problem drinkers was

not accounted for by better compliance with scheduled visits to the medical centre. The higher rate of utilization occurred despite the greater likelihood that they would miss or cancel scheduled appointments. Thus, the problem drinking group actually showed a _lower_ propensity to follow through on treatment.[20] Further, once a given type of health-related problem was diagnosed, the problem drinkers did not attend more frequently for that problem than did the control patients. Thus, if the overall differences on frequency of utilization are attributable to a greater propensity to seek medical attention rather than a poorer health status, this propensity is restricted to initial contact for diagnosis and confirmation of the health problem rather than for ongoing treatment.

Thus, the evidence indicates that problem drinkers constitute a special group of patients with a higher than expected rate of consultation that is probably due to their poorer psychosocial and physical health status. Since the prevalence of problem drinking is high in the physician's caseload (10-20%), and a high rate of consultation is associated with alcohol problems, this patient population deserves special attention by medical practitioners and educators. The higher rate of consultation should provide

----

20

 This finding may contribute to the clinical impression that
 problem drinkers are less frequent attenders.

incentive for the medical profession to make more determined interventions to reduce alcohol consumption and thereby improve the physical, emotional and social well-being of these patients. The results of this study, and suggestions from previous research (Roghmann et al., 1981) show that the more severe the problem drinking, the greater the impact on utilization. This supports the call that is being made repeatedly in the literature for general practitioners to implement systematic case-finding procedures for problem drinkers in an attempt to identify alcohol abuse as a problem area before it progresses to the point of severe alcohol dependence and concomitant physical debilitation (e.g., Skinner et al., 1981). Early stage problem drinkers are more likely to achieve a successful treatment outcome (Ogborne, 1977; Miller & Joyce, 1979) and are the preferred target group for low-cost, behaviourally oriented treatment delivered in a family practice setting or elsewhere (e.g., McIntosh & Sanchez-Craig, 1984).

The need for medical practitioners to more actively detect alcohol abusing patients and to implement appropriate treatment is currently being reviewed by the Canadian Medical Association.[21] This evaluation is undertaken in the

----

21

Carbonetto and Battista (manuscript in preparation). Information concerning the current status of this work may be obtained from Dr. C. Carbonetto, Department of Medicine, Division of Clinical Epidemiology, Montreal General Hospital.

context of the review of the status of all screening and
case-finding methods appropriate for periodic health
examinations (Canadian Task Force on the Periodic Health
Examination, 1979; Goldbloom & Battista, 1986). In the
past, the abuse of alcohol has been given a low rating as a
priority for active case-finding, in part due to the lack of
diagnostic procedures but also to the lack of evidence for
the efficacy of the interventions that would follow case
detection. Research in recent years has produced a range of
case-finding procedures appropriate for the primary health
care setting (e.g., Skinner et al., 1981; Holt et al.,
1981; Babor et al., 1986). In addition, research evidence
showing positive benefits from fairly low cost interventions
is now accumulating (Edwards & Orford, 1977; Edwards et al.,
1977; Kristenson et al., 1983; Chick et al., 1985; McIntosh
& Sanchez-Craig, 1984).

Since problem drinkers have comparatively high rates
of contact with their physician, treatment efforts should be
aimed at making improvements in a wide cross-section of life
areas and ultimately a decreased rate of health care
consultation. Research at American Health Maintenance
Organizations that showed that problem drinkers constituted
a special sub-group in the patient population with high
rates of consultation (Putnam, 1982a), was used to justify
the funding of outpatient treatment programs in the HMO.

The effects of treatment on subsequent utilization of HMO services were evaluated (Putnam, 1982b) and showed treatment to be associated with a decline in use of HMO services. Furthermore, failure to participate in treatment was associated with an increase in the use of services. A significant reduction in utilization and medical costs following treatment for alcoholism provided by an HMO was also observed by Reiff et.al. (1981) and Sherman et al. (1979). The reduction in medical costs remained after the cost of alcoholism treatment was taken into account, thus justifying the provision of treatment with the "cost-offset".

Differences in the nature of the health care delivery system inhibit strong generalizations from these American studies in HMO's, to the "cost-offset" likely to be achieved by providing treatment in ambulatory health care settings in Canada. The data from the present study in Canadian family practice provides justification for further research to determine whether the high rate of utilization of the family physician by problem drinkers can be reduced through the provision of treatment in a community setting or by specialized low-cost interventions provided within the medical practice itself.

Treatment strategies that are appropriate for family practice range from basic bibliotherapy (Miller & Taylor,

1980), to behavioural self-control strategies with one or two structured counselling sessions with the doctor or a trained nurse (McIntosh & Sanchez-Craig, 1984; Chick et al., 1985), to the use of a microcomputer to undertake a full lifestyle assessment and provide structured feedback and advice (Skinner et al., 1985). For cases who are seriously alcohol dependent and who lack social support, referral to specialized assessment and/or treatment facilities is recommended.

These various strategies for treatment, either within the medical practice or in the community, differ widely in terms of cost and resource allocation. Research showing that treatment results in patient improvement, as well as a decline in primary health care consultations and costs, would support the funding of treatment programs that are able to achieve the largest cost-offset. Such research may also support the funding of training initiatives for family practitioners and residents in family medicine in the use of case- finding procedures and brief interventions.

The results of this study have three main implications for the planning of this next stage of program development and research. First, since the higher prevalence of family/social/ marital problems, mental health problems and accidental injury were the main factors responsible for the higher rate of consultation among the

problem drinkers, treatment interventions must have an impact on these problem areas if a major decline in utilization is to be effected. There is recent evidence that the improvements in the mental health status of problem drinkers who have become abstinent is a lengthy process with slow progress made over a period of several months and up to five years (DeSoto et al., 1985). It is also often stated that family tensions initially increase when a problem drinker becomes abstinent and family members must re-orient themselves to his/her return to family decision-making and other activities (e.g., Steinglass, 1982; Arentzen, 1978). Thus, there may be no short-term decline, or perhaps even a short-term increase, in the utilization of the family physician for counselling concerning family and social relationships. The implication for the planning of impact studies in family medical practice is that they be planned to cover at least a two year follow-up and, if resources permit, up to a five year follow-up period.

Second, the doubling in the frequency of doctor-patient contacts was a robust finding across the various sub-groups examined in this study suggesting that the objective of reducing the utilization of the family physician through treatment interventions would be a viable objective for all sub-groups of problem drinkers. There was a trend towards one exception to this pattern, and it may be
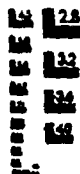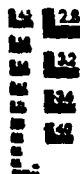
an important exception. The effect of problem drinking on
the rate of utilization appeared to be the lowest for the
sub-group of patients with the highest level of patient-
physician contacts. Cases and controls from the lowest
social strata differed, on average, by only 1.6 visits per
year with each group averaging around 5-6 visits per year.
There were several patients on public assistance, in both
the study and control group, who had over 20-30 visits to
the medical centre per year.

The characteristics of these patients matched closely
the characteristics of patients who have been variously
described in the research literature on "high attenders",
"multi-problem patients", or patients with "fat files"
(e.g., Browne et al., 1982). These low-income patients were
often single/separated women, with one or more dependents
and usually receiving family benefits, city welfare or
disability pensions. They tended to present most often to
their physician for chronic emotional problems,
social/family dysfunction, as well as physical illness. For
such multi-problem patients, the extra contribution of
alcohol abuse appears to be lower than among other groups of
patients. Thus, efforts to persuade family practitioners to
engage in program development and research in the area of
alcohol abuse should not be based on an argument that
treatment will necessarily have a large impact on the

utilization behavior of those patients that stand out in their mind as being the chronic high attenders in the practice. It might well be this sub-group of problem drinkers that will be least affected by interventions concerning their use of alcohol.

Third, in addition to sub-group differences such as observed for the lowest income patients, the planning of future cost-offset studies in Canadian family practice must recognize important individual differences. For example, the data showed extremely high variability in the influence of alcohol abuse on rates of utilization, especially for female patients. Although, in general, the study group of problem drinkers _averaged_ twice as many visits as their matched controls, there were several instances of extreme variation from this norm (e.g., differences between matched pairs of problem drinkers and controls of 20-30 visits per year). This variability would have to be taken into account in planning future studies. Clearly, if female problem drinkers were to be included in the study, much larger samples would be required than if only males were eligible for inclusion. The high individual variability and potential difficulties involved in obtaining large samples within one medical practice, suggest the need to consider multi-site studies. This may entail possible problems in the standardization of patient identification and treatment.

Interview data should also be collected from the patients themselves in order to link changes in utilization behavior to changes in drinking behavior (e.g., binge versus daily drinking, in-home versus out-of-home drinking).

6.2 Nature of the problems diagnosed by the physician.

The research was aimed at the specific question as to "whether there are particular kinds of health-related problems which distinguish the clinical record of problem drinkers and, secondarily, how well these problems would perform as indicators of alcohol abuse in a case finding checklist?" The results showed that the problem drinkers presented with a much more heterogeneous range of morbidity than their matched controls, with a significantly higher prevalence noted for ten of 22 diagnostic categories - neoplasms, endocrine/nutrition/metabolic, mental health, drug abuse (including tobacco), respiratory, digestive, skin/subcutaneous tissue, signs/symptoms/ill-defined conditions, injuries/adverse effects and social/marital/ family problems. On the basis of a multivariate analysis adjusting for the inter-correlation of the various categories of health-related problems, three of these sets of problems independently distinguished the problem drinking group - digestive disorders, social/marital/family functioning and accidental injuries. Exploratory analyses

with different demographic sub-groups suggested a high degree of consistency in this profile of morbidity. The one exception was a significantly lower risk of traumatic injury among problem drinkers of middle to upper social strata.

The wide range of problems and disabilities shown in this study for the problem drinking group has been consistently observed in previous research (Putnam, 1982a; Buchan et al., 1981). These previous studies conclude with recommendations for physicians to be particularly sensitive to this profile of morbidity as an aid in detecting alcohol abuse in other patients. The common pathologies displayed by the problem drinkers in this and other research, do suggest that the clinical record provides a rich source of information that could aid in case-finding. However, no systematic attempt has previously been made to determine how well a problem checklist that is based on these general categories of health-related disabilities might perform. Further, how might such a problem checklist complement other case-finding procedures available to the busy family practitioner?

The results of a re-classification of the problem drinkers and their controls based on the presence or absence of a problem within any one of the ten major categories were not particularly encouraging. Just being attuned to the presence of any one of these types of problems would be of

little diagnostic value because of the low level of specificity associated with this criterion (20.4%). Even when problems in two or three of the ten areas were required for a prediction of problem drinking status, sensitivity and specificity were still in the low-moderate range (77.8% and 65.7%, respectively).

Further analyses showed that a short list of three key problem areas (social/marital/family problems, digestive problems and accidental injury) provided results of the greatest clinical utility. A brief checklist based on these problem areas is shown in Figure 2. If two of these three problem areas were present in the clinical record, a positive predictive value of 47.5% could be obtained in a medical practice where the prevalence of problem drinking was 20%.

It is important to note that it would not be useful to include the frequency of contact with the physician as an additional indicator of alcohol abuse. Multivariate analyses showed that consideration of the past overall rate of contact would be of little diagnostic value beyond that inherent in the nature of the health problems diagnosed during previous contacts with the patient. This contrasts, for example, with a similar type of checklist recommended to physicians for detecting female patients with "recurrent abnormal illness behavior" (Deighton, 1985). In that study,

Figure 2.   A brief checklist of health-related problems for identifying 183
problem drinking patients.[1]

Is there notation in the clinical record
that during the past two years:

		YES	NO
(1)	the patient has presented for traumatic injury	☐	☐
(2)	the patient has presented with a disease of the digestive system[2]	☐	☐
(3)	the patient has presented with social, marital or other family dysfunction	☐	☐

----

[1] A positive response to any two of these health-related problems carries at least a .95 probability that patient is a problem drinker. (Sensitivity = 47.2%, Specificity = 87.0%. Positive predictive value = 47.5% if prevalence = .20).

[2] Physicians would be advised to disregard signs or symptoms of digestive problems which have not been related to an underlying organic condition (e.g., abdominal pain).

frequency of clinic attendance (two or more visits per year) was an independent predictor of this syndrome.

Table 26 lists some alternative case-finding methods that have been recommended for family practice and their corresponding levels of sensitivity, specificity, and predictive value.[22] Considering these alternatives, how could the brief problem checklist shown in Figure 2 best be utilized? First, the level of predictive value is sufficiently high to warrant its use if none of these alternative methods were going to be used. Its use would be justified because there are no costs involved and the patient's history is going to be reviewed in a general way regardless of a systematic search for undetected alcohol abuse. Given the low cost in time and effort, there would seem to be little justification for not being particulary sensitive to previous consultations for accidental injury, digestive disorders, and social/family dysfunction.

The checklist may be useful in reviewing the chart of a puzzling case where alcohol abuse has not been ruled out and it may be a cost-efficient way to form an initial opinion on a new patient whose records have been forwarded. If problems in two of the three areas are evident this should immediately raise a "red flag" with respect to excessive drinking. A suspicion initially generated in this manner

---

22

Appendix H shows the specific items of the CAGE, SMAST, Alcohol Clinical Index and Trauma Scale.

TABLE 26. Sensitivity, specificity and positive predictive value of various case finding procedures useful for the detection of alcohol abuse in family practice.[1]

PATIENT POPULATION	SENSITIVITY	SPECIFICITY	POSITIVE PREDICTIVE VALUE
Psychosocial Questionnaires			
Cage Questionnaire (a)[2] — General Practice (U.K.)	84%	95%	81%
(b)[3] — Psychiatric Inpatients (U.K.)	91%	77%	50%
Short Michigan Alcoholism Screening Test[1] — Psychiatric Inpatients (U.K.)	89%	89%	67%
Clinical Index/Medical History			
Trauma Scale[4] — General Practice (Can.)	67%	70%	36%
Alcohol Clinical Index[5] — Alcoholism Outpatients and General Practice (Can.)	89%	92%	74%
Laboratory Tests			
Gamma-Glutamyl Transferase[6] — General Practice (Can.)	33%	89%	43%
Mean Corpuscular Volume[6] — General Practice (Can.)	25%	94%	51%

[1] Calculation of positive predictive value were made with hypothetical population of 1000 patients where the prevalence of problem drinking equals 20% (see Appendix I for method of calculation)

[2] King, 1986. Cut-off on the CAGE was positive response. Alcohol abuse defined as "at risk" consumption over eight standard drinks per day)

[3] Bernadt, 1982. Cut-off on the CAGE was 2 positive responses, for SMAST cut-off was 6 positive responses. Alcohol abuse defined by diagnosis of alcoholism by standard psychiatric criteria

[4] Skinner et al, 1984. Cut-off on the Trauma Scale was a positive response to two or more of the five items. Alcohol abuse was defined by drinking over 60 g absolute alcohol daily (about four standard drinks per day)

[5] Skinner et al, 1986. Cut-off on the Alcohol Clinical Index was a positive response to four or more of the clinical signs or medical history items. These values for sensitivity and specificity were obtained on the basis of the discrimination of alcoholics in outpatient treatment from family practice patients

and supplemented by straight-forward questions concerning current and past drinking practices may then lead to a problem drinking diagnosis. Thus, with a relatively unsystematic application, the problem checklist could be a diagnostic aid if used as an initial screening tool.

Although checking for past problems in these three key problem areas would be better than having made no purposive investigation into potential alcohol abuse, it would be highly inefficient for this to be the only strategy employed for case finding in a medical practice. Family practitioners should recognize that a variety of other brief, low cost procedures are now available for this purpose (see Table 26 and reviews by Skinner et al., 1981; Holt et al., 1981, and Babor et al., 1986). If the problem checklist were the only case-finding procedure to be used, its low sensitivity would result in a very large number of cases being missed. If used in conjuction with one or more of the other procedures, its overall predictive value could be increased but sensitivity would be even lower than if it alone was used. Sensitivity would be lower because positive results on this checklist and positive results on another criterion would both be required for a problem drinking diagnosis. This will increase the number of cases missed.

Since initial screening tests should have high sensitivity, it would be preferable to use only one

procedure and the problem checklist would not be the best of all available alternatives. Based on available data, the CAGE questionnaire (Mayfield et al., 1974) or the Alcohol Clinical Index (Skinner et al., 1986) would be more appropriate choices for initial case-finding, followed up with laboratory tests to help rule out false positives. Thus, despite its low cost and easy implementation, the problem checklist would probably make little contribution to systematic, sequential case-finding, above and beyond that obtained with other methods.

Finally, it should be noted that whatever the means of case-finding the physician must still confront the patient and attempt to break through the denial so characteristic of this patient population. The results of laboratory tests can be useful aids for confronting the patient because they have the appearance of objectivity and can be linked to the patient's level of physical functioning. However, with a suspicion of alcohol abuse that is also grounded in the clinical record, the range of problems that are apparently linked to the excessive use of alcohol can also be pointed out. This may be of some assistance in breaking through the patient's denial, if he/she can see how the alcohol has touched on such a diverse range of bodily and social systems.

6.3   Nature and extent of utilization by family members.

6.3.1 Utilization by the spouses.

It is generally acknowledged that the harmful effects of alcohol abuse are not restricted solely to the heavy drinker, but extend to other family members as well. In recognition of this factor and because of the legitimate concern in family medical practice for the treatment of the entire family system, the following research question was posed: "Are spouses of problem drinkers in more frequent contact with their family physician than matched controls and do they present with different types of health-related problems?"

Research has shown that the severity of the drinking problem and the number of negative life events associated with the excessive drinking (e.g., job loss) are related to the level of psychiatric distress experienced by the co-habiting spouse (Steinglass, 1981; Moos et al., 1982). Although the mediating factors are unknown, alcohol abuse is also closely associated with family violence (Gayford, 1975; Orford et al., 1975).

If spouses of problem drinkers are more emotionally distressed and more likely to experience trauma at home, one would expect that they would be more frequent users of primary health care services. Studies examining this issue have, however, yielded inconsistent results. Roghmann et

al. (1981) observed 20% _lower_ rates of utilization among family members of either diagnosed alcoholics or a group of "high-risk" cases. Roberts and Brent (1982) reported 49% _higher_ levels of use, especially for reasons of trauma and for 'what the authors considered to be "stress-related" problems (e.g., psychosocial problems, abdominal disorders). In neither of these studies where the results for spouses analysed separately from other family members, although the age breakdown provided by Roghmann et al. (1981) showed no effects of problem drinking for family members in either the 24-44 or 45-64 age ranges. Presumably the large majority of the individuals in these age ranges were spouses, as opposed to the children of the problem drinking cases. Buchan et al. (1981) reported a small (27%) increase in the frequency of physician visits by spouses of problem drinkers, this difference being due primarily to more common family, psychiatric and circulatory problems.

The results of the present research parallel closely those obtained by Buchan and colleagues in their family practice in Great Britain. In the present study, a 23% increase in utilization was evident, a difference which was of borderline statistical significance at the five percent level. There was a clear tendency for a larger increase in utilization for spouses of those problem drinkers who were classed as alcohol dependent, but this interaction with

problem severity failed to reach statistical significance. In terms of the types of problems diagnosed by the family physician, mental health and family/marital dysfunction were more common among the problem drinking group than the control spouses. Expected differences in terms of traumatic injury, digestive disease and vague signs/symptoms were not evident.

When the results of the present research are considered in the context of previous findings, they clearly suggest that, for the spouses of problem drinkers; there are no large increases in the utilization of the family physician that can be attributed to alcohol abuse in the family. Certainly none of the studies show the doubling in visit frequency that is associated with the problem drinker.

It is appropriate to consider why the expected differences in utilization have not typically been observed in this line of research. Roghmann et al. (1981) speculated that the spouses of problem drinkers may well be in poorer physical and emotional health as a consequence of the high level of stress in the family, but that these spouses may be less likely to seek care from a health care provider. They cautioned, therefore, about the possible under-utilization of health care services by spouses of problem drinkers.

In the context of this research, there was no definitive test of the hypothesis that the spouses of

problem drinkers were less likely to seek care despite a poorer health status. There was, however, some indirect evidence of a lower predisposition to seek care from the family physician. There was a tendency towards a higher rate of no-shows/cancelled visits for the spouses of problem drinkers, a difference even more evident for the spouses of the cases at the highest level of severity. In addition, there was significantly higher use of local emergency services by the female spouses of the problem drinkers. This finding was also observed by Buchan et al. (1981). It is reasonable to at least speculate that the tendency for more frequent no-shows/cancelled appointments and the more frequent use of local emergency services are signs that the spouses of problem drinkers may be avoiding their family doctor at times when care is really needed.

6.3.2 Utilization by the children.

The final question that was addressed extended the research beyond the spouses of the problem drinkers to look separately at the potential effects on the utilization of the family physician by children living in the same home. Specifically, are children of problem drinkers in more frequent contact with their family physician than control children and do they present with different types of health-related problems?

A small number of empirical studies have indicated that children from problem drinking families are more likely to experience psychosocial problems, in particular, behavioral problems in school, depression, low self-esteem and delinquent behavior (e.g., Herjanic et al., 1977). A higher prevalence of physical symptoms which may be psychosomatic in nature has also been reported (e.g., headache, fatigue, abdominal pain, shortness of breath, sleep disturbances (Nylander, 1960; Schneiderman, 1975; Biek, 1981)). It is also fairly well established that these children are at high risk of trauma due to child abuse and neglect (Mayer & Black, 1977).

Many confounding and mediating factors undoubtedly exist in this area of research. However, on the basis of available research, it is reasonable to expect more frequent use of the family physician by children with a problem drinking parent and further, that they will be more likely to have diagnoses for trauma, mental health, and social problems and vague signs/symptoms of ill-health.

In this study the comparisons of the children of problem drinkers to the children of matched control patients revealed virtually no differences between the groups as a whole on any of the variables related to the utilization of the family physician. There was clearly no differences in the frequency of utilization. There was tendency for a higher prevalence of psychosocial problems, but this was

offset by a tendency for a lower likelihood of visits for preventive reasons. There was an interaction with child's age, with the children of the problem drinkers in the 6-11 age range having 43% more frequent contacts and more common mental health problems and social/family dysfunction.

The findings for the overall groups of children are identical to those obtained by Buchan and colleagues in their British study (Buchan, personal communication, 1986). The results for the children involved in their research are not available in published form, so it is unknown if there was any evidence showing differential effects for any specific age group. Roghmann et al. (1981) observed that for family members of either diagnosed alcoholics or high risk cases 'there was about a 19% lower rate of utilization for all children under the age of fifteen combined. Roberts and Brent (1982) found higher rates of utilization among family members, but only for females. As noted previously, the data for the children were not separated from that of the spouses. In their study, however, the median age of the male family members was 14 and that of the female family members was 30. Thus, it is clear that the results for the females as a group were heavily weighted by the female spouses. There may, therefore, have been little if any difference among the children.

When the results of the present research are viewed in the context of these earlier studies, the weight of the evidence suggests that, as a group, children of problem drinkers do not present more frequently to their family doctor. Neither is there strong evidence that, as a group, they are more likely to be diagnosed with mental health problems, social/family dysfunction, traumatic injury or vague signs/symptoms of ill health, all of which have been stated as being characteristic of these children (e.g., Biek, 1981). When compared to matched control children these expected differences are not evident in the context of family medical practice.

The results for the sub-group of children aged six to eleven may point to greater vulnerability of children in this age group with a problem drinking parent. Chafetz (1979) has noted that parental alcohol abuse may be more damaging for children in this age range because they are often deprived of normal friendships and role models, and these years are particularly important for socialization and peer relationships. However, Herjanic et al. (1977) found that children aged six to eleven with a problem drinking parent were less likely than an adolescent group to experience problems at home, at school or with peers. In the present study, no difference between children of problem drinkers and controls was observed for any other sub-group.

The consistency of these results suggests that the observed interaction with age could be a spurious finding. Strong conclusions would not be warranted on the basis of these data alone and future research should continue to explore age differences in the effects of parental alcohol abuse.

At present, one can only speculate as to the reasons for the close similarity in the two overall groups of children. It is possible that the effects of familial alcohol abuse on children living at home have been overstated due in part perhaps to the selected study of either children of severe alcoholics who are in treatment, or to the study of children who are themselves drawn from treatment or correctional settings. Jacob and Leonard (1986) have recently studied children of problem drinkers in a community sample and found that although they did have more behavioral problems than control children, only a very small proportion approached levels of clinical impairment. Thus, psychosocial problems of the majority of children involved in this research may not have been severe enough to bring them to the attention of the family physician.

The matching process in this study may also have diminished group differences. Moore (cited in Jacob, 1986) has recently proposed a theoretical model whereby factors such as the quality of the parent-child relationship, and the consistency of parental supervision are primary

determinants of child outcome. These main factors are thought to be disrupted by other secondary factors such as excessive drinking but also marital conflict, family crisis, social isolation, and unemployment. These represent a complex array of potentially confounding and mediating variables. In the present study, the families from which the two groups of children were drawn were matched on social position and family living arrangements, which in many instances involved spousal separation. This matching may have indirectly controlled for group differences on some of the above factors. If the association between alcohol abuse and psychosocial problems in the children is mediated by such factors as family crisis or marital conflict, then having indirectly controlled for these variables could at least partially account for the lack of differences between groups. It would still be reasonable to expect, however, that a trend in the data towards higher utilization and more psychosocial problems would remain, since factors such as family breakdown do not appear to be necessary conditions for maladjustment of children living with a problem drinking parent (Schuckit & Chiles, 1978).

The lack of differences between the groups of children could also be a function of differential help-seeking behavior on the part of the children and their parents. Perhaps the children were indeed more emotionally

and socially impaired, but the parents avoided bringing them into contact with the family doctor for such psychosocial difficulties. Such problems as acting out at school, truancy, or other behavioral difficulties may not be perceived as being legitimately in the domain of the family physician. There was a trend for a lower proportion of visits for prevention (i.e., annual health exams, innoculations) in the children of problem drinkers and this may signal a greater reluctance on the part of the parents to seek care for their children. There was, however, no evidence of a higher rate of no shows/or cancelled visits or a higher rate of use of the local emergency departments, two factors which may also have signalled an avoidance of the family doctor.

Finally, it is possible that the physicians are not sufficiently sensitized to the effects of parental alcohol abuse and thus may be failing to identify and deal with emotional, social and behavioral difficulties that may underlie what appear to be routine office visits. Selected case materials indicate that this may have been the case for at least some of the children in the problem drinking group. In one case, after a six year history with the medical centre a long-standing incestuous relationship between an eleven year old patient and her alcohol dependent father was discovered. Up to this point in time no evidence of any family difficulties was noted in the child's chart.

In another instance, a 16 year old patient, whose family had been registered in the practice for about 15 months, visited for a sore throat and became very upset that he couldn't have received an appointment earlier. Further enquiry revealed that dad was "yelling at him a lot" and "putting too much pressure on him regarding school." In this case, it was the mother who was severely alcohol dependent. She was described by the child as "O.K.", at which point the child refused to talk any more about home. On the next visit, any further problems at home were flatly denied.

Thus, there was at least some anecdotal evidence that emotional and family difficulties may occur for some time without the physician being aware of them. Given the clinical evidence that problem drinking families are shrouded in secrecy and denial (Wegsheider, 1981), it is unreasonable to expect that physicians would always be aware of dysfunctional family relationships.

6.3.3 Implications of the data concerning the family members

First, the results of this study suggest that the existing clinical record of spouses and children of problem drinkers would not be particularly useful aids in the detection of alcohol abuse in other families. The families of problem drinkers were very similar to the matched

controls on the health-related problems diagnosed during their contacts with the physician. The only exceptions were the higher proportion of the spouses, and the children between the ages of 6-11, presenting with mental health problems and social/family/marital dysfunction.

In a very general way, the notation of these problems in a family medical file may serve as an additional indicator to the physician that alcohol abuse is a contributing factor to the family's health care consultation. However, the systematic development of case-finding tools derived from the existing clinical record does not seem justified. Other case-finding methods which rely on the patient's self-reporting of medical symptoms and psychosocial functioning have been developed for children of problem drinkers (Biek, 1981; Jones, 1982). Although these methods have not yet seen widespread application, physicians in family practice or other specialities such as pediatrics would be advised to adopt these methods for case identification if they wish to implement regular case-finding for these children.

Second, on the basis of the present data, the need for therapeutic interventions aimed at family members is not as strongly indicated as for the problem drinkers themselves. Certainly it would not be appropriate for counselling or educational initiatives delivered in the

context of family medicine to be targetted at an eventual reduction of an unusually high rate of use of the family physician. It's important to reiterate, however, that the present results examine the utilization of health care services by the family members and do not necessarily reflect their actual emotional or physical health status. Therefore, the predominantly negative findings should not be interpreted as strong evidence that such therapeutic programs are not needed by at least some individuals.

The worldwide network of Al-Anon and Al-Ateen and the recent development of specialized services for children of problem drinkers (Hawley & Brown, 1981) suggest that there is a need for advice and support to family members. Indeed, in Canada and the United States, national associations for the children of alcoholics have recently formed. However, this international movement has grown rapidly despite the lack of empirical research which documents the actual contribution of alcohol abuse versus other factors in the family environment which can also contribute to poor childhood adjustment. Prospective studies aimed at delineating the relative contribution of alcohol abuse are clearly needed. Until more definitive data are available from such prospective studies, the predominantly negative findings from this research will contribute to the ongoing debate regarding the special status to be accorded to parental alcoholism as a major contributor to childhood dysfunction.

6.4   Limitations of the study.

6.4.1   Generalizability

There are two assumptions which underly research of this nature and which concern the generalizability of the findings. It is first assumed that medical practices which are used for the training of residents in family medicine do not differ substantively from non-teaching practices on variables related to the research questions. There are several features of the centres used in this research that distinguish them from non-teaching practices. For example, patient appointments are scheduled every 30 minutes compared to 15 minutes which is the norm for most medical centres. A comprehensive intake is undertaken which emphasizes life-style risk factors as well as medical/social history. Also, the "whole person" approach to medicine is fundamental to the training of residents (McWhinney, 1981), and this receives constant emphasis in the day to day management of patients. Given these factors, the full-time physicians and residents may take more initiative and have more opportunity to identify and treat psychosocial problems than is generally the case in non-teaching facilities. Counter-balancing these factors, however, is the turnover in the residents every six to twelve months. This lack of long-term continuity between patient and physician could restrict the detection of psychosocial problems. At

present, it is not known to what extent these differences in the nature of patient care may limit the generalizability of the results to private family practice.

The second assumption concerning the generalizability of the findings is that the problem drinkers employed in the research are representative of those in other family practice settings. A point prevalence estimate of 15.8% was obtained for the medical practice contributing most of the cases to the research. This estimate is consistent with research in a teaching practice in Toronto (e.g., Skinner et al., 1984) and a non-teaching practice in a rural area of Southwestern Ontario (Malla & Mersky, in press). A prevalence estimate was not possible for the second practice because inactive cases had not been routinely removed form the patient register. The absolute number of cases identified in the practice was 43 and this suggests prevalence was somewhat lower in this centre. Demographically, a male to female ratio of 2.3:1 for the total sample compares favourably to the ratio of 2.1:1 obtained in Malla's research (Malla & Mersky, in press). Also, the cases in the present study are of only a slightly younger age ($\bar{x}$=39.4 years compared to 42.1 years).

The slightly younger age of the problem drinkers in this study was due to the exclusion of cases who were married or living in a common-law relationship with another

problem drinker. Although the results cannot be generalized to this sub-group of problem drinkers, a review of the medical files of these families by the author suggested a similar profile of diagnoses and very frequent utilization. However, an important consequence of the exclusion of these families is that the results for the children of the problem drinkers also cannot be generalized to families where both parents abuse alcohol. It is likely that children living with two problem drinking parents, compared to those living with one such parent, would be more psychosocially impaired (Jacob & Leonard, 1986; McKenna & Pickens, 1981; Williams, 1982).

6.4.2 Validity

In addition to these limitations on the generalizability of the study there are methodological and measurement issues which may affect the validity of the conclusions.

Problem drinkers and controls were matched on the basis of social position and living arrangements, and this may have affected the magnitude of the differences between groups. Social position was coded according to patient's occupation rather than education or family income which was not noted in the patient records. The coding of living arrangements was based on the presence or absence of a

co-habiting spouse in order to obtain a matched sample of spouses. For those who were not living with a spouse, this was due to separation, divorce, or death for about 57% of the problem drinkers and 51% of the · controls. Both occupational status and family breakdown (i.e., separation/ divorce) can be considered as consequences of heavy drinking as well as potential confounders. If social position and family breakdown mediate the association between problem drinking and utilization of the family physician, the strength of this association would be diminished by their being used as matching variables. Thus, the large differences that were obtained in the utilization data may underestimate the actual effect of problem drinking. Moreover, along this same line of reasoning, this matching process may have contributed to the lack of substantive differences between the two groups of spouses and the two groups of children.

The retrospective nature of the selection of index cases and controls necessitated a reliance on existing documentation at the medical centres for recording status of the patients regarding problem drinking and intrapersonal (i.e., mental health) problems. This is a common difficulty in retrospective cohort studies where the determination of "exposure" must be based on existing records. There may be problems with the validity of the physicians' coding, given

a lack of consensus among medical practitioners on what constitutes an "alcohol problem" (Thom & Tellez, 1986). Further, as noted in Chapter 3 concerning the method of research, the broad classification of "intrapersonal" problems includes both state and trait psychiatric conditions and different results may have been obtained if these two general types of conditions could have been separated in the analysis.

These concerns notwithstanding, the physicians at the participating centres received training in the use of the patient classification system. Further, the quality of their intake assessments and case notes were closely supervised by full-time physicians who were involved in the development of the classification system. The description of the alcohol and intrapersonal problems noted in the charts indicated that the coding of patient status had a high degree of face validity. Steps were also taken to rule out false negatives in the control group. Finally, in epidemiological research, evidence of a "dose-response" relationship with problem severity increases confidence in the validity of the classification of subjects on the exposure variable. Such evidence was obtained in this research.

An important issue related to these concerns about the detection and coding of problem drinking is the extent

to which detected and undetected cases are similar in utilization behaviour and presenting health-related problems. There is some research evidence concerning potential differences between undetected and detected cases, but the literature is far from definitive. For example, a study of alcoholics in treatment found that those whose drinking problem was not known by their family physician tended to be women and to be from higher socioeconomic strata (Bulmer, 1980). Results of the present research showed that the differences between problem drinkers and controls on traumatic injury were significantly smaller for patients drawn from the upper levels of social strata. Thus, if undetected cases tend to be from a higher social strata, then the ability of a history of traumatic injury to identify new cases of problem drinking may be somewhat over-estimated. Additionally, a history of acute gout may be somewhat understated as a key indicator of alcohol abuse in this study, since it was restricted almost exclusively to problem drinkers from the higher social strata.

It is unknown if detected and undetected cases differ in quantity, frequency or pattern of alcohol consumption, or whether they suffer more serious alcohol-related disabilities. Hingson et al. (1982) found that among problem drinkers in a community sample who had contact with physicians, those asked or counseled about their drinking

did not have problems more serious than those who were not asked about their drinking. It is unknown if these results would apply to the present study.

It would seem reasonable to speculate that physicians would be more likely to miss the diagnosis of problem drinking in an early stage case experiencing few alcohol-related disabilities than with someone who is severely alcohol-dependent and suffering debilitating physical disease. To the extent that the detected cases are more severe problem drinkers than the undetected, the use of the morbidity profile to identify new cases may overemphasize health-related problems characteristic of the late stage problem drinker. That this is not a major problem in the study is indicated by the fact that it was the psychosocial dysfunction and traumatic injuries rather than late stage organic complications (e.g., liver cirrhosis) which primarily distinguished the problem drinkers. Psychosocial problems and trauma are characteristic of the early stage case (Skinner et al., 1981).

It is also reasonable to speculate as to whether the frequency of attending the physician could potentially be related to case identification. If so, the detected cases used in this research would be observed to be higher utilizers, but only through circular logic. Analyses showed, however, that the large majority of cases were

identified within the first few visits following registration at the centre. This was also found in a similar research study (Roberts & Brent, 1982). In addition, data analyses showed that the number of visits prior to coding of the alcohol problem was not associated with the difference between cases and controls on frequency of utilization during the study period. Thus, frequency of visiting was not likely a "cause" of case detection.

The approximately 360 patient diagnoses that are coded with the ICHPPC manual were grouped into 23 broad categories for the data analysis. This breakdown was chosen to make the results as comparable as possible to previous research (Roberts & Brent, 1982). A more detailed breakdown of the diagnoses may reveal additional relationships in the data and may provide a more useful index for case detection than the broader categories recommended in this research as indicators of problem drinking. For example, the group difference on "digestive disorders" reflected differences on dental caries, gingivitis, gastritis, peptic ulcer and esophagitis all of which may be independent predictors. Further analyses could explore associations with more specific diagnoses but would be restricted by the ratio of the number of variables to cases in multivariate analyses.

Due to its retrospective nature the study was also limited by the available size of the sample of identified

problem drinkers in the two participating practices and the correspondingly low statistical power associated with statistical comparison of sub-groups. Other medical practices in the London area could potentially have been included in the research but with corresponding limitations due to variation in the nature of the client records and patient classification. Resource limitations for coding and abstracting patient records also made a larger multi-site study prohibitive. Since previous research in this area has largely ignored sub-group differences, exploratory analyses with the smaller group size were thought to be warranted.

No attempt was made to determine the extent of utilization of physicians outside the medical practices in which the subjects were registered. Research at an academic family practice in the United States indicated that only 63% of the regular users of the practice considered it to be their usual source of care (Chatterton et al., 1982). Similar research has not been undertaken in a Canadian setting. There is no evidence to suggest that status as a problem drinker, or as a member of a family with a problem drinker, would be associated with unknown utilization of another family physician. Certainly there is no reason to believe that the control groups would be more likely to seek external care which would thereby account for their lower levels of usage. The study did not examine the extent of

referral to specialists.   As in any medical practice such referrals are often made, although again there is no evidence to suggest more frequent referral for the control patients.

6.4.3   Other conceptual and methodological limitations.

In addition to the above questions regarding the validity and generalizability of the research, the study is constrained by other conceptual and methodological limitations.   The study is concerned with the effects of problem drinking on co-habitating family members but the underlying assumption is that these effects are uni-directional.   This uni-directionality is implied in the "stress-victim" perspective whereby high levels of stress in the family are caused by excessive drinking and its negative consequences to work, income, family socialization etc.   In recent years a broader conceptual model of family interactions has been developed (Finney et al., 1983; Jacob, 1986) and this has proven to be a more fruitful grounding for research on dysfunctional families.   In particular, this model specifies the importance of bi-directional effects between the problem drinker and family members as well as the coping style of the spouse.   Although environmental stresses associated with excessive drinking do explain most of the variance in the physical complaints of the spouses (Finney et al., 1983),

these other factors are also important explanatory variables. Future research with a prospective design would allow such an interactional perspective to be brought to the research design.

·A prospective study would also have allowed for more standardized measurement of the severity of alcohol abuse as well as the determination of the level of alcohol consumption, duration of excessive drinking and typical drinking pattern (e.g., binge versus daily). Skinner's (1985) multiaxial classification of alcohol problems distinguishes among drinking history, alcohol dependence and alcohol-related problems, and provides a useful conceptual framework for incorporating variables related to the actual level and pattern of alcohol consumption into future research.

Finally, the study was limited in its ability to measure the magnitude of the effect of problem drinking on utilization behaviour, relative to other social-psychological determinants of the seeking of health care (e.g., social support, the perceived severity of illness, tendency for being introspective (Mechanic, 1986). There was some evidence that the high utilization by the problem drinkers themselves was more a reflection of a poorer health status than a greater propensity to seek care. However, in the context of this research there is no definitive test of this hypothesis.

With respect to the spouses and children who are living with a problem drinker, the need to study the actual health status separately from their utilization of the family physician is even more acute than with the problem drinkers per se. More research with a prospective design and multivariate approach to the data analyses would determine whether family members are not seeking the care that they may need from their family physician. Such research is especially needed concerning the children of problem drinkers given their increased risk of alcohol abuse in the future (Miller & Jang, 1977), and thus the major contribution the family physician may be able to make in breaking the inter-generational cycle of alcohol problems.

6.5 Conclusion .

Despite the above limitations to this study, the evidence is strong enough to warrant the conclusion that problem drinkers in a family medical practice are a special sub-set of the patient population characterized by more frequent contact with the physician and a characteristic profile of health-related problems. Given these findings and the prevalence of alcohol abuse in the patient population in the range of 10-20% (e.g., Hotch et al., 1983; Malla & Mersky, in press), more attention to this population by the medical profession is warranted. The family medical

practitioner is well-suited to play a key role in the
secondary and tertiary prevention of alcohol-related
problems. Many procedures for active case-finding have been
developed and the findings concerning the efficacy of low
cost, brief interventions have been encouraging. What is
needed now is a more concerted effort on the part of medical
practitioners and educators to incorporate this knowledge
and technology into medical curricula and routine practice.

REFERENCES

Adrian, M., & Laygee, N. (1986). Alcohol associated morbidity. In A. Carmi and S. Schneider (Eds.), Drugs and alcohol .(Medicolegal library series) (pp.166-183). Berlin: Springer-Verlag.

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders, Third Edition. Washington, D.C.: American Psychiatric Association.

Andrews, G., Tennant, C., Hewson, D., & Schonell, M. (1978). The relation of social factors to physical and psychiatric illness. American Journal of Epidemiology, 108(1), 27-35.

Arentzen, W.P. (1978). Impact of alcohol misuse on family life. Alcoholism: Clinical and Experimental Research, 2(4), 349-352.

Ashley, M.J., Olin, J.S., le Riche, W.H., Kornaczewski, A., Schmidt, W., Corey, P.N., & Rankin, J.G. (1981). The physical disease characteristics in inpatient alcoholics. Journal of Studies on Alcohol, 42(1), 1-14.

Ashley, M.J., Olin, J.S., le Riche, W.H., Kornaczewski, A., Schmidt, W., & Rankin, J.G. (1977). Morbidity in alcoholics: Evidence for accelerated development of physical disease, in women. Archives of Internal Medicine, 137, 883-887.

Babor, T.F., Ritson, E.B., & Hodgson, R.J. (1986). Alcohol-related problems in the primary health care setting: A review of early intervention strategies. British Journal of Addiction, 81, 23-46.

Bailey, M.B., (1967). Psychophysiological impairment in wives of alcoholics as related to their husbands' drinking and sobriety. In R. Fox (Ed.), Alcoholism: Behavioral research, therapeutic approaches (pp.134-144). New York: Springer.

Bashir, K.R., Smith, S.M., Bulmer, D.A., & Raman, S. (1982). The brief alcoholism rating scale: A new test for diagnosing. Canadian Family Physician, 28(May), 987-990.

Becker, M.H., & Maiman, L.A. (1975). Sociobehavioral determinants of compliance with health and medical care regimens. Medical Care, 13, 10-24.

Beland, F. (1982). The utilization of health services: Sequences of visits to general practitioners. _Social Science and Medicine, 16_, 2065-2072.

Biek, J. (1981). Screening test for identifying adolescents adversely affected by a parental drinking problem. _Journal of Adolescent Health Care, 2_, 107-113.

Bland, R., & Orn, H. (1985, October). _Lifetime prevalence of psychiatric disorders in Edmonton._ Paper presented at the annual meeting of the Canadian Psychiatric Association, Quebec City, Quebec.

Blishen, B.R., & McRoberts, H.A. (1976). A revised socio-economic index for occupations in Canada. _Canadian Review of Sociology and Anthropology, 13_(1), 71-79.

Bonham, G.S., & Wilson, R.W. (1981). Children's health in families with cigarette smokers. _American Journal of Public Health, 71_, 290-293.

Bowen, R.C., Cipywnyk, D., D'Arcy, C., & Keegan, D.L. (1984). Types of depression in alcoholic patients. _Canadian Medical Association Journal, 130_(April 1), 869-874.

Boyajy, T.B. (1978). _Alcoholism within prepaid group practice._ Washington, D.C.: Group Health Association of America.

Brennan, M., & Noce, A. (1981). A study of patients with psychosocial problems in a family practice. _The Journal of Family Practice, 13_(6), 837-843.

Brennan, M., & Spano, L. (1975). _The BJS patient profile card. A system of classification, registration and retrieval of patient data for family practitioners._ London: Victoria Family Medical Centre.

Brennan, M., & Spano, L. (1976). The BJS system: Recording and retrieving data for family medicine. _Canadian Family Physician, 22_(1064) 34-43.

Breslow, N.E., & Day, N.E. (1980). _Statistical methods in cancer research Volume 1 - the analysis of case-control studies._ (IARC Scientific Publications No. 32). Lyon: International Agency for Research on Cancer.

Brody, J.A., & Mills, G.S. (1978). On considering alcohol as a risk factor in specific diseases. American Journal of Epidemiology, 107(6), 462-466.

Browne, G.B., Humphrey, B., Pallister, R., Browne, J.A., & Shetzer, L. (1982). Prevalance and characteristics of frequent attenders in a pre-paid Canadian family practice. The Journal of Family Practice, 14(1), 63-71.

Buchan, I.C., Buckley, E.G., Deacon, G.L., Irvine, R., & Ryan, N.P. (1981). Problem drinkers and their problems. Journal of the Royal College of General Practitioners, 31, 151-153.

Bulmer, D.R. (1980). Pointers towards early detection of alcoholism. Canadian Family Physician, 26, 259-261.

Calsyn, D.A., Roszell, D.K., Walker, D., & O'Leary, M.R. (1983). Exploration of the relationship between frequency of illness, attrition from alcohol treatment, neuropsychological status and field dependence. Drug and Alcohol Dependence, 12(4), 363-369.

Canadian Task Force on the Periodic Health Examination. (1979). The periodic health examination. Canadian Medical Association Journal, 121(Nov. 3), 1193-1254.

Cantwell, D.P., & Baker, L. (1984). Parental mental illness and psychiatric disorders in "at risk" children. Journal of Clinical Psychiatry, 45(12), 503-507.

Casswell, S., & McPherson, M. (1982). The responses of a self-selected group of general practitioners to patients with alcohol-related problems. New Zealand Medical Journal, 95(July 14), 462-466.

Chafetz, M. (1979). Children of alcoholics. New York University Education Quarterly, 10.

Chafetz, M.E., Blane, H.J., & Hill, M.J. (1971). Children of alcoholics. Observations in a child guidance clinic. Quarterly Journal of Studies on Alcohol, 32, 687-698.

Chatterton, H.T., Clapp, N.E., & Gehlbach, S.H. (1982). Patterns of health care utilization in an academic family practice. The Journal of Family Practice, 14(5), 893-897.

Chick, J., Lloyd, G., & Crombie, E. (1985). Counselling problem drinkers in medical wards: A controlled study. British Medical Journal, 290(March 30), 965-967.

Classification Committee of WONCA. (1979). ICHPPC-2. International classification of health problems in primary care (1979 Revision). Oxford: Oxford University Press.

Cleary, P.D., Mechanic, D., & Greenley, J.R. (1982). Sex differences in medical care utilization: An empirical investigation. Journal of Health and Social Behavior, 23(2), 106-119.

Cork, M. (1969). The forgotten children. Toronto: Paperjacks (in association with the Addiction Research Foundation).

Deighton, C.M. (1985). Problem patients in general practice: Identifying young women with recurrent abnormal illness behavior. Journal of the Royal College of General Practitioners, 35, 466-470.

De Soto, C.B., O'Donnell, W.E., Alfred, L.J., & Lopes, C. (1985). Symptomatology in alcoholics at various stages of abstinence. Alcoholism: Clinical and Experimental Research, 9(6), 505-512.

Dohrenwend, B.S., & Dohrenwend, B.P. (Eds.) (1981). Stressful life events and their contexts. New Brunswick, N.J.: Rutgers University Press.

Dudley, D.L., Roszell, D.K., Mules, J.E., & Hague, W.H. (1974). Heroin vs alcohol addiction - quantifiable psychosocial similarities and differences. Journal of Psychosomatic Research, 18, 327-335.

Dutton, D.B. (1979). Patterns of ambulatory health care in five different delivery systems. Medical Care, 17, 221-243.

Edwards, G., Kyle, E., & Nicholls, P. (1974). Alcoholics admitted to four hospitals in England: I. Social class and the interaction of alcoholics with the treatment system. Quarterly Journal of Studies on Alcohol, 35(2), 499-522.

Edwards, G., & Orford, J. (1977). A plain treatment for alcoholism. Proceedings of the Royal Society of Medicine, 70, 344-348.

Edwards, G., Orford, J., Egert, S., Guthrie, S., Hawker, A., Hensman, C., Mitcheson, M., Oppenheimer, E., & Taylor, C. (1977). Alcoholism: A controlled trial of "treatment" and "advice". Journal of Studies on Alcohol, 38(5), 1004-1031.

El-Guebaly, N., Offord, DR., Sullivan, K.T., & Lynch, G.W. (1978). Psychosocial adjustment of the offspring of psychiatric patients: The effects of alcoholic, depressive and schizophrenic parentage. Canadian Psychiatric Association Journal, 23, 281-290.

Fine, E.W., Yudin, L.W., Holmes, J., & Heinemann, S. (1976). Behavioral disorders in children with parental alcoholism. Annals of the New York Academy of Sciences, 273, 507-517.

Finney, W.J., Moos, R.H., Cronkite, R.C., & Gamble, W. (1983). A conceptual model of the functioning of married persons with impaired partners: Spouses of alcoholic patients. Journal of Marriage and the Family, 45, 23-34.

Godkin, M.A., & Rice, C.A. (1981). Psychosocial stress and its relationship to illness behavior and illnesses encountered commonly by family practitioners. Social Science and Medicine, 15, 155-159.

Goldbloom, R., & Battista, R.N. (1986). The periodic health examination: I. Introduction. Canadian Medical Association Journal, 134(April 1), 721-729.

Haberman, P.W. (1964). Psychological test score changes for wives of alcoholics during periods of drinking and sobriety. Journal of Clinical Psychology, 20, 230-232.

Hawley, N.P., & Brown, E.L. (1981). The use of group treatment with children of alcoholics. Social Casework, 62(1), 40-46.

Herjanic, B.M., Herjanic, M., Penick, E.C., Tomelleri, C., & Armbruster, R.B.S. (1977). Children of alcoholics. In F. Seixas (Ed.), Currents in alcoholism, Volume II (pp.445-455). New York: Grune and Stratton.

Health and Welfare Canada. (1981). The health of Canadians - Report of the Canada Health Survey. Ottawa: Health and Welfare Canada.

Hingson, R., Mangione, T., Meyers, A., & Scotch, N. (1982). Seeking help for drinking problems. A study in the Boston metropolitan area. Journal of Studies on Alcohol, 43(3), 273-288.

Hingson, R., Scotch, N., Day, N., & Culbert, A. (1980). Recognizing and seeking help for drinking problems. A study in the Boston metropolitan area. Journal of Studies on Alcohol, 41(11), 1102-1117.

Hoffman, L. (1981). Foundations of family therapy. New York: Basic Books.

Holt, S., Skinner, H., Israel, Y. (1981). Early identification of alcohol abuse: Clinical and laboratory indicators. Canadian Medical Association Journal, 124(May 15), 1279-1299.

Hood, J.R., & Farmer, R.D.T. (1974). A comparative study of frequent and infrequent attenders at a general practice. International Journal of Nursing Studies, 11, 147-153.

Hotch, D.F., Sherin, K., Harding, P.N., & Zitter, R.E. (1983). Use of the self-administered Michigan Alcoholism Screening Test in a family practice centre. The Journal of Family Practice, 17(6), 1021-1026.

Jacob, T. (1986). Alcoholism: A family interaction perspective. In C. Rivers (Ed.), Nebraska symposium on motivation, Vol. 34. Lincoln, Nebraska: University of Nebraska Press (in press).

Jacob, T., & Leonard, K. (1986). Psychosocial functioning in children of alcoholic fathers, depressed fathers and control fathers. Journal of Studies on Alcohol, 47(5), 373-380.

Jennings, A.J., & Sheldon, M.G. (1985). Review of the health of children in one-parent families. Journal of the Royal College of General Practitioners, 35, 478-483.

Kashani, J.H., Buck, J.P., & Reid, J.C. (1985). Depressed children of depressed parents. Canadian Journal of Psychiatry, 30, 265-269.

Kinney, J., Bergen, B., & Price, T. (1982). A perspective on medical students perceptions of alcoholics and alcoholism. Journal of Studies on Alcohol, 43(5), 488-496.

Kolb, D., & Gunderson, E. (1981). A longitudinal study of health risks associated with alcohol abuse in young navy men. Drug and Alcohol Dependence, 8(2), 131-141.

Kristenson, H., & Hood, B. (1984). The impact of alcohol on health in the general population: A review with particular reference to experience in Malmo. British Journal of Addiction, 79(2), 139-145.

Kristenson, H., Olin, H., Hulten-Nosslin, M., Trell, E., & Hood, B. (1983). Identification and intervention of heavy drinking in middle-aged men: Results and follow-up of 24-60 months of long-term study with randomized controls. Alcoholism: Clinical and Experimental Research, 7(2), 203-209.

Kristenson, H., Peterson, B., Trell, E., & Hood, B. (1982). Hospitalization and alcohol-related morbidity within three years after screening in middle-aged men. Drug and Alcohol Dependence, 9(4), 325-333.

Lund, C.A., & Landesman-Dwyer, S. (1978). Pre-delinquent and disturbed adolescents: The role of parental alcoholism. Currents in Medicine, 5, 339-348.

Mäkelä, K. (1978). Level of consumption and social consequences of drinking. In Y. Israel, F.B. Glaser, H. Kalant et al. (Eds.), Research advances in alcohol and drug problems, Volume 4 (pp.303-348). New York: Plenum Press.

Malla, A., & Merskey, H. (In press). Screening for alcoholism in general practice. Family Practice Research Journal.

Marshman, J. (Chairperson) (1978). The treatment of alcoholics: An Ontario perspective. The report of the Task Force on Treatment Services for Alcoholics. Toronto: Addiction Research Foundation.

Maslow, A.H. (1968). Toward a psychology of being. Toronto: Van Nostrand.

Mayer, J., & Black, R. (1977). The relationship between alcoholism and child abuse and neglect. In F. Seixas (Ed.), Currents in alcoholism, Vol. II (pp.429-445). New York: Grune and Stratton.

Mayfield, D., McCleod, G., & Hall, P. (1974). The CAGE questionnaire: validation of a new alcoholism screening instrument.\ American Journal of Psychiatry, 131, 1121-1123.

McArdle, C., Alexander, W.D., & Boyle, C. (1974). Frequent attenders at a health centre. Practitioner, 213, 696-702.

McIntosh, M.C., Sanchez, C.M. (1984). Moderate drinking: An alternative treatment goal for early-stage problem drinking. Canadian Medical Association Journal, 131(Oct. 15), 873-876.

McKenna, T., & Pickens, R. (1981). Alcoholic children of alcoholics. Journal of Studies on Alcohol, 42(11), 1021-1029.

McWhinney, I. (1981). An introduction to family medicine. New York: Oxford University Press.

Mechanic, D. (1986). The concept of illness behaviour: Culture, situation and personal predisposition. Psychological Medicine, 16, 1-7.

Mechanic, D., Cleary, P.D., & Greenley, J.R. (1982). Distress syndromes, illness behavior, access to care and medical utilization in a defined population. Medical Care, 20(4), 361-372.

Meyer, R.E., & Hesselbrock, M.N. (1984). Psychopathology and addictive disease revisited. S.M. Mirin (Ed.), Substance abuse and psychopathology (pp.1-17). Washington: American Psychiatric Press.

Miller, D., & Jang, N. (1977). Children of alcoholics: A 20-year longitudinal study. Social Work Research and Abstracts, 13(4), 23-29.

Miller, W.R., & Joyce, M.A. (1979). Prediction of abstinence, controlled drinking, and heavy drinking outcomes following behavioral self-control training. Journal of Consulting and Clinical Psychology, 41, 773-775.

Miller, W.R. & Taylor, C.A. (1980). Relative effectiveness of bibliotherapy, individual and group self-control training in the treatment of problem drinkers. Addictive Behavior, 5, 13-24.

Moessner, H. (1979). Accidents as a symptom of alcohol abuse. The Journal of Family Practice, 8(6), 1143-1146.

Moos, R.H., Finney, J.W., & Gamble, W. (1982). The process of recovery from alcoholism. II. Comparing spouses of alcoholic patients and matched community controls. Journal of Studies on Alcohol, 43(9), 888-909.

National Council on Alcoholism. (1972). Criteria for the diagnosis of alcoholism. Annals of Internal Medicine, 77, 249-258.

Nobel, E.P. (Ed.) (1978). Third special report to the U.S. Congress on Alcohol and Health from the Secretary of Health, Education and Welfare. Rockville, Md.: National Institute of Alcohol Abuse and Alcoholism.

Nylander, I. (1960). Children of alcoholic fathers. Acta Paediatrica Scandanavia, 49(1), 9-127.

Nylander, I., & Rydelius, P.A. (1982). A comparison between children of alcoholic fathers from excellent versus poor social conditions. Acta Paediatrica Scandanavia, 71, 809-813.

Nighswander; T.S. (1984). High utilizers of ambulatory care services: 6-year follow up at Alaska Native Medical Center. Public Health Reports, 99(4), 400-404.

Observer & Maxwell, M.A. (1959). A study of absenteeism, accidents and sickness payments in problem drinkers in one industry. Quarterly Journal of Studies on Alcohol, 20, 302-313.

Ogborne, A.C. (1974). Patient characteristics as predictors of treatment outcomes for alcohol and drug abusers. In Y. Israel, F.B. Glaser, H. Kalant, et al., (Eds.), Research advances in alcohol and drug problems, Vol. 4 (pp.177-223). New York: Plenum Press.

Orford, J. (1984). The prevention and management of alcohol problems in the family setting: A review of work carried out in English-speaking countries. Alcohol and Alcoholism, 19(2), 109-122.

Orford, J., Guthrie, S., Nicholls, P., Oppenheimer, E., Egert, S., & Hensman, C. (975). Self-reported coping behavior of wives of alcoholics and its association with drinking outcome. Journal of Studies on Alcohol, 36(9), 1254-1267.

Pell, S., & D'Alonzo, C.A. (1968). The prevalence of chronic disease among problem drinkers. Archives of Environmental Health, 16, 679-684.

Pernanen, K. (1974). Validity of survey data on alcohol use. In R.J. Gibbins, Y. Israel, H. Kalant et al., (Eds.), Research advances in alcohol and drug problems, Vol. 1 (pp.355-374). New York: Riley & Sons.

Polich, J.M. (1981). Epidemiology of alcohol abuse in military and civilian populations. American Journal of Public Health, 71(10), 1125-1132.

Pope, C.R. (1982). Life-styles, health status and medical care utiliation. Medical Care, 20(4), 402-413.

Popham, R.E., Schmidt, W., & Israelstam, S. (1984). Heavy alcohol consumption and physical health problems: A review of the epidemiological evidence. In R.G. Smart, H.D. Cappell, F.B. Glaser, et al. (Eds.), Research advances in alcohol and drug problems, Volume 8 (pp.149-182). New York: Plenum Press.

Preston-Whyte, M.E., Fraser, R.C., & Beckett, J.L. (1983). Effect of a principal's gender on consultation patterns. Journal of the Royal College of General Practitioners, 33, 654-658.

Putnam, S. (1982a). Alcoholism, morbidity and care-seeking: The inpatient and ambulatory service utilization and associated illness experience of alcoholics and matched controls in a Health Maintenance Organization. Medical Care, 20(1), 97-121.

Putnam, S. (1982b). Short-term effects of treating alcoholics for alcoholism. The Group Health Journal, 3(1), 19-30.

Reich, L., Davies, R.K., & Himmelhoch, J.M. (1974). Excessive alcohol use in manic-depressive illness. American Journal of Psychiatry, 131(1), 83-86.

Reiff, S., Griffiths, B., Forsythe, A.B., & Sherman, R.M. (1981). Utilization of medical services by alcoholics participating in a Health Maintenance Organization outpatient treatment program: Three year follow-up. Alcoholism: Clinical and Experimental Research, 5(4), 559-562.

Richman, A., & Warren, R. (1985a) Abstainers, former drinkers and current drinkers: A comparison of health problem rates in the Canada Health Survey. Proceedings of the 34th International Congress on Alcoholism and Drug Dependence. Calgary: Alberta Alcoholism and Drug Abuse Commission.

Richman, A., & Warren, R.A. (1985b). Alcohol consumption and morbidity in the Canada Health Survey: Inter-beverage differences. Drug and Alcohol Dependence, 19, 255-282.

Ritzler, B.A., Strauss, J.S., Vanord, A., & Kokes, R.F. (1977). Prognostic implications of various drinking patterns in psychiatric patients. American Journal of Psychiatry, 124, 546-549.

Roberts, K.S., & Brent, E.E. (1982). Physician utilization and illness patterns in families of alcoholics. Journal of Studies on Alcohol, 43(1), 119-128.

Roghmann, K.J., & Haggerty, R.J. (1973). Daily stress, illness and use of health services in young families. Pediatric Research, 7, 520-526.

Roghmann, K.J., Roberts, J.S., Smith, T.S., Wells, S.M., & Wersinger, R.P. (1981). Alcoholics versus non-alcoholics' use of services of a Health Maintenance Organization. Journal of Studies on Alcohol, 42(3), 312-322

Rosenstock, I.M. (1966). Why people use health services. Millbank Memorial Fund Quarterly, 44(No.3, Part 2), 99-124.

Ross, C.E., & Duff, R.S. (1982). Returning to the doctor: The effect of client characteristics, type of practice, and experiences with care. Journal of Health and Social Behavior, 23(2), 119-131.

Rush, B.R., & Brook, R.C. (1981). The use of the Ontario health and social service system by persons with alcohol-related problems. Toronto: Addiction Research Foundation.

Rush, B.R., & Timney, C. (1985). Treatment services for alcohol and drug abuse in Ontario: Results of a provincial survey, 1983. Toronto: Addiction Research Foundation.

Rutter, M. (1970). Sex differences in children's responses to family stress. In J.E. Anthony and C. Koupernick (Eds.), The child in family: Yearbook of the International Association for Child Psychiatry and Allied Professionals (Vol. I). New York: John Wiley and Sons, pp. 165-196.

Rydelius, P.A. (1981). Children of alcoholic fathers: Their social adjustment and their health status over 20 years. Acta Paediatrica Scandinavia Supplement, 286, 1-89.

Sackett, D.L., Haynes, R.B., & Tugwell, P. (1985). Clinical epidemiology: A basic science for clinical medicine. Toronto: Little, Brown and Company.

Sanchez-Craig, M., & Israel, Y. (1985). Pattern of alcohol consumption associated with self-identified problem drinking. American Journal of Public Health, 75, 178-180.

Schmidt, W., & Popham, R.E. (1975/76). Heavy alcohol consumption and physical health problems: A review of the epidemiological evidence. Alcohol and Drug Dependence, 1, 27-50.

Schmidt, W., & Popham, R.E. (1981). The role of drinking and smoking in mortality from cancer and other causes in male alcoholics. Cancer, 47(5), 1031-1041.

Schmidt, W., Smart, R.G., & Moos, M.K. (1968). Social class and the treatment of alcoholism: An investigation of social class as a determinant of diagnosis, prognosis and therapy. Toronto: University of Toronto Press.

Schneiderman, I. (1975). Family thinking in prevention of alcoholism. Preventive Medicine, 4, 296-309.

Schuckit, M.A., & Chiles, J.A. (1978). Family history as a diagnostic aid in two samples of adolescents. The Journal of Nervous and Mental Disease, 166(3), 165-176.

Sharpe, C.R. (1984). A case-control study of alcohol consumption and drinking behavior in patients with acute gout. Canadian Medical Association Journal, 131 (Sept. 15), 563-567.

Simpson, R., & Rush, B.R. (1985). A programmers guide to alcohol consumption statistics. (Internal Document No. 57). Toronto: Addiction Research Foundation.

Skinner, H.A. (1985). The clinical spectrum of alcoholism: Implications for new drug therapies. In C.A. Naranjo and E.M. Sellers (Fds.), Research advances in new psychopharmacological treatments for alcoholism (pp.123-135). New York: Elsevier Science Publishers.

Skinner, H.A., & Allen, B.A. (1982). Alcohol dependence syndrome: Measurement and validation. Journal of Abnormal Psychology, 91(3), 199-209.

Skinner, H.A., Allen, B.A., McIntosh, M.C., & Palmer, W.H. (1985). British Medical Journal, 290(Jan.19), 212-216.

Skinner, H., & Holt, S. (1983). Early interventions for alcohol problems. Journal of the Royal College of Ceneral Practitioners, 33, 787-791.

Skinner, H., Holt, S., & Israel, Y. (1981). Early identification of alcohol abuse: Critical issues and psychosocial indicators for a composite index. Canadian Medical Association Journal, 124(May 1), 1141-1152.

Skinner, H.A., Holt, S., Schuller, R., Roy, J., & Israel, Y. (1984). Identification of alcohol abuse using laboratory tests and a history of trauma. Annals of Internal Medicine, 101(6), 847-851.

Skinner, H.A., Holt, S., Sheu, W.J., & Israel, Y. (1986). Clinical versus laboratory detection of alcohol abuse: The alcohol clinical index. British Medical Journal, 292 (June 28), 1703-1708.

Smart, R.G. (1979). Female and male alcoholics in treatment: Characteristics at intake and recovery rates. British Journal of Addiction, 74, 275-281.

Smart, R.G., & Adlaf, E.M. (1984). Alcohol and drug use among Ontario adults in 1984 and changes since 1982. Toronto: Addiction Research Foundation.

Smart, R.G., Gillies, M., Brown, G., & Blair, N.L. (1980). A survey of alcohol-related problems and their treatment. Canadian Journal of Psychiatry, 25, 220-227.

Spasoff, R.A. (1975). Expenditures for physicians' services by disease category, Ontario, 1971. In R.D. Fraser, R.A. Spasoff, M.G. Prime et al., (Fds.), Report of the total burden project. Toronto: Ontario Ministry of Health.

Steinglass, P. (1981). The impact of alcoholism on the family. Relationship between degree of alcoholism and psychiatric symptomatology. Journal of Studies on Alcohol, 42(3), 288-303.

Steinglass, P. (1982). The role of alcohol in family systems. In J. Orford & J. Harwin (Eds.), Alcohol and the family (pp.127-151). London: Croom Helm.

Thom, B., & Tellez, C. (1986). A difficult business: Detecting and managing alcohol problems in general practice. British Journal of Addiction, 81, 405-418.

Vaillant, G.E. (1983). The natural history of alcoholism: Causes, patterns and paths to recovery. Cambridge: Harvard University Press.

Vande Creek, L., Zachrich, R.L., & Scherger, W.F. (1982). The use of standardized alcoholism screening tests in family practice. Family Practice Research Journal, 2(1), 11-17.

Vogt, T.M. (1984). Effects of parental smoking on medical care utilization by children. American Journal of Public Health, 74(1), 30-34.

Wegsheider, S. (1981). Another chance. Hope and health for the alcoholic family. Palo Alto, California: Science and Behavior Books Inc.

Weissman, M.M., Myers, J.K., & Harding, P.S. (1980). Prevalence and psychiatric heterogeneity of alcoholism in a United States urban community. Journal of Studies on Alcohol, 41, 672-681.

Werner, E.E. (1986). Resilient offspring of alcoholics: A longitudinal study from birth to age 18. Journal of Studies on Alcohol, 47(1), 34-40.

Westhead, J.N. (1985). Frequent attenders in general practice: Medical, psychological and social characteristics. Journal of the Royal College of General Practitioners, 35, 337-340.

Whitfield, C.L. (1982). Skin diseases associated with alcoholism. In E.M. Pattison & E. Kaufman (Eds.), Encyclopedic handbook of alcoholism (pp.275-280). New York: Gardner Press.

Wilkins, R.H. (1974). The hidden alcoholic in general practice: A method of detection using a questionnaire. London: Flek Science.

Wilkinson, P., Kornaczewski, A., Rankin, J.C., & Santamaria, J.N. (1971). Physical disease in alcoholism: Initial survey of 1000 patients. Medical Journal of Australia, 1, 1217-1223.

Williams, C.N. (1982). Differences in child care practices among families with alcoholic fathers, alcoholic mothers, and two alcoholic parents. (Unpublished doctoral dissertation). The Florence Hella Graduate School, Brandeis University.

Woodside, M. (1983). Children of alcoholic parents: Inherited and psychosocial influences. Journal of Psychiatric Treatment and Evaluation, 5, 531-537.

Appendix   A

Sample materials from patient files

Appendix   C

Estimates of Statistical Power

Prob. No.	Date of Onset	LONG TERM PROBLEM LABEL	Date Resolved
2	Jan'79	Chest Pain - NYD	
5	Years	SMOKER (2-3pk/wk)	
17	Years	ALCOHOL ABUSE	
61		Social Problem	
62		Family Dysfunction	
63		Interpersonal Problem	
68		Peripheral Neuropathy - NYD (Suspect related by Alcohol)	
71		Hypertension (NH Hi Med 9...day 16/hr such)	
71/72		(Stone pan following surgery)	
821		History of methol & Penicillin (All by mth)	
14		Obesity	

Date Onset		LONG TERM MEDICATION AND TREATMENT	Date Stopped
		None	
Years		Entrophen 10 (650mg) T q i d	
	1/76	Line surgery	

WCB

No Show — April 3/80

APR 9

A (A79/84)

NIC

WCB

APR 25

A (A79/84)

APR 28
APR 29

no show — MAY 6

MAR 12 1981

4. EXAMPLE OF EMERGENCY ADMISSION FORM

VICTORIA HOSPITAL CORPORATION
LONDON, ONTARIO
DEPT. OF EMERGENCY MEDICINE RECORD

59116

DELETED.

DELETED

VITAL SIGNS

S - cast loose +
pain over lat malleolus

O - cast loose
alcohol on breath

lost cast

12 40

Appendix B

Schema for categorizing
ICHPPC Codes

ICHPPC CODE	INFECTIVE & PARASITIC DISEASES
008-	Proven infectious intestine disease
009-	Presumed infectious intestine disease
011-	Tuberculosis
033-	Whooping Cough
034-	Strep Throat, Scarlet Fever, Erysipelas
045-	Polio & CNS Enteroviral diseases
052-	Chickenpox
053-	Herpes Zoster
054-	Herpes Simplex
055-	Measles
056-	Rubella
057-	Other Viral Exanthems
070-	Infectious Hepatitis
072-	Mumps
075-	Infectious Mononucleosis
077-	Viral Conjunctivitis
0781	Warts, all sites
0799	Viral Infection NOS
084-	Malaria
090-	Syphilis, all sites & stages
098-	Gonorrea, all sites
0994	Non-specific Urethritis
110-	Dermatophytosis & Dermatomycosis
112-	Moniliasis excl Urogenital
1121	Moniliasis, Urogenital, proven
1310	Trichomoniasis, Urogenital, proven
127-	Oxyuriasis, Pinworms, Helminth NEC
132-	Pediculosis & other Infestations
133-	Scabies & Other Acariasis
136-	Other Infect/Parasitic Diseases NEC

ICHPPC CODE	NEOPLASMS
151-	Malignant Neopl Gastrointestinal Tract
162-	Malignant Neopl Respiratory Tract
173-	Malig Neopl Skin/Subcutaneous Tissue
174-	Malignant Neoplasm Breast
180-	Malig Neopl Female Genital Tract
188-	Malfg Neopl Urinary & Male Genital
201-	Hodgkins Disease, Lymphoma, Leukemia
199-	Other Malignant Neoplasms NEC
214-	Lipoma, any site
216-	Benign Neoplasm Skin
217-	Benign Neoplasm Breast
218-	Benign Neoplasm Uterus
228-	Hemangioma & Lymphangioma
229-	Other Benign Neoplasms NEC
239-	Neopl NYD as Benign or Malignant

ICHPPC CODE	ENDOCRINE/NUTRITION/METABOLIC DISEASES
240-	Nontoxic Goiter & Nodule
242-	Thyrotoxicosis w/wo Goiter
244-	Hypothyroidism, Myxedema, Cretinism
250-	Diabetes Mellitus
260-	Avitamin & Nutritional Disorder NEC
274-	Gout
278-	Obesity
272-	Lipid Metabolism Disorders
279-	Other Endocr, Nutritn, Metabol Disorders

ICHPPC CODE	BLOOD DISEASES
280-	Iron Deficiency Anemia
281-	Pernicious & Other Deficienc Anemia
282-	Hereditary Hemolytic Anemias
285-	Anemia, Other/Unspecified
287-	Purpura, Hemorrhag & Coagulat Defect
2891	Lymphadenitis, Chronic/Nonspecific
288-	Abnormal White Cells
2899	Blood/Blood Forming Organ Disor NEC
7900	Hematological Abnormality NEC
7902	Abnormal Unexplained Biochem Test

ICHPPC CODE	NERVOUS SYSTEM, SENSE ORGAN DISEASES
340-	Multiple Sclerosis
332-	Parkinsonism
345-	Epilepsy, all types
346-	Migraine
355-	Other Nervous System Diseases NEC
3720	Conjunctivitis & Ophthalmia
3730	Eyelid Infections/Chalazion
367-	Refractive Errors
366-	Cataract
365-	Glaucoma
369-	Blindness
378-	Other Eye Diseases
3801	Otitis Externa
3820	Acute Otitis Media
381:	Acute & Chron Serous Otitis Med
3819	Eustachian Block or Catarrh
386-	Vertiginous Syndromes
387-	Deafness, Partial or Complete
3804	Wax in Ear
388-	Other Ear & Mastoid Diseases
7803	Convulsions
7810	Abnormal Involuntary Movement
7804	Dizziness & Giddiness
7845	Disturbance of Speech
7840	Headache
7820	Disturbance of Sensation

ICHPPC CODE	CIRCULATORY SYSTEM DISEASES
390-	Rheumatic Fever/Heart Disease
410-	AC Myocard Infarct/Subac Ischemia
412-	Chronic Ischemic Heart Disease
428-	Heart Failure, Right/Left Sided
4273	Atrial Fibrillation of Flutter
4270	Paroxysmal Tachycardia
4276	Ectopic Beats, All Types
416-	Pulmonary Heart Disease
424-	Diseas Heart Valv Non-Rheum, NOS, NYD
429-	Other Heart Diseases NEC
401-	Hypertension, Uncomplicated
402-	Hypertension Involving Target Organ
435-	Transient Cerebral Ischemia
438-	Other Cerebrovascular Disease
440-	Atherosclerosis Excl Heart & Brain
443-	Other Arterial Diseas Excl Aneurysm
415-	Pulmonary Embolism & Infarction
451-	Phlebitis & Thrombophlebitis
454-	Varicose Veins of Legs
455-	Hemorrhoids
4580	Postural Hypotension
459-	Other Peripheral Vessel Diseases
7851	Palpitations
7802	Syncope, Faint, Blackout
7852	Heart Murmur NEC, NYD
7856	Enlarged Lymph Nodes, Not Infected
7962	Elevated Blood Pressure

ICHPPC CODE	PREVENTIVE/FAMILY PLANNING
V700	Medical Exam, Pap
V010	Contac/carrier, Infec/Parasit Disease
V030	Prophylactic Immunization
V140	Observ/Care pt. on hi risk medicat
V100	Observ/Care other hi risk patient
V252	Sterilization of male or female
V255	Oral Contraceptives
V251	Intrauterine Devices
V253	Other Contraceptive Methods
V256	General Contraceptive Guidance

MENTAL HEALTH DISORDERS

294-	Organic Psychosis Excl Alcoholic
295-	Schizophrenia, All types
296-	Affective Psychoses
298-	Psychosis, Other/NOS Excl Alcoholic
300C	Anxiety Disorder
3001	Hysterical & Hypochondriac Disorder
3004	Depressive Disorder
3009	Neurosis, Other/Unspecified
315-	Specific Learning Disturbance
3074	Insomnia & Other Sleep Disorders
308C	Transien Situat Disturb, Adj React
3078	Tension headache, psychogenic backache
312-	Behavior Disorders NEC
3027	Sexual Problems
301-	Personality & Character Disorders
317-	Mental Retardation
316-	Other Mental & Psychological Disorder

ALCOHOL ABUSE/DEPENDENCE

3031	Alcohol Abuse & Alcoholic Psychosis
305C	Acute Alcoholic Intoxication

DRUG ABUSE (INCL. TOBACCO)

3051	Tobacco Abuse
3048	Other Drug Abuse, Habit, Addiction

GENITOURINARY SYSTEM DISEASE

(excluding female breast, genital and menstrual disease)

580-	Glomerulonephritis, Acute & Chronic
5901	Pyelonephritis & Pyelitis, Acute
595-	Cystitis & Urinary Infection NOS
592-	Urinary System Calculus, All Types
597-	Urethritis NOS, NEC
5936	Orthostatic Albuminuria
5997	Hematuria NOS
598-	Other Urinary System Diseases NOS
600-	Benign Prostatic Hypertrophy
601-	Prostatis & Seminal Vesiculitis
603-	Hydrocele
604-	Orchitis & Epididymitis
605-	Redund Prepuce, Phimosis & Balanitis
607-	Other Male Genital Organ Diseases
7881	Dysuria
7883	Enuresis
7884	Frequency of Urination
791-	Abnormal Urine Test NEC

OBSTETRICAL/GYNOCOLOGICAL DISEASES

(including female breast, genital and menstrual disease)

610-	Chronic Cystic Breast Disease
611-	Other Breast Diseases
614-	Pelvic Inflammatory Disease
622-	Cervicitis & Cervical Erosion
6161	Vaginitis NOS, Vulvitis
618-	Uterovaginal Prolapse
627-	Menopausal Symptoms & Post Meno Bleed
6254	Premenstrual Tension Syndrome
6250	Non-Psych Vaginismus & Dyspareunia
6260	Absent, Scanty, Rare Menstruation
6262	Excessive Menstruation
6253	Painful Menstruation
6269	Intermenstr Bleeding
629-	Other Female Genital Organ Diseases
606-	Sterility & Reduced Fertility
633-	Ectopic Pregnancy
640-	Bleeding During Pregnancy
6466	Urinary Infection, Preg & Postpart
642-	Toxemias of Preg & Puerperium
636-	Induced Abortion
634-	Abortion, Spontaneous & NOS
648-	Other Complications of Pregnancy
650-	Normal Delivery
661-	Complicated Delivery
676-	Mastitis & Lactation Disorders
670-	Other Complications of Puerperium
795C	Non-specific Abnormal Pap Smear
V223	Diangosing Pregnancy
V220	Prenatal Care
V24-	Postnatal Care

SOCIAL, MARITAL, FAMILY PROBLEMS

V602	Economic Problem
V600	Housing Problem
V614	Medical Care Problem
V611	Marital Problem
V612	Parent & Child Problem
V613	Aged Parent or Inlaw Problem
V610	Family Disruption w/wo Divorce
V619	Other Family Problems
V623	Educational Problem
V616	Pregnancy Out of Wedlock
V624	Social Maladjustment
V620	Occupational Problem
V627	Phase-of-Life Problem NEC
V625	Legal Problem
V629	Other Social Problem

ADMINISTRATIVE

V68C	Letter Forms Prescription wo Exam
V683	Referral wo Exam or Interview

MISCELLANEOUS

V50-	Med/Surg Procedures wo Diagnoses
V654	Advice & Health Instruction
V651	Problems External to Patient
V999	Problems NEC

PERINATAL MORBIDITY & MORTALITY

778-	All Perinatal Conditions

SIGNS, SYMPTOMS, ILL-DEFINED CONDITIONS

7808	Excessive Sweating
7806	Fever of Undetermined Cause
7865	Chest Pain
7823	Edema
7832	Weight Loss
7807	Malaise, Fatigue, Tiredness
7822	Mass & Localized Selling NOS/NYD
793-	Other Unexplained Abnormal Results

INJURIES & ADVERSE EFFECTS

802-	Fracture Skull & Facial Bones
805-	Fracture Vertebral Column
807-	Fracture Ribs
812-	Fracture Clavicle
813-	Fracture Radius/Ulna
814-	Fract(Meta)Carpal & (Meta)Tarsal
816-	Fracture Phalanges Foot/Hand
820-	Fracture Femur
823-	Fracture Tibia/Fibula
829-	Fracture All Other Sites NEC
836-	Acute Damage Knee Meniscus
839-	Disloc/Sublux Other Sites NEC
840-	Sprain/Strain Shoulder & Arm
842-	Sprain/Strain Wrist, Hand, Fingers
844-	Sprain/Strain Knee & Lower Leg
8450	Sprain/Strain Ankle
8451	Sprain/Strain Foot & Toes
8470	Sprain/Strain Neck
8478	Sprain/Strain Vertebral Excl Neck
848-	Sprain & Strain All Other Sites NEC
850-	Concussion & Intracranial Injury
889-	Lacerat/Open Wound/Traum Amputatn
910-	Insect Bites & Stings
918-	Abrasion, Scratch, Blister
929-	Bruise, Contusion, Crushing
949-	Burns & Scalds, All Degrees
912-	Foreign Body in Tissues
930-	Foreign Body in Eye
939-	Foreign Body Entering Thru Orifice
908-	Late Effect of Trauma
959-	Other Injuries & Trauma
977-	Overdos Medicin Accid or Deliberate
9952	Adverse Effect Medicin Proper Dose
989-	Adverse Effects of Other Chemicals
998-	Surgery & Medical Care Complication
994-	Adverse Effects of Physical Factors
9950	Other Adverse Effects NEC

ICHPPC CODE	RESPIRATORY SYSTEM DISEASES
460-	Acute Upper Respir Tract Infection
461-	Sinusitis, Acute & Chronic
463-	Acute Tonsillitis & Quinsy
474-	Hypertroph/Chron Infect Tonsl/Aden
464-	Laryngitis & Tracheitis, Acute
466-	Bronchitis, Bronchiolitis, Acute
487-	Influenza
486-	Pneumonia
5110	Pleurisy All Types Excl Tubercul
5119	Pleural Effusion NOS
491-	Bronchitis, Chronic & Bronchiectasis
492-	Emphysema & Copd
493-	Asthma
477-	Hay Fever
4781	Boil in Nose
519-	Other Respiratory System Diseases
7847	Epistaxis
7863	Hemoptysis
7860	Dyspnea
7862	Cough

	DIGESTIVE SYSTEM DISEASES
520-	Teeth & Support Structure Diseases
528-	Mouth, Tongue, Salivary Gland Disease
530-	Esophageal Diseases
532-	Duodenal Ulcer w/wo Complications
533-	Other Peptic Ulcer
536-	Other Stomach & Duoden Dis/Disord
540-	Appendicitis, All types
550-	Inguinal Hernia w/wo Obstruction
551-	Hiatus/Diaphragmatic Hernia
553-	Other Hernias
562-	Diverticular Disease of Intestine
558-	Irrit Bowel Syndr/Intest Disor NEC
555-	Chronic Enteritis, Ulcerative Colitis
5640	Constipation
565-	Anal Fissure/Fistula/Abcess
5646	Proctitis, Rectal & Anal Pain NOS
5693	Bleeding Per Rectum NOS
578-	Hematemesis, Melena, GI Hemorrhage NOS
571-	Cirrhosis & Other Liver Diseases
574-	Gallbladder & Biliary Tract Disease
579-	Other Digestive System Diseases NEC
7830	Anorexia
7870	Nausea/Vomiting
7871	Heartburn
7891	Hepatomegaly/Splenomegaly
7873	Flatulence, Bloating, Eructation
7890	Abdominal Pain

ICHPPC CODE	SKIN/SUBCUTANEOUS TISSUE DISEASES
680-	Boil & Cellulitis Incl Finger & Toe
683-	Lymphadenitis, Acute
684-	Impetigo
685-	Other Infections Skin/Subcutaneous
690-	Seborrhoeic Dermatitis
6918	Eczema & Allergic Dermatitis
692-	Contact & Other Dermatitis NEC
6910	Diaper Rash
6963	Pityriasis Rosea
6961	Psoriasis w/wo Arthropathy
696-	Pruritis & Related Conditions
700-	Corns & Callosities
7062	Sebaceous Cyst
703-	Ingrown Toenail & Nail Disease NEC
704-	Alopecia & Other Hair Diseases
705-	Pompholyx & Sweat Gland Dis NEC
7061	Acne
707	Chronic Skin Ulcer
708-	Urticaria
709-	Other Skin & Subcutaneous Tiss Diseases
7821	Rash & Other Nonspecific Skin Erupt

	MUSCULOSKELET, CONNECTIVE TISSUE DISEASE
714-	Rheumatoid Arthrit & Allied Conditions
715-	Osteoarthritis & Allied Conditions
7161	Traumatic Arthritis
7194	Pain or Stiffness in Joint
719C	Swelling or Effusion of Joint
725-	Arthritis Nec/Diff Conn Tiss Dis
7260	Shoulder Syndromes
7263	Other Bursitis & Synovitis
728-	Other Nonarticular Rheumatism
7295	Pain & Other Limb Symptoms
723-	Cervical Spine Syndromes
721-	Osteoarthritis of Spine
7242	Back Pain wo Radiating Symptoms
7244	Back Pain with Radiating Symptoms
737-	Acquired Deformities of Spine
7274	Ganglion of Joint & Tendon
732-	Osteochondrosis
7330	Osteoporosis
717-	Chronic Internal Knee Derangement
736-	Acquired Deformity of Limbs
739-	Other Musculoskel, Connective Diseases

	CONGENITAL ANOMALIES
746-	Congenital Anomaly Heart & Circulat
754-	Congenital Anomalies of Lower Limb
7525	Undescended Testicle
7436	Blocked Tear Duct
758-	Other Congenital Anomalies NEC

Appendix   C

Estimates of Statistical Power

Using a two-tailed statistical test, with $\alpha = .05$, 80% power and a fixed number of matched pairs of observations, a t-test comparing average number of visits per year will be capable of detecting a true difference of size A, with A determined by the formula:

$$A = \sqrt{\frac{7.9 \ (2\sigma^2) \ (1-rho)}{n}}$$

, where rho = the correlation of the dependent variables between the two groups, and, n = the number of matched pairs.

For analyses with independent samples (as with the groups of children in the present study), 1-rho is removed from the formula.

This formula is useful for estimating the ability of the planned analyses to detect clinically significant differences given the size of the sample eligible for the study and the variance of the data. A two-fold difference between groups in the frequency of doctor-patient contacts and the proportion of patients with each diagnosis are considered to be clinically significant.

Before applying this formula to estimate the ability of the analyses to detect differences of this magnitude, it should be noted that this is a conservative procedure in the

present study. The formula is applied to the data on visit frequency prior to their undergoing the logarithmic transformation. This transformation has the effect of reducing the variability in the data and the size of the difference that the statistical comparisons will be able to detect will actually be smaller than that determined by the formula.

For comparisons of. visit frequency between the overall group of problem drinkers, and their matched controls,

$$A = \sqrt{\frac{7.9 \ (2)(27)(1-.15)}{108}} = 1.8$$

For comparisons of visit frequency between spouses and their matched controls,

$$A = \sqrt{\frac{7.9(2)(22)(1-.24)}{49}} = 2.3$$

For comparisons of visit frequency between the two groups of children,

$$A = \sqrt{\frac{7.9 \ (2)(12.5)}{71}} = 1.7$$

Thus, these comparisons have an 80% chance of detecting a difference in visit frequency of about two visits per year for each target group. Thus a clinically significant difference can be confidently detected using the overall groups.

The general formula for comparisons of the proportions in each group with particular diagnoses is:

$$A = \sqrt{\frac{7.9(P_1Q_1 + P_2Q_2)(1-rho)}{n}}$$

For the comparisons of proportions between the problem drinkers and controls,

$$A = \sqrt{\frac{7.9((.53)(.47) + (.33)(.67))(1-.12)}{108}} = .17$$

For the comparisons of proportions between the spouses and controls,

$$A = \sqrt{\frac{7.9(.27)(.73) + (.16)(.84)(1-.235)}{49}} = .20$$

For the comparisons of proportions between the groups of children,

$$A = \sqrt{\frac{7.9(.22)(.78) + (.14 \times .26)}{71}} = .15$$

Thus, these comparisons have an 80% chance of detecting a true difference in the proportion of group members with a particular diagnosis of about 15 to 20 percentage points.

Appendix D

Comparison of problem drinkers and
controls on specific health-related problems

D1. Comparison of problem drinkers and controls on more specific health-related problems subsumed under ten general categories which were significantly different between groups in bivariate analysis.

	PROBLEM DRINKERS		CONTROLS		RATIO OF DISCORDANT PAIRS
	N	%	N	%	
NEOPLASMS					
Malignant	2	2.8	0	0.0	2/0
Benign	13	12.0	2	1.9	13/2
ENDOCRINE/NUTRITION/METABOLIC					
Obesity	19	17.6	12	11.1	19/12
Gout	7	6.5	0	0.0	7/0
Other	7	6.5	2	1.9	7/2
MENTAL HEALTH					
Transient situational problem	12	11.1	6	5.6	12/6
Tension headache	6	5.6	2	1.9	6/2
Psychoses (Except alcoholic)	1	.9	4	3.7	1/4
Neuroses	35	32.4	6	8.2	27/6
Sleep disturbance	9	8.3	3	2.8	9/3
Other mental, psychological	15	13.9	8	7.4	15/8
DRUG ABUSE					
Tobacco	24	22.2	7	6.5	22/5
Other drugs	8	7.4	0	0.0	8/0
RESPIRATORY SYSTEM					
Resp. system disease[1]	52	48.1	35	32.4	33/16
Resp. signs, symptoms	7	6.5	3	2.8	7/3
DIGESTIVE SYSTEM					
Digestive system disease[1]	37	34.3	12	11.1	37/7
Abdominal pain	17	15.7	13	12.0	15/11
Other digestive signs, symptoms	8	7.4	7	6.5	8/7
SKIN, SUBCUTANEOUS TISSUE[1]					
All skin conditions combined	44	40.7	23	21.3	30/9

[1]For respiratory, digestive and skin disease, supplementary data were hand-tabulated for specific diagnoses in each category. These data are presented in Table D2.

- TABLE D1 continued....

	PROBLEM DRINKERS		CONTROLS		RATIO OF DISCORDANT PAIRS
	N	%	N	%	
VAGUE SIGNS, SYMPTOMS, ILL-DEFINED CONDITIONS					
Chest pain	15	13.9	3	2.8	14/2
Edema	3	2.8	0	0.0	3/0
Malaise, fatigue	12	11.1	3	2.8	11/2
Weight loss	0	0.0	0	0.0	0/0
General signs, symptoms	4	3.7	3	2.8	4/3
INJURIES/ADVERSE EFFECTS					
Fractures	9	8.3	0	0.0	9/0
Sprains and strains	27	25.0	15	13.9	21/9
Other trauma	38	35.2	17	15.7	33/12
Insect bites and stings	2	1.9	1	.9	2/1
Adverse effects	3	2.8	3	2.8	3/3
SOCIAL/MARITAL/FAMILY					
Economic problem	12	11.1	7	6.5	12/7
Housing problem	1	.9	0	0.0	1/0
Parent-child relationship	5	4.6	3	2.8	4/2
Marital, family disruption	38	35.2	11	10.2	34/7
In-law problem	1	.9	1	.9	1/1
Educational problem	2	1.9	0	0.0	2/0
Occupational problem	9	8.3	5	4.6	9/5

D2. Specific diagnoses for problem drinkers and controls with respiratory, digestive
and skin disease.

RESPIRATORY DIAGNOSES	PROBLEM DRINKERS		CONTROLS	
	N	%	N	%
Acute upper respiratory infection	28	25.9	22	20.4
Sinusitis, tonsillitis, laryngitis	8	7.4	5	4.6
Hay fever, asthma	5	4.6	2	1.9
Influenza	2	1.9	4	3.7
Acute and chronic bronchitis	20	18.5	9	8.3
Pneumonia, COPD	7	6.5	0	0.0
Other	2	1.9	0	0.0

DIGESTIVE DIAGNOSES	N	%	N	%
Caries, tooth absess, gingivitis	10	9.3	2	1.9
Peptic, duodenal ulcer and esophagitis	3	2.8	1	.1
Indigestion, gastritis, dyspepsia	20	18.5	5	4.6
Appendicitis, inquinal hernia	1	.1	2	1.9
Diarrhea, constipation	4	3.7	3	2.8
Gall bladder, liver disease	7	6.5	1	.1
Other	1	.1	0	0.0

SKIN DIAGNOSES	N	%	N	%
Cellulitis, boils, other skin infection	13	12.0	7	6.5
Dermatitis (all types), psoriasis, heat rash	11	10.2	8	7.4
Pruritis, neurodermatitis	7	6.5	2	1.9
Acne, subaceous cyst, chronic skin ulcer	10	9.3	6	5.6
Hives	2	1.9	0	0.0
Dry skin, skin lesions, seborrhea	9	8.3	4	3.7
Rashes and other skin eruptions	3	2.8	3	2.8

Appendix E

Detailed calculations for Tables 12 - 14
concerning re-classification of problem
drinkers and controls

TABLE F2. Sample size, mean and standard deviation of the average difference in the number of patient-physician contacts between problem drinkers and controls, by gender, age, social position and problem severity/

		GENDER				
		Male			Female	
	n	X	SD	n	X	SD
AGE						
18-29	19	3.8	4.0	12	2.2	5.8
30-55	38	2.5	5.0	18	2.2	13.7
55+	18	3.6	3.1	3	3.0	7.5
SOCIAL POSITION						
Upper/middle (I-IV)	28	3.5	3.4	9	2.2	5.3
Lower (V-VI)	33	3.4	5.2	8	3.8	9.2
Public assistance (PA)	14	1.7	4.0	16	1.5	13.7
PROBLEM SEVERITY **(AT RISK CASES EXCLUDED)**						
Problem drinker	34	2.6	3.0	16	.8	13.3
Alcohol dependent	29	4.8	5.2	15	4.0	8.1
PROBLEM SEVERITY **(AT RISK CASES RECODED)**						
At risk/problem drinker	46	2.1	3.5	18	.8	12.5
Alcohol dependent	29	4.8	5.2	15	4.0	8.1

/Due to the small number of "at-risk" cases (8), results are presented with these cases excluded as well as with them recoded to the next highest level of severity.

The lowest probability that a patient is a problem drinker would be obtained if he/she had presented with only mental health problems where B = .23. Thus,

$$\bar{p}(x) = \frac{exp\ (.23)}{1 + exp\ (.23)} = \frac{1.26}{2.26} = .56$$

Any other problem or combination of problems with result in a probability higher than this value.

In the body of the text, cut-off levels of p(x) = .5, .7 and .9 were employed. The .5 cut-off was selected as the lowest probability level because no problems, or combination of problems resulted in a value of $\hat{p}(x)$ below this criterion. Thus, the existence of any one of the ten problems resulted in a positive prediction of problem drinking status. A level of .7 was chosen as the next cut-off point because no combination of two problems fell below this criterion (mental health problems and respiratory problems resulted in p(x) = .71). A level of .9 was chosen as the final criterion because almost all three-way combinations of problems resulted in a value of $\hat{p}(x)$ higher than this cut-off. Some two-way combinations also met this cut-off.

When only the three categories of health-related problems were entered into the logistic regression model (i.e., social/marital, accidents and digestive disease) the following unstandardized beta coefficients were obtained:

> Social/marital = 1.41
> Accidents = 1.64
> Digestive = 1.40

The existence of any one of these three problems resulted in a value of p(x) at least equal to .80. This was the value obtained when only digestive disease was present (i.e., the lowest beta coefficient).

The existence of any two of these three problems always resulted in a value of $\hat{p}(x)$ over the $\hat{p}(x)$ = .9 criterion. (Accidental injury and social problems $\hat{p}(x)$ = .96, accidental injury and digestive problems $\hat{p}(x)$ = .96 and social and digestive problems $\hat{p}(x)$ = .95).

The value of $\hat{p}(x)$ that was obtained for each subject was used to reclassify him/her as a problem drinker or control patient.

Thus, a prediction was made based on the existence or non-existence of the health-related problems and the cut-off of $\hat{p}(x)$ that was chosen. For each of the cut-off points (.5, .7 and .9) a comparison was then made between the predicted status and the actual status of the patient. These comparisons result in the different levels of sensitivity, specificity and predictive values that were shown in Tables 12-14.

Tables E1 and E2 in this Appendix show the calculations of the predictive values and related statistics (pre-test and post-test probabilities).

TABLE 13   Calculations for Table 14, where any one of the three conditions
indicates problem drinking (sensitivity 87.0 and specificity 41.7)

		Actual Status				CHANGE FROM PRE TEST PROBABILITY
Prevalence = 5% (PRE TEST PROBABILITY)		PD	NPD			
Predicted Status	PD	44	551	595	Positive Predictive Value = 44/595 = 7.4%	2.4
	NPD	6	399	405	Negative Predictive Value = 6/405 = 1.5%	-3.5
		50	950	1000		

		Actual Status				
Prevalence = 10% (PRE TEST PROBABILITY)		PD	NPD			
Predicted Status	PD	87	525	612	Positive Predictive Value = 87/612 = 14.2%	4.2
	NPD	13	375	388	Negative Predictive Value = 13/388 = 3%	-6.7
		100	900	1000		

		Actual Status				
Prevalence = 20% (PRE TEST PROBABILITY)		PD	NPD			
Predicted Status	PD	174	466	640	Positive Predictive Value = 174/640 = 27.2%	7.2
	NPD	26	334	360	Negative Predictive Value = 26/360 = 7.2%	-12.8
		200	800	1000		

		Actual Status				
Prevalence = 30% (PRE TEST PROBABILITY)		PD	NPD			
Predicted Status	PD	261	408	669	Positive Predictive Value = 261/669 = 39.0%	9.0
	NPD	39	292	331	Negative Predictive Value = 39/331 = 11.8%	-18.2
		300	700 = 1000			

A dental, family, social problems and digestive problems

PD: problem drinker NPD:non problem drinker

TABLE E2 Calculations for Table 14, where any two of the three conditions[1] indicates problem drinking (sensitivity = 41.7% and specificity = 87.0%)

		Actual Status					CHANGE FROM PRE TEST PROBABILITY
Prevalence = 5% (PRE TEST PROBABILITY)		PD[2]	NPD[2]				
Predicted Status	PD	24	123	= 147	Positive Predictive Value = 24/147 = 16.3		11.3%
	NPD	26	827	853	Negative Predictive Value = 26/853 = 3.1%		-1.9%
		50	950	1000			

		Actual Status					
Prevalence = 10% (PRE TEST PROBABILITY)		PD	NPD				
Predicted Status	PD	47	117	164	Positive Predictive Value = 47/164 = 28.7%		18.7%
	NPD	53	783	836	Negative Predictive Value = 53/836 = 6.3%		-3.7%
		100	900	1000			

		Actual Status					
Prevalence = 20% (PRE TEST PROBABILITY)		PD	NPD				
Predicted Status	PD	94	104	198	Positive Predictive Value = 94/198 = 47.5%		27.5%
	NPD	106	696	802	Negative Predictive Value = 106/802 = 13.2%		-6.8%
		200	800	1000			

		Actual Status					
Prevalence = 30% (PRE TEST PROBABILITY)		PD	NPD				
Predicted Status	PD	141	91	232	Positive Predictive Value = 141/232 = 60.8%		30.8%
	NPD	159	609	768	Negative Predictive Value = 159/768 = 20.7%		-9.3%
		300	700	1000			

[1] Accidents, family/social problems and digestive problems

[2] PD=problem drinkers, NPD=non-problem drinkers.

Appendix   F

Sub-group means and standard deviations

for main sub-group comparisons of problem

drinkers versus controls on frequency of utilization

TABLE F1. Differences for several sub-groups on average number of patient-physician contacts per year.

Patient Sub-Group[1]	n	(d) Average Difference in visits per year (cases minus control)	Standard Deviation of d	Variance of d
GENDER Males	75	3.1	4.4	19.4
Females	33	2.3	10.7	114.5
AGE 18-29	31	3.2	4.8	23.0
30-55	56	2.4	8.7	75.7
Over 55	21	3.5	3.7	13.7
SOCIAL POSITION Upper-Middle (I-IV)	37	3.2	3.9	15.2
Lower (V-VI)	41	3.5	6.0	36.0
Public Assist. (PA)	30	1.6	10.2	104.0
PROBLEM SEVERITY At-risk	14	.8	4.3	18.5
Non-dependent	50	2.0	7.8	60.8
Dependent	44	4.5	6.2	38.4
NUMBER OF YEARS[2] PRIOR TO PROBLEM IDENTIFICATION. 5 visits or less	88	2.4	6.9	47.6
Over 5 visits	13	4.9	7.0	49.0
NOTES RE. IMPROVEMENT IN ALCOHOL PROBLEM DURING STUDY PERIOD: Yes	23	5.0	5.2	27.0
No	85	2.3	7.2	51.8
LIVING ARRANGEMENTS With spouse	59	3.3	5.2	27.0
Other	49	2.3	8.5	72.3
CLINIC Victoria	79	2.8	7.9	62.4
Byron	29	2.9	2.9	8.4
STUDY YEARS 1980/81[3]	8	3.9	2.9	8.1
1981/82	40	2.8	7.0	49.2
1982/83	19	3.7	4.9	24.0
1983/84	41	3.3	4.8	23.0

[1] Data for gender, age, social position, and problem severity are also shown in Table 18 in the body of the text. The remaining data are shown only in this table.

[2] Excludes seven cases with missing data

[3] Includes six cases for 1979/80.

TABLE F2. Sample size, mean and standard deviation of the average difference in the number of patient-physician contacts between problem drinkers and controls, by gender, age, social position and problem severity/

| | | GENDER | | | | |
| | Male | | | Female | | |
	n	X̄	SD	n	X̄	SD
AGE						
18-29	19	3.8	4.0	12	2.2	5.8
30-55	38	2.5	5.0	18	2.2	13.7
55+	18	3.6	3.1	3	3.0	7.5
SOCIAL POSITION						
Upper/middle (I-IV)	28	3.5	3.4	9	2.2	5.3
Lower (V-VI)	33	3.4	5.2	8	3.8	9.2
Public assistance (PA)	14	1.7	4.0	16	1.5	13.7
PROBLEM SEVERITY (AT RISK CASES EXCLUDED)						
Problem drinker	34	2.6	3.0	16	.8	13.3
Alcohol dependent	29	4.8	5.2	15	4.0	8.1
PROBLEM SEVERITY (AT RISK CASES RECODED)						
At risk/problem drinker	46	2.1	3.5	18	.8	12.5
Alcohol dependent	29	4.8	5.2	15	4.0	8.1

Due to the small number of "at-risk" cases (8), results are presented with these cases excluded as well as with them recoded to the next highest level of severity.

TABLE F3. Sample size, mean and standard deviation of the average difference in the number of patient-physician contacts between problem drinkers and controls by age, by social position and problem severity.[1]

	AGE								
	18 - 29			30 - 55			55 +		
	n	$\bar{x}$	SD	n	$\bar{x}$	SD	n	$\bar{x}$	SD
SOCIAL POSITION									
Upper/middle (I-IV)	9	3.4	6.1	20	3.1	3.1	8	3.1	3.0
Lower (V-VI)	13	3.8	4.9	20	3.3	7.4	8	3.3	4.3
Public Assistance (PA)	9	2.1	3.1	16	.4	13.7	5	4.6	4.3
PROBLEM SEVERITY (AT RISK CASES EXCLUDED)									
Problem drinker	18	3.0	4.2	27	1.7	10.0	5	.2	1.9
Alcohol dependent	7	5.9	6.6	23	4.7	7.5	14	4.2	3.5
PROBLEM SEVERITY (AT RISK CASES RECODED)									
Problem drinker	24	2.4	3.9	33	1.1	9.3	7	2.2	4.0
Alcohol dependent	7	5.9	6.6	23	4.3	7.5	14	4.2	3.5

[1]Due to the small number of "at-risk" cases (8), results are presented with these cases excluded as well as with them recoded to the next highest level of severity.

TABLE F.3. Sample size, mean and standard deviation of the average difference in the number of patient-physician contacts between problem drinkers and controls by age, by social position and problem severity.[1]

| | AGE | | | | | | | | |
| | 18 - 29 | | | 30 - 55 | | | 55 + | | |
	n	X	SD	n	X	SD	n	X	SD
SOCIAL POSITION									
Upper/middle (I-IV)	9	3.4	6.1	20	3.1	3.1	8	3.1	3.0
Lower (V-VI)	13	3.8	4.9	20	3.3	7.4	8	3.3	4.3
Public Assistance (PA)	9	2.1	3.1	16	.4	13.7	5	4.6	4.3
PROBLEM SEVERITY									
(AT RISK CASES EXCLUDED)									
Problem drinker	18	3.0	4.2	27	1.7	10.0	5	.2	1.9
Alcohol dependent	7	5.9	6.6	23	4.7	7.5	14	4.2	3.5
PROBLEM SEVERITY									
(AT RISK CASES RECODED)									
Problem drinker	24	2.4	3.9	33	1.1	9.3	7	2.2	4.0
Alcohol dependent	7	5.9	6.6	23	4.3	7.5	14	4.2	3.5

[1]Due to the small number of "at-risk" cases (8), results are presented with these cases excluded as well as with them recoded to the next highest level of severity.

TABLE F4. Sample size, mean and standard deviation of the average difference in the number of patient-physician contacts between problem drinkers and controls by social position by problem severity.[1]

SOCIAL POSITION

	Upper/middle[2]			Lower[2]			Public Assistance		
	n	X	SD	n	X	SD	n	X	SD
PROBLEM SEVERITY (AT RISK CASES EXCLUDED)									
Problem drinker	19	3.0	4.5	18	2.1	2.7	13	.5	14.3
Alcohol dependent	13	4.3	3.3	15	6.8	7.7	16	2.5	6.1
PROBLEM SEVERITY (AT RISK CASES RECODED)									
Problem drinker	24	2.6	4.1	26	1.6	3.8	14	.5	13.7
Alcohol dependent	13	4.3	3.3	15	6.8	7.7	16	2.5	6.1

[1]Due to the small number of "at-risk" cases (8), results are presented with these cases excluded as well as with them recoded to the next highest level of severity.

[2]Upper/middle = Blishen codes I-IV, lower = codes V-VI

Appendix   G

Sub-group comparisons on the various
categories of health-related problems

TABLE G1. Gender differences in proportion of problem drinkers and controls with the ten categories of health-related problems which were significantly different between the overall groups.[1]

| Category of Health-Related Problems | MALES (n=75) | | | | FEMALES (n=33) | | | | Results x² test (df=1)[2] |
| | Problem Drinkers | | Controls | | Problem Drinkers | | Controls | | |
	n	%	n	%	n	%	n	%	
Neoplasms	11	14.7	1	1.3	4	12.1	1	3.0	x^2 = .02
Endocrine/Nutrition/Metabolic	21	28.0	7	9.3	7	21.2	5	15.3	x^2 = .37
Mental Health	32	42.7	13	17.3	22	66.7	17	51.5	x^2 = .38
Drug Abuse (incl. tobacco)	20	26.7	4	5.3	9	27.3	3	9.1	x^2 = .004
Respiratory	39	52.0	22	29.3	18	54.5	14	42.4	x^2 = .003
Digestive	29	38.7	10	13.3	17	51.5	15	45.5	x^2 = 2.80
Skin/subcutaneous tissue	31	41.3	12	16.0	13	39.4	11	33.3	x^2 = 3.20
Signs, symptoms, ill-defined	19	25.3	6	8.0	12	36.4	3	9.1	x^2 = .04
Injuries/adverse effects	37	49.3	24	32.0	23	69.7	7	21.2	x^2 = 1.00
Social/marital/family	35	46.7	11	14.7	20	60.6	13	39.4	x^2 = .50

GENDER

[1] Main group differences are shown in Table 7 in the body of the text.

[2] This chi-square test uses the discordant pairs for both males and females and evaluates the consistency in the difference between problem drinkers and controls on the health-related problem. With df=1, a x^2=3.84 is required for statistical significance at $\leq$.05. All values reported here fail to reach this criteria.

TABLE G2. Age differences in proportion of problem drinkers and controls with the ten categories of health-related problems which were significantly different between the overall groups.[1]

	18 - 29 (N=31)				30 - 55 (N=88)				55 + (N=21)				Result of
Category of Health-Related Problems	Problem Drinkers		Controls		Problem Drinkers		Controls		Problem Drinkers		Controls		χ^2 test $(df=2)$ [2]
	n	%	n	%	n	%	n	%	n	%	n	%	
Neoplasms	2	6.5	0	0.0	6	10.7	2	3.6	7	33.3	0	0.0	$\chi^2 = 2.62$
Endocrine/Nutrition/Metabolic	7	22.6	0	0.0	15	26.8	8	14.3	6	28.6	4	19.0	$\chi^2 = 3.38$
Mental Health	15	48.4	9	29.0	31	55.4	13	23.2	8	38.1	8	38.1	$\chi^2 = 3.83$
Drug Abuse (incl. tobacco)	8	25.8	2	6.5	12	21.4	5	8.9	9	42.9	0	0.0	$\chi^2 = 2.37$
Respiratory	15	48.4	14	45.2	29	51.8	14	25.0	13	61.9	8	38.1	$\chi^2 = 2.15$
Digestive	11	35.5	9	29.0	26	46.4	10	17.9	9	42.9	6	28.6	$\chi^2 = 2.81$
Skin/subcutaneous tissue	15	48.4	8	25.8	16	28.6	11	19.6	13	61.9	4	19.0	$\chi^2 = 2.65$
Signs, symptoms, ill-defined	4	12.9	2	6.5	14	25.0	5	8.9	13	61.9	2	9.5	$\chi^2 = 1.86$
Injuries/adverse effects	19	61.3	8	25.8	29	51.8	17	30.4	12	57.1	6	28.6	$\chi^2 = .53$
Social/marital/family	17	54.8	8	25.8	29	51.8	12	21.4	9	42.9	4	19.0	$\chi^2 = .31$

AGE

[1] Main group differences are shown in Table 7 in the body of the text.

[2] This chi-square test uses the discordant pairs for the three age levels and evaluates the consistency in the difference between problem drinkers and controls on the health-related problem. With $df=2$, a $\chi^2=5.99$ is required for statistical significance at $\alpha=.05$. All values reported here fail to reach this criterion.

TABLE G3.. Differences across social position in proportion of problem drinkers and controls with the ten categories of health-related problems which were significantly different between the overall groups.[1]

Category of Health-Related Problems	UPPER/MIDDLE[2] (n=37)				SOCIAL POSITION LOWER[2] (n=41)				PUBLIC ASSISTANCE (n=30)				Result of X² test (df=2)
	Problem Drinkers		Controls		Problem Drinkers		Controls		Problem Drinkers		Controls		
	n	%	n	%	n	%	n	%	n	%	n	%	
Neoplasms	6	16.2	1	2.7	6	14.6	0	0.0	3	10.0	1	3.3	X^2 = 1.42
Endocrine/Nutrition/Metabolic	9	24.3	1	2.7	11	26.8	6	14.6	8	26.7	5	16.7	X^2 = 3.88
Mental Health	17	45.9	6	16.2	19	46.3	12	29.3	18	60.0	12	40.0	X^2 = .18
Drug Abuse (incl. tobacco)	10	27.0	3	8.1	8	19.5	4	9.8	11	36.7	0	0.0	X^2 = 3.53
Respiratory	18	48.6	15	40.5	25	61.0	11	26.8	14	46.7	10	33.3	X^2 = 4.77
Digestive	11	29.7	10	27.0	19	46.3	5	12.2	16	53.3	10	33.3	X^2 = 4.40
Skin/subcutaneous tissue	15	40.5	6	16.2	14	34.1	8	19.5	15	50.0	9	30.0	X^2 = 3.53
Signs, symptoms, ill-defined	11	29.7	6	16.2	10	24.4	2	4.9	10	33.3	1	3.3	X^2 = 4.77
Injuries/adverse effects	13	35.1	10	27.0	25	61.0	14	34.1	22	73.3	7	23.3	X^2 = 8.55
Social/marital/family	20	54.1	8	21.6	16	39.0	9	22.0	19	63.3	7	23.3	X^2 = 1.55

[1]Main group differences are shown in Table 7 in the body of the text.

[2]Upper/middle = Blishen codes I-IV, lower = codes V-VI.

[3]This chi-square test uses the discordant pairs for the three levels of social position and evaluates the consistency in the difference between problem drinkers and controls on the health-related problem. With df=2, a X^2 = 5.99 is required for statistical significance at ≤ .05. All but one value reported here (injuries/adverse effects) fail to reach this criterion.

Appendix H

Samples of various case-finding procedures

for the detection of problem drinking in

family practice patients

CAGE (Mayfield et al., 1971)

Four items: (1) Have you ever felt that you ought to Cut down on your drinking?

(2) Have people Annoyed you by criticizing your drinking?

(3) Have you ever felt bad or Guilty about your drinking?

(4) Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover? (Eye-opener)

SMAST (Short Michigan Alcoholism Screening Test) (Selzer et al., 1975)

Thirteen items: (1) Do you feel you are a normal drinker? (By normal, we mean do you drink less than or as much as most other people.)

(2) Do others who are important to you ever worry or complain about your drinking?

(3) Do you ever feel bad about your drinking?

(4) Do friends or relatives think you are a normal drinker?

(5) Are you always able to stop drinking when you want to?

(6) Have you ever attended a meeting of Alcoholics Anonymous (A.A.) for yourself?

(7) Has drinking ever created problems between you and others who are important to you?

(8) Have you ever gotten into trouble at work because of your drinking?

(9) Have you ever neglected your obligations, your family or your work for two or more days in a row because you were drinking?

(10) Have you ever gone to anyone for help about your drinking?

SMAST con't...

(11) Have you ever been in a hospital because of your drinking?

(12) Have you ever been arrested for drunken driving, driving while intoxicated, or driving under the influence of alcoholic beverages?

(13) Have you ever been arrested, even for a few hours, because of other drunken behavior?

Alcohol Clinical Index (Skinner et al., 1986)

CLINICAL SIGNS	MEDICAL HISTORY ITEMS
Hand tremor	Inability to concentrate
Tandem gait	Troubled by mental confusion
Deep knee bend	Difficulty in remembering recent events
Spider naevi (>5)	
Collateral circulation	Hallucinations
Gynaecomastia	Hands shake in morning
Abdominal tenderness	Troubled by frightening dreams
Rhinophyma	Wake up with a headache
Facial erythema	Hands often tremble
Coated tongue	Injured in an assault or fight
Oedema of soft palate	Wake up feeling thirsty
Nicotine stains	Dry coated tongue
Palmar erythema	Cough on most days
Bruises or abrasions	Bring up phlegm
Scars (secondary to trauma)	
Cigarette burns	
Tattoos	

Trauma Scale (Skinner et al., 1984)

Since your 18th birthday:

Have you had any fractures or dislocations to your bones or joints?

Have you been injured in a road traffic accident?

Have you injured your head?

Have you been injured in an assault or fight (excluding injuries during sports)?

Have you been injured after drinking?

Publications in Refereed Periodicals

Rush, B.R., Timney, C., Simmons, M., Evans, J., & Findlay, B. (In press) A comparison of psychotropic drug use among agency and general populations. International Journal of the Addictions.

Ogborne, A.C., Rush, B.R., Ekdahl, A., & Fondacarro, R. (1986). The views of health and social service professionals regarding alcohol problems and their treatment. The International Journal of Addictions, 21(9 & 10), 1051-1058.

Rush, B.R., & Gliksman, L. (1986). Alcohol availability, consumption and damage: An overview of related research and current issues. Advances in Alcohol and Substance Abuse, 5(4), 9-32.

Rush, B.R., Steinberg, M., & Brook, R.C. (1986). The relationships among alcohol availability, alcohol consumption and alcohol-related damage in the Province of Ontario and the State of Michigan 1955-1982. Advances in Alcohol and Substance Abuse, 5(4), 33-34.

Rush, B.R., & Ogborne, A.C. (1986) The acceptability of non-abstinence treatment goals among alcohol treatment programs in Ontario. Journal of Studies on Alcohol, 47(2), 146-150.

Ogborne, A.C., Rush, B.R., & Fondacarro, R. (1986) A study of the cost-effectiveness of two methods of dealing with initial non-respondents in a mail survey of health and social service professionals. Evaluation and the Health Professions, 9(1), 121-128.

Rush, B.R., Gliksman, L., & Brook, R.C. (1986). Alcohol availability, alcohol consumption and alcohol-related damage. Part I: The distribution of consumption model. Journal of Studies on Alcohol, 47(1), 1-10.

Gliksman, L., & Rush, B.R. (1986). Alcohol availability, alcohol consumption and alcohol-related damage. Part II: The role of socio-demographic factors. Journal of Studies on Alcohol, 47(1), 11-18.

Ogborne, A.C., Rush, B.R., & Dwyer, D. (1985). The development of community-based treatment systems: An Ontario perspective. British Journal of Addiction, 80, 363-367.

Malla, A., Rush, B.R., Gavin, M., & Cooper, G. (1985). A community-centered alcoholism assessment/treatment service: A descriptive study. Canadian Journal of Psychiatry, 30, 35-43.

Rush, B.R., & Malla, A. (1984). A comparison of disulfiram acceptors and refusers on selected demographic and clinical characteristics. Alcohol and Drug Dependence, 14, 75-85.

Rush, B.R., & Timney, C. (1983). The detection and assessment of alcohol-related problems in health and social service agencies. Canadian Journal of Public Health, 74, 270-275.

Ogborne, A.C., & Rush, B.R. (1983). The coordination of alcoholism treatment services: Problems and prospects. British Journal of Addictions, 78, 131-138.

Rush, B.R., Brook, R.C., & Graham, K. (1982). Alcoholics in Ontario: Where do they go for help and what happens when they get there? Canadian Journal of Community Mental Health, 1(1), 59-70. (Also reprinted in E. Bennett and B. Tefft (Eds.), Theoretical and Empirical Advances in Community Mental Health. Queenston: Edwin Mellon Press, pp. 209-220.

Gliksman, L., Smythe, P.C., Gorman, J., & Rush, B.R. (1980). The adolescent alcohol questionnaire: Its development and psychometric evaluation. Journal of Drug Education, 10, 209-227.

Books, Book Chapters, Conference Proceedings, Major ARF Publications and Reports

Rush, B.R., Timney, C., Simmons, M., Evans, J., and Cooperstock, R. (1986). A comparison of psychotropic drug use among agency and general populations. Proceedings of the 34th I.C.C.A. Congress on Alcoholism and Drug Dependence, Calgary, Alberta, August 1985, pp.117-121.

Rush, B.R., & Layne, N. (Eds.). (1985). Alcohol, drugs and Canadian youth. Proceedings of a symposium on epidemiological and social/psychological studies on alcohol and drug use among young people. Toronto, May 30 - June 1, 1984. A joint publication of the Health Promotion Directorate of Health and Welfare Canada, the Addiction Research Foundation of Ontario and the Canadian Addictions Foundation. Published at the University of Western Ontario, London, Ontario.

Rush, B.R., & Timney, C. (1985). Treatment services for alcohol and drug abuse in Ontario: Results of a provincial survey, 1983. Toronto: Addiction Research Foundation.

Simmons, M., Rush, B.R., Finlay, B., & Timney, C. (1984). Licit and illicit drug use in the Durham region: A needs assessment for treatment services. Toronto: Addiction Research Foundation.

Rush, B.R., & Ogborne, A.C. (Eds.). (1983). Evaluation research in the Canadian addictions field. Proceedings of a workshop on evaluation and addictions. Regina, September 1982. Ottawa: Health and Welfare Canada.

Rush, B.R. (1983). A management information system based on treatment clinics rather than treated clients. In B.R. Rush & A.C. Ogborne (Eds.), Evaluation research in the Canadian addictions field. Proceedings of a workshop on evaluation and addictions, Regina, September 1982. Ottawa: Health and Welfare Canada.

Rush, B.R., Macdonald, S., & Giesbrecht, N. (1982). Estimating the number of alcoholics in Ontario: An analysis by county. Addiction Research Foundation Working Paper Series. Toronto: Addiction Research Foundation.

Rush, B.R., & Brook, R.C. (1981). The use of the Ontario health and social service system by persons with alcohol-related problems. Toronto: Addiction Research Foundation.

Rush, B.R., Timney, C., & Ekdahl, A. (1981). Statistical supplement to the provincial survey, 1980: Western Region. Toronto: Addiction Research Foundation. (One volume for each of four regions).

Paper Presentations at Scientific and Professional Meetings

Rush, B.R., & Brennan, M. (1985, November). Problem drinkers, their families and Canadian family medical practice: Close encounters of a different kind? Paper presented at the Michigan Family Practice Research Day 1X, Michigan State University, East Lansing, Michigan.

Rush, B.R. (October, 1985). Maintaining credibility as an evaluator: Going from the in-house out. Paper presented at Evaluation '85, a Joint Meeting of the Canadian Evaluation Society, Evaluation Network and the Evaluation Research Society, Toronto, Ontario.

Rush, B.R., Timney, C., Simmons, M., Evans, J., and Cooperstock, R. (1985, August). A comparison of psychotropic drug use among agency and general populations. Paper presented at the 34th I.C.A.A. Congress on Alcoholism and Drug Dependence, Calgary, Alberta.

Rush, B.R., Steinberg, M., & Brook, R.C. (1984, April). The relationship among alcohol availability, alcohol consumption and alcohol-related damage in the Province of Ontario and the State of Michigan, 1955-1982. Paper presented at the annual meeting of the National Council on Alcoholism, Detroit, Michigan.

Rush, B.R., & Brook, R.C. (1983, May). The development and management of an agency-based information system in the Ontario addictions field. Paper presented at the annual meeting of the Canadian Evaluation Society, Victoria, B.C.

Malla, A., & Rush, B.R. (1983, January). Beyond the chemical properties of disulfiram. Paper presented at the annual meeting of the Indian Psychiatric Society, Bombay, India.

Rush, B.R. (1982, September). A management information system based on treatment clinics rather than treated clients. Paper presented at the meeting of the Special Interest Group on Program Evaluation of the Canadian Addictions Foundation, Regina, Saskatchewan.

Rush, B.R., Gliksman, L., & Brook, R.C. (1982, June). Determinants of alcohol-related damage in large populations: An investigation using linear structural equation modeling (LISREL). Paper presented at the annual meeting of the Canadian Psychological Association, Montreal, Quebec.

Rush, B.R. (1981, July). The role of agency surveys in the planning of alcoholism services. Paper presented at the Canadian Addictions Foundation Conference, St. John's, Newfoundland.

Brook, R.C., Rush, B.R., & Faveri, M.R. (1980, May). Assessing the implementation of a plan of action for the development of alcohol treatment services in Ontario. Paper presented at the Symposium on Alcohol Statistics, Health and Welfare Canada.