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Program Research: Attitudes and Symptom Reduction in a Preventive Medicine Clinic

Simon Fraser University

Master of Arts

1983

Dr. Ronald Roesch

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PROGRAM RESEARCH:
ATTITUDES AND SYMPTOM REDUCTION IN A PREVENTIVE MEDICINE CLINIC

by

Jacqueline Jo-Anne Douglas
B.A., Simon Fraser University, 1979

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in the Department
of
Psychology

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Program: Research: Attitudes and Symptom Reduction in a Preventive Medicine Clinic

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(Date)
Abstract

Therapeutic programs can supply researchers with scarce clinical populations, large samples and long-term testing opportunities. However, it can be difficult to accommodate both experimental rigour and the exigencies of an applied setting. This study attempted to take advantage of the above factors within a Preventive Medicine program. Symptom reduction and attitudes toward personal responsibility for health were investigated.

233 clients who had completed a Cornell Medical Index upon entering such a program were retested after 2 years or more. A significant decrease in symptomatology was identified ($p = 0.0021$), which was not related to sex or number of visits for the sample.

In a 58 subject subsample, scores on the Krantz Health Opinion Survey and the Wallston Health Locus of Control for Health were not related to symptom reduction, nor were age, sex or education. Smoking and alcohol consumption, while also not related to symptom reduction, should be retested since base measures were very low. Due to strong selection bias in the sample, these results cannot be generalized to the overall population.

Numerous difficulties were encountered during this research. Sample shrinkage, too few measuring instruments, poorly validated measures, lack of involvement with the program and its staff, no control group and other
methodological problems produced inconclusive results with no generalizability. While it is important for researchers to remain flexible in their approach to doing program evaluations and other research in clinical settings, in this case the obtained results and conclusions were considered too limited to justify the large scale efforts expended in obtaining these data.
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The development and application of research in applied settings is problematic for both researchers and program planners. Researchers frequently have difficulty gaining access to clinical populations, and program planners often institute treatment programs in the absence of advice from researchers and clinicians.

In order to be maximally effective, clinical intervention programs should be based on well researched principles and techniques. The assumptions underlying a proposed treatment plan can then be recognized, research can be sought to support or refute these assumptions, and necessary modifications can be made before the client is treated. In this way, needless consumption of time and possibly harmful aspects of the proposed intervention can be minimized or eliminated.

In examining a set of behaviours to identify areas where changes can be sought, assumptions are often made about causal links or about relationships among physiological and psychosocial factors. A thorough understanding of relationships among the relevant variables within a behavioural system provides the most justifiable basis for planning effective interventions. These behavioural systems are usually complex, and clinicians are expected to design effective treatments in the presence of multiple, interactive factors. In some cases, the intervention must be integrated into a larger program of service delivery. In order to maximize the expectation that interventions will be successful, many clinicians study medical and psychological literature in search of information that can be directly
applied to a treatment plan.

A comprehensive working knowledge of the nervous system or of behavioural research sometimes yields a useful intervention strategy, but very often it does not. Why is it so common for the best experimental minds to spend their working lives researching in a particular area of behavioural investigation, yet their many discoveries are of limited use to the clinician? It may be that the clinician is often dealing with behaviours and disorders on a very different level than is usually investigated by researchers. In the interest of attaining experimental rigour, experimentalists often must narrow the question or field of investigation, while practicing clinicians are usually concerned with a much broader segment of a physiological or psychosocial system.

It may be, for example, that motivational systems under chronic or acute stress, defined somewhat loosely, here as, "a general concept embracing all circumstances, good and bad, that require bodily adaptation by the autonomic and endocrine systems," (Buck, 1973, pg.30), behave very differently than under normal conditions or severe organic disease. If this is so, it is not unreasonable to suggest that research based on well functioning people or on those suffering from serious organic insult may not be of much help in treating the large group of clients seen by clinical psychologists today for stress induced motivational system disorders.

Animal research provides an understanding of the nervous system and the physiological aspects of such disorders as anorexia nervosa
(Bemis, 1978), obesity (Crisp, 1978) and other disorders (Bloom, Segal & Gillemin, 1976). Although other aspects of behaviour disorders are studied in animals as well, it can be difficult to relate these to a therapeutic situation with human clients.

Clinical research with humans has provided a large body of knowledge about the aetiology, symptomatology and treatment of disorders (Bemis, 1978; Crisp & Stonehill, 1971; Jenkins, 1979; Pomerleau & Brady, 1979; Selye, 1956; Vigersky, 1977; Wakeling, DeSouza & Beardwood, 1977). However, only some of the conditions in an actual intervention setting are reproduceable in the laboratory, and it can be difficult to generalize laboratory results to operating programs of intervention. Much of the research done within existing programs is difficult to apply, as well. Frequently, the need for experimental rigour and other methodological considerations (e.g., time and monetary constraints) determine the nature of the research design. This can result in a restricted study or a change in the questions asked. In this situation, the type of treatment actually investigated bears little resemblance to that received by the program's clients. This leaves an important gap between research and application.

Intervention techniques must be studied under tightly controlled conditions. However, there is also a need to investigate both the nature and the outcome of treatment as it actually occurs.

Related to this, are the issues of cooperation with program managers, and gaining access to long-term data. It has been suggested
(Cowen, 1978: Hackler, 1979) that program evaluation and program related theoretical research should be done non-intrusively within existing programs. Cowen states that the effectiveness of community service programs will ultimately be assessed by combining results from many poorly designed studies. This is because a number of obstacles to doing well designed outcome research arise from differences in values and objectives between evaluators and program staff. Hackler recommends that traditional scientific procedures be reversed, so that questions are limited by the data at hand. Rather than beginning with theories and designing research to test them, he suggests that researchers use available data to evaluate programs. He further suggests giving aid to program staff and government departments in collecting a large body of data, as a first step. Rigorous methods and complex issues could then be slowly approached, as researchers and program directors become more aware of one another's needs and more trusting of one another's intentions.

Hackler's views have been criticized on a number of points (Corrado, 1981). Hackler suggests that valid experiments should not be done (at least initially), because they are difficult to carry out within politically and organizationally sensitive programs and because their frequently negative results could exacerbate the situation by causing marginally useful programs to be cancelled. He further concludes that the difficulty of implementation and the frequency of negative results (Corrado labels this the "nothing works" position) together contribute to the scarcity of valid
experiments in these settings. Corrado suggests that Hackler's conclusions are both contradictory and based on invalid assumptions. He offers alternative explanations for the paucity of experiments and for the frequency of negative results. Corrado also gives examples of interpretation errors in negative evaluation reports and points out that experimental studies have found some programs either partially or wholly effective. These criticisms severely weaken the validity of Hackler's recommendations. Whether or not these recommendations are justifiable on the basis of his evidence, some of the issues raised should be investigated. It is important to deal with the issue of doing valid research within the program setting. There is also a need for research that can be directly applied to the design of intervention plans.

In the foregoing discussion, two problem areas have been addressed. First, it is often difficult for practicing clinicians to make use of experimental findings. Second, it has been suggested that it would be well to make use of existing data, because professionals are often loathe to have researchers "interfering" with their clients. In conjunction with this, there are often large samples and long-term data available within ongoing therapeutic programs that are not easily accessible to researchers from other sources.

In effect, it is suggested (Hackler, 1979) that in order to be relevant to the treatment situation, to maximize cooperation from practitioners, and to use existing data well, researchers should be
tailoring projects to fit established programs and data bases. It is further suggested that this be done in a non-instrusive manner for both program evaluation and other types of research.

Prevention

Preventive intervention is one area where these issues can be addressed. Experimental data on the aetiology and early treatment of disorders are particularly relevant to this type of intervention. Preventive treatment plans generally deal with comparatively large numbers of people, making programs based on this model potentially useful as a way to spread the expertise of a few professionals among many recipients. Some aspects of the intervention can be allocated to non-professionals or to the client. Preventive programs can reduce the risk of severe problems developing, while encouraging clients to participate in their own health care.

In the mental health field, three levels of prevention have been defined (Caplan, 1964) according to the point at which intervention occurs and the type of target population. Primary prevention occurs earliest in the process of disorder development. This is least closely related to the work traditionally done by mental health specialists in their efforts to eliminate disorders. This type of prevention involves intervening before symptoms occur so that a disorder is prevented from developing. Primary prevention has been defined as a community concept which involves lowering the rate of new cases in a population over time. Its target is not the individual. Its aim
rather, is to reduce the risk of developing illness for a whole population so that fewer people will become ill.

Secondary prevention seeks to lower the incidence of a particular disorder within an "at risk" population. This is usually attained by treatment of existing cases to lessen their severity and duration. Thus, the relevant factor in secondary prevention is decreasing identified cases. Specificity is important here in terms of disorder, so that problems are identified early and eradicated before they become epidemic or more severe within the target group.

Tertiary prevention can be viewed as primarily a patch-up measure. Here, intervention occurs well after a disorder has developed, and its focus is on the individual. Community wide rehabilitation is attempted by individual treatment. This type of intervention is closest to the practises of most community mental health and medical treatment centres, in that problems are seldom attacked until they are well entrenched.

Although Caplan's three level definition of prevention was developed explicitly to fit a community wide concept of prevention which is distinct from the conventional psychiatric practise of one-on-one intervention, its concept of levels can also be applied to individual treatment. In this way, lifestyle changes designed to eliminate factors which could lead to disease can be described as primary prevention, treatment of isolated symptoms before the actual development of a syndrome can be seen as secondary prevention, and various forms of direct treatment of well established disorders can be viewed as tertiary treatment on an individual level. For the
purpose of prevention, only primary and secondary intervention are of genuine interest. Tertiary intervention can be viewed as preventing disease progression or preventing mortality. However, these are not generally the goals of prevention programs.

Preventive Medicine

In preventive medicine programs, there is an interface between psychology and medicine. In striving to prevent the development of degenerative disease, physical complaints are addressed before they occur. This is generally accomplished through attempts to reduce risk factors. Some of the risk factors involved, such as hypertension and obesity, are of interest to physicians as predisposers to degenerative disease, and they are widely studied by psychologists, as well. These complaints are particularly interesting to those who study behavioural medicine (Pomerleau & Brady, 1979).

In the past, programs of prevention have been aimed primarily at reducing risk factors within a fairly large segment of the population. Three related methods of intervention have been widely used to counteract the spread of degenerative disease. Personal health services such as vaccination, educational measures and environmental action have all been found useful to various degrees. At present, several large scale intervention trials are underway in Europe and the United States (Breslow, 1978; Hall, Robbins & Gesner, 1972; Williams & Arnold, 1977). The goals of these programs are to test the feasibility of reducing risk factors and, ultimately, to reduce disease. The Multiple Risk Factor Intervention Trials (MRFIT) used group therapy to
facilitate lifestyle changes in 12,866 people at risk of coronary heart disease. These measures were specifically directed at nutrition, smoking and hypertension. Those who reached a criterion risk factor reduction were subsequently placed on maintenance programs (Breslow, 1978).

A more cost effective method was used by the Stanford University Heart Disease Prevention Program. In this study, two California communities were the target of extensive mass-media campaigns over a two year period. In one of these, individual counselling was also provided for a small subsample with a third community used as a comparison group. The treatment communities received information via television, radio, billboards, posters and the mail. They showed a sustained decrease in risk factors over two years, whereas the "untargeted" comparison community increased risk factor levels. Evaluators concluded that these methods can persuade people to change their habits and effectively decrease the risk of heart disease at a reasonable cost in dollars (Breslow, 1979). Actual costs of the program were not reported by Breslow. However, a cursory comparison of the Stanford and MRFIT programs suggests that the Stanford technique, emphasizing large scale advertising, would be less costly on a per capita basis than the MRFIT which offered more personal attention.

In Finland, the North Karelia Project was instituted to decrease cardiovascular disease, especially among middle aged males. The goals of this project were to lessen risk factors and to provide tested field methods for nationwide use in the control of general health problems.
The program was designed to run over six years. It employed a variety of techniques administered by individuals or institutions. Intervention methods included media campaigns, environmental changes such as restriction of public smoking, training health care personnel, and providing health information to the public. Findings at the end of four and one half years indicated enthusiastic public cooperation, decreased smoking among middle aged males, increased use of low fat milk, and decreases in blood pressure. A decline in the incidence of strokes was noted, as well (Breslow, 1978).

Several other programs are still in progress. The American Health Foundation's "Know Your Body" programs among New York school children is monitoring and trying to decrease raised blood cholesterol, high blood pressure, smoking, obesity and other risk factors (Williams & Arnold, 1977). There is also a program in Switzerland set up to enlist community resources in the reduction of cardiovascular risk factors in the population (Breslow, 1978), and the Health Hazard Appraisal Program which was developed at the Indianapolis Methodist Hospital is used throughout North America to evaluate individual risk level (Hall, Robbins & Gesner, 1972). Several of these programs (for example the Stanford and North Karelia projects) concentrate their efforts toward environmental change on community-wide education. Others, such as MRFIT, approach prevention on a more individual level.

There is already some evidence that the Stanford and North Karelia projects have had at least some effect on cardiovascular risk factors, although some of the necessary control comparisons have not been made.
One difficulty with interpreting results obtained from specific programs is the possibility of confounding by a general trend toward lowered incidence of such risk factors as smoking and hypertension in control groups. This effect has been attributed to a general increase in health awareness over the past decade (Breslow, 1979). It may be difficult to separate out how much of this awareness is related to the existence of preventive programs and government interest in such matters.

The MRFIT project has not yet produced clear evaluation results, since it has been underway too short a time to permit compilation of results pertinent to the program's objectives. As data become available from the various studies within this relatively new area of intervention, the feasibility of preventive programs will be more easily evaluated. Evaluation of these programs will provide data on successful preventive techniques, and could make preventive medicine more cost effective, since more time and money could be channelled into those techniques and programs that have been found most useful. Ineffective measures could be dropped or modified.

Furthermore, if the apparent trend toward this type of intervention holds, efforts to maintain health will likely focus increasingly on risk factors rather than on established diseases. Decisions concerning governmental support for such a trend will, hopefully, depend on the results of evaluative studies within existing programs. There is a clear need for both process and outcome evaluations in this area to provide information on which to base these decisions.

Evidence is rapidly accumulating that a decrease in risk factors
and symptoms of ill health is due, largely, to particular aspects of lifestyle change (McCamy & Presley, 1975). Activity level, nutrition, smoking and drug use affect both general health and longevity. It has been stated (Breslow, 1979) that health maintenance requires a positive (active) strategy to prevent disease and extend life. This could be attained by developing healthful lifestyles, improving the environment and turning the focus of medicine toward health maintenance.

The type of preventive efforts now being advocated by Breslow and others encompass additional efforts to those possible within a traditional physician's office. People must also take steps to protect their own health. While post-illness medical care can usually deal with symptoms on a fairly immediate level, preventive medicine extends into all facets of life. This requires systematically attacking two types of risk factors in human illness. One is the body changes which precede illness (e.g., high blood pressure and elevated serum cholesterol levels). Another is personal habits such as smoking and poor nutrition. Breslow suggests that packages of health care should be geared to the specific needs of people as they age. Toward this end, the medical profession has become increasingly interested in the practice of preventive medicine. It has been suggested (Schuman, 1979) that during the 1980's there will be an increase in both the quality and quantity of preventive medicine practiced by physicians in family practice. As preventive medicine becomes more popular, it is likely that private physicians will base their practices on this concept rather than on the concept of cure.
Responsibility as an Issue in Prevention

Responsibility for decreasing risk factors rests, ultimately, with the individual. Many of the steps considered necessary, such as decreasing health threatening habits or removing harmful factors from one's immediate environment, occur through changes in behaviour. Personal responsibility for individual health care is one aspect of the larger issue of personal responsibility for one's own wellbeing. Involving the client in his/her own health care has been used to aid in lowering risk factors, along with other intervention techniques.

One type of intervention which involves both self-involvement and personal control with respect to taking preventive action is contingency or behavioural contracting. This form of intervention was introduced by Homme, Csanyi and Rechs (1969) as a device for altering classroom behaviour, and has since been used in the treatment of alcoholism (Miller, 1972; Miller, Herson & Eisler, 1974), drug abuse (Boudin, 1972), marital problems (Jacobson, 1977; Stuart, 1969), smoking reduction (Elliott & Tighe, 1968; Winnett, 1973), and in self-treatment of a number of problem behaviours (Kanfer, 1980).

Of particular interest, here, is the effect of personal involvement and personal control on therapeutic outcome. In looking at these factors as outcome predictors, Vanicelli (1979) found a negative correlation between the amount of therapist input in a contract for controlling alcohol abuse and aftercare participation. To the degree that cooperation in the form of voluntary post-treatment contact can be considered an outcome, more self-involvement in defining the contract
resulted in a more positive outcome (continued cooperation) for this clinical population.

Self-involvement in treatment initiation also affects outcome. Using attendance rates at alcohol treatment centres as an outcome measure, Rosenberg and Lifitik (1976) found that involuntary referrals were significantly more likely to attend than were voluntary referrals. Another study (Davis & Ditman, 1968) found no difference in the outcome measure of attendance.

Other intervention outcome measures also showed no difference between more or less self-involvement. Using the decision to seek help as an indicator of self-involvement, no difference was found in length of abstinence during the first year post-treatment (Aharan, 1967). Similar results were found (Voegler, 1976) using absolute alcohol consumption as an outcome criterion. However, this finding did not hold across all studies using decision to seek help as an indicator of self-involvement. Wexberg (1953) found that self-referrals were twice as likely to have reduced alcohol consumption six months after treatment began, and were more likely to experience self-reported "social improvement" than were those coerced into treatment.

In their review of this research Dunham & Mass (1982) concluded that the studies contained several methodological problems, especially selection bias. Dunham and Mass attempted to clarify the somewhat contradictory evidence. They looked at the effect of four types of referral for treatment and various demographics, (e.g., sex, age, occupation, prior treatment), on "stable abstinence" after
treatment ceased. They found that coercion resulted in significantly higher success rates than did self referral for most patient types. One interesting subgroup labelled "institutionally dependent", was found most successful in this treatment program. Group members were referred by agencies for treatment, and were judged highly dependent individuals. A significant difference in outcome between these and the group identified as independent (self referral group), who were least successful, was noted. This indicated a personality related differential success rate for self-involvement and/or for personal control in at least one phase of treatment. Lack of responsibility for decision making (to the degree that this can be considered the relevant variable in referral by an external source) seems to result in a more positive outcome for dependent individuals. The opposite effect is found for independent personality types within the alcohol abusing population used in this study.

Along with their effects on client cooperation and on other outcome measures, personality variables are related to a variety of physical complaints. Some personality factors that have been shown to relate to physical symptomatology are self concept (Gottsmans & Lewis, 1982), state-trait anxiety (Auerbach, 1973; Spielberq, 1973) and assertiveness (Keane, Martin, Berber, Wooten, Fleece & Williams, 1982). Furthermore, locus of control has been found to relate to how victims react under crisis (Smith, 1970), particularly cancer and surgery crises (Gottsmans & Lewis, 1982).

Whether cooperation at various stages of treatment is viewed as an
intervening variable between the treatment and the final result or whether it is used as a treatment outcome measure, it is of interest in a study of preventive intervention. It is especially applicable where the decision to carry out preventive measures is primarily up to the individual, as it is in a small scale private program. Here, it may be important both in treatment initiation and in carrying out suggested lifestyle changes.

A number of factors have been found to influence a client's use of preventive health practices. Rosenstock (1974) proposed the Health Belief Model of preventive health behaviour. This model states that cooperation with preventive regimens can be predicted by susceptibility to a particular disease, degree of severity of disease contracted, believed efficacy of preventive action, barriers to action such as physical or financial difficulties etc., and presence of a cue to action that enhances the client's awareness of his/her feelings about the condition. This model has been used to predict participation in a number of preventive programs (Becker, Kaback, Rosenstock & Ruth, 1975), and immunization of various types (Cummings, Jette, Brock & Haefner, 1979).

In addition to health beliefs, intention has also been found important in predicting cooperation with preventive programs. Immunization behaviour (Cummings et al., 1979), women's contraceptive choice (Davidson & Jaccard, 1975), smoking behaviour (Salber & Abelin, 1967) and tuberculosis screening participation (Wurtele, Roberts, & Leeper, 1982) have all been associated with behavioural intention.
A strong relationship of attitudes and intentions to behavioural outcomes other than compliance has also been well supported (Ajzen & Fishbein, 1977; Bagozzi, 1981; Fishbein & Ajzen, 1974; Weigel & Newman, 1976).

In addition to its relationship to outcomes of various sorts, attitude has been found to relate to personal involvement. Petty, Cacioppo & Goldman (1981) concluded that under conditions of high personal relevance, attitudes are primarily influenced by quality of information. Under low involvement conditions, the source is more important. In the preventive health care field, therefore, it may be that information is more important for some client subgroups (e.g., those who perceive the issue as one of high personal relevance), while the actual setting and its staff may be more salient for others (e.g., those who perceive the issue of little personal relevance). If this is the case, it would require different approaches to maximally influence each group toward changes in lifestyle.

The Present Study

Clearly, the relationship of attitudes to health related behaviour and its outcomes is not a simple one. Personality variables, intention and compliance are some of the factors involved in this complicated issue. One of the many questions needing further study is the relationship between attitudes, personal control over treatment, and outcome.

A well established private preventive medicine clinic provided a
setting within which the following issues could be addressed:

1. Investigation of the process involved in seeking clear, useable outcome data from a post-hoc, non-intrusive evaluation, as measured by symptom reduction.

2. Advantages and problems in such an undertaking. Does the quality of results support the use of these techniques?

3. Investigation of a psychological question under the above conditions. Is there a relationship between attitude toward health care, feelings of personal control over health, and degree of symptom reduction?
Method

The Setting

The Vancouver Preventive Medicine Centre. This program was established in response to a perceived need in Vancouver for a positive program of health maintenance. Two physicians founded the centre in February, 1977 with five doctors now on staff. There has been a number of newspaper reviews and several other types of media coverage since the centre opened. This coverage has all been positive, and public opinion is clearly in favour of such a program. It is still to be determined, however, whether it is effective.

The centre operates on a self-referral basis, with the aim of identifying and decreasing risk factors for the development of disease. The primary intent is to induce clients to modify harmful aspects of their lifestyle. For each patient, risk factors are determined through interviews, physical examination and appropriate laboratory tests. Plasma triglycerides, cholesterol, glucose levels and uric acid are measured. Doctors counsel improved eating habits in an attempt to bring elevated levels of the above factors to acceptable levels. Coronary risk analysis is calculated based on laboratory tests and various personal habits, and expressed as a numerical value. This score is calculated in such a way that it correlates positively with degree of risk of coronary problems. Further to this, a Health Hazard Appraisal (Milsum, 1978) is done. This computer scored, and the client's "effective age" is calculated. Effective age is an expression of
physical degeneration, and it often differs markedly from chronological age. Where this occurs, information is given on how to attain a more desirable effective age. Since elevated effective age is a strong risk factor for a number of diseases (Milsum, 1979), patients are encouraged to make concrete efforts toward decreasing it.

The patient's stress level is also monitored using the Social Readjustment Rating Scale (Holmes & Rahe, 1967). Those experiencing high scores on this measure are informed that they are at risk of developing problems in both physical and psychological health. They are instructed in methods of decreasing stress factors in their environment, either through modification of their own habits or of their environments. A computerized dietary analysis reveals specific nutritional deficits and instructions on improved diet are given where necessary. In addition to all of this, a personal data sheet is kept to monitor each patient's progress. During the initial interview, past and present symptoms are monitored using the Cornell Medical Index Health Questionnaire (Brodman, Erdmann, Lorge, & Wolff, 1949). This information is used in initial diagnosis, as well as to monitor general levels of health.

Physicians at the centre were very cooperative in providing data and access to a large subject pool for the study. As a result of the apparent success of their efforts, they were anxious to have their program evaluated. However, since these doctors feel strongly that patients should not be inconvenienced and since they do not have time or funds to contribute to the research, the setting presents a
particularly challenging situation for doing research. Since established treatment programs frequently present similar situations, it would be interesting to explore the possibilities offered by this program. There have been few evaluative studies of preventive medicine of any description. Of the several government sponsored preventive health care programs now running, only a few have been in effect long enough to yield any evaluation data. Furthermore, there have been no evaluation studies found on preventive medicine in private practice. As the medical profession's interest in this aspect of medicine and its commitment of time and resources are increasing (Geyman, 1979; Sloane, 1979), there is a real need for evaluation of preventive medicine in family practice.

Applicability of the Setting. The issue of personal responsibility for health care is also of primary importance in this program, because preventive lifestyle changes are ultimately left up to the patient. Evidence is rapidly accumulating to support the idea that eating, smoking, exercise and other lifestyle changes result in decreased risk factors for disease. Activity level, nutrition, smoking and drug use affect both general health and longevity, and these can only be controlled, barring legislative changes, by the individual (Breslow, 1978; McCamy & Presley, 1975). Responsibility for decreasing risk factors rests, finally, with the individual since risk factor reduction is accomplished through behaviour change. Researchers in the area of psychosomatics have long been aware of the intimate connection between
psychosocial and physiological factors in the development of disease.
Attitudes toward personal responsibility for health care is one
psychosocial variable that may affect both compliance with treatment and
self-referral. These actions, in turn, may affect symptom reduction.

This setting provides the opportunity to look at the relationship
between individual attitudes toward health care, feelings of personal
responsibility for health care, and physical symptoms. Additionally, it
provides an opportunity to examine the possibilities for answering
research questions within an ongoing intervention program, using
non-intrusive data collection methods.

Tests

Cornell Medical Index Health Questionnaire. The Cornell Medical
Index (CMI) was chosen as a symptom checklist and as a future
evaluation tool by the medical practitioners at the formation of the
Vancouver Preventive Medicine Centre. This instrument had already been
in use for three years prior to the beginning of this study. It
provided the only useable long-term pretest data for identifying a
change in symptomatology for the Centre's client population.

The CMI is a self-administered, sex-specific questionnaire given
to people older than 13 years of age. Administration time is estimated
at 10 to 30 minutes for the 125 items, each answered "yes" or "no".
The questions are informally worded to make them suitable for
administration to a varied population, and their selection was based
on questions generally asked by physicians in a comprehensive medical
history (Brodman, et al., 1949). The questions are clustered according to particular organ systems, into subgroups for the following content areas: A - eyes and ears; B - respiratory; C - cardiovasuclar; D - digestive; E - musculoskeletal; F - skin; G - nervous system; H - genitourinary; I - fatigueability; J - frequency of illness; K - miscellaneous diseases; L - habits; M - inadequacy; N - depression; O - anxiety; P - sensitivity; Q - anger; R - tension. Analysis of test results are often further divided into sections A-L for various somatic symptoms and M-R for psychological symptoms.

In an attempt to provide content validity, Brodman, Erdmann, Lorge & Wolff (1951) showed 94% agreement with hospital examinations on general diagnoses and 87% on specific illness categories. In later studies, Brodman, Erdmann, Lorge, Gershenson, and Wolff (1952) and Brodman, van Woerkem, Erdmann, and Goldstein (1959) were able to discriminate between a number of groups using CMI patterns of responses.

In addition to its usefulness as an indicator of physical ill health, it has been used to indicate emotional disturbance. In this regard, the original studies carried out by the developers of the test were not convincing. Using a sample of 5,121 medical and surgical patients from New York City Hospital, a 526 patient subsample of these who were diagnosed as neurotic during subsequent examination, 610 randomly selected New York residents, 459 hospital employees and 371 male psychiatric outpatients, Brodman et al. (1952) concluded that certain patterns of response on the CMI could be an indication of
emotional disorder. Brodman and his colleagues found that 30 or more "yes" responses were given by 76% of psychiatric outpatients, 65% of females in the neurotic group and 52% of males in the neurotic group. Excluding the 5,121 hospital patients group from which the neurotic group was selected, the next highest proportion with a score of 30 or more occurred for females in the "normal" New York residents. These proportions were, apparently, compared subjectively with proportions of these groups who had scores of 10, 20, 40, 50, 60 and 70 "yes" responses on the CMI. For the category of "20 yes responses", the differences between the "normal" groups and the emotionally disturbed groups were not as subjectively striking as in the "score of 30" category. Only the hospital employees group occurred markedly less often than the other groups in the "20 yes response" category (5% males; 13% females). However, since no statistical comparisons were reported, these scoring categories may not be a valid discriminator among groups, based on these data.

This group of researchers also reports that emotional disturbance can be assumed from answering both "yes" and "no" on 3 or more questions, omitting 6 or more questions, or from adding 3 or more remarks or question modifications. However, this conclusion is based on frequency of occurrence within the 5,121 hospital patients, with no other group used for comparison. Since no comparisons were reported, the conclusions are unwarranted.

Other researchers have found differences among general medical patients and neurotics. Brown and Fry (1962) found that the mean total
of "yes" responses for two samples of subjects taken from general practitioners' patient loads were 15.4 and 17.4, while two neurotic samples (as defined by elevated scores on Eysenck's neuroticism scale) had mean totals of 29.8 and 41.3. In another study, Desroches and Larson (1963) reported total scores of 45.3, 58.0 and 69.7 for domiciliary, general medical and psychiatric patients respectively. These subjects were selected from patients attending a veteran's hospital. Scores for all groups in this study were well above those found by Brown and Fry to separate psychological disorders from other types of complaint. Reasons for this are not clear. However, these findings do bring into question the validity of either the samples used or of the CMI as a discriminator of psychological disorder.

Further studies have correlated either the total CMI scores or various subsection scores with established tests of emotional disorder (Dudley, 1976; McDonald, 1967; Marks, 1967; Verghese, 1970; Weiss, 1969). A typical criterion for emotional disorder has been the 30 or more "yes" responses on the total CMI found by Brodman et al. (1952), although others have been identified. Ryle and Hamilton (1962), in screening married couples for neurosis, defined CMI scores of 0-15 as normal, 16-30 as intermediate, and more than 30 as highly neurotic. Pond, Ryle, and Hamilton (1963) found that more than 16 "yes" responses with a congruent diagnosis from a doctor was sufficient to indicate neurosis in a working class population. A total score of 30 or more, or a score of 10 or more on sections M-R was used as a criterion for neuroticism in 234 general hospital patients (Johns, 1972).
While a number of research reports have accepted raised CMI scores as an indication of emotional disturbance, the validity of these assumptions has been frequently criticized. Some researchers (Abramson, 1966; Desroches & Larson, 1963) argue for the importance of local norms. Others (Amoff, Strough & Seymour, 1956) state that the usefulness of the CMI is not on a statistical level, but rather as a tool for gathering valuable information in a standardized, economical and objective manner to aid clinicians in medical examination.

The CMI has some face validity as a symptom checklist and as a conserver of physician hours, but it is not feasible as a quantitative measure of psychological adjustment. Levitt (1974) suggests that when only a total score is required there are a number of measures available which are more easily and quickly administered. However, when used as a symptom checklist the CMI can provide information about patients' total health in a manner that is easily accessed by busy medical practitioners. Most objections to the CMI as a valid quantitative measure of psychological adjustment seem to be based on the simplicity of design form, subjective basis of original item selection and lack of normative data. With regard to its lack of normative data, most research has been concerned with emotionally or chronically physically ill patients, or for very select subgroups of the general population (Brodman, Erdmann, Lorge, Deutschberger & Wolff, 1954; Caldebeck-Meenan, 1966; Lawton, 1959; Richman, Slade & Gordon, 1966; Stout, Wight & Bruhn, 1969; White, Reznikoff & Evel, 1958).

Scores are affected by childhood experiences and marital adjustment
(Ryle & Hamilton, 1962), by age and possibly by social class. Reportedly, the CMI has shown little predictive validity for specific physical disorders, but does correlate fairly well (correlation value unreported) with physicians' appraisals of emotional health (Abramson, Terespolsky, Brook & Kark, 1965). Sex, education and ethnic group appear to have little or no effect on its validity.

In order to deal with some of the criticisms of the CMI and to supply more essential normative data, Seymour (1976) studied 1046 male military applicants for response patterns on the CMI. It was found that those diagnosed with other measures as neurotic scored higher on the CMI than those diagnosed normal. In addition, there were several patterns of response which distinguished a group of "high responders" from "low responders". Overall, Seymour concluded that the CMI provided substantial predictive validity in the context of health care for this sample. However, the skewed distribution of responses to different subsections indicated that equal weights cannot be given to each response. He stated that it is unreasonable to consider seven "yes" responses on sections J (frequency of illness), C (cardiovascular), and D (digestive) to be equivalent. These results and conclusions suggest that it may not be wise to consider the number of "yes" responses, alone, as an indicator of emotional disorder. It may also be a poor basis for distinguishing between groups within the general population. Rather, the pattern of response may be more important as an indicator.

Seymour tested subjects twice, with a 14-16 week interval between
tests, in an attempt to provide validity data. The CMI was administered initially, and another (name unreported) physician's checklist was given after the interval. Because there was significant correlation between the scores on these two measures, it was concluded that some measure of reliability was given for the CMI. This is an extremely weak argument for reliability of this measure. Certainly, a clearer picture would have emerged had it also been administered after the 14-16 week interval. These data indicate more about symptom stability than they do about the CMI's reliability. However, since no other reliability data have been located for this measure, it has been reported here.

Another study (Clum, Flag & Holberg, 1970) investigated the differential stability of individual CMI items during Marine recruit training. While there was a lack of stability for historical items in the Index, it was concluded that subjects were under stress and were therefore, highly atypical. This, then, was thought to indicate that the lack of reliability demonstrated on this area of the questionnaire may not generalize to other situations. However, since no reliability was demonstrated for particular subsections either, the measure does not appear to be quantifying a stable trait.

Short interval test-retest reliability is also lacking in the CMI (Jurjevich, 1966). In a sample of male military outpatients, the CMI was found to be unstable over a period of 11 days.

Based on the above studies, it must be concluded that this measure is rather unstable over time. However, a symptom checklist is expected
to be monitoring a transient condition, and the CMI may be useful for this purpose. Generally, this test has gone out of fashion in recent years as a research instrument because of its unwieldiness and the availability of shorter and less subjectively derived tests. One reviewer strongly questions its use as a psychometric instrument (Lykken, 1972). Although it has been shown as a poor measure of most psychological disorders and is not a reliable measure of any trait that can be monitored over time, it is still used as a symptom checklist by physicians in medical practice. Since it apparently has face and content validity for the purpose of identifying malfunctioning organ systems and particular physical disorders, its continued use in this setting is understandable. However, its use as a research tool in any but the broadest sense is indefensible. The only parameter that this instrument can be assumed to indicate with any measure of certainty is number of symptoms of ill health being experienced at time of administration.

For the purpose of this study, the scores reported for subjects on the CMI will be interpreted only as number of reported symptoms. It cannot be assumed that a decrease in overall symptom number actually indicates improved health. That kind of interpretation would require careful scrutiny of both number and type of item by a qualified medical practitioner. The "meaning" of the responses given in this research will, therefore, not be sought.

Since this instrument has been used by the Preventive Medicine Centre at patient intake interviews from the program's inception, it
offers a useful gauge of increase or decrease in number of symptoms of ill health before and after treatment at the Centre. The change in quantity of symptoms is considered to be a useful measure of overall patient discomfort (Brodman et al., 1951). Where the change is large, it may even indicate a change of state from psychological disturbance to an undisturbed state (for example, a change from 30 "yes" responses to 5 "yes" responses, overall). Therefore, the CMI will be considered to be indicative of change which is undefined relative to health status, but indicative of general discomfort.

Krantz Health Opinion Survey. This test was developed and validated in 1980 as an attempt to provide a measure of individual attitudes toward different treatment approaches (Krantz, Baum & Williams, 1980). Since previous research suggested that patients prefer various levels of active participation in their own health care, Krantz and his colleagues reasoned that a valid measure of patient preferences would be related to treatment outcomes. Scales were constructed to measure two important aspects of self-involvement. These are acceptance of information offered by medical practitioners and active involvement in self care.

The sixteen item test was developed from a pool of 40 original questions, using a 359 subject sample. Factor analysis yielded a Behavioural Involvement Subscale (11 items) and an Information Subscale (7 items). High scores represent positive attitudes toward both self directed and informed treatment. Items in both subscales refer to
routine aspects of health care, rather than severe illness. For this reason, it was deemed particularly suitable for use in this study, since preventive health care as practiced at the Vancouver Preventive Medicine Centre deals primarily with routine health improvement measures and changes in lifestyle, rather than with illness, per se.

The total Krantz Health Opinion Survey (HOS) showed a Kuder-Richardson Reliability of .77, .74 and "above .74" when administered to three separate college student samples. Test-retest reliability was .74 for the total HOS Scale over a seven week period.

Validity of this test was established through administration to unselected residents of a college dormitory, students reporting to a college infirmary for minor illness and students enrolled in a medical self-help course. The three samples which represented extremes in preference for different types of treatment scored as predicted, and the tests discriminated between these groups. Norms are provided in Table 1. The test correlated .31 with the Wallston Health Locus of Control Scale, which measures expectancies of ability to control one's own health. It showed "only modest" correlation with repression-sensitization (value unreported), and low or near zero correlation with the Crowne-Marlowe Social Desirability Scale and with the Hypochondriasis Scale of the MMPI. Overall, the test was found to be a reliable, valid measure of patient attitudes toward self-involvement in health care.
Table 1

Normative Data for the Krantz Health Opinion Survey

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Score</th>
<th>SD(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Dormitory Residents</td>
<td>56</td>
<td>7.84</td>
<td>3.25</td>
</tr>
<tr>
<td>Users of College Infirmary</td>
<td>81</td>
<td>7.31</td>
<td>3.45</td>
</tr>
<tr>
<td>Students in Self-help Class</td>
<td>12</td>
<td>10.75</td>
<td>3.79</td>
</tr>
</tbody>
</table>

\(^a\) Standard Deviation.

Wallston Health Locus of Control Scale. This eleven item scale was developed as an area-specific measure of expectancies regarding locus of control in health issues (Wallston, Kaplan & Maides, 1976). It has been shown to provide discriminant validity from Rotter's (1966) Locus of Control Scale. It was also found to be almost totally free of social desirability bias, as shown by a correlation of -0.01 with the Crowne-Marlowe scale. Furthermore, "internals" as measured by this instrument who value health highly sought more health related information than other groups. Weight control patients reported being more satisfied with the program when it was consistent with their Health Locus of Control type.

Norms are provided for primarily black, hypertensive outpatients, college dormitory residents and older college students who do not live on campus (see Table 2).
Table 2

Normative Data for the Wallston Health Locus of Control Scale

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Score</th>
<th>SDa</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Studentsb</td>
<td>185</td>
<td>34.49</td>
<td>6.31</td>
</tr>
<tr>
<td>College Students</td>
<td>94</td>
<td>33.08</td>
<td>5.35</td>
</tr>
<tr>
<td>Community Residents</td>
<td>101</td>
<td>35.93</td>
<td>7.11</td>
</tr>
<tr>
<td>Hypertensive Outpatients</td>
<td>38</td>
<td>40.05</td>
<td>6.22</td>
</tr>
</tbody>
</table>

a Standard Deviation.
b Two separate groups of College students were tested.

Subjects

Data Set A. Test-retest data were obtained from 233 of the 729 patients who attended the Vancouver Preventive Medicine Centre, 1743 West 10th Ave., Vancouver, B.C., between August, 1977 and August 1979. The primary data source was patient files kept by the Centre, for clients who had completed a CMI during their first visit. Some of the files had been closed because patients no longer maintained contact, while others were still open. For the open files, active involvement continues. Of the 729 patients' files for which a CMI had been administered at the intake interview, 20.9% (153 patients) had not continued after the initial visit. This group was labelled "drop-outs". An attempt was made to obtain retest data from both drop-outs and patients with continued contact (sample shrinkage shown in Appendix A).
For this phase of the investigation, drop-outs were labelled "control group" and those who had visited the centre at least twice were the experimental group. Most of the experimental group had visited the Centre a number of times. However, actual number of visits was not recorded on most of these active files. These two groups were separated in an attempt to identify a treatment versus a non-treatment group. These two groups were subsequently combined under the label "responders" (N=231) for further analyses. At this point, two male Ss were dropped. One had completed the female version of Section H, and the other had completed both male and female versions of this section.

A second group of patients were selected who had been given the CMI during their intake interview, but who had not returned the second (mailed) questionnaire. This group of 236 "non-responders" was randomly selected from the total Vancouver Preventive Medicine Centre patient population, excluding those used in the first phase of the investigation. The number was chosen to be approximately equal to the responder sample. This group, along with 229 of the responder sample comprised Data Set A. Two more of the responder group were dropped after reliabilities for the CMI had been calculated. These two subjects were found to be outliers within a subsample of this group (Data Set B) and were, therefore, dropped from both samples. Appendix A explains sample shrinkage.

Data Set B. The original sample for this section of the investigation consisted of 126 (54%) of the original 233 member "responder" group used
in the first phase of the project. These 126 subjects represent all of those people in the responder sample for whom data on smoking, alcohol consumption, miles driven per year and seat belt use had been collected at their original visit to the Centre. Since smoking and alcohol consumption were to be monitored for changes and included in the analyses, only the 126 subjects were used.

Testable data were obtained from 60 of these (21 males, 39 females), representing 47.6% of the original subsample. Two male subjects had very high scores on the CMI. Since these scores were important variables in subsequent regression analyses within this sample, these two subjects' results were judged to unnecessarily bias the sample. These outliers were, therefore, dropped from both Data Set A and Data Set B. Sample shrinkage for Data Sets A and B are detailed in Appendix A.
Procedure

All patients who had come to the Vancouver Preventive Medicine Centre (PMC) and completed a CMI prior to August, 1979 were sent a second copy by mail. Both active and inactive files were used. A covering letter briefly explained the purpose of the CMI, assured the patient of confidentiality, and made a plea for cooperation.

A stamped self-addressed envelop was included with the questionnaire to facilitate return rates. The first mailing consisted of 576 experimental subjects and 153 controls. In an attempt to separate out a control group of untreated patients, experimental were those who had continued after first contact with the PMC. Controls were those who had visited the centre only once.

Data Set A

This mailout yielded, after 11 weeks, 197 experimental subject returns (34% of experimental subject pool), and 33 controls (21.5% of control subject pool). A telephone campaign aimed at increasing return rate resulted in five more returns out of 162 recontacts. At this point, efforts to increase response rate ceased. Overall, 202 experimental returns and 33 control returns were received. Two experimental subjects were deleted because only half of the questions had been answered. The final sample comprised 34.7% of the experimental subject pool and 21.5% of the control pool. This was a somewhat disappointing amount of analyzable data. However, many of the
non-returns had moved, leaving no forwarding address. For those who were contacted more than once, it was decided that yet another reminder may be interpreted as intrusive and would reflect badly on the PMC. Time and money were also important considerations in the decision to proceed with a total of 233 subjects. Each subject was tested twice, for a total of 466 completed CMI's.

Since one subsection of the questionnaire differed for males and females (H - genitourinary), there were 126 separate questions for females and 124 separate items for males.

An IBM 370/148 Computer was used for data analysis. MTS raw data files were analyzed using analysis of variance for repeated measures (BMDDP2V). Total number of "yes" responses on the CMI over sex, group (experimental or control) and time (intake=Time 1; retest=Time 2) were analyzed.

From the 496 patients who did not return a useable CMI, 236 were randomly selected to roughly coincide with the 233 member responder group. The 236 subjects were labelled "nonresponders". Two responders were deleted who had questionable patterns of response on the CMI, and the resulting sample of 467 clients was used to test reliability of the measure. SPSS Subprogram Pearson Correlation between odd and even items was used, along with the Spearman-Brown Correction for basic odd-even reliabilities.
Year of birth, sex and education were recorded for all 236 non-responders. Age data were recorded for 203 responders and sex and education levels for 205 responders. The resulting combined sample of responders and non-responders was analyzed using a stepwise logistic regression (BMDPLR) for "group membership". From an original pool of 229 responders and 236 non-responders, those subjects with missing data or CMI scores of 85 or more were deleted for this analysis. While this would not have affected the large sample, analyses using the smaller subsample (Data Set B) would be strongly influenced by outliers. Since the number of subjects with scores above 85 was small for both samples (See Appendix B) they were deleted. This, along with deletions for missing data, resulted in a 436 subject group being used for the logistic regression.

An SPSS Partial Correlation between group membership and CMI Time 1 score was done to examine the relationship of these two variables. A chi-square was also calculated for number of males and females in each group.

Data Set B. The Krantz Health Opinion Survey (HOS) and the Wallston Health Locus of Control (HLC) were mailed to a 126 member subsample of the 229 subject responder group. A stamped, self-addressed envelope was enclosed to facilitate returns, along with a covering letter requesting subject cooperation and written permission to use the data for research purposes. Only 52 of these packets were originally returned. Telephone contact with 50 of the remaining patients yielded
eight more returns, for a total of 60 useable subjects (21 male and 39 female). These 60 subjects composed Data Set B of the study. (See Appendix A).

Test scores, year of birth, sex, years of education, smoking habits (increase, decrease, no change) and alcohol consumption (increase, decrease, no change) were recorded for each subject. Some behaviour change measures were included in an attempt to monitor compliance with suggested lifestyle changes. It was expected that actual behaviour change would correlate with either change in symptomatology or with locus of control for health. Smoking habits and alcohol consumption were chosen because pre-test data were available for these variables from a subgroup of the original data pool. Age, sex and education were chosen as demographic variables because they tend to covary with number of symptoms of ill health on the CMI (Abramson et al., 1953) and with Locus of Control (Rotter, 1966). Originally, miles driven per year and seat belt use were also to be included in the analyses. However, since no change in these behaviours over the two year period was reported for the 60 available subjects, these variables were dropped.

Outliers were deleted, and the resulting subject pool of 58 was analyzed using a stepwise multiple regression (BMDP2R). Change score over a two year period was the dependent variable and CMI Time 1 score, HLC score, HOS score, age, sex, education level, smoking behaviour, and alcohol consumption as independent variables. This was done in order to determine the best predictor(s) of decrease in symptoms. For further corroboration, the data were standardized and another regression was run
using CMI Time 2 score as dependent variable and retaining the same independent variables.

In order to determine the magnitude of the effect, SPSS Subprogram Regression analyses were done on these data in standard and non-standardized form, using CMI change score as dependent variable and two different sets of independent variables. The first regression used CMI Time 1 score, HLC score, HOS score, age, sex, education level, smoking behaviour and alcohol consumption as independent variables. The second regression used only CMI Time 1 score as an independent variable, retaining the same dependent variable. The difference between these two R-square values was then taken as a measure of the magnitude of the effect of the group of independent variables, excluding CMI Time 1 score.

These data were also submitted to t-tests between males and females within the three tests and the demographic variables. A t-test between CMI Time 1 and CMI Time 2 was done on the 58 subject sample, as well as a t-test between the CMI Time 1 and CMI Time 2 scores for this sample and the 229 member responder group from Data Set A. T-tests between groups were used to determine whether the 58 subjects were representative. A chi-square for sex between this group and the 205 responders with this information recorded was done for the same purpose.

SPSS Subprogram Reliability was used to test the reliability of the HOS and the HLC within the 58 subject Data Set B.
Results

Data Set A

The first step in the investigation was analysis of variance (BMDP2V) between the 200 experimental (open file) and 33 control (drop-out) subjects gained from the CMI mailout. Significant effects from this analysis were for Time of Administration including section H (genitourinary) and Time of Administration excluding section H (see Table 3).

Table 3

Analysis of Variance Between Drop-outs and Open Files

<table>
<thead>
<tr>
<th>Condition</th>
<th>Variable</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMI including section H</td>
<td>Time</td>
<td>9.66</td>
<td>1,227</td>
<td>.0021</td>
</tr>
<tr>
<td>CMI excluding section H</td>
<td>Time</td>
<td>9.43</td>
<td>1.227</td>
<td>.0024</td>
</tr>
</tbody>
</table>

There was no significant difference found between males and females in the number of "yes" responses, nor were there significant differences between those who had visited the PMC only once (drop-outs) and those with continued contact (open file). Further investigation revealed that both of these groups were given the same information concerning preferred health habits at first contact. Since this comprises a large part of the prevention aspect of the Centre's activities, no real
difference in preventive treatment could be justifiably assumed. Given that these clients are a self-selected group from the outset, all of whom receive at least part of the same "treatment", and given that the analysis of variance between groups was not significant, these samples were combined for further analyses.

Since both control and experimental subjects were self-selected, it cannot be assumed from these data that this sample is representative of the population in general. Additionally, the PMC patient sample was narrowed further by the failure of many clients to return a completed CMI questionnaire. Therefore, the 233 responders also cannot be assumed to represent the total client population at the PMC.

However, if group membership is not related to original intake scores on the CMI, then it can be suggested that the people for whom an improvement over time has been shown (responders) are from the same population as the entire patient pool at the Centre. A logistic regression (BMDPLR) on 436 of these subjects who had scores of 85 or less and were not missing relevant demographics was calculated. A score of 85 was chosen as a cut-off point because it was well above the highest score reported in the literature (Desroches & Larson, 1963) as a representative mean total for a patient population (69.7). It was decided that 85-plus could be considered extreme in this case without excluding any relevant population. Frequency distributions of scores on the CMI, HOS and HLC are provided in Appendix B.

This regression showed that group membership could be predicted by education, age, sex and the age-by-education interaction (see Table 4),
but not by CMI Time 1 score. In order to examine the relationship of group membership and CMI Time 1 scores, alone, an SPSS Partial Correlation of these two variables was calculated. Sex, age and education were held constant. No significant correlation was found between original intake CMI score and group membership ($r=0.03, p=0.50$).

Both the logistic regression and the partial correlation showed that these groups do not differ relative to original scores on the symptom check-list. They can, therefore, be considered to be from the same population with respect to the variable in question.

Table 4
Logistic Regression for Group Membership

<table>
<thead>
<tr>
<th>Term Entered</th>
<th>df</th>
<th>Log likelihood</th>
<th>Improvement: $x^2$</th>
<th>p</th>
<th>Step #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>1</td>
<td>-301.033</td>
<td>24.756</td>
<td>0.000</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>-288.655</td>
<td>19.710</td>
<td>0.000</td>
<td>2</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>-278.800</td>
<td>6.060</td>
<td>0.014</td>
<td>3</td>
</tr>
<tr>
<td>Age x Education</td>
<td>1</td>
<td>-274.160</td>
<td>3.221</td>
<td>0.073</td>
<td>4</td>
</tr>
</tbody>
</table>

The distribution of sex within groups was examined, as well, for Data Set A. A chi-square for frequency of males and females showed that there was a significant relationship between sex and group membership within this sample (see Table 5). Given that the responder and non-responder groups differed markedly on number of males and females, the responder group cannot be assumed to be totally representative of
the type of client who attends the PMC. The logistic regression also indicates that these groups differ on a group of demographic variables. However, since group membership cannot be predicted by CMI Time 1 score, responders can be cautiously assumed to be representative on that dimension. Descriptive data are provided for responder and non-responder groups in Table 6.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Females</th>
<th>Number of Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responders</td>
<td>155</td>
<td>50</td>
<td>205</td>
</tr>
<tr>
<td>Non-responders</td>
<td>156</td>
<td>80</td>
<td>236</td>
</tr>
<tr>
<td>Total</td>
<td>311</td>
<td>130</td>
<td>441</td>
</tr>
</tbody>
</table>

\(^a\)Chi-square = 4.77, p = 0.025

The CMI was tested for reliability within the 467 member group who had been administered the test during the intake interview. These were separated by group and by sex. As can be seen from Table 7, for all of the combinations and groupings tested, reliabilities were above .85.

Data Set B

In order to investigate whether symptom decrease can be predicted from a combination of attitudes and other variables, a Stepwise Multiple Regression (BMDP2R) was run, using CMI Change score as dependent variable.
Table 6

Descriptive Statistics for Data Set A

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Set A:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMI Time 1</td>
<td>465</td>
<td>25.22</td>
<td>17.38</td>
<td>0 - 120</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>439</td>
<td>40.03&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.69</td>
<td>2 - 68</td>
</tr>
<tr>
<td>Education</td>
<td>441</td>
<td>13.46</td>
<td>2.08</td>
<td>3 - 20</td>
</tr>
<tr>
<td><strong>Responders:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMI Time 1</td>
<td>229</td>
<td>23.64</td>
<td>17.20</td>
<td>0 - 116</td>
</tr>
<tr>
<td>CMI Time 2</td>
<td>229</td>
<td>16.70</td>
<td>17.35</td>
<td>0 - 123</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>203</td>
<td>37.81&lt;sup&gt;b&lt;/sup&gt;</td>
<td>18.32</td>
<td>3 - 62</td>
</tr>
<tr>
<td>Education</td>
<td>205</td>
<td>13.98</td>
<td>2.41</td>
<td>9 - 20</td>
</tr>
<tr>
<td><strong>Nonresponders:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMI Time 1</td>
<td>236</td>
<td>26.76</td>
<td>17.45</td>
<td>0 - 120</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>236</td>
<td>41.94&lt;sup&gt;c&lt;/sup&gt;</td>
<td>12.86</td>
<td>2 - 68</td>
</tr>
<tr>
<td>Education</td>
<td>236</td>
<td>13.05</td>
<td>1.73</td>
<td>5 - 18</td>
</tr>
</tbody>
</table>

<sup>a</sup>Mean age = 41 years
<sup>b</sup>Mean age = 43 years
<sup>c</sup>Mean age = 39 years
Table 7
Reliabilities for CMI: Data Set A

<table>
<thead>
<tr>
<th>Sex</th>
<th>CMI Time (1,2)</th>
<th>N&lt;sup&gt;a&lt;/sup&gt;</th>
<th>r</th>
<th>Adjusted r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responder Group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>57</td>
<td>.95</td>
<td>.97</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>174</td>
<td>.92</td>
<td>.95</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>57</td>
<td>.94</td>
<td>.96</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>174</td>
<td>.94</td>
<td>.96</td>
</tr>
<tr>
<td>Male</td>
<td>pooled</td>
<td>114</td>
<td>.94</td>
<td>.96</td>
</tr>
<tr>
<td>Female</td>
<td>pooled</td>
<td>348</td>
<td>.93</td>
<td>.95</td>
</tr>
<tr>
<td>Pooled</td>
<td>2</td>
<td>231</td>
<td>.89</td>
<td>.94</td>
</tr>
<tr>
<td>Pooled</td>
<td>1</td>
<td>231</td>
<td>.92</td>
<td>.95</td>
</tr>
<tr>
<td>Nonresponder Group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>81</td>
<td>.91</td>
<td>.95</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>155</td>
<td>.92</td>
<td>.95</td>
</tr>
<tr>
<td>Pooled</td>
<td>1</td>
<td>236</td>
<td>.92</td>
<td>.95</td>
</tr>
</tbody>
</table>

<sup>a</sup>Computer was instructed to identify sex based on section H (genitourinary) of the CMI. Therefore, all 231 responder subjects were included in the analysis.
Independent variables were CMI Time 1 score, HOS score, HLC score, sex, year of birth, years of education, smoking habits (increase, decrease, no change) and alcohol consumption (increase, decrease, no change). Best predictor of change in CMI score from intake to readministration two or more years later was found to be original number of symptoms (CMI Time 1 score). No other variable included in the analysis contributed enough variability to be entered into the equation. Another BMDP2R using standardized input data revealed that the best predictor of CMI Time 2 score was also CMI Time 1 score (see Table 8).

Table 8

Stepwise Multiple Regression to Predict CMI Improvement

<table>
<thead>
<tr>
<th>Condition</th>
<th>DV</th>
<th>Term Entered</th>
<th>$R^2$</th>
<th>St. Error</th>
<th>$F$ to enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-standard data</td>
<td>CMI Change</td>
<td>CMI Time 1</td>
<td>0.14</td>
<td>8.74</td>
<td>9.16</td>
</tr>
<tr>
<td>Standard data</td>
<td>CMI Time 2</td>
<td>CMI Time 1</td>
<td>0.58</td>
<td>0.65</td>
<td>78.43</td>
</tr>
</tbody>
</table>

Aside from the strong correlation between CMI Time 1 and CMI Time 2 scores ($r=0.76$), few other interesting correlations were to be found. There was a noticeable correlation between age and education within the sample ($r=0.32$), and between smoking increase and alcohol increase ($r=0.38$), although these are not particularly strong.

For this sample, mean Time 1 score was 23.14 and mean Time 2 score
was 16.3. It should be noted that these scores are well below those cited in the literature as indicative of psychoneurosis (Brodman et al., 1952; Ryle & Hamilton, 1962) unless accompanied by a congruent diagnosis by a physician (Pond et al., 1963). Descriptive data for all measures within this sample are shown in Table 10.

The magnitude of effect for the independent variables on CMI Change score was examined. Two SPSS Subprogram Regression analyses were used, with CMI Time 2 score as dependent variable. The first used CMI Time 1 score plus all previously mentioned attitude and demographic variables as independent variables. A second regression used only CMI Time 1 score as a predictor (see Table 9). Subtracting these two $R^2$ values revealed that when the effect of original CMI score is taken into consideration, only approximately 10% of the variance in final CMI score is contributed by all other variables combined (3% with adjusted $r^2$).

Table 9

<table>
<thead>
<tr>
<th>Condition</th>
<th>DV</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>St. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMI Time 1 + all descriptors</td>
<td>CMI Time 2</td>
<td>0.672</td>
<td>0.602</td>
<td>8.504</td>
</tr>
<tr>
<td>CMI Time 1 alone</td>
<td>CMI Time 2</td>
<td>0.583</td>
<td>0.575</td>
<td>8.783</td>
</tr>
<tr>
<td>Magnitude:</td>
<td></td>
<td>0.089</td>
<td>0.027</td>
<td></td>
</tr>
</tbody>
</table>

* SPSS Subprogram Regression.
Table 10

Descriptive Statistics for Data Set B

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krantz HOS</td>
<td>58</td>
<td>4.57</td>
<td>3.62</td>
<td>0 - 14</td>
</tr>
<tr>
<td>Wallston HLC</td>
<td>58</td>
<td>50.45</td>
<td>7.83</td>
<td>29 - 65</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>58</td>
<td>37.40</td>
<td>13.06</td>
<td>6 - 62</td>
</tr>
<tr>
<td>Education</td>
<td>58</td>
<td>14.09</td>
<td>1.79</td>
<td>10 - 18</td>
</tr>
<tr>
<td>CMI Time 1</td>
<td>58</td>
<td>23.14</td>
<td>13.66</td>
<td>1 - 56</td>
</tr>
<tr>
<td>CMI Time 2</td>
<td>58</td>
<td>16.31</td>
<td>13.49</td>
<td>0 - 71</td>
</tr>
<tr>
<td>CMI Change</td>
<td>58</td>
<td>7.17</td>
<td>9.34</td>
<td>-30 to +34</td>
</tr>
<tr>
<td>Alcohol Increase</td>
<td>58</td>
<td>0.05</td>
<td>0.22</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Alcohol Decrease</td>
<td>58</td>
<td>0.05</td>
<td>0.22</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Smoking Increase</td>
<td>58</td>
<td>0.03</td>
<td>0.18</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Smoking Decrease</td>
<td>58</td>
<td>0.02</td>
<td>0.13</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

Note: Mean age = 44 years
A t-test to ensure that a significant change had occurred over time for this sample was significant. However, no significant difference was found between this sample and the 229 member responder group on CMI scores, age, or education level. (see Table 11). Therefore, this small sample can be assumed to represent the larger group from which it was drawn with respect to these dimensions.

Table 11
Testing Means for Data Set B: CMI Scores, Age and Education

<table>
<thead>
<tr>
<th>Variable</th>
<th>t</th>
<th>df</th>
<th>2-tail probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMI Time 1 with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMI Time 2 (same group)</td>
<td>5.57</td>
<td>57</td>
<td>0.000</td>
</tr>
<tr>
<td>CMI Time 1 (229 responders)</td>
<td>0.28</td>
<td>57</td>
<td>0.50</td>
</tr>
<tr>
<td>CMI Time 2 with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMI Time 2 (229 responders)</td>
<td>0.22</td>
<td>57</td>
<td>0.50</td>
</tr>
<tr>
<td>CMI Change Score with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMI Change (229 responders)</td>
<td>0.19</td>
<td>57</td>
<td>0.50</td>
</tr>
<tr>
<td>Age with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (229 responders)</td>
<td>0.09</td>
<td>57</td>
<td>0.50</td>
</tr>
<tr>
<td>Education with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (229 responders)</td>
<td>0.43</td>
<td>57</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Table 12

**T-tests Between Males and Females for All Measures: Data Set B**

<table>
<thead>
<tr>
<th>Variable</th>
<th>t</th>
<th>df</th>
<th>2-tail probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOS Score</td>
<td>1.02</td>
<td>56</td>
<td>0.31</td>
</tr>
<tr>
<td>HLC Score</td>
<td>-0.37</td>
<td>56</td>
<td>0.71</td>
</tr>
<tr>
<td>Age</td>
<td>0.71</td>
<td>56</td>
<td>0.48</td>
</tr>
<tr>
<td>Education</td>
<td>-0.41</td>
<td>56</td>
<td>0.68</td>
</tr>
<tr>
<td>CMI Time 1</td>
<td>-1.94</td>
<td>56</td>
<td>0.06</td>
</tr>
<tr>
<td>CMI Time 2</td>
<td>-1.25</td>
<td>56</td>
<td>0.22</td>
</tr>
<tr>
<td>CMI Change</td>
<td>-1.18</td>
<td>56</td>
<td>0.24</td>
</tr>
<tr>
<td>Smoking Increase</td>
<td>0.52</td>
<td>56</td>
<td>0.61</td>
</tr>
<tr>
<td>Smoking Decrease</td>
<td>-0.69</td>
<td>56</td>
<td>0.49</td>
</tr>
<tr>
<td>Alcohol Increase</td>
<td>1.28</td>
<td>56</td>
<td>0.21</td>
</tr>
<tr>
<td>Alcohol Decrease</td>
<td>-1.24</td>
<td>56</td>
<td>0.22</td>
</tr>
</tbody>
</table>
This sample was also tested for differences between males and females on all measures. No significant difference was found between males and females on any of the variables measured (see Table 12). Additionally, when the proportion of males and females within this group and the 229 member responder group was compared, no relationship was found between sex and group membership (see Table 13).

Table 13

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Females</th>
<th>Number of Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Set B</td>
<td>39</td>
<td>19</td>
<td>58</td>
</tr>
<tr>
<td>Responders (Data Set A)</td>
<td>155</td>
<td>50</td>
<td>205</td>
</tr>
</tbody>
</table>

Chi-square = 1.64, p = 0.25

Both the HOS and the HLC were tested for reliability within the 58 subject group comprising Data Set B. SPSS Subprogram Reliability produced alpha levels of 0.80 for the Krantz HOS, and 0.78 for the Waliston HLC.

Overall, it is apparent that the best predictor of change for this self-selected client population is number of presenting symptoms. None of the other variables monitored in this study contributed significantly to that change. Although equivalent on some measures, the Data Set B findings cannot be generalized to the larger (responder) group. Every variable measured in the study. The HLC and HOS findings should be confined to this small group.
Discussion

General Considerations

Two of the objectives for this research were to provide information about the outcome of a preventive medicine program, and to answer a more theoretical question concerning the relationship of health care attitudes to symptom reduction. Perhaps an even more important issue in this study was the attempt to accomplish these objectives within an ongoing program, using non-intrusive methods. Had this method been successful in answering the questions posed, it would have lent support to the suggestion of Hackler (1979) and others that evaluators and other researchers must reverse the research process. That is, they must fit their questions to the data and situation at hand when dealing with ongoing programs. A similar point of view is put forward strongly by program managers, line workers and government funders.

This argument can be very seductive. It is especially convincing for those areas of research where the primary intent is to provide information that will be used by practicing clinicians in designing interventions or by program planners in resolving funding issues. Where these are the main reasons for doing research rather than more scholarly motives, it can be difficult to maintain an objective view. Some basic methodological priorities must be maintained, however, lest the research process be rendered useless at the program level.

In the present study, some useful information was obtained from the
rather long and arduous process that evolved. However, the questions that were ultimately answerable in this situation are of very limited interest.

The process of doing research under the restrictions imposed by this program and the problems encountered along the way, provide a convincing argument for the traditional order of doing research. That is, ask your questions, tailor a research design to directly address those questions and do not lose sight of your objectives. Some information was gained with respect to the two research questions. It was found that symptoms do decrease over a fairly lengthy time period for those clients who self-refer to the Vancouver Preventive Medicine Centre. However, these results cannot be generalized to the population overall, nor can it be assumed that the decrease is due to the treatment received. No relationship was found between symptom decrease and attitudes toward health care, locus of control for health or a number of demographic variables. For this client group, number of presenting symptoms was the best predictor of change. Given the limited nature of these results, the discussion will centre on problems encountered, rather than the findings, themselves.

The Process

As this study progressed, both the sample and the possibilities diminished. A number of the problems encountered related to the setting and methodological constraints. In seeking to avoid an artificially imposed treatment situation, decisions points arose where choices had to
be made between experimental rigour and other considerations. As can be expected in an actual program setting, these decisions were not always left up to the researcher. It was considered of primary importance in this situation to disturb the setting and its clients as little as possible. The choice was to use only those data already available at the Centre, or some easily collectable additions. It was also decided that the research be kept totally out of the way of the physicians and their clients. The advantages offered by this setting which made this prospect seem worth pursuing, were a large data base, long term test-retest opportunity and the possibility of collecting useable data under these conditions.

Non-instrusive data collection methods were chosen both to test the methodology and to comply with the program physicians' requirement that patients not be disturbed or inconvenienced. This had a number of consequences which affected the results. The measures used in the first phase of the investigation were predetermined. From an original expectation of 4 or 5 useable measures of different aspects of the program, only one materialized. This measure was not a good one for research purposes. The attitude measures chosen for the second aspect of the research were short, and the behavioural measures of change (smoking and drinking) were not as sensitive as one would have liked. Also, the sample became very narrow due to a high rate of nonresponse. It would have been too intrusive and costly to expend more resources in obtaining a more representative sample, at the Centre. Staff turnover
and differences among physicians in record keeping habits also had an
effect. This resulted in missing tests and demographic information for
some clients. Another difficulty was the lack of control or
comparison data. No such information had been collected at an early
stage in the program to provide long-term comparison opportunities. An
try to make up for this lack by using program drop-outs as controls
was not fruitful.

Proceeding without a control group and with a disappointing return
rate, steps were taken to salvage some degree of generalization for the
eventual results of the analyses. This involved a lot of data collection
and manipulation on the outcome phase of the study, with relatively
little return. In the end, little could be said about the program.

More problems were encountered when the second research question
was addressed. Again, no control group was available. The methods
necessary for obtaining an even marginally comparable control group were
considered either too intrusive, too costly, or in need of too long a
time commitment to be feasible under existing constraints. The sample
narrowed drastically, again. This was, in part, due to poor response
but the primary factor in the shrinkage was that few patients at the
PMC had had behavioural measures taken at first contact. Another
limiting factor at this stage was that a relatively important post-test
measure (Health Hazard Appraisal) was abandoned because of cost.
Results of this phase were even less generalizable than those of the
outcome phase.

Overall, the process was frustrating from a research point of view.
Attempting to evaluate a program or answer a research question while having almost no control over the data base was, in this case, a wasteful process. Much effort was expended in data collection, analysis and changes of plan as obstacles arose. The original questions were only partially answered. Additionally, the nongeneralizability of results renders them rather trivial.

On a more positive note, this process did offer some useful information. There comes a point where non-intrusive methods lose their usefulness as research tools. This study made that fact abundantly clear. Here, this method of maintaining cooperation and trust between program managers and the researcher neither made the process flow more smoothly, nor helped provide more meaningful results. Perhaps this method can be used to advantage if the researcher has been involved in the original program planning stages. At that time, instruments could be built in which would establish a sound data base for later use. Failing that, the researcher must have control over the measures introduced later and over the data collection process.

In doing research within a ongoing program, a fallback plan of action should be established from the outset. The researcher should be free to use this strategy when necessary, as well, if meaningful results are to be gained. Flexibility is important in working with real world situations. However, when changes of plan are made in the middle of the process, it is easy to lose sight of the original objectives. A well thought out alternative plan can help avoid this situation.

Another important point to come out of this study is that while
non-intrusive methods may be used to advantage, this can become obstructive if carried to the point of non-involvement. During this project, the doctors at the Centre were minimally involved with the research. Aside from this, the researcher was, essentially, cut off from the program being researched. Carried to this degree, non-intrusion becomes non-involvement, and good results are highly unlikely under these circumstances.

The Outcome Phase

This stage of the investigation identified a significant decrease in symptomatology for those who become involved with the PMC. However, these results are not generalizable nor attributable to an identified treatment plan. It must not be assumed that the symptom reduction is actually due to the treatment. A placebo effect may be operating such that symptom reduction may simply be due to an expectation of improvement. This is not likely over such a long period as two years, although further research is needed before this possibility can be eliminated. The time span between testing periods on the CMI also makes it unlikely that the symptom decrease is due to a "savings" on the second test or a general tendency to improve the second time a test is taken. Since this is not a learning situation, but rather questions about one's health, there are no correct answers to be learned. Since no data were located concerning other groups in similar situations the relevant comparisons were not made.

It is more likely that the decrease is due to a general improvement
in the population's health and increased awareness of health issues over the past several years. It is also quite likely that part of the decrease is due to regression toward the mean, since most norms for the CMI in the general population are slightly lower than the mean CMI Time 1 score for this client group.

In addition to the lack of control group and missing behaviour change measures, the actual measures available posed still further problems. The PMC had planned to collect a number of measures on all clients who came for consultation. These measures were also to be readministered at regular intervals throughout contact with the Centre. Very few of these measures were actually taken in the first instance, and almost none were readministered. This posed one of the most important obstructions to assessing the effectiveness of this four-part program of lifestyle change. The measures originally selected had covered a number of areas of living (e.g., eating habits, symptomatology, physiological measures such as blood constituents, external stressors, smoking habits, seat belt use, etc.).

Upon inspection of client files, it became apparent that only the CMI could be used to assess changes. Other measures promised to offer useful information (e.g., seat belt use, smoking and drinking, Health Hazard Appraisal), however none of these were useful in the end.

The CMI, although available for most patients, posed problems as well. It was subjectively designed as a symptom checklist before factor analysis and other sophisticated test design techniques were widely available. It has not yet been objectively shown that this test actually measures those
aspects of health that its designers expected, nor is its reliability unquestioned. However, it does have a certain measure of face validity. It can, at least, be considered a quantitative measure of "number of complaints", and was shown to reliably measure something for this sample.

Another problem for the CMI is that it is cumbersome. Other symptom checklists such as the Cumulative Illness Rating Scale (Linn, Linn, & Gurel, 1968) and the Physical Symptoms Inventory (Wahler, 1968) are shorter and have demonstrated content validity. These would be better measures to use if more work is to be done in the area.

The two year test-retest opportunity was an important aspect of the research. Had the opportunity to introduce a different measure presented itself the CMI would still have been retained in this study, because it was assumed that introducing a new measure would have answered an entirely different question (a short term effect). It would now be useful to begin using other measures at intake and to compare these with the available CMI data, both at intake and for change differences over two years. This would not only provide a clearer picture of the attitude versus symptom reduction issue, but would also investigate the validity of the CMI.

The validity issue is an important one, here. Because the measures had been administered by program staff since the PMC opened its doors with a less than clear plan for future evaluation, a control or comparison group was not set up. Nor were the measures chosen researched for their
methodological applicability. Both of these factors affected the eventual generalizability of results. Even if all of the original measures had been available, it is not clear that these would provide usable research data. Further, in the absence of a non-treatment control group of any sort, conclusions based on the study results are confined to self-referred users of the PMC.

Attitudes and Symptom Reduction

Results of numerous analyses revealed little about the relationship of symptom decrease over time to attitude change. No relationship was found between attitude toward health care or health locus of control and a decrement in symptomatology for this sample: The original supposition of this section of the research was that symptom reduction would be significantly more evident for those who wanted active participation in their own care, and/or felt that they have control over their own health. This was not the case. Rather, if patients actually come to the Centre they are likely to improve to the degree that they exhibit the type of symptoms sampled by the CMI. Furthermore, for this sub-sample, improvement is likely to occur regardless of attitude toward personal responsibility for health.

However, these results cannot be generalized to the overall population. It is also questionable whether they can be assumed to apply to the total client group from which the 58 subject sub-sample was drawn. While the sub-sample can be considered representative of the Centre's population on several variables (CMI score, sex, age, education), it is
not clear whether attitudes are generalizable. Therefore, conclusions must be confined to the very small 58 subject group.

In order to render these results more widely applicable, a randomly selected sample of the PMC's clients could be administered the attitude measures for comparison with these data. These measures, along with demographic data would indicate whether the present small sample was comparable. It is interesting to note that the mean score on the HOS (4.57) is well below norms established in a college population (see Table 1). This group also scored more externally (50.45) than did those subjects used to establish norms for the HLC (see Table 2). Since these subjects demonstrated their cooperativeness by returning the two sets of questionnaires, and since they also seem less self-directed than the norm in health matters, they may represent a special ("cooperative") population subgroup.

Given that little other information of interest has been obtained from this study, and PMC staff was not prepared to assist with data collection or to have the normal routine disrupted, further avenues were not pursued. In the process of doing research in such a situation, there comes a point where further attempts would yield little useful information, relative to the costs involved. In this case, the relationship of attitudes to symptom reduction could be investigated elsewhere in a much more rigorous manner, without intruding further on this setting.

Suggestions for Further Research

Since most normative data for the HOS and the HLC were gathered from
college samples, it would be interesting to investigate the relationship between these measures and symptom reduction in similar samples. Information is also needed on the relationship between personality type and symptom decrease, and on personality, attitudes and decrement in symptomatology. Intuitively, it seems that some relationship would exist, but it is not clear what that relationship might be.

In identifying the attitude/symptom relationship, preferences for a particular type of treatment might be measured by comparing the subsections of the Krantz Health Opinion Survey with symptom decrease. These subsections discriminate between those clients who prefer active involvement and those who prefer information. However, in this study all of the attitude, control and demographic variables together accounted for 10% or less of the variance in CMI scores. Thus, it was not possible to investigate this relationship in this study, but it does suggest an area where further research may be useful.

It should be noted that the attitude and personality measures were taken at the second CMI administration, after the treatment had long been underway. It could, in fact, be considered complete in many cases. A different relationship might be found if attitude measures were administered at intake. Further information of value may be found if changes in both attitudes and symptom number were compared over time.

Another area of interest would be whether the PMC and other such programs of prevention are more effective for particular client subgroups such as dependent personalities, various psychological
disturbances, smokers, the aged and others. Private preventive programs could then be monitored to determine if some aspects are more effective than others (ie. education, improved nutrition, decreased stressors), and for whom these separate components are most effective. Finally, it would be most useful to know whether the people who receive this type of counselling actually put the recommended lifestyle changes into effect. Furthermore, if they do, does this result in symptom reduction? It may be that information alone would provide a reduction in stress or affect the client in some other way that results in decreased symptoms, whether or not the physician's advice is actually implemented. An attempt was made during this study to answer this question. However, the available behaviour change measures were neither sensitive nor broadly based enough to obtain answers.

In summary, there were numerous problems encountered in this research endeavour. Some interesting and useful information was gained. However, the most useful knowledge acquired during this study was not related to the actual research questions. That aspect of the research was judged to have contributed less really conclusive evidence than the amount of effort warranted. The primary gain from this study was the support it lends to the need to maintain rigorous research methodology in doing program related research. It is no use trying to force a match between rigid experimental rigour and sloppy reality. However, it is important to adhere to some basic methodological guidelines. The suggestion of Hackler (1969) and others that programmers and researchers must allow for one another's needs is well taken. However, it must not
be forgotten that this allowance must work both ways. If methodology is stretched too far in an effort to accommodate clinical reality, neither the clinician nor the research community will benefit.
Appendix A

Figure 1: Details of Sample Shrinkage for Data Set A and Data Set B

Mailout of first CMI
N=729

Returns
N=233

Experimental: Controls:
N=200  N=33

Used in later analyses
N=229

Data Set A (all Ss)
N=465

Randomly selected: "Non-responders"
N=236

Data Set A with sex & education
N=441

Sex & Education:
recorded
N=205

Data Set A with age
N=439

Age:
recorded
N=203

Data Set A with outliers:
data Ss
deleted
N=436

Data Set B
Sent Attitude Measures
N=126

Responders
N=60

Used in Analysis
N=58
### Table A

Proportion of Sample Decrease: Data Set A

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>% of 729</th>
<th>Return Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ss receiving CMI at intake</td>
<td>729</td>
<td>100.0</td>
<td>32.0 (233 Ss)</td>
</tr>
<tr>
<td>Dropped out after first visit</td>
<td>153</td>
<td>20.9</td>
<td>N/A</td>
</tr>
<tr>
<td>2 or more visits</td>
<td>576</td>
<td>79.0</td>
<td>N/A</td>
</tr>
<tr>
<td>Drop-out returns (controls-Phase 1)</td>
<td>33</td>
<td>4.5</td>
<td>21.5 (of 153)</td>
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<tr>
<td>&quot;Open-files&quot; returns (experimentals)</td>
<td>200</td>
<td>27.4</td>
<td>34.7 (of 576)</td>
</tr>
<tr>
<td>Total non-responders to 2nd CMI</td>
<td>496</td>
<td>68.0</td>
<td>N/A</td>
</tr>
<tr>
<td>Non-responder group (subsample)</td>
<td>236</td>
<td>32.4</td>
<td>47.6 (of 496)</td>
</tr>
<tr>
<td>Responder group with deletions</td>
<td>229</td>
<td>31.4</td>
<td>31.4 (of 729)</td>
</tr>
<tr>
<td>Data Set A</td>
<td>465</td>
<td>63.8</td>
<td>63.8 (of 729)</td>
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### Table B

Proportion of Sample Decrease: Data Set B

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>% of 729</th>
<th>% of 233</th>
<th>% of 126</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ss with smoking recorded (Time 1)</td>
<td>126</td>
<td>17.3</td>
<td>54.0</td>
<td>100.00</td>
</tr>
<tr>
<td>Unprompted returns</td>
<td>52</td>
<td>7.2</td>
<td>22.3</td>
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<td>Total returns</td>
<td>60</td>
<td>8.2</td>
<td>25.8</td>
<td>47.60</td>
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<td>Usable records</td>
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<td>8.0</td>
<td>24.9</td>
<td>46.30</td>
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Appendix B

Table C

Frequencies for CMI Scores: Data Set A

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<th>Score</th>
<th>Number of Ss</th>
<th>CMI Time 1</th>
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<td>0-09</td>
<td>82</td>
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<tr>
<td>10-19</td>
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<td>10-19</td>
<td>88</td>
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<td>123</td>
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<td>20-29</td>
<td>27</td>
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<td>30-39</td>
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<td>30-39</td>
<td>14</td>
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<td>40-49</td>
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<td>120-129</td>
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<td>Total</td>
<td>229</td>
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<td>-------</td>
<td>-------------</td>
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### Table E

Frequencies for HLC and HOS Scores: Data Set B

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<th>HOS Scores</th>
<th>Number of Ss</th>
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</thead>
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</tr>
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<table>
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<td><strong>Total</strong></td>
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References


Abramson, J. H., Terespolsky, I., Brook, J., & Kark, S. The Cornell Medical Index as a health measure in epidemiological studies. British Journal of Preventive and Social Medicine, 1965, 19, 103-110.


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