THE UNIVERSITY OF CALGARY

EFFECTS OF BLOOD PRESSURE SCREENING ON LIFESTYLE BEHAVIORS

by

DIANNE E.G. ANDERSON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE

DEPARTMENT OF MEDICAL SCIENCE

CALGARY, ALBERTA

JULY, 1989

THE UNIVERSITY OF CALGARY

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the faculty of Graduate Studies for acceptance, a thesis entitled, "Effects of Blood Pressure Screening on Lifestyle Behaviors" submitted by Dianne E.G. Anderson in partial fulfillment of the requirements for the degree of Master of Science.

Supervisor: Dr. H.E. Bryant
Dept. of Community Health Sciences

Examiner: Dr. E.G. Love
Dept. of Community Health Sciences

Examiner: Dr. S. Tenove
Faculty of Nursing

Examiner: Dr. C.D. Waddell
Dept. of Community Health Sciences

Examiner: Dr. J.D. Johnston
Dept. of Community Health Sciences

July 12, 1989.

ABSTRACT

Corporate health protection programs encourage positive employee health habits. Over the years, hypertension screening programs have become popular in the workplace. The premise is that if employees can be made aware of elevated blood pressures they will make the appropriate lifestyle changes to lower that risk factor for cardiovascular disease. The purpose of this study was to investigate the effects of labeling employees as "at risk" for hypertension; more specifically, to find out if employees make lifestyle changes if they have been labeled as "at risk" for hypertension.

In 1987, a program called <u>Target Your Blood Pressure</u> was conducted at Petro-Canada, Calgary. It was a comprehensive hypertension screening program which began by offering the 1055 participants hypertension education: its prevention, detection, and control. This was followed by blood pressure screening, individual counseling and lifestyle data collection. It was during the blood pressure screening process that employees were labeled as "at risk", or "not at risk" for hypertension in accordance with the Canadian blood pressure measurement and referral standards.

After a period of 12-15 months, all participants were sent a follow up questionnaire inquiring about their

lifestyle practices. The amount of change described for selected behaviors: salt intake, alcohol use, body mass, perceived stress level, exercise, smoking and cigarette consumption, was calculated. The relationship of labeling and change for the "at risk" (labeled) and "not at risk" (not labeled) employees was assessed.

It was found that labeling an individual as "at risk" for hypertension led to a significant reduction in salt use. The lifestyle behaviors that were more difficult to change such as reduced alcohol intake, weight loss, regular exercising, and smoking cessation, were not associated with being labeled. To promote positive change in these behaviors, it was suggested that the labeling message would have to be strengthened. A potentially negative outcome was an increase in perceived stress among employees that were labeled. An additional finding was that work location affected employee reaction to the labeling message associated with smoking cessation.

The results of this study indicated that labeling was accepted by individuals, and was associated with behavioral change: positive (salt reduction), as well as negative (increased perceived stress). Based on these findings, programmatic approaches to lifestyle modification can be supported if follow-up to reduce the negative effects of labeling is included.

ACKNOWLEDGEMENTS

Accomplishments of this magnitude are never managed in isolation. Many individuals contributed to the completion of this research project and thesis. My sincere thanks are extended to the following:

Petro-Canada Inc., Calgary for providing financial support and access to a study population.

Petro-Canada Health Centre Staff, in particular Marilyn Walker, who was instrumental in the planning and implementation of this research project.

Petro-Canada employees who participated in the study.

Dr. Heather Bryant for supervising this thesis.

Dr. E.J. Love, Dr. Sandra Tenove and Dr. Cam Waddell, committee members, for their guidance throughout the preparation of this thesis.

Dr. Don Johnston for agreeing to act as an external examiner.

The residents and graduate students of the Department of Community Health Science, for their inspiration and friendship.

Calgary Health Services for financial support in the first year of this program.

My close friend, Barbara Roberts for her constant belief that I could accomplish this task.

Last, but never least, I want to acknowledge the love, and encouragement by Trevor, Tara and Duncan, the dearest people in the world to me. They survived months of having an absentee wife and mother, so that I might realize a dream.

DEDICATION

This work is dedicated to my mother, Alice Boa:

How tirelessly you have worked over the years ensuring that the ones you love succeed. Supportive roles fail to gain much recognition. So this is my tribute to you:

Step forward Mom and take a bow.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

THE RESEARCH PROBLEM

I. INTRODUCTION

Corporate health promotion programs encourage positive employee health habits (Grove, Reed, & Miller, 1979; Guidotti, Cowell, & Jamieson, 1989). Health education, screening, intervention, and follow-up are the usual components of worksite health promotion programs. Having created an increased health awareness among employees, program promotors anticipate the development of positive health behaviors, and/or lifestyle changes. The ultimate goal is behavioral change that will lead to improved employee health status.

The primary objective of the screening process is the detection of disease during the early asymptomatic stage. The assumption is that early treatment will alter the disease process (Edelman & Mandle, 1986). A secondary objective is to reduce health care costs (Alderman & Stanback, 1985). It is assumed that prevention, or early treatment, costs less than later vigorous interventions.

"Screening sorts out the apparently well persons who have a disease from those who do not" (Edelman & Mandle, 1986, p.143). In doing so, screening programs inevitably label individuals as having, or not having an illness or disease; or being "at risk", or "not at risk", for illness or disease (Alderman, Carlson, & Melcher, 1981; MacDonald et al., 1985).

Labeling is the process whereby a person is identified as having a disease, or a risk factor for a disease. The action of labeling includes providing information, making individuals aware of their health status, plus any reinforcement which comes from adding treatment to the disease/risk identification (MacDonald et al., 1985). Labels change the person's self-concept which in turn changes society's perception of the individual (Hardman, et al., 1984). Thus, personal beliefs, as well as social beliefs regarding health status, affect behavior.

A presumed consequence of labeling is that the individual adopts behaviors in accordance with the nature of the label: if sick, illness behaviors are adopted; if well, health behaviors are adopted (Mann, 1984). **Illness behavior** is the manner in which people monitor their bodies, define and interpret their symptoms or health risks, take remedial actions, and use the health care system (Mechanic, 1986). **Health behavior** is a pattern of response relating to health when the person is free of disease symptoms (Mechanic, 1986).

Thus the theory is that people who perceive themselves as unhealthy, adopt illness behaviors; those that believe they are healthy, do not. To test this hypothesis, the relationship between hypertension labeling and lifestyle behaviors was studied.

II. LITERATURE REVIEW

Hypertension

Hypertension is a major cardiovascular risk factor affecting 15% of the Canadian adult population (Federal/ Provincial Working Group on the Prevention and Control of High Blood Pressure [HDFPCG], 1987a). Of all the known cardiovascular disease risk factors, hypertension is the one that can be altered reliably and readily through the use of antihypertensive agents (Alderman, 1984).

It is estimated that about 15% of Canadians have definite hypertension, and a further 10% have borderline hypertension (HDFPCG, 1979). Herd and Weiss (1986) propose that putting 25% of the population on drug therapy is impractical and too costly. Instead, prevention and treatment of hypertension through behavioral means: exercise, weight control, sodium restriction, and smoking cessation are suggested (Meyer & Henderson, 1974; Charlesworth & Baer, 1984: Herd & Weiss, 1984; Fielding, 1984; Hart, 1987). Other behaviors thought to reduce hypertension are stress reduction (Patel et al., 1981; Eliot, 1988) and a moderate alcohol intake of less than 2 ounces of alcohol per day as opposed to greater alcohol intakes (Berkman & Breslow, 1983; McMahon, 1986).

The bulk of the hypertension therapy literature concentrates on the effectiveness of antihypertensive drug therapies. Recent interest in the use of non-pharmacological therapies to lower blood pressure has resulted in the following recommendations:

1. Reduce sodium intake.
2. Cease smoking.
3. Exercise regularly.
4. Reduce stress.
5. Reduce weight.
6. Use alcohol in moderation, if at all.

In many clinical settings, all six non-pharmacological treatment regimens are advised for those individuals identified as "at risk for hypertension".

The contribution each treatment modality makes toward blood pressure control has been difficult to assess and the research on each is controversial. In addition, many of the above mentioned behaviors tend to occur in combination. For example, exercising is associated with weight loss as well as stress management, making it difficult to tease apart the individual effects. This results in the presence of additional variables that may be causing the observed association. If the effect of each behavior change were known, then the value of each treatment modality could be established. To compound the problem, the benefits of some of the above treatment modalities have been questioned. The merits of each non-pharmacological treatment will now be discussed.

Sodium intake and hypertension

Support for the sodium overload theory as a causal mechanism for hypertension originated with ecological studies that compared salt intakes and blood pressure levels between populations (Fries, 1976). Hypertension does not exist in populations with sodium intakes less than 30 mmol/day (Hart, 1987). This type of study generated the hypothesis that high sodium intakes were linked with hypertension. This crude measure of association between salt intake and hypertension was recently supported by the Intersalt Study, a large, comprehensive study that looked at the relationship of salt to hypertension using data from 52 centers in 32 countries. It concluded that: a) there is a linear relationship between salt intake and blood pressure levels; b) to be effective, sodium should be restricted to less than 80 mmol per day; and c) community sodium intakes are too high and should be lowered to 100-150 mmol per day (Elliott, 1989).

Caution must be exercised when dealing with these recommendations. In these ecological studies, groups rather than individuals are used as units for comparison. In dealing with individuals, exceptions always exist:

individuals who habitually ingest less than 80 mmol/day may become, or be hypertensive, while other individuals who consume high sodium diets may not be hypertensive. To further test the salt-hypertension relationship, studies using individual data were needed.

Of the studies that dealt with individual blood pressure responses to sodium intake, Watt (1983) showed that a reduction to 60-80 mmol of sodium daily for 4 weeks had little effect on lowering borderline levels of hypertension; while in three others, a low-sodium diet reduced blood pressure (MacGregor, et al., 1982; Mann, 1987; Markandu et al., 1988). The last three studies demonstrated greater researcher control over the amount of sodium ingested by the study subjects. MacGregor (1982) employed a double-blind crossover study design; Mann (1987) used 24 hour urinary sodium excretion as well as dietary recall to determine salt intakes; and Markandu, et al. (1988) used both of the above methods to monitor sodium intake as well as a variety of sodium intakes to determine a dose response in relation to blood pressure levels.

Although some researchers question whether high sodium intakes are associated with the development of hypertension, community efforts to promote low salt diets have advanced (Berglund, 1984). The premise appears to be that low sodium diets are harmless, and that indeed, they may be helpful. Based on this rationale, clinicians traditionally recommend salt reduction for patients at risk for hypertension.

In addition, the Canadian Consensus Conference on Non-pharmacological Approaches to the Management of High Blood Pressure [CCCNAMHBP], 1989, supports low salt intakes through recommendations that:

1. the public reduce salt intakes.
2. borderline hypertensive individuals use salt reduction as the sole therapeutic measure.
3. hypertensive individuals use salt reduction as an adjunct to drug therapy.

In summary, low sodium diets have been recommended as a means to prevent and control hypertension.

Smoking and hypertension

The literature overwhelmingly links smoking with an increase in myocardial infarction rates and coronary artery disease (Hart, 1987). The connection between smoking and hypertension is less apparent. Green et al., 1986, found higher blood pressures among nonsmokers than among smokers or exsmokers. Similarly, House et al., 1986, noted that smoking was not a predictor of hypertension. Hart, 1987, claimed that the hypertensive effects of smoking are immediate, but that they do not result in long-term effects. He presented as evidence the observation that cigarette smokers have lower blood pressures than nonsmokers. If circumstances were such that the hypertensive subjects in these studies were medically advised to quit smoking, while the normotensive individuals were not, then a selection bias may have existed resulting in these spurious results. All these studies used cross-sectional data: since the disease and exposure are measured at the same time, temporal problems exist making it impossible to determine causation (Hennekens & Buring, 1987).

In contrast, cigarette smoking was found to produce significant increases in blood pressure in other studies which used prospective approaches or clinical trials (Benowitz, et al., 1984; Freestone & Ramsay, 1980; Aronow et al., 1971). It has been found that hypertensive individuals who smoke experience mortality rates twice that of hypertensive non-smokers (Bulpitt,et al., 1986). In addition, smoking is cited as one of the three classical coronary risk factors (Epstein, 1982) with hypertension and hyperlipidemia being the other two. Thus all three warrant prevention and/or control.

Somers (1980) claims that 33% of tobacco-related mortality is due to atherosclerosis, while 30% is caused by diseases of the heart. Smoking cessation is important as it reduces risk over a wide range of diseases. Thus, health education against coronary heart disease and stroke includes smoking cessation as well as the control of hypertension. As a stronger public health message, the

CCCNAMHBP, 1989, advocates a lifestyle of smoking abstinence to prevent and control hypertension.

Alcohol intake and hypertension

Recent studies that link moderate alcohol intake with lowered cholesterol levels have set up yet another controversy. High cholesterol levels are associated with atherosclerosis. Atherosclerosis, or "hardening of the arteries", in turn, is associated with high blood pressure. The premise is that if cholesterol levels could be lowered, then perhaps blood pressures would also be reduced. This explains the development of the recent interest in moderate alcohol intakes, lowered cholesterol levels and blood pressure levels.

In the past, alcohol was considered a major risk factor for causing hypertension (Beilin, 1989; Hart, 1987). Eleven percent of hypertension in men has been attributed to drinking (MacMahon, 1986). Unfortunately, heavy drinking is also associated with smoking, as well as poor dietary practices (Klatsky, 1985). Thus confusion exists as to whether it is the alcohol, or the other factors in the substance abuser's life, that leads to hypertension.

Heavy drinking, defined as the regular use of 3 or more alcoholic drinks daily, has been associated with an increased risk of hypertension (Yano et al., 1984; Klatsky, 1985; Cooper, 1988; Beilin, Puddey, & Vandogen, 1987). However, recent studies have identified moderate alcohol intake (2 or less drinks per day) as protective against coronary heart disease as compared to alcohol abstinence (Kannel, 1975; Klatsky, 1985). The proposed mechanism is that alcohol increases high density lipoproteins, which in turn remove plaque from blood vessel walls. This is thought to lower the occurrence of coronary artery disease and possibly hypertension. Thus, a new question develops: Is alcohol a protective factor against heart disease, or is the observation that it lowers cholesterol levels merely the result of the technological limitations in measuring alcohol's effect on serum cholesterol levels?

Despite the suggestion that a moderate alcohol intake may be helpful in lowering cholesterol, a prescription of alcohol use to prevent or lower blood pressure would appear more harmful than good. Alcohol is associated with many social and health-related problems. To recommend its use prophylactically based on tentative research in the cardiovascular area would seem very short-sighted.

In summary, moderate, or no alcohol intake for the treatment of hypertension is supported by both the American and Canadian authorities on hypertension management. The Surgeon General's Report, 1988, states: "Consumption of three to four drinks per day causes a measurable increase in both the systolic and diastolic blood pressures" (Department of Health and Human Services, 1988, p. 657). This position has been reinforced by the CCCNAMHBP, 1989, through its recommendation that hypertensive individuals avoid alcohol intakes greater than 2 standard drinks per day (240 ml of wine, or 60 ml of liquor, or 720 ml of beer). The consensus is that there is a strong causal relationship between excessive alcohol consumption and hypertension and that advising moderate alcohol use to prevent heart disease is unfounded.

Obesity and hypertension

Obesity is the least disputed risk factor for hypertension. Body mass indices (BMI*) greater than 27 have been positively associated with hypertension. The Canadian Fitness Survey demonstrated that for men, "the prevalence of hypertension increases with each (unit of) increase in BMI" (Health Promotion Directorate, 1988, p. 65). Despite this, "excess weight has not been found to be a strong predictor of cardiovascular mortality" (Health Promotion Directorate, 1988, p.91). Three studies found that lean, hypertensive males had higher mortality rates than overweight hypertensives (Sorlie, et al., 1980; Barrett -Connor et al., 1985; Cambien, et al., 1985). This does not dispute the fact that obesity is linked with hypertension. It may be that lean males, genetically predisposed to hypertension, have a poorer prognosis than overweight males who can remedy a weight problem to lower their blood pressures.

Studies have shown that a decrease of 1 kilogram in

* BMI= Weight in kilograms/Height in meters^2

body weight can lower systolic blood pressure by 3.4 mmHg and diastolic blood pressures by 1.3 mmHg for hypertensive individuals, and 1.4 mmHg systolic and 0.6 mmHg diastolic for normotensives (Staessen et al.,1985); that obesity is a predictor of hypertension (House et al., 1986); and that an important correlate of blood pressure is the pattern of fat distribution with abdominal adiposity being highly correlated with hypertension (Blair et al., 1984).

In comparison, some studies failed to demonstrate a reduction in blood pressure associated with weight loss in hypertensives (Haynes, et al., 1986). However, Haynes, 1989, in his address to the CCCNAMHBP, Halifax, Nova Scotia, stated that his more recent research supports weight loss as a therapeutic means to lowering high blood pressure with some qualifications. He noted that weight loss leads to catabolic effects that result in lowering blood pressure. However, once the person's body weight stabilizes, blood pressure often increases again. Interestingly there was no correlation between weight reduction and a lowering of blood pressure in subjects older than 60 years of age. Thus depending on the subject's age, weight loss may, or may not lower blood pressure.

In summary, weight loss is recommended as part of hypertension management: "There is evidence that weight loss will reduce blood pressure in individuals with high blood pressure" (CCCNAMHBP, 1989, P. 3), and "Even when weight loss does not reduce blood pressure to normal, health risks may be reduced, and smaller doses of anti-hypertensive medication may be needed" (DHHS,1988, p. 148).

Stress and hypertension

The relationship between stress and high blood pressure has become a popular research topic. For many years, stress has been associated with hypertension by behavioral psychologists and researchers such as Patel, Weiss, Mann, and Eliot. Currently, the focus is on job stressors and their effect on employee health (House, 1986; Frommer et al., 1986; Van Ameringen et al., 1988).

Until recently, only a few studies had established a significant relationship between work stress and hypertension (Caplan, 1975; Aro, 1982). The current interest in workplace stress management has prompted interest in this area. Van Ameringen et al. (1988) found that intrinsic stress (stress pertaining to job context) was significantly related to diastolic blood pressure among women younger than 35 years of age; as intrinsic stress levels rose, so did diastolic blood pressures. They concluded that this was preliminary evidence in linking long-term, self-induced stress with hypertension.

Stress management, relaxation therapy and biofeedback are the main behavioral therapies recommended for reducing stress in workers, as well as blood pressures. Workplaces have adopted these approaches to improve worker performance and health, thus reinforcing the layperson's belief that hypertension is related to high stress levels and, or, "bad nerves". In addition, the Canadian Health Promotion Survey, 1985, reports that people who classify their lives as very stressful are more likely than the general population to have their blood pressure checked (Health and Welfare Canada, 1988). Thus the perceptual link between high stress and elevated blood presure exists, although the actual linkage is still being researched.

Physical activity and hypertension

Sedentary lifestyles have been associated with hypertension (Lucas, 1988; Paffenbarger, 1988). Athletic populations have been noted to have lower blood pressures than nonathletic populations (Cooper et al., 1976; Fagard et al., 1985). Unfortunately, the relationship between hypertension and physical activity is confounded by factors such as age, weight, distribution of body fat, smoking and dietary practices. Many studies in this area do not control for these factors (Fagard et al., 1985). Thus there is no conclusive evidence that an inverse relationship exists between physical activity and hypertension.

Attempts have been made to lower blood pressure in hypertensive subjects through the use of regular physical activity (reviewed in Lucas, 1988). These studies suggested that increased physical activity can lower blood pressure levels. In contrast, Fargard, 1985, reviewed five other fitness intervention studies done with hypertensive subjects, of which only one study reported a lowering of the arterial pressure.

Hagberg, 1988, reported at the International Conference on Exercise, Fitness and Health, that endurance exercise training in hypertensive individuals lowered both their diastolic and systolic blood pressures on an average of 10 mmHg. He proposed that a regular walking routine would lower diastolic blood pressure. Castelli, 1988, and Kavanagh, 1985, also supported regular exercise as a non-pharmacological treatment for hypertension.

The panel at the CCCNAMHBP, 1989, listened to researchers in favor of, and opposing physical activity as a means for lowering hypertension. The forthcoming recommendation indicated that:

> Appropriate physical activity is a useful adjunct to weight management in the control of high blood pressure. While there is evidence that regular aerobic activity may result in a lowering of blood pressure in patients with mild hypertension, definitive recommendations must await further research" (p. 10).

In summary, physical activity is known to be benefical in weight loss programs, stress management, and physical fitness: three assets towards attaining healthy blood pressures. Thus regular aerobic exercise is advised by clinicians as a way to lower body weight, increase cardiovascular fitness, and potentially reduce blood pressure.

<u>Conclusion</u>

Although some questions still exist concerning the non-pharmacological approaches to hypertension management, there appears to be enough evidence to make lifestyle recommendations to individuals "at risk for hypertension". The recommended non-pharmacological therapies for hypertension include:

1. Salt Reduction:	Avoid use of table salt at least.
2. Weight Control:	Avoid overeating (weight control). Reduce fat, and caloric intakes.
3. Smoking:	Stop smoking.
4. Alcohol:	Limit your alcohol intake to 2 ounces per day.
5. Stress:	Learn ways to relax, and get plenty of rest and sleep. Take some time for yourself each day. Enroll in a stress control class.
6. Exercise:	Regular physical exercise 3 times a week. Exercise for 20-30 minutes each session. Progress gradually with all physical exercise.

(Adapted from <u>Know Your Blood Pressure by Heart</u>, Canadian Heart Foundation, 1987).

Thus, regular exercise, weight reduction, smoking cessation, moderate alcohol consumption, effective stress management and a low sodium diet, are cited as positive lifestyle behaviors for the prevention and control of hypertension. This multi-faceted approach to treating hypertension is supported by many hypertension experts (Kavanagh, 1985; Federal/Provincial Working Group on the Prevention and Control of High Blood Pressure [FPWGPCHBP], 1986; Leenen & Haynes, 1986; Rowan, 1986; Lucas, 1988; Canadian Heart Foundation, 1987; Hart, 1988; Patel, 1988; CCCNAMHBP, 1989). The health promotion literature on hypertension further reinforces these positive health behaviors (Alberta Heart Foundation, 1975; American Heart Association, 1981, 1984 & 1986; Canadian Heart Foundation, 1984 & 1987; Health and Welfare Canada, 1984; Participaction, 1985; Rowan, 1986; Leenan and Haynes, 1986). Information abounds claiming that hypertension is serious, requires treatment, and is amenable to these specific lifestyle changes.

There has been a consequent shift in public awareness of hypertension. Repeated surveys since 1974 have shown that the public's knowledge about high blood pressure has increased, that more people are likely to visit a physician for the detection of hypertension or its control, and that more individuals are likely to follow medical advice (Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure, 1984). In Canada, three recent health surveys found that individuals who had their blood pressure checked recently were more aware of the issues surrounding hypertension (Health and Welfare Canada, 1988); a majority of the employees surveyed recognized that blood pressure was related to food and alcohol intake (Maritime Telephone and Telecommunications [MT&T], 1989); and hypertensive individuals under treatment for hypertension cited weight loss, salt-restriction, stress avoidance, exercise and alcohol reduction as the medical advice they had received (MT&T, 1989, Nova Scotia Department of Health, 1987).

The conclusion drawn is that despite the status of blood pressure research regarding the role of each risk factor for hypertension, the common belief amongst therapists and the public is that hypertension development and control is related to salt intake, increased body weight, high stress, sedentary lifestyles, excess alcohol use and smoking. Acting in accordance with these beliefs and the current status of hypertension research, the TARGET YOUR BLOOD PRESSURE program organizers provided Petro-Canada employees with health education on healthy eating, smoking cessation, exercise, stress management, alcohol moderation and weight control for cardiovascular health, and hypertension prevention and control.

Worksite Screening Programs

Descriptive studies have reported the outcomes of many hypertension screening programs (Stamler et al., 1976; HDFPCG, 1979; O'Connell et al., 1985; Zimmerman et al., 1986; Rudd et al., 1987). Overall, the consensus is that hypertension screening programs are important, but that they should be done in conjunction with health education, medical referrals, and follow-up to enhance compliance with treatment regimens (Alderman, 1984; Alderman & Stanback, 1985; National High Blood Pressure Education Program,1987).

In Canada, most adults are in the workforce. Worksite hypertension screening programs have been advocated to identify the "at risk" individuals for coronary heart disease and cerebral vascular disease (FPWGPCHBP, 1987b; Sallis et al., 1986; Alderman, 1984; Foote, 1983; Baer et al., 1979; Logan et al., 1979). The underlying assumption is that once identified as hypertensive, or borderline hypertensive, the employee will seek medical consultation and comply with a treatment regimen (pharmacological or non-pharmacological in nature). The ultimate goal is to improve employee health, thereby reducing the cost of corporate health benefit plans and employee replacement, while increasing productivity and profits (Collings, 1982; Alderman & Stanback, 1985).

Labeling

Labeling in this study is telling someone that they have hypertension. This initiates a process that is reinforced, or refuted, by a medical referral and subsequent treatment. The hypertensive person becomes identified and segregated resulting in an awareness that there is a medical concern. An inevitable consequence of labeling is the development of an altered self-perception (Gove, 1980). This alteration varies in degree, ranging from an awareness of being different from the normal, to behaving as if one were ill (Parsons,1951; Twaddle,1973; Cockerham,1978).

Hypertension screening programs result in the labeling of the employee as having, or not having, a risk factor for cardiovascular diseases. The effect of hypertensive labeling on employees has been studied and the results are conflicting. Detrimental outcomes were found regarding employee absenteeism (Haynes et al., 1978; Taylor et al., 1981), incomes (Johnston et al., 1984), job status (Monk, 1981), well-being (Bloom & Monterosa, 1981; Wagner & Strogatz, 1984), and marital situations (Mossey, 1981). In contrast, Alderman (1981) and Rudd (1987) reported that worksite hypertension screening produced minimal adverse psychological changes when an intervention program was included.

In these studies, neither the occupational status of the employees studied nor the method of clinical labeling used were addressed. If they had been, they may have reduced the discrepancies in the labeling literature. The rationale for such a statement is based on recent health promotion research. Rosenbaum and Bursten, 1988, found occupational status, level of employee responsibility, and type of industry to be related to perceived health status and emotional health. For example, blue collar workers rated their perceived health status as lower than did white collar workers; managers reported being less healthy than did the professionals; and the labour intensive, construction, and transport/communications workers graded their health as "fair to poor" as compared to employees from other industries. Since socioeconomic disparity exists amongst these workers, different degrees of actual health status would be expected (Health and Welfare Canada, 1988). Thus worker groups experience and view their health differently, and perhaps these nuances affect their reactions to the labeling process. Therefore, it would be important to address occupational status, level of responsibility, and type of industry when assessing the effects of labeling.

In addition, the way a person is told that he/she has hypertension is important (Rudd, 1984). Being told one has a blood pressure problem can be very distressing. Soghikian et al., 1981, concluded that it would be advisable to develop strategies to reduce the psychological side-effects of telling people they have high blood pressure. Perhaps the amount of hypertension education at the time of labeling, and the follow-up available for hypertensives in each study, accounts for the differing results in the labeling literature.

MacDonald et al., 1985, reviewed the disadvantages of being labeled as hypertensive. Their conclusions were that labeling, by its very nature, can be harmful. They based their statement on studies which found illness absenteeism from work to be higher among aware hypertensives than among either normotensives, or unaware hypertensives; and psychological well-being to be lower among hypertensives than among normotensives, or unaware hypertensives. Their article contained a comforting conclusion: certain circumstances of care prevented the psychological trauma of being labeled — hypertension education and follow up care.

Having reviewed the negative findings associated with labeling, attention will now be paid to the possible positive aspects. The most obvious of these is that being labeled may motivate the hypertensive person to make recommended lifestyle changes in an effort to lower blood pressure. In doing so, this may necessitate time away from work, or a reassessment of life and marriage. These changes, although perceived as negative by employers, may actually be positive for the hypertensive person.

The major effects of labeling stem from the reaction of other people to the labeled individual. Once labeled, the person is considered "different", and the label remains even though the person acts the same as everyone else (Monk, 1981). Thus the person internalizes the hypertension stereotype, often behaving in ways consistent with societal expectations such as being unable to do certain things, or having to make lifestyle changes due to a health-related problem (Monk, 1981; Mann, 1984). It is difficult to hide a hypertension condition given that dietary and exercise changes are to be made, as well as the possible introduction of antihypertensive drugs and medical supervision into one's life.

The Current Study

The relationship between labeling due to hypertension screening and the resultant changes in lifestyle practices has not been well-studied (Lefebvre, Hursey, & Carleton, 1988). Many studies have looked at absenteeism and psychological well-being, or blood pressure changes as outcome variables; none have investigated the degree of lifestyle change that results due to hypertension labeling. The decision to study the effect of hypertension labeling on lifestyle changes as opposed to the other outcomes, was based on this lack of information.

Additional reasons for studying the effects of labeling associated with the hypertension screening process included the following premises:

1. If screening for hypertension fails to produce behavior changes, then worksite hypertension control programs may need to use different approaches.
2. If screening does yield positive lifestyle

changes, then hypertension screening could be a viable health protection approach to use.

3. If detrimental effects are observed with hypertension screening programs, the ethical question: Is hypertension screening more harmful than helpful? needs to be addressed.

The general research question in this thesis was: Do individuals identified as having a risk factor (hypertension) for cardiovascular disease alter their non-optimal health behaviors (lifestyles) more than those labeled as being without that risk? More specifically, do employees who were told they have elevated blood pressures make more changes regarding salt intake, smoking behaviors, degree of exercising, alcohol use, stress management, and control of body weight, than do employees with normal blood pressures? To answer this question, a worksite population at Petro-Canada was studied through the use of a health protection/health promotion program: Target Your Blood Pressure Program. The data from this program were used for this study.

CHAPTER 2

METHODOLOGY

I. HISTORICAL BACKGROUND

The Target Your Blood Pressure Program was a comprehensive, blood pressure screening program designed to increase blood pressure awareness among Petro-Canada employees. It began June 28, 1987, as a pilot project at Petro-Canada Centre, Calgary. Two University of Calgary nursing students conducted the program under the supervision of the Senior Coordinator of Health Services (West), Petro-Canada. They received extensive briefings on the Target Your Blood Pressure Program components: promotion, implementation, follow-up and evaluation.

The promotional component consisted of noon hour video presentations of the Ticker Test (Canadian Broadcasting Company), posters and company memoranda. After an extensive campaign, the worksite blood pressure screening clinics began throughout the twin towers at Petro-Canada Centre, Calgary. The program proved popular and was portable enough to also be used with employees working at field locations. Out of a possible 1909 employees, a total of 900 Calgary-based employees and 177 field employees

(Northern Region Resources and Empress Plant) availed themselves of the service. Special emphasis was placed on the use of the Canadian blood pressure measurement and referral standards that had been formally announced June, 1987 by the Canadian Coalition for Blood Pressure Control and Prevention. The follow-up and evaluation components were conducted throughout the fall of 1987.

Prior to the Target Your Blood Pressure Program, employee demographic and lifestyle data at Petro-Canada were unavailable. By September, 1987, baseline data regarding lifestyle habits and demographic characteristics had been collected on 1077 Petro-Canada employees.

The method used to collect the baseline data was a combination of self-report and nurse interview, along with actual blood pressure measurements. Employees who chose to participate in the program completed the Target Your Blood Pressure Program questionnaire, with or without assistance. Following this process, the nurse measured the employee's blood pressure. It was at this point that each participant was labeled as normotensive (NBP), borderline hypertensive (BBP), or hypertensive (HBP) according to the referral guidelines adapted from the Canadian Coalition on Blood Pressure Prevention, Detection and Control Group (Petro-Canada, 1987).

In summary, this worksite hypertension screening program offered health education for all, lifestyle counseling upon request, referrals to family physicians, and workplace follow-up for BBP and HBP employees. Participation in the Target Your Blood Pressure Program program was voluntary, and all employees received the same health education prior to the screening process. The actions taken after the hypertension screening were employee-initiated, although advice and counseling was available at the Petro-Canada Health Centre for those who requested guidance and follow-up.

In December, 1987, a descriptive report was completed regarding the employee lifestyle data and the prevalence of hypertension at Petro-Canada (Anderson, 1987). A synopsis of the baseline data on 1077 screenees follows in Tables 1 and 2.

Table 1

Demographics

	CALGARY		OFFSITE
NUMBER SCREENED	900	employees	177
RESPONSE RATE	52%		99%
SEX RATIO	45.3% 54.7%	females males	3.4% 96.6%
AGE RANGE	18-66	years	21-62
MARITAL STATUS	66% 23% 7% 4%	married single divorced widowed	78% 12% 7% 3%
BLOOD PRESSURE TYPES	89.6% 10.4%	normal BP elevated BP	80.4% 19.6%

Table 2
<u>Observations About the Petro-Canada Population</u>

* The prevalence of elevated blood pressures increased with age amongst those in the sample.

* Males had a higher prevalences of elevated blood pressures than females.

* Offsite males (Field Employees) had a higher prevalence of elevated blood pressures than Calgary males.

* The prevalence of table salt use was 60% among Calgary employees and 75% among Offsite employees.

* 80% of the Petro-Canada group were "Never Smokers" and "Ex-smokers". This was higher than the Canadian National average of 66% (Health and Welfare Canada, 1988).

* The Offsite males had the largest percentage of smokers.

* A majority (84%) of the screened employees reported alcohol intakes of less than 2 ounces of alcohol per day.

* The percentages of overweight employees were 33% for the Calgary population and 53% for Offsite.

* Perceived stress levels were similar among the populations screened with most reporting a "moderate" stress level.

* 41% of employees never/seldom exercised, or did so once a week.

* 62% of the employees screened by TARGET YOUR BLOOD PRESSURE program did not know their blood pressures: between 14-21% of these employees were found to have elevated blood pressures.

The Interim

Since September, 1987, employees have been left to their own devices regarding their blood pressure management. As was stated earlier, help was available, if the employee initiated the contact. With an interval of 12-15 months, the following question remained:

Did employees identified as having elevated blood pressures make the recommended lifestyle changes?

The specific research questions that evolved were:

1. Is there a difference in the proportion of hypertensive individuals making lifestyle changes as compared to the normotensive individuals?
2. What factors influence behavioral change (e.g. gender, age, marital status, location of worksite)?
3. Which lifestyle behaviors are the most likely to change?

II. THE LABELING PROCESS

Labeling in this study was the process of telling an employee that she/he was at risk for hypertension. The labeling process began with answering a questionnaire. This questionnaire prompted a self-examination of lifestyle practices in relation to the development of high blood pressure. In addition, each person was given health education materials on high blood pressure prevention, detection, and control, which encouraged further self-assessment and identification of the presence of hypertension risk factors.

Specially trained nurses reviewed employee responses to the questionnaires, thereby ensuring that all questions were answered. Blood pressure measurements were done and appropriate referrals were made to personal physicians according to the Petro-Canada Blood Pressure protocol (Petro-Canada, 1987).

Employees were told their blood pressure values, instructed as to the meaning, given wallet cards with the documented blood pressure values, and advised to monitor their blood pressure as per the Target Your Blood Pressure Protocol (Petro-Canada, 1987). For example, a person whose blood pressure was in the normotensive range was urged to adopt healthy lifestyles, to reduce any existent cardiovascular risk factors, and to have a blood pressure recheck in 2 years. In contrast, the borderline hypertensive employee although counseled in a similar manner, was encouraged to have a blood pressure recheck in 6 months, or sooner depending on the severity of the condition.

Based on the existence of Canadian Blood Pressure Measurement Standards (June 1987), the labeling process used during the Target Your Blood Pressure Program should be similar to the labeling associated with other Canadian blood pressure screening programs. This would allow for meaningful population blood pressure comparisons. As well, these standards were established to ensure that the hypertension screening would correctly identify those persons with hypertension from those who did not (CCCNAMHBP, 1989). The use of the mean blood pressure measurement (the average of two blood pressure readings) also helped to minimize errors. Despite these precautions, some inappropriate labeling would have occurred.

III. METHOD OF STUDY

The use of an historical cohort and the techniques of survey research were selected for studying the effects of labeling on the employee population that participated in the Target Your Blood Pressure Program at Petro-Canada during the summer of 1987. The advantages of this approach were that a temporal relationship between the labeling and the behavioral changes could be determined; differences could be demonstrated between the "labeled" and "not labeled" groups as incidence rates of behavioral change could be calculated; by grouping employees according to labeling, the behavioral change outcomes did not affect the grouping process; and this approach permitted the observation of many outcomes. Also by using an historical cohort, the research project was relatively inexpensive and quick to do.

Research Design

Baseline Data		Labeling Effects 1 Year	Survey Data	
Body index	S	NBP ——————→	Body index	S
Smoking	C		Smoking	U
Alcohol intake	R	BBP ——————→	Alcohol intake	R
Salt intake	E		Salt intake	V
Stress levels	E	HBP ——————→	Stress levels	E
Exercise level	N		Exercise level	Y

LEGEND: NBP = Normal blood pressure (<140/90)
BBP = Borderline hypertension (140-159/90-114)
HBP = High blood pressure ($\geq$160/115).

Some potential disadvantages of this approach were uncontrollable events that might happen to the employee subjects over the 12-15 month interium, such as termination from the company, moving or other events leading to loss to followup, and death. Indeed this happened, but the effects were equally distributed in both the "labeled" and "not labeled" groups.

Methodology

Sample Size

The results of the 1987 Petro-Canada blood pressure screening program were:

HBP = 9 individuals ┐
BBP = 123 individuals ┘ — "AT RISK" or "LABELED"

NBP = 945 individuals —— "NOT AT RISK" or "NOT LABELED"

As anticipated, the "at risk" rates for hypertension were lower than the prevalence rates for hypertension in the general population. More well individuals enter the work force than do ill persons, and sick workers leave their jobs. Thus worker groups tend to be healthier (Mausner and Kramer, 1985). Also, older individuals, who are more likely to be hypertensive, retire leaving a younger, less hypertension-prone worker population.

For this research project, universal sampling was used. Unfortunately, little had been done in the related literature to establish what the degree of behavioral change due to labeling should be. Clinically, one would anticipate that at least a 10% change in behavior would be necessary for a corporation such as Petro-Canada to support any screening program as economically feasible. Using this belief, and the results of a literature review, an 11% "effect size" was arrived at. Effect size, in this study, was defined as the difference between the "labeled" and "not labeled" groups regarding the proportion of employees who changed their behaviors.

The calculations of this particular effect size are provided in Table 3, Appendix A, but briefly were as follows. Each behavior — smoking, level of exercise, reduction of alcohol, weight loss, stress reduction and salt restriction, was researched to determine the degree of behavioral change that could be expected within one year for "labeled" and "not labeled" subjects. The "labeled" values were based on the outcomes of various behavioral intervention studies in which the control groups were labeled, but not provided any behavioral interventions. The "not labeled" values were based on behavioral change rates seen within the Canadian population at any given time — a baseline value. The effect, then, was the difference between the two.

The smallest arithmetic difference in lifestyle change expected in untreated, "non-labeled" individuals was smoking change, with a baseline rate of 12% for smoking cessation. When this value was subtracted from the expected smoking cessation rate of 23% for "labeled" subjects, an 11% effect size was established. By selecting a sample size that would have enough power to detect the smallest degree of behavioral change, in this case related to smoking change, all the other behavioral changes which were calculated as greater should be observable. Thus an 11% effect size was established for this project.

Using Schlesselman's formula for sample size determination (1982, p. 150), the minimal sample size to detect an 11% effect for smoking cessation with a study power of 80%, was calculated as 108 "labeled" individuals and 324 "not labeled" subjects, or a 1:3 ratio. Given that such a large worker group was available, an adequate sample to detect the size of the labeling effects sought was anticipated.

Recruitment of Subjects

To participate in this research project, the employees had to have been involved in the Target Your Blood Pressure Program from June 28 to August 30, 1987. Each subject was asked to complete a mailed, survey questionnaire about their perception of their blood pressure status, and their current lifestyle and health care practices. Each questionnaire was coded so that the researcher could identify the respondent for baseline comparison purposes, while avoiding a second hypertension labeling process. To obtain participant consent without revealing the specific intent of the project and thus risking biased results, subjects were merely asked to participate in a follow-up study for the original Target Your Blood Pressure Program.

Of the 1077 employees screened the previous year, 22 were eliminated because they had refused to have their name placed on the original questionnaire making data comparison impossible. 1055 individuals were sent questionnaires along with Petro-Canada Health Centre's letter sanctioning the study.

Data collection occurred during the months of October and November, 1988. This time was chosen as people were more likely to be in set routines as opposed to the summer, or pre-Christmas season.

To enhance respondent participation, the questionnaire was kept short and trim looking, questions were quick and easy to answer, and return envelopes along with an introductory/thank you letter were included as part of the enclosures. Additional attempts to increase the response rate were:

1) sponsorship of the research project by Petro-Canada Health Centre

2) sending a follow-up reminder one week after the initial mailout

3) mailing subsequent cover letters and questionnaires

to nonrespondents, three weeks after the first mailout. The response rate obtained was 70.2%, thus supporting Dillion's claims that these approaches promote response in survey research (Dillion, 1983).

Return of the survey questionnaire served as the individual's consent to participate in the study. Responses were kept confidential and used only for research purposes. Names were not used on the questionnaire, although individual employees could be identified by the researcher if absolutely necessary. Instead, number codes were used as tracers. To promote trust, and prevent nonresponse or erasing of the number code, an explanation of this process was provided in the covering letter.

Questionnaire

The first page of the questionnaire, Time 2 (Appendix B) was a replica of the original self-administered questionnaire used to obtain the baseline employee lifestyle data, Time 1. It was designed to be used for pre and post-labeling lifestyle behavior comparison purposes. The remainder of the questionnaire was adapted from the Canadian Health Promotion Survey (1985) (Statistics Canada, 1985) which used a telephone interview format, and from the Rand Health Insurance Study (Foxman et al., 1982). Questions to assess the degree of "labeling" undergone by screenees were added. They dealt with beliefs about the need to treat high blood pressure, whether behavior changes were made, why and how they were made, and health care behaviors prior to and since the screening program.

The questions taken from the 1985 Canada Health Promotion Survey, along with inquiries pertaining to treatment interventions, allowed for comparisons to be made between the Petro-Canada populations and the Canadian and Albertan populations. If behaviors proved similar, then the study results would likely be generalizable to these populations. Since the questions dealt with health habits and lifestyle, between group comparisons on health behavior changes could also be made.

To assess the adequacy of the Time 2 format, the questionnaire was piloted for use as a self-report tool. Workers of various ages and educational backgrounds were asked to complete the questionnaire. Modifications were made based on the noted response difficulties. Questionnaire completion time averaged 20 minutes.

Method of Data Collection

Data collection began October 3, 1988, following receipt of the research study approval from the Department of Community Health Sciences, the Conjoint Medical Ethics Committee of the University of Calgary Medical Faculty, and Petro-Canada Inc.. The 1055 subjects were sent questionnaires. As the questionnaires were returned, employee names were separated from the identification numbers.

Three weeks into the data collection it became apparent that the field (Offsite) subjects were reacting negatively to the questionnaire's covering letter. They were not familiar with either of the individuals who had signed the covering letter, and were contacting their regional occupational health nurse to find out what the study was all about. Unfortunately, this individual was also unaware of the research project, or its purposes. A new covering letter was then devised to address their concerns. Within a week, the response rate for this group dramatically improved.

At the four week mark, a second questionnaire was sent to nonrespondents, with a reminder/thank you letter following a week later. Data collection terminated November 21, 1989.

Data Management

The 1987 baseline data on the 1077 employees screened was stored on computer at Petro-Canada Health Centre, Calgary using dBase III plus. In addition, the original lifestyle questionnaires were kept, making person identification possible. Thus, information regarding lifestyle practices, demographic characteristics, and blood pressure values for each subject in 1987, or at Time 1, were available.

The Time 2 data were also entered into the computer as they became available. To ensure that the Time 1 entries were accurate, each entry was rechecked as the Time 2 data were entered. Once all the entries were made, the program was transformed to an ASCII file, taken from Petro-Canada, and entered into SPSS by the Computer Services, University of Calgary. This procedure was used to handle data from the first page of the questionnaire.

Responses to pages 2-8 of the questionnaire were coded according to the coding manual that had been prepared by the principal investigator for use with the questionnaire. Data were entered into SPSS by a data entry clerk, Department of Computer Services, University of Calgary. The accuracy of the coding entries was checked by comparing the number of negative responses against the number of eligible responses for certain questions. This approach worked well for the data cleaning.

Data Analysis

Data analysis occurred December, 1988, through April, 1989 using the SPSS statistical program. Two separate data bases existed: lifestyle data on the Petro-Canada employees for Time 1 and Time 2 (PC Data), and health promotion data at Time 2 for the Petro-Canada employees who responded to the survey questionnaire (HP Data).

General frequency distributions and frequency distributions for the "labeled" and "not labeled" subjects were determined for both data sets. Using the Petro-Canada Data, the frequency distributions were established for only those employees who answered at both Time 1 and Time 2 (the T_1-T_2 sample), as well as for the "labeled" and "not labeled" subjects within this T_1-T_2 sample.

To assess the comparability of the "labeled" and "not labeled" groups, demographic variables (sex, age, marital status and work site) were compared regarding their frequencies. Chi-squares were done to determine if significant differences between the two groups existed. The chi-square statistic was appropriate as the data were nominal and ordinal levels of measurement, the sample size was large, and frequencies were being compared.

Since significant differences were found to exist between these two groups, stratified analysis was used to control for confounders. This technique allowed for the evaluation of the association between the degree of labeling and behavior change without the interference of variables such as sex, age, work location and marital status (Hennekens & Buring, 1987; Rothman, 1986).

The amount of individual behavioral change from Time 1 to Time 2 (behavior change scores) for the T_1-T_2 sample was calculated by subtracting the individual's behavioral ratings at Time 2, from that at Time 1, according to the formula:

Change score = $T_2 - T_1$.

The change scores for each of the individual health behaviors, or lifestyle practices were determined for the "labeled" and "not labeled" groups. The frequencies of the change scores for the two groups, as well as for the subjects in the greatest need of changing each type of behavior (smokers, drinkers, overweight, salt users, highly stressed, sedentary), were established. The "labeled" and "not labeled" groups were subsequently compared regarding the degree of change, and direction of these changes. As well, each behavioral change was tested using the chi-square test for trend (Schlesselman, 1982, p. 201).

The use of change scores was appropriate as they allowed for direct measurement of the degree of behavioral change for each individual, as opposed to group change. Intuitively, this approach appeared more accurate for discussing individual behavior change, than using group responses. It avoided the fallacy of incorrectly equating group behavior with that of individuals.

Two-tailed tests of significance were used throughout the analysis. In the case of lifestyle changes, the use of two-tailed tests was justifiable as people may make positive, negative, or no change to their behaviors. For example, the employees at Petro-Canada who made lifestyle changes in response to the <u>Know Your Blood Pressure by Heart</u> educational sessions, may have later reverted to their former lifestyles. Similarly, employees who quit smoking in response to Petro-Canada's Smoke-free Workplace Policy in 1987, may have relapsed within the year (the expected rate of recidivism is 50%). In addition, hypertensive employees might have found the use of antihypertensives easier than making behavioral changes, and their efforts to make lifestyle changes may have deteriorated.

Therefore, the H^o = no change

H^a = [+] or [-] change

The direction of the change scores in relation to the development of hypertension was conceptualized based on the hypertension literature. Individuals who were overweight, smoke, highly stressed, sedentary, heavy drinkers, and salt users were deemed as positive for the development of hypertension [(+) HTN]. A model was designed (Table 4) and used to interpret the behavioral changes.

Table 4

DIRECTION OF CHANGE SCORES IN RELATION TO DEVELOPMENT OF HYPERTENSION

1. BODY MASS INDEX

Zone B ——> Zone C ——> Zone D
(-) HTN (+) HTN

2. SMOKING

Non-smoker —> Exsmoker —> Smoker
(-) HTN (+) HTN

3. STRESS

Low —> Moderate —> High —> Extreme
(-) HTN (+) HTN

4. ALCOHOL CONSUMPTION

Less than 2oz/day ——> More than 2oz/day
(-) HTN (+) HTN

5. ACTIVITY LEVEL

Active ——————> Sedentary
(-) HTN (+) HTN

6. SALT USE

Restricted ——> No Added Salt ——> Salt User
(-) HTN (+) HTN

The validity of the questionnaire to measure the labeling effect was assessed by crosstabulating the questions that dealt with labeling, with being "labeled", or "not labeled". A significant difference between the groups would exist if the questionnaire was valid.

The Petro-Canada T_1-T_2 sample was compared to two standard populations, the Canadian and Albertan populations, to determine whether this workplace sample was representative of the general population. Questions that were used in both the Canadian Health Promotion Survey, 1985, and the Petro-Canada, Target Your Blood Pressure Survey, were compared.

The reliability of the questionnaire was determined by crosstabulating questions that asked similar content, but using a different format. If the questionnaire was reliable, then the responses to similar questions should be the same.

CHAPTER 3

RESULTS

I. DESCRIPTION OF SAMPLE

Originally, there were 1077 participant files. By Time 2, only 1055 were eligible for inclusion as 22 files were either repeat files, or incomplete entries at Time 1. Of these 1055 eligible participants, 741 answered the eight page questionnaire. This translated to a 70.2% response rate. The proportion of "labeled" to "not labeled" subjects was similar for the respondents and nonrespondents (Figure 1).

Figure 1. Response rates for the respondents and nonrespondents according to being "labeled" and "not labeled".

TOTAL
1055

Respondents	
741 (70.2%)	
Labeled	Not Labeled
74 (10%)	667 (90%)

Non-respondents	
314 (29.8%)	
Labeled	Not Labeled
40 (12.7%)	274 (87.3%)

Of the non-respondents, 10% were employees who were lost to follow up, one employee died of a cause unrelated to cardiovascular disease (0.3%); the majority (89.7%) were employees who chose to not respond. Of the lost to follow up group, 58% were women and 42% were men, whereas for the Time 2 respondents 37.9% were women and 62.1%, men. Thus more females were lost to follow-up. Relocation, name changes, termination from Petro-Canada, and temporary or contract positions at Time 1 with Petro-Canada appeared to be the reasons for individuals not receiving the questionnaire.

The active non-respondent group was composed of 39% females and 61% males. This ratio of women to men was similar to the sex ratio for Time 2 respondents (37.9% females and 62.1% males). Summer students made up 11% of this group.

Respondents and non-respondents were compared to detect possible response bias. The ratio of the "labeled" to "not labeled" was similar for both respondents (10%:90%) and non-respondents (12.7%:87.3%). In addition, the age, marital status, work location, blood pressure values, and most of the responses to lifestyle questions appeared relatively the same for the respondents as compared to the non-respondents. Some exceptions were that proportionally fewer "labeled" smokers (14.9%) responded than did the "not labeled" smokers (18.4%); fewer "labeled" women (2.7%) than "not labeled" women (41.8%); and more overweight "labeled" (46.5%) employees than "not labeled" ones (14.8%). These differences were significant, thus some response bias existed.

II. COMPARABILITY OF THE GROUPS

The collected demographic data were used to assess the comparability of the two groups: "labeled" and "not labeled". The "labeled" group was found to be older, predominantly male, married and working in field locations at Time 1. Statistical comparisons showed the groups to be significantly different in age, sex, marital status and work location (Table 5).

Table 5

Comparison of the demographics for "labeled" and "not labeled" groups

Variable	Labeled		Not Labeled		p-Values
	N	%	N	%	
Sex : Females	2	0.7%	279	99.3%	0.0000
Males	72	15.7%	387	84.3%	(X^2 test)
Missing values	0		1		
Work Location:					
Calgary	52	8.4%	568	91.6%	0.0016
Offsite	22	18.3%	98	81.7%	(X^2 test)
Missing values	0		1		
Marital Status:					
Married	61	11.7%	460	88.3%	0.0191
Not married	12	5.9%	192	94.1%	(X^2 test)
Missing values	1		14		
Age : Mean years	40.4 yrs		35.4 yrs		0.0000 (t-test)
Missing values	0		3		

Missing values were due to non-response.

Based on the original work done with the Petro-Canada population (Anderson, 1987), the employees "at risk" for hypertension were expected to be different from the "not at risk" group. Other screening programs for blood pressure programs would see similar disparities as hypertension has well-known risk factors in the population. However, to limit the chance that behavioral changes seen between the "labeled" and "not labeled" groups were in fact due to these associated factors and not to the labeling itself, sex, work location, marital status, and age were considered as potential confounders. The issue of confounding will be dealt with later in this chapter.

III. MAJOR RESEARCH QUESTION: COMPARISON OF BEHAVIORS, PRE- AND POST-LABELING

The health behaviors, or lifestyle practices were assessed, and compared pre and post-labeling for the two groups using the T_1-T_2 sample. This comparison was done sequentially for each behavior:

Stage 1. Unpaired group data were used for group comparisons between Time 1 and Time 2. This indicated whether differences existed in the "labeled" and "not labeled" groups, but the unit of analysis was the group resulting in a crude estimate of the differences.

Stage 2. The use of paired data enabled individual comparisons using the whole T_1-T_2 sample. This analysis was more meaningful as it was at an individual level, but a dilution effect due to the presence of "mislabeled" employees was anticipated. These subjects were then isolated and removed from the data base so that the labeling effect could be measured better.

Stage 3. The paired data on employees who correctly picked up on their blood pressure labeling at Time 1, allowed for individual comparisons between Time 1 and Time 2. At this point, both the employees who did, and did not, need to make lifestyle changes for each behavior were included in the data analysis. To isolate only the employees who had modifiable hypertension risk factors, stage 4 of the analysis was used.

Stage 4. Individual comparisons using the paired data on the employees who had the greatest need to make behavioral lifestyle changes at Time 1 and who picked up on the labeling were done .

This layered approach to the analysis allowed for movement from the least to the most stringent means of testing each behavioral variable, as well as the avoidance of attributing to individuals the behavioral changes seen in groups.

The results of these analyses will now be discussed according to the behaviors studied. The preliminary analysis using the group data guided the selection of the behaviors to be analyzed further using stages 2, 3, and 4. Since the group analyses were inconclusive, only the results from the individual analyses, stages 3 and 4, will be presented. Reference will be made to the stage 2 results only when the findings were particularly relevant.

<u>Salt Intake</u>

Using the unpaired group data, there was little difference between the "labeled" and "not labeled" employees in the number of employees that reduced their salt intake: 8.9% fewer "labeled" subjects used salt at Time 2 as compared to 8.4% fewer "not labeled" subjects. Of interest was a 1.7% increase in "RESTRICTED" salt use among the "labeled" workers as opposed to a 4.6% increase in the "not labeled" group. Unfortunately, by using this group data, it was difficult to determine whether this change in salt use was real at an individual level. Thus, salt use was assessed using the paired, individual data.

To accomplish this, the degree of change, and the postulated effect of that change on the development of hypertension was determined for the "labeled" and "not labeled" groups. The Direction of Change Model presented in Chapter 2, was used to determine this relationship (p.41). For example, those who used less salt were deemed more likely to lower their hypertension, or were (-)HTN.

In addition, only employees who correctly perceived their blood pressure label at Time 2 were used for this part of the analysis. Individuals were selected into this group if they correctly identified their Time 1 label when asked about their blood pressure at Time 2. As previously indicated, this was done to prevent a dilution of the effect by employees who were ineffectively labeled.

The individual change scores for salt intake for this group showed that proportionately more "labeled" employees (27.4%) decreased their salt intakes than did the "not labeled" employees (17.5%). As well, twice as many "labeled" workers increased their salt use as compared to the "not labeled" employees. Despite the differences, no significant trend (p=0.6948) was noted (Table 6).

Table 6

<u>Individual change scores for salt use among employees who correctly identified their blood pressure label.</u>

Change	Labeled		Not Labeled	
	N	Adjusted %	N	Adjusted %
INCREASED	9	14.5%	43	7.2%
SAME AMOUNT	36	58.1%	447	75.3%
DECREASED	17	27.4%	104	17.5%
Subtotal	62	100.0%	594	100.0%
Missing Values	12	16.2%	73	10.9%
Total	74		667	

+HTN

-HTN

X^2 statistic = 8.99, p = 0.0112
X^2 for trend = 0.15, p = 0.6948

The above analysis included both the salt and non-salt users who correctly identified their blood pressure label. To assess whether a similar result would exist for just the salt users out of this group, or for those employees in the greatest need of lifestyle change regarding this risk for hypertension (salt users), change scores were established for the "labeled" and "not labeled" employees regarding salt use.

Among the salt users, there was a significant difference in salt reduction (p=0.0450) between the "labeled" and "not labeled" employees, as well as a significant trend toward salt reduction (p=0.0407). The "labeled" employees reported more salt reduction (15.8%) than did the "not labeled" employees (Table 7).

Table 7

<u>Change in salt use among salt users who correctly identified their blood pressure label.</u>

Change	Labeled		Not Labeled	
	N	Adjusted %	N	Adjusted %
INCREASED	-	---%	-	---%
SAME AMOUNT	19	63.3%	299	79.1%
DECREASED	11	36.7%	79	20.9%
TOTAL	30	100.0%	378	100.0%

+HTN

-HTN

X^2 statistic = 4.02, p = 0.0450
X^2 for trend = 4.19, p = 0.0407

When the analyses including only those who picked up on their labeling versus the total sample are compared, it is noteworthy that only trivial differences in the results were found. Thus, those individuals whose perception of their label did not concur with the labeling given at Time 1, did not influence the total results of the program.

In summary, a significant decrease in salt use among the "labeled" employees was found for those employees who were salt users and the trend towards salt reduction was significant.

Perceived Stress Levels

Based on the group data, both the groups showed a shift from lower to higher stress levels. At the individual level, the paired analyses of the two groups allowed a more detailed look at the pattern in the change scores. The "not labeled" employees tended to remain at the SAME AMOUNT, or to decrease their stress; while more of the "labeled" workers (14.9%) reported INCREASED stress (Table 8).

Table 8

Individual change scores for stress among employees who correctly picked up on their blood pressure label.

Change	Labeled		Not Labeled	
	N	Adjusted %	N	Adjusted %
INCREASED	24	38.7%	139	23.8%
SAME AMOUNT	32	51.6%	376	64.5%
DECREASED	6	9.7%	68	11.7%
Subtotal	62	100.0%	583	100.0%
No response	12	16.2%	25	12.6%
Total	74		667	

+HTN

-HTN

X^2 statistic= 6.56, p= .0376
X^2 for trend = 4.56, p= .0327

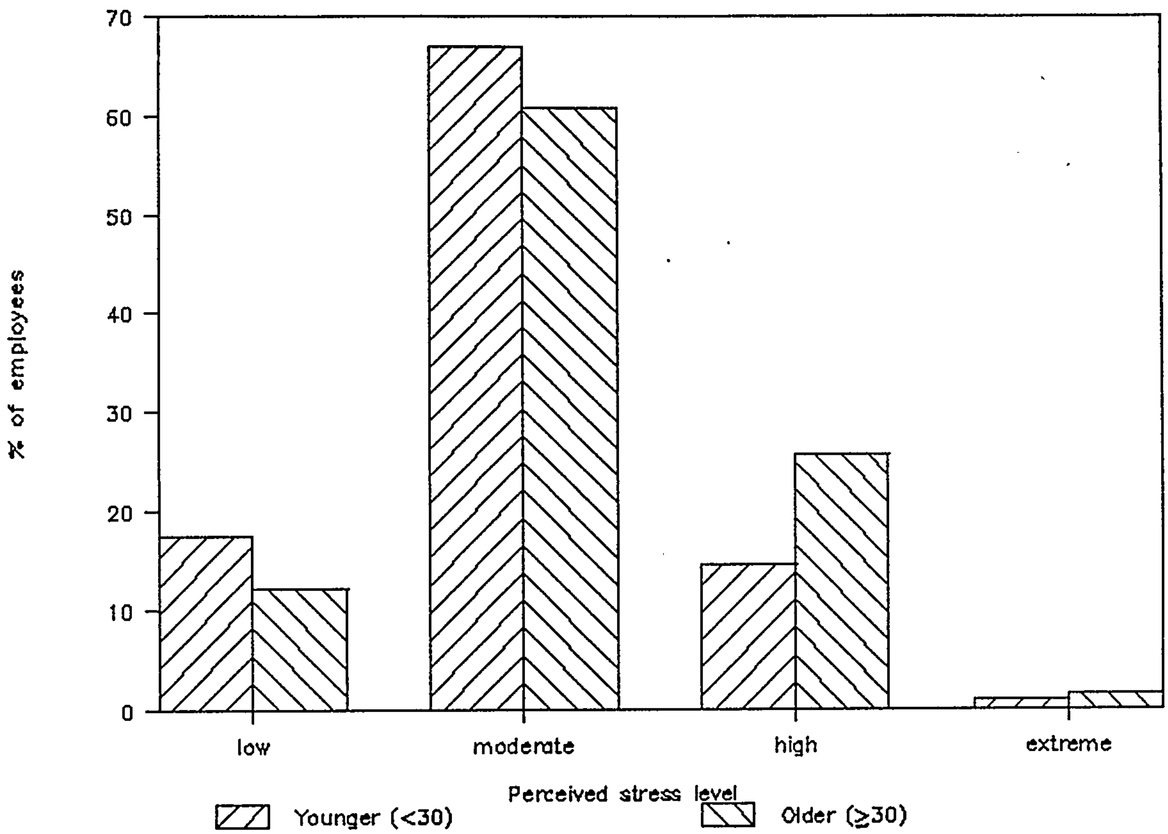
Significant differences were found between the two groups ($p=0.0376$), as well as a trend in the change scores ($p=.0327$) for the employees who correctly identified their blood pressure labels at Time 2. Thus stress change was significant and the level of stress appeared to increase in the "labeled" employees.

Given that an increase in stress was noted among the "labeled" employees, possible explanations for this finding were explored. Since the "labeled" employees were also the older employees at Time 1, and older workers tend to be in senior positions with considerable responsibility, a crosstabulation of the stress levels and age at Time 1 was done. What was found was that more older employees (27%) rated their perceived stress levels as HIGH or EXTREME in comparison to the younger workers (15.2%) (Figure 2, p.53).

The differences in perceived stress levels of the age groups was significant ($p=0.0059$). Thus the "labeled" employees who were older to begin with, also reported higher stress levels at Time 1 than did the "not labeled" employees. The interpretation of this finding and how it related to labeling and stress change will be discussed later in Chapter 4.

Since the <u>Target Your Blood Pressure Program</u> urged stress reduction as a means of lowering hypertension, the HIGHLY and EXTREMELY STRESSED employees at Time 1 were assessed to see if there was a difference in stress reduction between the "labeled" and "not labeled" employees at Time 2. No differences were noted.

Figure 2. Employee stress levels in relation to age.



Alcohol Intake

Of the individuals who picked up on their labeling, 92.8% of the "not labeled" employees as compared to 85.5% of the "labeled" individuals ingested the same amount of alcohol at Time 1 and Time 2. The difference was not significant ($p=.0599$); nor did the change scores show a trend for change in drinking behaviors.

The previous analysis included both the moderate (less than 2 oz. per day) and heavy drinkers (more than 2 oz. per day). To determine whether employees responded to the program's message —alcohol use in moderation if at all —the drinking behaviors of the employees who were the heavy drinkers at Time 1 were examined. Again, no significant differences in alcohol reduction were noted between the "labeled" and "not labeled" individuals.

<u>Body Weight</u>

At the level of paired (individual) analysis for the whole T_1-T_2 group (Stage 2), the 97.2% of the "labeled" employees either stayed the SAME WEIGHT, or LOST WEIGHT as opposed to 89.1% of the "not labeled" individuals (p=.0358). A trend in weight change was not found using the chisquare test for trend (Table 9).

Table 9

<u>BMI change scores for the whole T1-T2 sample.</u>

Change	Labeled		Not Labeled	
	N	Adjusted %	N	Adjusted %
GAINED WEIGHT	2	2.8%	67	10.9%
SAME WEIGHT	66	93.0%	495	80.8%
LOST WEIGHT	3	4.2%	51	8.3%
TOTAL	71	100.0%	613	100.0%

+HTN

-HTN

X^2= 6.66, p= 0.0358
X^2 for trend= .57, p= 0.4495

The individual analysis on the employees who picked up on their labeling failed to show significant differences between the "labeled" and "not labeled" groups.

To explain the above findings, the effect of sample size must considered. As the level of analysis for change in BMI became more stringent, smaller sample sizes were dealt with. This would have reduced the power of the analysis at Stage 3 possibly making it difficult to arrive at significant findings.

When the employees with BMI $\geq$25 at Time 1 and who correctly picked-up on their blood pressure labels were examined, the following results were found. The "labeled" and "not labeled" employees demonstrated significant differences in the type of BMI changes with the "labeled" employees showing more weight stability. A significant trend in weight change was absent (Table 10).

Table 10

BMI change scores in employees with BMI >25 at T_1 and who picked-up on their blood pressure label.

Change	Labeled		Not Labeled	
	N	Adjusted %	N	Adjusted %
GAINED WEIGHT	-	---%	15	9.0%
SAME WEIGHT	38	92.7%	118	70.7%
LOST WEIGHT	3	7.3%	34	20.3%
TOTAL	41	100.0%	167	100.0%

+HTN

-HTN

X^2= 8.96, p= 0.0113

X^2 for trend= .23, p=.6315

Upon examination of the mean weights, the "not labeled" subjects showed an average BMI at Time 1 of 23.71 and a change in BMI of -0.1506; the "labeled" employees had a mean BMI of 26.60 with a BMI change of -0.1187. The mean differences in weight were not significantly different for the "labeled" and "not labeled" groups.

Thus the "not labeled" employees' weights tended to fluctuate, while the "labeled" employees either maintained, or lost weight, and no trends in weight change were noted.

Exercise

Exercise changes were unremarkable for the "labeled" and "not labeled" employees. For this reason, the results have not been presented in detail.

Summary

Changes in lifestyle behaviors were assessed at group and individual levels. The individual change in behavior was deemed the most stringent mode of testing and thus, the most credible. This mode of testing demonstrated significant changes in salt use and perceived stress levels. Body weight showed an overall difference in the pattern of weight change, but no significant trends were evident. All other behavioral changes assessed failed to net any significant findings.

IV. THE ISSUE OF CONFOUNDERS

Four potential confounders were identified in section III of this chapter: sex, age, marital status, and work location. All four could affect one's propensity to change behaviors, as well as the likelihood of being hypertensive and labeled. For example, being male is a risk factor for developing hypertension. In addition, sex differences exist regarding response to symptoms and treatment (Evers et al., 1987), as well as compliance to treatment regimens (Prineas, Stephens & Lovell, 1973).

Age can be a confounder as the frequency of blood pressure monitoring increases with age, and hence the increased chance of being labeled (Health and Welfare Canada, 1988). Also, younger individuals respond differently to the impact of labeling (Stenn et al., 1981). They are more likely to perceive themselves as immune to chronic diseases, and therefore tend to resist lifestyle changes.

Lack of social support (marital status) has been linked to the likelihood of developing hypertension (labeling) as well as to being less likely to make lifestyle changes (Alderman et al., 1982). Married individuals may be more likely to receive social support when following hypertension treatment regimens, than unattached persons. Thus sex, age and marital status have been cited as confounders in this and other studies related to hypertension labeling (Mossey, 1981; Monk, 1981; Soghikian et al.,1981).

In this study, work location was also considered a potential confounder. Rural Petro-Canada employees (Offsite) were known to have a higher prevalence of hypertension (Anderson, 1987), and therefore, were more likely to be "labeled" as at risk for hypertension. In addition, different populations relate differently to labeling (Rudd et al., 1984). Also, Prineas et al., 1973, suggested that a difference exists between rural and urban compliance rates to hypertension treatments. Thus work location was included as a possible confounder in this study.

The test for confounding comprised two steps. First, each behavior change was crosstabulated by sex, age, marital status, and work location to establish whether these variables were associated with a different propensity to change for the various behaviors studied. For example, if sex were a potential confounder to weight change, it would be important to determine whether males or females were more likely to change their weight from Time 1 to Time 2. If there was no difference in weight change between the sexes, then any difference between the "labeled" and "not labeled" employees could not be explained by differences in the sex distribution of the two groups.

To avoid oversights in the data analysis, while trying to function efficiently, a liberal level of significance was arbitrarily chosen as the cutoff point for further analyses. Potential confounders that were associated with the behavior changes and had a probability value of ≤ 0.2000 were deemed as potential confounders. The factors which met these criteria are noted in Table 11.

Table 11
Potential confounders regarding the propensity to change

Potential Confounder	Behavioral Change
Sex	Exercise change Change in alcohol intake
Work location	Exercise change Change in alcohol intake Change in stress level Change in smoking behavior Change in number of cigarettes
Age	Weight change

The second stage, or stratified analysis, was applied to these variables. Change scores for the "labeled" and "not labeled" groups were crosstabulated by sex, age and work location for these behavior variables. The process used for stratifying was as follows: for each variable, the crude and adjusted (Mantel-Haenszel) relative risks were calculated (Hennekens and Buring, 1987, p. 307). Confounding exists when the overall estimate of the association between exposure and disease (crude relative risk [CR]) does not equal the risk for disease when the effect of the confounding factor has been taken into account (adjusted relative risk [AR]) (Kleinbaum, Kupper, & Morgenstern, 1982; Rothman, 1986) indicating that some other factor, namely the variable being held constant, has caused the noted difference. Confounding is problematic only if the offending factor is unevenly distributed in the strata and leads to erroneous conclusions about associations.

To assess the equality between the adjusted relative risk and crude relative risk, 95% confidence intervals were calculated for the crude relative risks. This is the range of values within which there existed a 95% certainty that the true crude relative risk would fall. The adjusted relative risk and crude relative risk were deemed equal if the adjusted relative risk fell within the confidence interval of the crude relative risk. To explain this process further, the test for work location as a confounder in relation to labeling and the propensity to change exercise behaviors will be discussed.

By controlling for work location, the adjusted relationship between labeling and exercise change was examined. Crosstabulations were used to determine the frequency of exercise change for the "labeled" and "not labeled" employees at each work location. The crude and adjusted relative risks were calculated along with the 95% confidence intervals for the crude relative risks (Table 12).

Table 12

Stratified analysis: exercise change & labeling by Location

Location	Labeling	Increased Activity	No Change	Sub-T	Total	RR
Calgary	Label	14	32	46	470	1.19
	No label	108	316	424		
Offsite	Label	6	10	16	75	1.23
	No label	18	41	59		

Adjusted RR_{MH}= 1.30 Crude RR= 1.24 (0.83;1.85)

For this example, the Adjusted RR=1.30, while the Crude RR=1.24 with a confidence interval of 0.83-1.85. Since the Adjusted RR fell within this range, it was deemed equal to the Crude RR, and confounding was said not to exist. If the opposite were true, then confounding would be evident.

From the tests for confounding that were conducted on the behaviors cited in Table 11, only work location in relation to a change in the number of cigarettes smoked appeared to exhibit confounding. Unfortunately, there were very few employees who were labeled as "at risk for hypertension", and who had increased their cigarette consumption over the 12-15 month interval. In fact, analyses were often based on cells with only one observation. It is difficult to conclude much from this finding.

The procedure as explained above was repeated for the "At Risk" subgroup of the sample and again no confounding was demonstrated. In conclusion, only work location in relation to increased cigarette consumption showed any potential confounding. Unfortunately, the small cell sizes prevented meaningful analyses.

From the stratified analyses that were done, interaction, or effect modification appeared to be present. Interactions are independent factors that can alter the magnitude or direction of an association between two variables. Interaction is said to be present when the relative risk for the controlled factor is increased in one stratum and decreased in the other. Table 13 displays the interaction observed with smoking change and labeling in relation to work location.

Table 13
Smoking Change & Labeling by Location

Location	Labeling	Smoking Cessation	No Change	Sub-T	Total	RR
Calgary	Label	1	48	49	603	0.57
	No label	20	534	554		
Offsite	Label	1	20	21	111	4.29
	No label	1	89	90		

Adjusted RR_{MH}= 0.95 Crude RR= 0.88 (0.21;3.64)

Location	Labeling	Adoption of Smoking	No Change	Sub-T	Total	RR
Calgary	Label	3	48	51	597	2.68
	No label	12	534	546		
Offsite	Label	1	20	21	118	0.58
	No label	8	89	97		

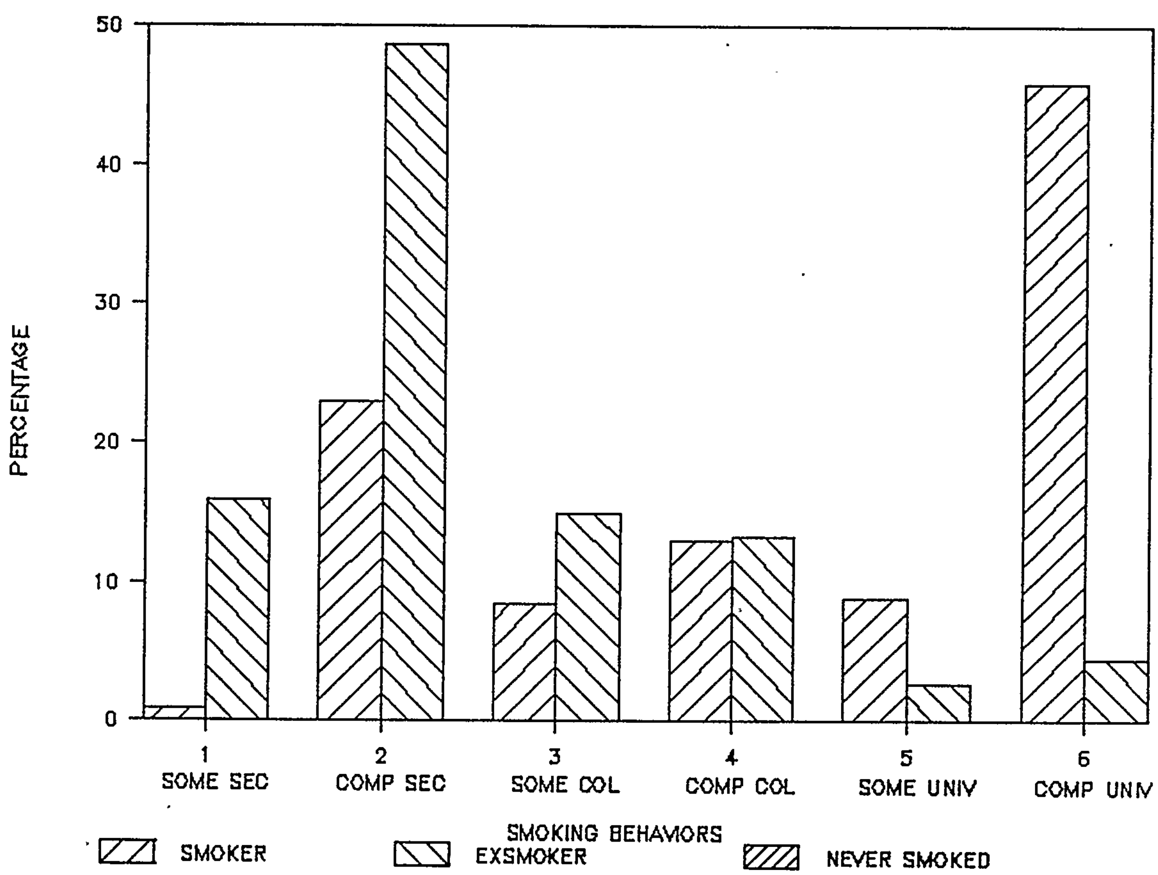
Adjusted RR_{MH}= 1.48 Crude RR= 1.79 (0.69;5.06)

This shows that the "labeled" employees in Calgary were less likely to stop smoking, as opposed to the "labeled" Offsite workers who were more likely to quit.

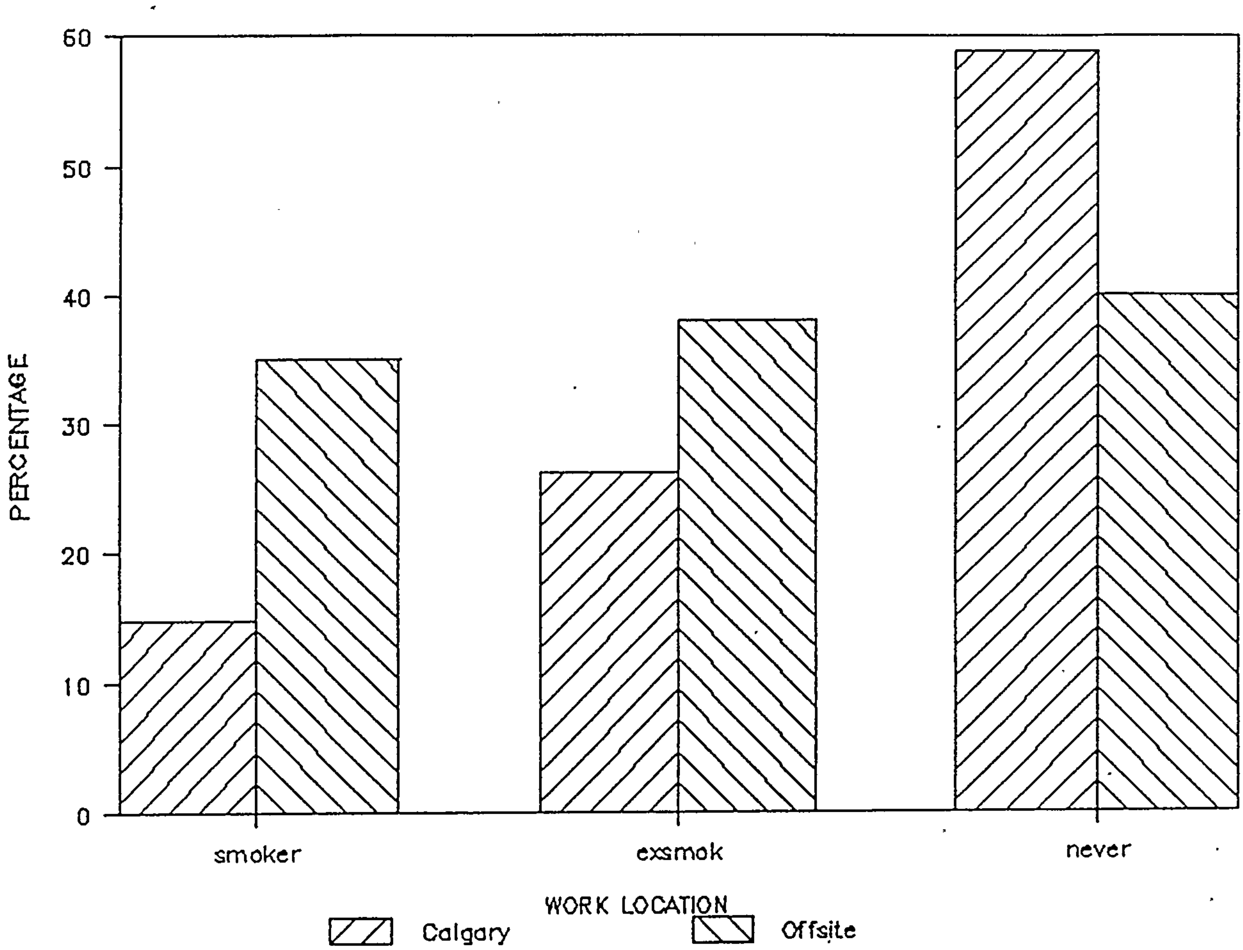
The same scenario for location was evident in relation to the adoption of the smoking habit from Time 1 to Time 2. In Calgary, the "labeled" employees were more likely than the "not labeled" to smoke, while at the Offsite, "not labeled" employees were twice as likely than the "labeled" employees to begin smoking. Although small sample sizes existed in this study, work location appeared to interact with smoking change.

To understand the observed effect modifier more, the smoking prevalences and educational status for employees in each location were assessed. The Calgary employees tended to have higher levels of education (Figure 3) and to be "Never Smokers" (Figure 4): the Offsite employees were the "Smokers" (Figure 4). Thus two totally different subpopulations existed within this worksite population.

Figure 3. Education and work

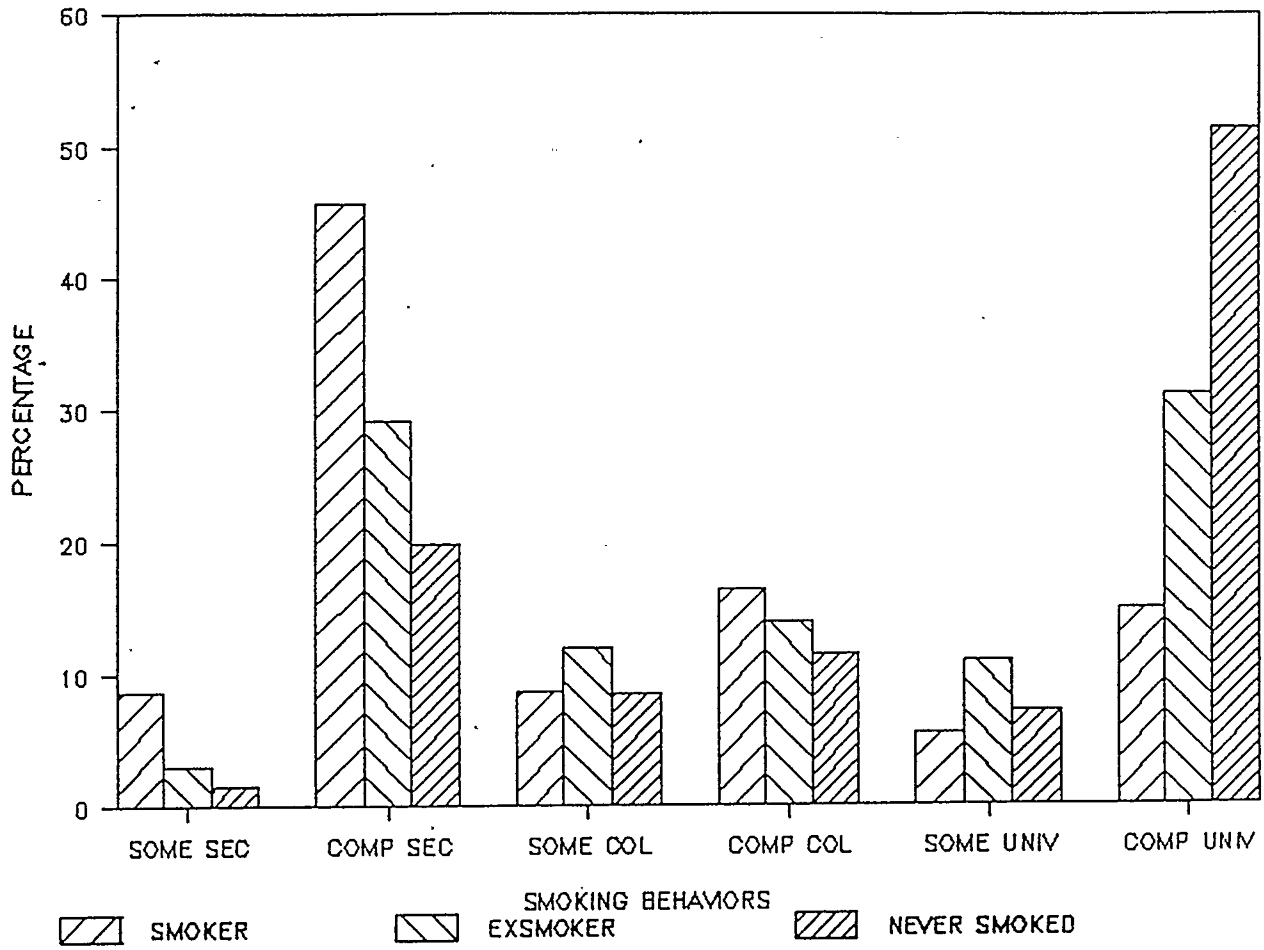


<u>Figure 4</u>. Smoking and work location.



To complete the picture, the relationship between smoking and educational status was examined. What was found was that as the employee's level of education increased, smoking decreased (Figure 5).

Figure 5. Smoking and education status.



Thus, employee changes in smoking behavior in relation to labeling depended on their work location; the role of educational status and other unmeasured factors may have contributed to this relationship.

V. THE LABELING PROCESS

In this study, it was important to establish whether the blood pressure labeling was effective or not. Specific questions in the survey questionnaire were designed to measure the labeling effect. The responses to these questions were compared to see if there was a significant difference between the "labeled" and "not labeled" groups, using chi-square test for significance.

To question #15: <u>When did you have your blood pressure checked?</u>, 79% of the "labeled" employees responded that they had their blood pressures checked within the last 6 months as opposed to 44% of the "not labeled". The difference was significant ($p=0.0001$). This indicated that the "labeled" employees had significantly more medical monitoring of their blood pressures, which in turn suggested that the labeling effect was present.

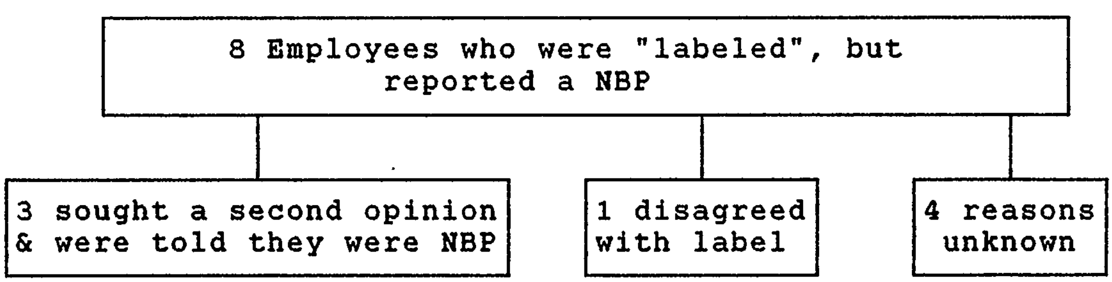
To question #76: <u>What were you told about your blood pressure level at the TARGET YOUR BLOOD PRESSURE screening program?</u>, 84.9% of the "labeled" and 91.8% of the "not labeled" subjects correctly identified themselves as being within their respective blood pressure ranges (actually measured at Time 1). Thus the labeling effect was evident, but possibly understated by the "labeled" employees. Problems with recall were noted: 3 of the 74 "labeled" employees (4%) and 19 of the 667 "not labeled" employees (3%) could not remember at Time 2 what the nurse had told them about their blood pressure reading at Time 1.

In addition, some of the "labeled" subjects received conflicting blood pressure assessments from their physicians as their workplace blood pressures differed from the home, or physician measurements. Of the "labeled" employees, 3 (4%) were told by their physicians that their blood pressures were normal when they sought second opinions. One person did not believe his Time 1 label and blamed his elevated blood pressure reading on the use of cigarettes and coffee just prior to the blood pressure measurement. The reasons for the loss of the "at risk" label were not apparent for 4 other subjects (5%).

A final point was that "labeled" employees may have responded to treatment interventions since Time 1 with the resultant normalization of their blood pressures. This might have caused confusion, which in turn led employees to classify themselves as within normal blood pressure limits at Time 1. In conclusion, more than 85% of the employees correctly identified their blood pressure labels at Time 2.

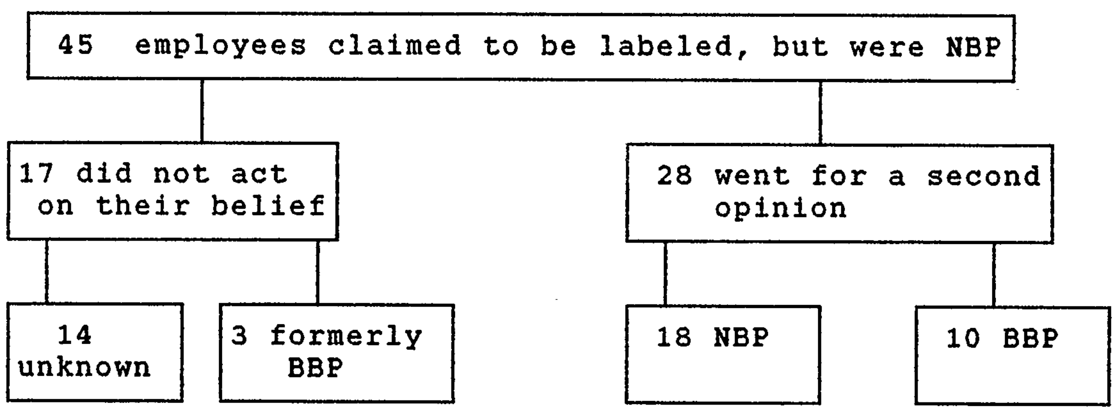
As a concern existed about the effectiveness of the clinical labeling, an indepth evaluation of the employees who failed to correctly pick up on the blood pressure labeling at Time 1 was made. Figure 6 provides a summary of the employees who were labeled as "at risk for hypertension", but who dropped their label.

Figure 6. Summary of the Effectiveness of Being "Labeled"



Looking at the opposite scenario — the "not labeled" employee at Time 1 who claimed to be "labeled" at Time 2, there were 45 employees who stated the nurse said they were borderline hypertensive although the label of normotensive had been assigned to them at that time. The health care behaviors of these individuals were investigated: 17 (37%) did not seek a second opinion to support their belief, while 28 (63%) did. Of the first group, three of the 17 had been previously labeled as borderline hypertensive and perhaps this label lingered. Of the last group, 18 (64%) were told by their physicians that their blood pressures were normal, while 10 (36%) had their suspicions of having an elevated blood pressure confirmed (Figure 7).

Figure 7. Summary of the Effectiveness of Being "Not-Labeled"



The last group, the 10 employees who were told by their physicians that they were borderline for hypertension, were investigated further as to why they even sought a second opinion. Five individuals were found to have had previous histories of hypertension while another three indicated that they were just worried about hypertension.

Thus 10-45 (1.5%-7%) of the "not labeled" employees were responding as if they had been "labeled", while 11% of the "labeled" employees had dropped their blood pressure labels. These lessened the distinction between "labeled" and "not labeled" groups. The conclusion was: labeling was effective and in fact, appeared to be a phenomenon that showed a lasting effect.

VI. COMPARABILITY OF STUDY POPULATION TO OTHER POPULATIONS

The survey responses given by the Petro-Canada sample were compared with the responses of the Canadian and Albertan populations in the respective health promotion surveys (Health and Welfare Canada, 1988 ; Parakulam, 1987). In addition, demographic comparisons were made (Appendix C).

The Petro-Canada population appeared to be better educated, more physically active, and more safety and health conscious than the general populations. The group was comprised of more older males, fewer smokers, and more alcohol drinkers who drank more often. They reportedly did more to improve their health, while still planning further health-related endeavors. Therefore, the Petro-Canada sample was not representative of the general population and the study results cannot be readily generalized to the community at large. However, many workplace populations would would be similar to the Petro-Canada population. In the last chapter, this issue will be discussed further.

VII. RELIABILITY OF THE DATA

Many duplicate questions were asked to try to establish the reliability of the research instrument: the Target Your Blood Pressure questionnaire. This can be equated to the establishment of equivalence: two parallel instruments administered to the same individuals at the same time (Polit & Hungler, 1983). Of the questions that were assessed, crosstabulations showed at least a 90% agreement indicating that the questionnaire was a reliable tool.

As a final check for reliability, the actual blood pressure values in the Petro-Canada data were crosstabulated with the actual blood pressure values as they were coded in the Health Promotion data. This was done to estimate the coding reliability. It showed a 99.7% agreement for normotensives, 98.6% for borderline hypertensives and 100% for the one hypertensive individual, indicating that the coding reliability was sound.

SUMMARY

Thus in this study, labeling was associated with some lifestyle changes that are associated with the prevention or control of hypertension. Research question #1 for this study was answered: Labeling an individual as "at risk" for hypertension as a result of a blood pressure screening program led to some behavioral changes. The reasons for the observed behavioral changes, as well as their possible meanings will be discussed in Chapter 4.

CHAPTER 4

DISCUSSION

I. Effects of Hypertension Labeling on Behavioral Change

The results of this study showed that significant behavioral changes were observed from Time 1 to Time 2 among the "labeled" employees, as compared to the "not labeled" employees regarding salt use, weight control, and perceived stress levels. These results indicated both positive and negative findings associated with labeling.

Positive Findings

Salt intake decreased, while weight stabilized in the "labeled" employees. This was interpreted by the author as a move towards lessening the development of hypertension according to the proposed model on risk factor for hypertension development, Table 5.

Salt Intake

Salt reduction associated with labeling was noted at all levels of the analysis. This was not surprising given the strength of the message in the current hypertension literature that salt reduction can lower blood pressure. Pamphlets stating that high salt intakes are associated with hypertension have been distributed to the Canadian people by the Canadian Heart Foundation, Health and Welfare Canada, and provincial Heart and Stroke Foundations (Health and Welfare Canada; Health and Welfare Canada, 1984; Participaction, 1985; Alberta Heart and Stroke Foundation, 1983; Calgary Health Services, 1983). Time and other magazines published articles on the detrimental effects of salt on blood pressure (Wallis, 1982; Bashline, 1982; Consumer Report, 1984; Whitescarver, 1985). Books on hypertension management strongly recommend salt restriction: "Salt restriction is absolutely essential (for blood pressure control)..." (Leenen & Haynes, 1986, p. 70). Also, medical personnel advise salt reduction as the first step to controlling borderline hypertension (CCCNPAMHBP, Recommendations, March 1989). In fact, food manufacturers have responded to this persuasive low-salt message by introducing low sodium products. In addition, salt reduction intuitively seems easier to accomplish and requires fewer life skills than any other recommended behavior modification for lowering blood pressure.

There is always the possibility that all the "labeled" employees were giving socially desirable responses to the salt questions at Time 2 resulting in spurious changes. However, it is difficult to speculate as to why this would be more likely in the "labeled" group. This is an unlikely explanation for the between group differences seen.

Body Weight

Change in BMI for the overweight "labeled" and "not labeled" employees showed a significant difference. Looking at the frequency rates regarding BMI, the "not labeled" employees (29.3%) tended to gain and lose weight more than the "labeled" employees whose weight either stayed the same (92.7%), or decreased (7.3%).

Thus, employees who were labeled seemed to be trying to combat hypertension through weight maintenance, or loss. The fact that the "labeled" employees were an older group, and that older individuals are more prone to gain weight and to live sedentary lifestyles (Katch & McArdle, 1983), weight control for the "labeled" employees as opposed to weight loss was a challenge. Weight loss is difficult enough without the presence of an opposing tendency to gain weight. Thus labeling may be associated with weight control, as compared to weight loss.

Negative Findings

Perceived Stress Levels

Increases in perceived stress levels appeared to be associated with blood pressure labeling. Of the employees who picked up on their labeling, more "labeled" employees (38.7%) as compared to the "not labeled" employees (23.8%) reported increased perceived stress levels. Likewise, fewer "labeled" employees demonstrated decreased levels of perceived stress. A significant trend ($p = 0.0327$) was found in support of this finding.

It should be noted that many employees in both the groups moved from LOW, or MODERATE STRESS levels to a HIGH STRESS level. This finding was not surprising. Petro-Canada experienced severe downsizing of staff in 1986. Many of the remaining employees who would have previously delegated tasks, suddenly had no one to delegate to. Meanwhile, workloads gradually increased. As well, the "labeled" group of employees differed from the "not labeled" group in age and sex ratio to begin with. They were the older males which allows one to postulate that they were in the middle to upper management positions and actually were experiencing more stress at Time 2, than they were in 1987 at Time 1. Indeed, the older employees ($\geq$30 years) in this study said they were experiencing significantly more stress than the younger ones were (Figure 2). Thus, the increased stress levels reported by the "labeled" employees could have been more related to the worker's level of responsibility than to the labeling process. Unfortunately, conclusive evidence for this finding was not available.

Since significant differences in stress change were not found for the very stressed "labeled" and "not labeled" employees, one has to ask whether the observed increase in stress among the "labeled" employees occurred among those who identified themselves as being less stressed at Time

1. Here there was a potential for increased stress being associated with hypertension labeling. Unfortunately many other factors were involved making it difficult to say for certain that labeling lead to increased stress. More research into the area of stress and hypertension labeling in the workplace is warranted.

<u>Other Behaviors</u>

Other lifestyle behaviors failed to show significant changes. This lack of change may be due to the relatively healthful profile of the population at Time 1. For example, only 18.3% of the total Petro-Canada sample population smoked, while the smoking rates for Alberta were 33% (Parakulam, 1987). Also, only 15.3% of the Petro-Canada sample were sedentary as opposed to 19% of Albertans who reported never exercising (Parakulam, 1987). In addition, behavioral changes such as smoking cessation, regular exercising and controlled alcohol use require considerable life skills, social support and motivation to achieve.

Also, the study sample contained 74 "labeled" subjects, as opposed to the 108 calculated as necessary to demonstrate the smaller behavior changes (smoking cessation and increased exercise). Thus the power of the study was reduced, possibly accounting for the lack of evidence of behavioral change in these areas.

II. Additional Information

Work location and smoking

One effect modifier was found: work location in relation to change in smoking behaviors. This modifier worked in two ways:

1) In Calgary, the "labeled" employees tended to continue smoking at Time 2 and to be less likely to quit than the "not labeled" employees. In this instance, labeling was interpreted as detrimental.

2) In the Offsite, more of the "labeled" employees tended to quit smoking at Time 2 than did the "not labeled" employees. Here labeling was interpreted as beneficial. These findings, although they appeared significant, were not subjected to tests of significance.

To understand this finding, the differences between worksites needed investigation. Educational status and smoking behaviors were examined. The majority of Calgary employees had completed university education, whereas the average Offsite worker had finished high school. Differences existed in their smoking behaviors with twice as many Offsite employees smoking as compared to Calgary employees. Consistent with the smoking literature, this study found a relationship between smoking behavior and educational status: as educational levels increased smoking behavior decreased. Thus these two groups were distinctly different populations and their responses to labeling were equally different.

Further contributing factors to this difference in response to labeling were as follows. Firstly, although the delivery of the program was consistent for both locations subtle differences in the personnel delivering the labeling message may have existed. The occupational health nurse who screened and labeled the Offsite employees was well-known, established in her position, and respected. In contrast, the Calgary nurses were students. To the Offsite workers who tended to have less education, the occupational health nurse was possibly accepted as an expert, therefore strengthening the labeling message. In contrast, the well-educated Calgary employees may have doubted the expertise of student nurses, thereby reducing the strength of the labeling message.

Secondly, there are differences in ability to access other health professionals for employees in the two locations. Calgary workers can easily consult a physician for a second opinion about their blood pressure, whereas rural employees tend to rely more on the occupational health nurse. If an opposing opinion were obtained in Calgary, the labeling effect would have been lessened.

Thirdly, the "not labeled" Calgary employees may have picked up on the no smoking message and in their "yuppie zeal" to improve their lifestyle and health, decreased their smoking behaviour regardless of the status of their hypertension risk. This may have been reinforced by the fact that the opportunities for smoking cessation assistance were greater in Calgary than the Offsite. Thus the tendency of the "not labeled" Calgary employees to smoke less may have been unrelated to the labeling effect.

Finally, these findings may be reflecting a pattern in which health promotion information is dispersed within a population. Urban employees tend to respond earlier to health promotion messages than do rural individuals (Rogers, 1983). Thus, at the beginning of this study, many of the Calgary workers had already quit smoking, leaving a residual "hard core" group of smokers with little room for change. Meanwhile, the Offsite employees who would be receiving and reacting to the "stop smoking" message later, would have just begun to respond to it during the implemention of this study. One would expect to detect a greater change in their smoking behavior.

These findings have implications for corporate health programs. One, the type of worker population needs to be identified when planning a worksite smoking cessation program. Two, continuity of health care is important. If smoking cessation in relation to hypertension control is desired, then it would appear advantageous to have an experienced, well-accepted occupational health professional provide a consistent, comprehensive message of health care concerns. Employees labeled as "at risk for hypertension" may accept the advice to stop smoking better if they know and respect the health advisor.

<u>Labeling controversy</u>

This study helps to explain the controversy found in the labeling literature. Studies done at DOFASCO by Haynes et al., 1978, and by the National Heart and Lung Institute Survey (1973) found labeling of employees as hypertensive to result in increased absenteeism at work. In addition, Mossey (1981) noted a deterioration of marital satisfaction and home life among employees labeled as hypertensive. These researchers concluded that labeling was detrimental. Other worksite studies contradicted this conclusion. The Hypertension Detection and Followup Program (1979) found no change in self-reported absenteeism. In fact, Rudd et al. (1983) documented significant variation in employee absenteeism among different worksites participating in hypertension screening. Perhaps the key to this controversy is not so much whether labeling has positive or negative effects on workers, but rather how the labeling is done, the circumstances affecting the workplace, and the characteristics of the population being labeled.

Haynes (1978) used steelworkers, or a predominantly blue collar workforce. Rudd (1983) in contrast, studied a very heterogeneous group of employees. Rudd (1984), in defense of his own findings cited Haynes' use of atypical worker populations as the reason for atypical results. This workplace study supports the effects of work location on hypertension labeling. As indicated in Chapter 3, the employee's response (smoking behaviors) to hypertension labeling differed according to the person's work location. This study points to the need for more research into the area of work location and hypertension labeling.

III. THE LABELING PROCESS

Labeling, the independent variable in this research study, was clinical in nature. As stated earlier, the employees were identified as "at risk" or "not at risk" for hypertension by specially trained nurses. Labeling appeared to be effective in that 84.9% of the "labeled", and 91.8% of the "not labeled" employees at Time 2 could correctly identify their blood pressure labels.

Care was taken to standardize as much of the labeling process as possible through the use of blood pressure measurement standards, referral guidelines and interviewer training. This was critical as the method by which a person is labeled may be as important as the label itself (Rudd, 1984). The differences noted in location and smoking changes may have reflected this issue. A different nurse screened most of the Offsite workers, whereas the same two nurses screened all of the Calgary employees. Perhaps the subtle differences in the delivery of the blood pressure labeling may have accounted for some of the effect of work location on smoking change discussed in section 2.

In addition, care was taken to avoid the arousal of fear in employees labeled as "at risk for hypertension".

Extensive health education packages on high blood pressure detection, prevention and control were provided to employees. The main message was that high blood pressure can be controlled and can be treated through lifestyle changes. With the noted increase in stress among the "labeled" employees though, one has to ask if this approach was adequate. Perhaps counselling support should have been offered to the "labeled" employees. Active follow-up reiterating the prognosis and effective management of hypertension may have reinforced the fact that one can control hypertension through lifestyle changes. This would allow the employee a sense of control over the condition and hopefully, alleviate any increases in personal stress. This study reinforces the need for hypertension screening follow-up, a component which is strongly recommended by Alderman (1981) and Rudd (1987) as a way to lessen the detrimental effects of hypertension labeling.

IV. The Petro-Canada Population

The study group had 82.3% non-smokers: 15% more than cited in the Alberta population and 16% more than in the Canadian population. This difference may have been strictly due to the steadily declining smoking rates in Canada: the Petro-Canada study was three years more recent than the other two surveys. However, this seems unlikely. Alternatively, it may be reflecting the outcome of

Petro-Canada's Smoke-Free Workplace Policy. At any rate, the finding was consistent with Parakulum's observations that the proportion of smokers was the lowest among professionals (Parakulum, 1987), of which there were a high number in this study group.

Alcohol use within the last year was 92.6% among the sampled employees. This was 10% higher than either the Albertan, or Canadian rates (Health and Welfare Canada, 1988; Parakulam, 1987). In addition, 51.4% of those drinkers used alcohol one to three times per week: a rate 16-18% greater than either the Canadian or Alberta rates . This was understandable, as individuals with higher education, income, or employment status, tend to exhibit higher rates of alcohol consumption (Parakulam, 1987). Also, males tend to drink more than females (Health and Welfare Canada, 1988), and this population contained more males.

The Petro-Canada employee population had fewer sedentary persons, only 12.7%, as compared to 19% for Alberta and 22% for Canada. The rate of persons exercising more than three times per week was similar for the three populations, but the Petro-Canada group had 10% more persons exercising 1-2 times per week. Unfortunately, this higher rate of exercising did not translate to lower body mass indices (BMI): 39.6% of the Petro-Canada sample were in the BMI $\geq$25 range as compared to 32.1% of Canadians.

Stress levels were higher in the Petro-Canada study population: 69.1% reported that their lives were **Fairly to Very Stressful**, as compared to only 50% of Albertans and 48% of Canadians. This higher rate was consistent with the finding of a recent stress survey completed on this same population (Personal communications, Marilyn Walker, Petro-Canada, February, 1989).

A substantial proportion of the Petro-Canada study population reported being **Very healthy** (73.9%) as compared to Albertans and Canadians (61%). Only 11% of the study group mentioned physical limitations, whereas 16% of the other populations noted disabilities. Also, more of this group claimed they did something to improve their health over the past year (89.2%, as compared to 66% of Canadians). In addition, more (79.9%) said they should continue to improve their current health status, while only 66% of Canadians expressed a similar belief. Thus, this workplace population appeared more health conscious and conscientious.

For the above reasons, this sample was not representative of the Canadian or Albertan populations. In addition, we are unsure of how representative it was of the reference population at Petro-Canada. Unfortunately, data on the total Petro-Canada population is just now being collected. Thus the characteristics of the reference group are still unknown.

Despite this, the Petro-Canada population may well be similar to many other Canadian work groups for comparative purposes. Other petrochemical, hydro-electric, telephone company and government workers would be similar to Petro-Canada employees in age, sex distribution, marital status, work location and educational status. If one were in doubt, then a second approach would be to assess the group in question regarding these demographic variables and to make modifications if differences were noted. A third approach could be to use only the urban, or rural, subpopulations from this study for comparison depending on whether the population of interest is predominantly white or blue collar. Thus, although the study results cannot be readily generalized, they can be used with numerous employee groups.

V. Limitations and Strengths

Limitations

One limitation of this study was that the format of the survey questionnaire had not been validated prior its use in the study. Originally, the Canadian Health Promotion Survey [CHPS] used this questionnaire format for telephone interviewing. The technical report for CHPS does not provide reliability and validity data on this tool. For this study, changes were made to the format: questions added and the method of use altered to self-report. It was piloted prior to use, and it appeared to have face validity. Later, during the data analysis, attempts to further establish its degree of validity were made. From the data analysis done in Chapter 3, the validity appeared adequate.

Mailed questionnaires have response problems (Dillman, 1983). However, as already discussed, steps to increase the response rate were incorporated into this study. In addition, the use of the intra-company mail system appears to have contributed greatly to achieving a good response rate (70.2%).

As with any survey research, there may be biases resulting from differences in memory recall, provision of social desirability responses, and adoption of response sets when answering the questionnaire. To detect this, an equivalent forms measure of reliability was outlined in Chapter 3. From this investigation the reliability of the questionnaire appeared good.

There was also the potential for numerous losses to follow up which could jeopardize the study's validity. Most of these were found and reached by external mail.

In this project, clinical "labeling" was used as the independent variable. The labeling effect appeared to have been produced as evidenced by the checks for validity of labeling (Chapter 3). Yet, the intensity of the "labeling" was uncertain. In future, through use of a controlled experimental study, the "labeling" message could be intensified and therefore may show a greater effect on behavioral change. This remains a limitation for this study.

The effects of nonparticipation is concerning for social research studies, especially when inquiries are made about smoking, drinking, and exercise behaviors (Hennekens & Buring, 1987). Persons who smoke, drink and live sedentary lives tend to be poor respondents to questionnaires (Dillman, 1983). Upon examination of the percentage of respondents in the total population and the sample population by demographics and question responses at Time 1 this limitation was recognized, but as already discussed, was considered minimal.

Strengths

This study contributes to the hypertension research literature as the effects of hypertension labeling on behavioral/lifestyle changes have not been studied. Past studies used blood pressure change, absenteeism, psychological distress, or well-being as the outcome variables related to hypertension labeling. However, this investigator was unable to locate any studies dealing with changes in risk behavior associated with the effects of hypertension screening. Thus, this study was unique.

The study also contributes to the general body of research on labeling. Many studies have focused on the negative aspects of labeling while omitting the positive outcomes. This study illustrated that positive aspects of labeling exist, and suggested that even greater behavioral changes may be possible if the labeling message were stronger.

For Petro-Canada and other large industries, this study was important as it indicated that reductions in salt intake and weight control in the overweight individuals can be accomplished through blood pressure screening programs; but that program modifications are necessary to yield change in smoking, stress management, alcohol intake and exercise behaviors. It also pointed to the need for special health education approaches for employees working in different locations.

This research study stemmed from the descriptive study conducted at Petro-Canada, 1987 (Anderson, 1987). It resembled a "natural" experiment in that all the screenees received the same educational experiences, and had provided baseline lifestyle data prior to hypertension labeling. Thus labeling was the independent variable, with lifestyle behaviors as the dependent variable. Standardized blood pressure measurements and referral criteria were used by recently trained nurses. These factors are important as they standardize the impact each may have on the labeling process (Lefebvre, Hursey and Carleton, 1988).

Another strength was the design of the questionnaire. The Health Promotion Survey responses of the Petro-Canada employee population could be compared with those from the Canada and Albertan Health Promotion Surveys. Thus, the investigator could estimate the degree of generalizability of the research study results, as well as have a standard to measure the Petro-Canada employee population against.

Additional strengths were having a large sample size, and a lengthy post-labeling follow-up time (1 year). These two areas can be problematic to prospective studies (Polit & Hungler, 1983), but were not with this one. Although some of the more detailed analyses could have used a greater number of some types of subjects, these persons may not have entered the study in adequate numbers even with an enormous sample size. Few young people and even fewer women are hypertensive, for example. Thus larger samples would still have yielded small cell sizes when doing multi-staged stratified analyses.

VI. Suggestions for the Future

This study was exploratory in nature. Further work is required in the area of labeling, especially since screening for health hazards and risks has become so popular in the workplace. With the advent of workplace cholesterol screening, the same labeling concerns exist as did, and do, for blood pressure screening: Does screening do more harm than good? Does labeling lead to any positive behavioral and lifestyle changes?

Based on the findings of this and other hypertension labeling studies cited in Chapter 1, the potential for detrimental effects from blood pressure screening is real. Ways to lessen the impact of hypertension labeling, as well as effective counselling techniques to ameliorate the undesirable effects need exploring. In addition, the labeling process should be closely examined to determine whether critical times for follow-up exist.

An important follow-up study to this one would be to use this same employee population and remeasure their lifestyle behaviors and blood pressure levels, as well as screen them for cholesterol. They could then be followed for an additional year and rescreened to determine the degree of lifestyle, blood pressure, and serum cholesterol changes attained. The benefits of extending this study would be to ascertain:

1. Whether the behavioral changes noted at Time 2 in this study remained.
2. Whether labeling associated with cholesterol screening led to behavioral changes.
3. Whether labeling associated with two risk factors, hypertension and hyperlipidemia leads to greater behavioral changes than labeling for just one risk factor.
4. A data base on the prevalence of employee hypertension and hyperlipidemia in Alberta.

Thus more work is needed in the area of labeling and lifestyle change.

However, this study found that:

1. Labeling an individual as "at risk" for hypertension as a result of a blood pressure screening program led to one positive behavioral change, namely salt reduction.

2. Some behaviors, such as smoking cessation, reduced alcohol intake, weight loss and regular exercise were more resistant to change. This indicates that health education modifications and stronger labeling messages for hypertension are required for these behavioral changes to occur.

3. Potentially negative changes were noted concerning stress management and hypertension labeling. Unfortunately, this study was limited in being able to explain this finding. More work to determine the reasons is needed.

4. Calgary employees were more resistant to changes in smoking behavior than the Offsite employees. Health protection programs need to be tailored to worker populations if the desired outcomes are to be realized.

The Target Your Blood Pressure Program demonstrated that screening for hypertension can positively influence behaviors that are amenable to change (salt use). Hypertension screening in this study was not associated with sweeping, positive lifestyle behavioral changes; as well, it did yield a potentially negative behavioral outcome (increased perceived stress). It seems that more aggressive forms of intervention would be necessary to promote difficult lifestyle modifications (weight loss, regular exercising, smoking cessation, reduction in alcohol intake), and caution needs to be used with employees labeled as "at risk" for hypertension so as to not increase their stress levels. As well, a comprehensive worksite program delivered by consistent occupational health professionals and interventions tailored to the type of worker and work location to maximize the outcomes, would be key components. Further research may then be able to broaden the small positive effects in this program into more fruitful interventions in the workplace.

REFERENCES

Alberta Heart and Stroke Foundation. (1975). You and Your Blood Pressure. South Deerfield, MA: Channing L. Bete Co., Inc..

Alberta Heart and Stroke Foundation. (1983). What you should know about sodium in your diet. South Deerfield, MA: Channing L. Bete Co., Inc..

Alderman, M., and Englland, A.. (1979). Blood pressure control in private practice: A case report. Journal of Public Health, 69 (1), 25-29.

Alderman, M., Carlson, M., and Melcher, L.. (1981). Labelling and absenteeism: the Massachusetts Mutual experience. Clinical & Investigative Medicine, 4, (3/4), 165-171.

Alderman, M.. (1984). Worksite treatment of hypertension. In J. Matarazzo, S. Weiss, J. Herd, N. Miller, and S. Weiss, Behavioral Health: A Handbook of Health Enhancement and Disease Prevention. New York: John Wiley & Sons.

Alderman, M. & Stanback, M.. (1985). Hypertension detection and management through the worksite in the United States. In C. Bulpitt, ed., Handbook of Hypertension, Vol. 6: Epidemiology of Hypertension. Amsterdam: Elsevier.

Alexander, J.. (1984). Blood pressure and obesity. In J. Matarazzo, S. Weiss, J. Herd, N. Miller, and S. Weiss, Behavioral Health: A Handbook of Health Enhancement and Disease Prevention. New York: John Wiley & Sons.

American Heart Association. (1981). Ten commandments for the patient with high blood pressure. Dallas, Texas: Author.

American Heart Association. (1984). High blood pressure: What is it? What it can do to you. What you can do about it. Dallas, Texas: Author.

American Heart Association. (1986). About high blood pressure. Dallas, Texas: Author.

Anderson, D.. (1987). Target Your Blood Pressure Pilot Project report. Unpublished: In house report for Petro-Canada Health Centre, Calgary.

Aro, S.. (1982). Stress, morbidity and health-related behavior. Scandanavian Journal of Social Medicine, Supplement 25.

Aronow, W., Dendinger, B,, and Rowkaw, S.. (1971). Heart rate and carbon momoxide level after smoking high, low and non-nicotine cigarettes. Annuals of Internal Medicine, 74, 697-702.

Baer, L., Parchment, Y., & Kneeshaw, M.. (1979). Hypertension in health care providers and effectiveness of worksite treatment. Preventive Medicine, 8, 125.

Barrett-Connor, E. and Khaw, K.. (1985). Is hypertension associated with obesity? Circulation, 72(1), 53-60.

Bashline, S.. (1982). Hold the salt! <u>Field 'n Stream</u>, <u>87</u>, 31-32.

Bausell, C. and Bausell, R.. (1987). The internal structure of health-seeking behavior. <u>Evaluation & The Health Professions</u>, <u>10</u>(4), 460-475.

Beilin, L.. (1989). Alcohol and hypertension. Paper presented at <u>The Canadian Consensus Conference on the Non-pharmacological Approach to the Management of High Blood Pressure, March 21-23, 1989, Halifax, Nova Scotia.</u>

Beilin, L., Puddey, I., and Vandongen, R.. (1987). Alcohol-related hypertension. In T. Strasser and D. Ganien, eds., <u>Mild Hypertension: From Drugs Trials to Practice</u>. New York: Raven Press.

Becker, M., Haefner, D., Kasl, S. et al.. (1977). Selected psychosocial models and correlates of individual health-related behaviors. <u>Medical Care</u>, <u>15</u>, 27-44.

Benowitz, N., Kuyt, F. and Jacob, P.. (1984). Influence of nicotine on cardiovascular and hormonal effects of smoking: <u>Clinical Pharmacology and Therapy</u>, <u>36</u>, 74-81.

Benson, H.. (1977). Systemic hypertension and the relaxation response. <u>New England Journal of Medicine</u>, <u>296</u>(20), 1152-1155.

Berger, R. and Federico, R.. (1985). <u>Human behavior: A perspective for the helping profession</u>. N.Y.: Longman.

Berkman, L. and Breslow, L.. (1983). Health and ways of living: The Alameda County Study. New York: Oxford University Press.

Blair, D., Habicht, J., Sims, E., Sylvester, D., and Abraham, S.. (1984). Evidence for an increased risk for hypertension with centrally located body fat and the effect of race and sex on this risk. American Journal of Epidemiology, 119(4), 526-540.

Blair, S., Collingwood, T., Reynolds, R., Smith, M., Hagan, D., and Sterling, C.. (1984). Health promotion for educators: Impact on health behaviors, satisfaction, and general well-being. American Journal of Public Health, 74, 147-149.

Bloom, J., and Monterossa, S.. (1981). Hypertension labeling and sense of well-being. AJPH, 71 (11), 1228-1232.

Bjurstrom, L., and Alexiou, N.. (1978). A program of heart disease intervention for public employees. Journal of Occupational Medicine, 20, 521-531.

Bulpitt., C., Beevers, Butler, A. et al.. (1986). The survival of treated hypertensive patients and their causes of death: A report from the DHHS Hypertensive Care Computing Project. Journal of Hypertension, 4, 93-98.

Burglund, G.. (1984). Sodium excretion and blood pressure. In J. Matarazzo, S. Weiss, J. Herd, N. Miller, and S. Weiss, Behavioral Health: A Handbook of Health Enhancement and Disease Prevention. New York: John Wiley & Sons.

Calgary Health Services. (1983). Nutrition: The low sodium diet. Calgary: Author.

Cambien, F., Chretien, J., Ducimetiere, P., Guize, L., and Richard, J.. (1985). Is the relationship between blood pressure and cardiovascular risk dependent on Body Mass Index? American Journal of Epidemiology, 122(1), 434-442.

Canadian Consensus Conference on Non-pharmacological Approaches to the Management of High Blood Pressure [CCCNAMHBP] (1989). Preliminary recommendations from the consensus panel. Halifax, Nova Scotia: Author.

Canadian Heart Foundation. (1984). Cardiovascular risk factors. Ottawa: Author.

Canadian Heart Foundation. (1987). Know your blood pressure by heart. Ottawa: Author.

Caplan, R., Cobb, S., French, J., et al.. (1975). Job demands and workers health. Institute for Occupational Safety and Health. Washington: Government Printing Office.

Castelli, W. (1988, June). Exercise, fitness and health: discussant. Unpublished paper presented at the International Conference on Exercise, Fitness, and Health: A Consensus Conference. Toronto, Ontario.

Charlesworth, E., Williams, B., and Baer, P. (1984). Stress management at the worksite for hypertension: Compliance, cost-benefit, health care and hypertension-related variables. Psychosomatic Medicine, 46 (5), 387-397.

Cockerham, W. (1978). Medical sociology. Englewood Cliffs, N.J.: Prentice-Hall Inc..

Collings, G. (1982). Managing the health of the employee. Journal of Occupational Medicine, 24, 15-17.

Consumer Report (1984). Salt and your health. Consumer Report, 49, 17-22.

Cooper, K., Pollack, M., and Martin, R. (1976). Physical fitness levels vs. selected coronary risk factors: A cross-sectional study. Journal of the American Medical Association, 236, 166.

Cooper, K. (1988). Controlling cholesterol. New York: Bantam Books.

Dai, W., Laporte, R., Hom, D., Kuller, L. et al. (1985). Alcohol consumption and high density lipoprotein cholesterol concentration among alcoholics. American Journal of Epidemiology, 122(4), 620-627.

Dawaber, B.. (1980). Smoking cessation programs in occupational settings. Public Health Reports, 95, 149-157.

Department of Health and Human Services. (1988). The Surgeon General's Report on Nutrition and Health. Washington, D.C.: US Government Printing Office.

Dillman, D.. (1983). Mailed and other self-administered questionnaires. In P. Rossi, J. Wright, & A. Anderson, Handbook of Survey Research, New York: Academic Press.

Drazen, M., Nevid, J., Pace, N., and O'Brien, R.. (1982). Worksite based behavioral treatment of mild hypertension. Journal of Occupational Medicine, 24, 511-514.

Edelman, C. and Mandle, C.. (1986). Health promotion throughout the lifespan. St. Louis: The C.V. Mosby Company.

Eliot, R.. (1988). Stress and the heart: Mechanisms, measurements, and management. Mount Kisco, N.Y.: Futura Publishing Co., Inc..

Elliot, P.. (1989). Salt and high blood pressure. Paper presented at The Canadian Consensus Conference on the Non-pharmacological Approach to the Management of High Blood Pressure, March 21-23, 1989, Halifax, Nova Scotia.

Epstein, F.. (1982). The problem of hypertension. In Brunner, H. and Haralambos, G., eds., Clinical Hypertension and Hypotension. New York: Marcel Dekker, Inc., 3-21.

Evers, S., Bass, M., Donner, A., & McWhinney, I.. (1987). Lack of impact of salt restriction advice on hypertensive patients. Preventive Medicine, 16, 213-220.

Fagard, R., M'Buyamba, R., Staessen, J., Vanhees, L., and Amery, A.. (1985). Physical activity and blood pressure. In C. Bulpitt, Handbook of Hypertension, Volume 6: Epidemiology of Hypertension. Amsterdam: Elsevier.

Federal/Provincial Working Group on the Prevention and Control of High Blood Pressure. (1986). The prevention and control of high blood pressure in Canada. Ottawa: Minister of Supply and Services Canada.

Federal/Provincial Working Group on the Prevention and Control of High Blood Pressure. (1987a). Canadian manual to assist health professionals in developing knowledge and skills for prevention and control of high blood pressure. Manual submitted to Health and Welfare Canada for publication.

Federal/Provincial Working Group on the Prevention and Control of High Blood Pressure. (1987b). Canadian workplace guidelines: High blood pressure prevention and control programs. Manuscript submitted to Health and Welfare Canada for publishing.

Fielding, J.. (1984). Health promotion and disease prevention at the worksite. Annual Review of Public Health, 5, 237-265.

Foote, A. and Erfurt, J.. (1983). Hypertension control at the worksite. New England Journal of Medicine, 308, (14), 809-813.

Foxman, B., Lohr, K., Brook, R. Goldberg, G., Rosenthal, M., Sloss, E. (1982). Conceptualization and measurement of physiologic health of adults: Chronic obstructive airway disease, volume 8. Santa Monica, CA: The Rand Corporation.

Freestone, S. and Ramsay, L.. (1980). Effect of coffee and cigarette smoking in untreated and diuretic-treated hypertensive patients. British Journal of Clinical Pharmacology, 11(4), 428P-429P.

Fries, E.. (1976). Salt volume and the prevention of hypertension. Circulation, 53, 589-595.

Frommer, M., Edye, B., Mandryk, J., Grammeno, G., Berry, and G., Ferguson, D.. (1986). Systolic blood pressure in relation to occupation and perceived work stress. Scandanivan Journal of Environment and Health, 12, 476-485.

Gove, W.. (1980). The labelling of deviance. Beverly Hills, Ca: Sage Publications.

Green, M., Jucha, E., and Luz, Y.. (1986). Blood pressure in smokers and nonsmokers: Epidemiologic findings. American Heart, 111, 932-940.

Guidotti, T., Cowell, J., & Jamieson, G.. (1989). Occupational hHealth services: A practical approach. Chicago: American Medical Association.

Hagberg, J.. (1988, June). Exercise, fitness and hypertension. Paper presented at the International Conference on Exercise, Fitness, and Health: A Consensus Conference. Toronto, Ontario.

Haefner, D. and Kirscht, J.. (1970).Motivational and behavioral effects of modifying health beliefs. Public Health Reports, 85, 478.

Hanson, J. and Nedde, W..(1970). Preliminary observations on physical training for hypertensive males. Cited in Fagard, R. et al., (1985). Physical activity and blood pressure. In C. Bulpitt, Handbook of Hypertension, Volume 6: Epidemiology of Hypertension. Amsterdam: Elsevier.

Hardman, M., Drew, C., and Egan, M.. (1984). Human exceptionality: Society, school, & Family. Boston: Allyn and Bacon Inc..

Hart, J.. (1987). Hypertension: Community control of high blood pressure 2nd ed.. Edinburgh: Churchill Livingstone.

Haynes, B., Sackett, D., Taylor, W., Gibson, E., and Johnson, A.. (1978). Increased absenteeism from work after detection and labeling of hypertensive patients. New England Journal of Medicine, 299(14), 741-744.

Haynes, B.. (1986). Is weight loss an effective treatment for hypertension? The evidence against. Canadian Journal of Physiology and Pharmacology, 64, 825-830.

Haynes, B.. (1989). Obesity/Weight reduction and hypertension. Paper presented at The Canadian Consensus Conference on the Non-pharmacological Approach to the Management of High Blood Pressure, March 21-23, 1989, Halifax, Nova Scotia.

Health and Welfare, Canada. Food & your heart. Ottawa: Author.

Health and Welfare, Canada. (1984). Let's talk about blood pressure. Ottawa: Author.

Health and Welfare, Canada. (1988). Canada's Health Promotion Survey (Catalog No. H39-119/1988E). Ottawa: Minister of Supplies and Services, Canada.

Health Promotion Directorate, Health Services and Promotion Branch. (1988). Canadian guidelines for healthy weights. Ottawa: Minister of National Health and Welfare.

Hennekens, C. & Buring, J.. (1987). Epidemiology in medicine. Boston: Little, Brown and Company.

Herd, J., and Weiss, S. (1984). In J. Matarazzo, S. Weiss, J. Herd, N. Miller, and S. Weiss, Behavioral Health: A Handbook of Health Enhancement and Disease Prevention. New York: John Wiley & Sons.

House, J., Strecher, V., Metzner, H., and Robbins, C.. (1986). Occupational stress and health among men and women in the Tecumseh Community Health Study. Journal of Health and Social Behavior, 27(3), 62-77.

HDFPCG (Hypertension Detection and Follow-up Program Cooperative Group). (1979). Five-year findings of the Hypertension Detection and Follow-up Program. JAMA, 242,(23), 2562-2571.

Johnston, M., Gibson, E., Terry, W., Haynes, B., Taylor, W., Gafni, A., Sicurella, J., and Sackett, D.. (1984). Effects of labelling on income, work, and social function among hypertensive employees. Journal of Chronic Diseases, 37 (6), 417-423.

Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure. (1984). The 1984 Report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure. Archives of Internal Medicine, 144, 1045-1054.

Kannel, W. and Sorlie, P.. (1975). Hypertension in Framingham. In O. Paul, Epidemiology and Control of Hypertension. New York: Stratton Intercontinental Medical Book Corporation.

Katch, F. and McArdle, W.. (1983). Nutrition, weight control and exercise, 2nd. ed.. Philadelhpia: Lea & Febiger.

Kavanagh, T.. (1985). The Healthy Heart Program. Canada: Tri-Graphic Printing, Key Porter Books.

Kegeles, S.. (1963). Why people seek dental care: A test of a conceptual formulation. Journal of health and Human Behavior, 4, 166.

Klatsky, A.. (1985). Blood pressure and alcohol consumption. In C. Bulpitt, Handbook of Hypertension, Volume 6: Epidemiology of Hypertension. Amsterdam: Elsevier.

Kleinbaum, D., Kupper, L. and Morgenstern, H.. (1982). Epidemiologic research: Principles and quantitative methods. Belmont, Ca: Lifetime Learning Publications.

Kris-Etherton, P., Krummel, D., Dreon, D., Mackey, S., Borchers, J., & Wood, P.. (1988). The effect of diet on plasma lipids, lipoproteins, and coronary heart disease. National Cholesterol Education Program, 88(11), 1373-1400.

Leenen, F. & Haynes, B.. (1986). How to control your blood pressure and get more out of life. Toronto: Grosvenor House Press Inc..

Lefebvre, R., Hursey, K., and Carleton, R.. (1988). Labeling of participants in high blood pressure screening programs: Implications for blood cholesterol screenings. Archives of Internal Medicine, 148, 1993-7.

Logan, A., Milne, B., Achber, C., Campbell, W., and Haynes, R.. (1979). Work-site treatment of hypertension by specially trained nurses: a controlled trial. Lancet, 2, 1175-1178.

Lucas, C.. (1988). Nonpharmacologic and pharmacologic treatment of hypertension. In L. Hall and G. Meyer, Cardiac Rehabilitation: Exercise Testing and Prescription, Volume 2. Champaign, Illinois: Life Enhancement Publications.

Macdonald, L., Sackett, D., Haynes, R. and Taylor, D.. (1985). The disadvantages of being labelled hypertensive. In C. Bulpitt, Handbook of Hypertension, Volume 6: Epidemiology of Hypertension. Amsterdam: Elsevier.

MacGregor, G., Markandu, N., Best, F., Cam, J., Elder, D., Squires, M., and Sagnella, G.. (1982). Double-blind randomized crossover trial of moderate sodium restriction in essential hypertension. Lancet, 1, 351-354.

MacMahon, S.. (1986). Alcohol and hypertension: implications for prevention and treatment (editorial). Annals of Internal Medicine, 105, 124-126.

Mann, A.. (1984). Hypertension: Psychological aspects and diagnostic impact in a clinical trial. Psychological Medicine, monograph 5, 35pp.

Mann, K. and Sullivan, P.. (1987). Effect of task-centered instructional programs on hypertensives' ability to achieve and maintain reduced dietary sodium intake. Patient Education and Counseling, 19, 53-72.

Maritime Telephone & Telecommunications (1989). Report of the Maritime Tel. & Tel. Health Survey. Halifax:Author.

Markandu, N., Singer, D., Sagnella, G., Cappuccio, F., Sugden, A., & MacGregor, G.. (1988). A double blind study of three sodium intakes, and the long term effects of sodium restriction in essential hypertension. Presented at the 12th Scientific Meeting of the international Society of Hypertension, Kyoto, Japan, May 22-26, 1988.

Mausner, J. & Kramer, S.. (1985). Epidemiology: An introductory text. Philadelphia: W.B. Saunders Company.

Mechanic, D.. (1986). Health and illness behavior. In J. M. Last, Maxcy-Rosenau: Public Health and Preventive Medicine, 12th ed., 971-981.

Melby, C., Lyle, R., and Hyner, G.. (1988). Beyond blood pressure srceening: A rationale for promoting the primary prevention of hypertension. American Journal of Health Promotion, 3(2), 5-11.

Meyer, A. and Henderson, J.. (1974). Multiple risk factor reduction in the prevention of cardiovascular disease. Preventive Medicine, 3, 225-236.

Monk, M.. (1981). Blood pressure awareness and psychological well-being in the Health and Nutrition Examination Survey. Clinical & Investigative Medicine, 4, (3/4), 165-171.

Mossey, J.. (1981). Psychological consequences of labelling in hypertension. Clinical & Investigative Medicine, 4, (3/4), 165-171.

National Heart, Lung and Blood Institute. (1973). The public and high blood pressure: A survey. DHEW publication No. 74-356.

National High Blood Pressure Education Program. (1987). The physician guide: Improving adherence among hypertensive patients. Bethesda, MD.: National Institutes of Health.

Nova Scotia Department of Health. (1987). Report of the Nova Scotia Heart Health Survey. Halifax: Author.

O'Connell, J., Price, J., and Price, J.. (1985). Hypertension screening and follow-up in the workplace. The Ohio State Medical Journal, 891-896.

Paffenbarger, R.. (1988). Epidemiologic perspectives of exercise and behavioral management in the prevention of chronic disease. In L. Hall and G. Meyer, Epidemiology, Behavior Change, and Intervention in Chronic Disease. Champaign, Illinois: Life Enhancement Publications.

Parakulam, G.. (1987). Promoting the health of Albertans: A study of practices, attitudes and beliefs impinging on chronic disease prevention. Edmonton: Alberta Community and Occupational Health.

Parsons, T.. (1951). Social structure, dynamic process: The case of modern medical practice. In The Social System, Glencoe, Illinois: Free Press.

Participaction. (1985). Blood pressure control. Toronto: Author.

Patel, C. (1988). Fighting heart disease: A practical self-help guide to prevention and treatment. Toronto: Macmillian of Canada.

Patel, C., Marmot, M., and Terry, D.. (1981). Controlled trial of biofeedback-aided behavioral methods in reducing mild hypertension. British Medical Journal, 282, 2005-2008.

Pender, N.. (1987). Health promotion in nursing practice, 2nd. ed. Norwalk, Conn.: Appleton & Lange.

Petro-Canada. (1987). Target your blood pressure. In-house program at Petro-Canada Inc, Calgary Health Centre, Calgary.

Petro-Canada. (1986). What is your heart health risk score? Calgary: Author.

Prineas, R., Stephens, W., and Lovell, R.. (1973). Early consequences of screening for hypertension in a community. Clinical Science and Molecular Medicine, 45, Supp. 47-53.

Polit, D. & Hungler, B.. (1983). Nursing research: Principles and methods (2nd ed.). Philadelphia: J.B. Lippincott Company.

Red Health Unit. (1988). Take Heart!: Worksite heart health in action. Red Deer, Alta: Fletcher printing Co., Ltd..

Reisen, E., Abel, R., Modan, M., Silverberg, D., Eliahou, H., and Modan, B.. (1978). Effect of weight loss without salt restriction on the reduction of blood pressure in the overweight hypertensive patients. New England Journa of Medicine, 298, 1-6.

Rodnick, J.. (1982). Health behavior changes associated with Health Hazard Appraisal Counseling in an occupational setting. Preventive Medicine, 11, 583-594.

Rogers, E.. (1983). Diffusion of innovations, 3rd. ed.. New York: The Free Press.

Rosenbaum, P. & Bursten, J.. (1988). Canada's Health Promotion Survey: Technical Report Series- Special study on labour force groups. Ottawa: Minister of Supply and Services.

Rosenstock, I.. (1966). Why people use health services. Milbank Memorial Fund Quarterly, 44, 94-127.

Rothman, K.. (1986).. Modern epidemiology. Boston: Little, Brown and Company.

Rowan, R.. (1986). How to control high blood pressure without drugs. N.Y.: Ivy Books.

Rudd, P., Price, G., Graham, L., and Fortmann, S.. (1983). Absenteeism and psychological dysfunction after hypertensive screening. Clinical Research, 31(2), 303A.

Rudd, P., Price, G., Graham, L. and Fortmann, S.. (1984). More on labeling of hypertensive patients. The New England Journal of Medicine, 310, 1126.

Rudd, P., Price, G., Graham, L., Beilstein, B., Tarbell, S., Bacchetti, P., and Fortmann, S.. (1987). Consequences of worksite hypertension screening: Changes in absenteeism. Hypertension, 10, (4), 425-436.

Sallis, J., Hill, R., Fortmann, S., and Flora, J.. (1986). Health behavior change at the worksite: Cardiovascular risk reduction. Progress in Behavior Modification, 20, 161-197.

Schlesselman, J., & Stolley, P.. (1982). Case-control studies: Design, conduct, analysis. New York: Oxford University Press.

Soghikian, K., Fallick-Hunkeler, E., Ury, H., and Fisher, A.. (1981). The effect of high blood pressure awareness and treatment on emotional well-being. Clinical & Investigative Medicine, 4, 179-181.

Somers, A.. (1980). Life-style and health. In J. Last, Maxcy-Rosenau Public Health and Preventive Medicine. N.Y.: Appleton-Century-Croft.

Sorlie, P., Gordon, T. and Kannel, W.. (1980). Body build and mortality: The Framingham Study. JAMA, 243, 1828-1831.

Staessen, R., Fagard, R., & Amery, A.. (1985). Blood pressure, caloric intake and obesity. In C. Bulpitt, ed., Handbook of Hypertension, Vol. 6: Epidemiology of Hypertension, 131-158.

Stamler, J., Stamler, R., Riedlinger, W., Algera, G., and Roberts, R.. (1976). Hypertension screening of 1 million Americans: 1973-1975. JAMA, 235, (21), 2299-2306.

Statistics Canada (1985). Canada Health Promotion Survey: Special survey program. Ottawa: Author.

Stenn, P., Noce, A., & Buck, C.. (1981). A study of labelling phenomenon in school children with elevated blood pressure. Clinical & Investigative Medicine, 4, 179-181.

Stewart, I.. (1953). Headache and hypertension. Lancet, 1, 1261-1266.

Subcommittee on Nonpharmacological Therapy of the 1984 Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. (1984). Nonpharmacological approaches to the control of high blood pressure. Hypertension, 8, 444-467.

Taylor, D., Haynes, B., Sackett, D., and Gibson, E.. (1981). Longterm follow-up of absenteeism among working men following the detection and treatment of their hypertension. Clinical & Investigative Medicine, 4, (3/4), 165-171.

Twaddle, A.. (1973). Illness and deviance. Social Science and Medicine, 7, 751-755.

Van Ameringen, M., Arsenault, A., and Dolan, S.. (1988). Intrinsic job stress and diastolic blood pressure among female hospital workers. Journal of Occupational Medicine, 30(2), 93-97.

Wagner, E. & Strogatz, D.. (1984). Hypertension labeling and well-being: Alternative explanations in cross-sectional data. Journal of Chronic Diseases, 12(12), 943-947.

Walker, M.. (1989). Personal communication. Petro-Canada Centre, Calgary.

Wallis, C.. (1982). Salt: A new villain? Time, 119, 64-8.

Watt, G., Edwards, C., Hart, J., Hart, M., Walton, P., and Foy, C.. (1983). Dietary sodium restriction for mild hypertension in general practice. British Medical Journal, 286, 432-435.

Whiteshaver, S.. (1985). Hypertension and sodium salts. Science, 230,ponse difficulties. Questionnaire completion time averaged 20 minutes.

Method of Data Collection

Data collection began October 3, 1988, following receipt of the research study approval from the Department of Community Health Sciences, the Conjoint Medical Ethics Committee of the University of Calgary Medical Faculty, and Petro-Canada Inc.. The 1055 subjects were sent questionnaires. As the questionnaires were returned,

APPENDICES

Appendix A

Percentage of Lifestyle Changes for the Labeled and Nonlabeled Subjects

EXPECTED BEHAVIORAL CHANGES WITHIN 1 YEAR: LABELED SUBJECTS	
SMOKING CESSATION (average= 23%)	14% (MR. FIT Group, 1982) 33% (Meyer & Henderson, 1974) with n=6 20-30% usual quit rates (Fielding, 1984) 15-27% (Danaher, 1980)
INCREASED EXERCISE (average= 40%)	20-40% for workforce participation <50% for exercise 2x/wk (Fielding, 1984) 6% increase in aerobic calories/kg per wk (Wilbur, 1982)
REDUCTION OF ALCOHOL (44%)	44% (Meyer & Henderson,1974) with n= 14
WEIGHT REDUCTION (33%)	33% (Meyer & Henderson,1974) with n= 12
STRESS REDUCTION (< 2%)	< 2%
REDUCED SALT INTAKE (average= 27%)	29% (Mann, K., 1987) over 3 months 25% dietary changes (Meyer & Henderson, 1974) with n= 14

THE EXPECTED EFFECT OF LABELING WOULD BE THE DIFFERENCE BETWEEN THE PERCENT BEHAVIORAL CHANGE OF THE LABLELED VERSUS THE NONLABELED.

EXPECTED BEHAVIORAL CHANGES WITHIN 1 YEAR			
	SUBJECTS		EFFECT
BEHAVIORS	NONLABELED	LABELED	DIFFERENCE
SMOKING CESSATION	12% *	23%	11%
INCREASED EXERCISE	29% *	40%	11%
REDUCTION OF ALCOHOL	< 2% *	44%	42%
WEIGHT REDUCTION	4% *	33%	29%
STRESS REDUCTION	< 2% *	?	?
REDUCED SALT INTAKE	?	27%	?

* According to the Canadian Health Promotion Survey (1985).

Target Your Blood Pressure

Take the **CHALLENGE!**

RESEARCH QUESTIONNAIRE:

HEALTH BEHAVIORS AMONG WORKING ADULTS

The information on this first page will be compared with your TARGET YOUR BLOOD PRESSURE screening data, taken last summer.

Occupation: ______________________________

Birth Date			Age	Sex		Height		Weight	Marital Status			
Year	Month	Day		M	F	Ft.	In.	Pounds	Married Common Law	Widowed	Divorced Separated	Single

HISTORY:

	MOTHER YES	MOTHER NO	MOTHER UNKNOWN	FATHER YES	FATHER NO	FATHER UNKNOWN	SELF YES	SELF NO	SELF UNKNOWN
HEART DISEASE:	☐	☐	☐	☐	☐	☐	☐	☐	☐
HYPERTENSION:	☐	☐	☐	☐	☐	☐	☐	☐	☐

DO YOU ALREADY KNOW YOUR BLOOD PRESSURE? YES (Approximately) ☐ NO ☐

DO YOU ENGAGE IN VIGOROUS ACTIVITY/EXERCISE FOR 20 MINUTES OR MORE:

NEVER OR SELDOM ☐ 1x/WEEK ☐ 2x's/WEEK ☐ 3 OR MORE x's/WEEK ☐

SALT INTAKE: SALT USER ☐ NO COOKING/TABLE SALT ☐ RESTRICTED SALT DIET ☐

SMOKING: SMOKER ☐ NUMBER OF CIGARETTES PER DAY____ YEARS SMOKED ____

EX-SMOKER ☐ NEVER SMOKED ☐

BIRTH CONTROL PILLS: YES ☐ NO ☐

PERCIEVED STRESS LEVEL: LOW ☐ MODERATE ☐ HIGH ☐ EXTREME ☐

ALCOHOL INTAKE: LESS THAN 2 oz. / DAY ☐ MORE THAN 2 oz. / DAY ☐

PETRO-CANADA ®

THE FOLLOWING QUESTIONS WHICH HAVE BEEN USED IN BOTH PROVINCIAL AND NATIONAL CANADIAN HEALTH PROMOTION SURVEYS, PERTAIN TO HEALTH PROMOTION ACTIVITIES. WE WOULD LIKE SOME INFORMATION ON OUR PROGRAM PARTICIPANTS TO SEE HOW WE COMPARE WITH THE "NATIONAL AVERAGE". YOUR COOPERATION IN ANSWERING THESE QUESTIONS WOULD BE APPRECIATED.

First I would like to ask you a few questions about your health.

1. In general, compared to other persons your age would you say your health is.....
Excellent [ ] Very good [ ] Good [ ] Fair [ ] Poor [ ]

---

2. Do you agree or disagree with the following statement?
Compared to most people my age I make more of an effort to improve my health.
Agree [ ] Disagree [ ] No opinion [ ]

---

3. Do you think there is anything you personally should do to improve your physical health.
Yes [ ] **No [ ] ------------>> Go to question 6**

---

4. What is the most important thing you personally should do?

....

---

5. Is there anything stopping you from making this improvement?

....

---

6. Do you think there is anything you personally should do to improve the way you **cope with stress**?
Yes [ ] **No [ ] ------------>> Go to question 9**

---

7. What is the most important thing you think you should do?

....

---

8. Is there anything stopping you from making this improvement?

....

---

9. In general would you say you're ....
Very happy [ ] Pretty happy [ ] Not too happy [ ]

---

10. Would you describe your life as....
Very stressful [ ] Fairly stressful [ ] Not very stressful [ ] Not at all stressful [ ]

---

11. Are there health topics about which you feel you need more information?
Yes [ ] **No [ ] ------------>> Go to question 13**

---

12. On which of the following health topics do you feel you need more information?

	Yes	**No**
Nutrition	[ ]	[ ]
High blood pressure	[ ]	[ ]
Stress management	[ ]	[ ]
Smoking	[ ]	[ ]
Alcohol	[ ]	[ ]
Safety and accident prevention	[ ]	[ ]

The next few questions are about your current physical condition.

13. Are you limited in the kind or amount of activity you can do because of a long term physical condition or health problem? By long term, I mean a condition that has lasted or is expected to last more than 6 months.

Yes [ ] **No [ ] ------------>> Go to question 15**

---

14. Are your activities limited...

	Yes	No
At home	[ ]	[ ]
At work or school	[ ]	[ ]
In other activities such as leisure time pursuits or transportation to or from work.	[ ]	[ ]

---

15. When did you have your blood pressure checked?

Last 6 months [ ] 6-12 months [ ] 1-2 yrs [ ] More than 2 yrs [ ]

Never [ ] or Unknown [ ] ------------>> Go to question 20

---

16. As far as you know is your blood pressure high?

Yes [ ] **No [ ] -->> Go to question 20** or **Unknown [ ] -->> Go to question 20**

---

17. Are you worried about having high blood pressure?

Yes [ ] No [ ]

---

18. Are you currently doing anything to control your high blood pressure?

Yes [ ] **No [ ] ------------>> Go to question 20**

---

19. What are you doing to control your high blood pressure ?

....

....

---

20. Do you agree or disagree with the following statement?

High blood pressure is serious and needs to be treated to obtain a lower level.

Agree [ ] Disagree [ ] Unable to comment [ ]

The next few questions are about exercise.

21. Exercise includes vigorous activities such as calisthenics, jogging, racquet sports, team sports, dance classes, or brisk walking. Do you feel you get as much exercise as you need or less than you need?

As much as needed [ ] Less than needed [ ] Don't know [ ]

---

22. How many times per week do you exercise for at least 15 minutes?

[ ] times

---

23. Would you say you are physically **more** active, about the **same** or **less** active than other persons your age?

More [ ] Same [ ] Less [ ]

---

24. Do you think that getting more exercise would improve your health.....

A great deal [ ] A moderate amount [ ] A little [ ] Not at all [ ] Unknown [ ]

The next few questions are about smoking.

25. At the present time do you smoke cigarettes?

Yes [ ] **No [ ]** ------------->> **Go to question 32**

FOR CURRENT SMOKERS:

26. Do you smoke cigarettes **regularly**, that is usually every day; or **occasionally**, not everyday?

Regularly [ ] Occasionally [ ]

---

27. How many years have you smoked cigarettes?

[ ] years

---

28. On the average, about how many packs a day do you smoke now?

[ ] packs

---

30. In the past year has anyone asked you to <u>not smoke</u> around them?

Yes [ ] **No [ ]** ------------->> **Go to question 36**

---

31. Where has this happened? Please state as many of the places as you can.

....

------------->> **Go to question 36**

==

FOR NONSMOKERS OR EXSMOKERS:

32. Have you **ever** smoked cigarettes fairly regularly?

Yes [ ] **No [ ]** ------------->> **Go to question 36**

---

33. How long did you smoke?

[ ] years

---

34. When did you quit smoking?

[ ] months

---

35. What made you quit smoking?

....

==

36. Have you changed your smoking behavior since July, 1987?

Yes [ ] **No [ ]** ------------->> **Go to question 39**

---

37. How have you changed your smoking behavior?

....

---

38. Why have you changed your smoking behavior?

....

---

39. Do you think that a person who quits after years of heavy smoking reduces the risk of getting a disease related to smoking....

A great deal [ ] A moderate amount [ ] A little bit [ ] Not at all [ ] Unknown [ ]

Now I would like to ask some questions about alcohol consumption.

In the next questions when we use the word <u>drink</u>, it means:

1 bottle of beer, or glass of draft
1 small glass of wine
1 shooter or mixed drink with hard liquor

40. In the past 12 months, have you taken a drink of beer, wine, or liquor or other alcoholic beverage?

Yes [ ] **No [ ]** ------------->> **Go to question 43**

---

41. During the past 12 months, how often, on average, did you drink an alcoholic beverage? Was it.....

Everyday [ ] 4-6 times/week [ ] 2-3 times/week [ ] Once a week [ ]
1-2 times/month [ ] Less often than once a month [ ]

---

42. (a) Thinking back over the past 7 days, on how many of these days did you have any alcoholic drinks?

[____] days **None [ ]** --------->> **Go to question 43**

(b) On how many of these days did you have 2-3 drinks?

[____] days **None [ ]** --------->> **Go to question 43**

(c) On how many of these days did you have 4 or more drinks?

[____] days **None [ ]** --------->> **Go to question 43**

---

43. Would you say that this is **more, less** or about the **same** amount that you usually drink during a week?

More [ ] Less [ ] Same [ ]

---

44. How many drinks do you think a person can have per week, without endangering his/her health over the long term?

[______] drinks Unknown [ ]

---

45. Now I'd like your opinion on some statements about drinking. Please check, whether you agree or disagree?

	Agree	**Disagree**	**Unknown**
Moderate drinking can be good for your health	[ ]	[ ]	[ ]
Most drinkers do not suffer health problems as a result of their drinking	[ ]	[ ]	[ ]
High blood pressure is made worse by heavy alcohol intake.	[ ]	[ ]	[ ]

---

46. Have your drinking habits changed since July 1987?

Yes [ ] **No [ ]** ------------->> **Go to question 49**

---

47. How have they changed?

....

---

48. Why have you changed your drinking behaviors?

....

The next few questions are about safety.

49. How often do you use seatbelts when you ride in a car?

Always [ ] Most of the time [ ] Sometimes [ ] Rarely or never [ ]

---

50. When you are driving a car do you insist that the children with you have their seatbelt fastened or are in carseats?

Always [ ] Most of the time [ ] Sometimes [ ] Rarely or never [ ]
Don't drive [ ] Don't drive with children in the car [ ]

The next few questions are about social relationships.

51. Of the people you see socially, how many smoke cigarettes?
None [ ] A few [ ] About half [ ] Most or all [ ] Unknown [ ]

---

52. How many would you say drink too much?
None [ ] A few [ ] About half [ ] Most or all [ ] Unknown [ ]

---

53. How many of your friends exercise regularly?
None [ ] A few [ ] About half [ ] Most or all [ ] Unknown [ ]

---

54. Does your **spouse** do any of the following?
Not married [ ] --------->> Go to question 55

	Yes	**No**
Exercise	[ ]	[ ]
Smoke cigarettes	[ ]	[ ]
Drink too much	[ ]	[ ]
Overeat	[ ]	[ ]

The next few questions are about nutrition.

55. In the last week, on how many days did you have the following items for breakfast? **Please mark each box with a number from 0-7.**

Nothing, or just tea or coffee	[ ] days
Eggs, bacon, ham, or other meat	[ ] days
Breads, pastries, pancakes, or cereals	[ ] days
Fruit or juice	[ ] days
Cheese, milk or other dairy products	[ ] days

---

56. Are there any foods which you think you should limit or avoid for the sake of your health?
Yes [ ] **No [ ] --------->> Go to question 58**

---

57. Of the following types of food, which **one** do you feel is the **most important** to limit or avoid for the sake of your health? Food that is....................
High in cholesterol [ ] High in salt [ ]
High in fat [ ] Unknown [ ]
High in sugar [ ]

---

58. Are there any foods which you think you should eat more often for the sake of your health?
Yes [ ] **No [ ] --------->> Go to question 60**

---

59. Of the following types of food, which **one** do you feel is the **most important** to eat more often for the sake of your health? Foods such as................
Fruits and vegetables [ ] Whole grain cereals [ ]
Milk and milk products [ ] Meat/poultry/fish [ ]

---

60. Do you agree or disagree with the following statements?

	Agree	**Disagree**	**Unknown**
Following a healthy diet is expensive and time consuming.	[ ]	[ ]	[ ]
I'd rather be overweight than have to give up many of the foods that I like.	[ ]	[ ]	[ ]
Skipping breakfast is an effective way to control or reduce your weight.	[ ]	[ ]	[ ]

---

61. Have you changed your eating habits since July 1987?
Yes [ ] **No [ ] -------->> Go to question 64**

62. How have you changed your eating habits?
....
....

63. Why have you changed your eating habits?
....
....

Finally, a few questions about yourself.

64. What is the highest grade or level of education that you have ever completed?
....
....

65. What language do you speak at home the most often?
....

66. Are you aware of any safety or accident prevention programs at your place of work?
Yes [ ] No [ ] Don't know [ ]

67. Are you aware of any workplace programs to improve health, physical fitness or nutrition?
Yes [ ] No [ ] Don't know [ ]

68. In the past 15 months, have you seen or received any information about health topics at your place of work? (e.g. posters, bulletin boards, pamphlets)
Yes [**No [ ] -----------> Go to question 72**

69. Have you found the information helpful?
Yes [ ] **No [ ] -----------> Go to question 72**

70. What information did you find useful?
....

71. How did you use that information?
....

72. Do you think your place of work is an appropriate place to promote good health habits?
Yes [ ] No [ ] Don't know [ ]

73. What is the **single** most important thing you have done in the past 15 months to improve your health?
....

74. Aside from improving your health, was there any other reason that you decided to do this?
Yes [ ] **No [ ] -----------> Go to question 76**

75. What was the other reason?
....

These remaining questions are about your health care practices.

76. What were you told about your blood pressure level at the TARGET YOUR BLOOD PRESSURE screening program?

Within a normal range [ ] Borderline for high blood pressure [ ]

I had high blood pressure [ ]

---

77. Has a doctor measured your blood pressure since the screening program?

Yes [ ] **No [ ] ---------------->> Go to question 79**

---

78. What did your doctor say about your blood pressure?

....

---

79. Have you ever been told that you have high blood pressure **prior** to, the TARGET YOUR BLOOD PRESSURE screening program?

Yes [ ] **No [ ] ---------------->> Go to question 80**

By whom? When?

....

---

80. Have you ever been told that you have high blood pressure **since** the TARGET YOUR BLOOD PRESSURE screening program?

Yes [ ] **No [ ] ---------------->> Go to question 83**

By whom? When?

....

---

81. Have high blood pressure medications ever been prescribed for you?

Yes [ ] No [ ]

---

82. Are you taking high blood pressure medications now?

Yes [ ] No [ ]

---

83. Considering the health topics we've discussed in this questionnaire, is there anything you <u>intend</u> to do to improve your health in the next year?

....

....

....

COMMENTS:

....

....

....

....

....

....

....

Appendix C

COMPARISON OF THE STUDY SAMPLE TO THE ALBERTAN AND CANADIAN POPULATIONS

Variables	P-C Sample % (N=741)	Alberta % (N=2733)	Canada % (N=11181)
DEMOGRAPHICS:			
Sex: Males	62.5%	50.4%	49.1%
Females	37.5	49.6	50.9
Age: <30 years (M)	16.8	41.1	34.2
<30 years (F)	33.0	37.7	32.7
Marital Status:			
Married	74.6	59.4	61.6
Single	16.6	30.0	27.2
Widowed	0.9	4.4	6.1
Sep/divorced	6.6	6.1	5.2
Level of education:			
No school	0.0	10.4	12.2
Some secondary	3.2	25.5	24.8
Completed secondary	27.0	28.5	27.9
Some college/Univ.	30.3	21.5	23.0
Completed university	39.5	13.5	11.5
No response	2.7	0.5	0.6
BEHAVIORS:			
Smoking:			
Smokers	17.7	33.0	34.0
Exsmokers	28.1} 82.3	}67.0	}66.0
Never smoked	54.2}	}	}
Among the Smokers:			
Regular smoking	88.0%	88.0%	88.2%
Occasional smoking	12.0	12.0	11.8
% Reported that they had been asked not to smoke by others	54.5	47.0	47.0
Benefits of quitting smoking: % said:			
Benefitted alot	42.5		32.1
A moderate amount	35.3		30.3
Alcohol Consumption:			
Drank within 12 months	92.6	83.0	82.0
No alcohol	7.4	17.0	18.0

Variables	P-C Sample %	Alberta %	Canada %
Drinkers: Males	93.8	85.0	86.0
Females	90.6	82.0	77.0
Alcohol Use:			
< once/week	33.5	57.0	56.0
1-3x's/week	51.4	35.0	33.0
4-7x's/week	15.1	8.0	11.0
% Believed that moderate drinking was good for health	33.3	36.0	43.0
% Believed: Most don't suffer from drinking	19.5	23.0	20.0
Exercise:			
Never	12.9	19.0	22.0
1-2x's/week	34.1	13.0	24.0
3-4x's/week	29.3	23.0	}
5-6x's/week	14.9	9.0	}54.0
Daily	7.4	31.0	}
BMI			
< 20	11.0	----	13.7
20-25	49.4	----	53.0
≥25-27	20.6	----	15.2
≥ 27	19.0	17.0	16.9
Diet:			
Breakfast:			
Never skip it	55.1	82.0	71.0
Always skip	10.3	18.0	18.0
Sometimes skip	34.6	----	11.0
% Believed:			
healthy diet is expensive	16.4	24.0	25.0
skipping breakfast lowers weight	5.6	8.0	7.0
rather be overweight than give up foods they liked	3.7	9.0	9.0
% Believed they should			
eat fruits & vegetables	78.8	50.0	49.0
limit salt intake	14.0	----	10.9
limit fat intake	33.4	20.0	34.5
limit sugar intake	10.3	17.0	24.2
limit cholesterol	36.1	16.0	26.8

Variables	P-C Sample %	Alberta %	Canada %
Stress:			
Very stressed	7.5	10.0	9.0
Fairly stressed	61.6	40.0	39.0
Not very stressed	28.9	40.0	39.0
Not stressed	1.9	10.0	13.0
% Believed they should personally do something to lower stress	43.5	29.0	31.0
<u>HEALTH PRACTICES:</u>			
BLOOD PRESSURE:			
BP checked within 1 yr	99.9	93.0	74.8
High blood pressure	10.9	8.0	
% with HBP that are trying to lower it	78.5	69.0	
General Health:			
Very good/Excellent	73.9	61.0	61.0
Poor	0.0	3.0	3.0
% felt they make more effort to improve health	52.5	66.0	64.0
% limited physical ability	10.7	16.0	16.0
Happiness:			
Very happy	23.7	38.0	42.0
Pretty happy	68.9	59.0	54.0
Not too happy	7.4	3.0	4.0
Seatbelt Use:			
Always	84.2	25.0	65.0
Most of the time	11.8	11.0	13.0
Never/rarely	1.1	64.0	13.0
Buckle up children	80.1	75.0	91.0
<u>WORKPLACE SAFETY & HEALTH PROMOTION:</u>			
% Believed workplace was appropriate for promoting health habits	85.6%	63.0%	69.0%
Aware of safety & accident prevention programs	65.3	53.0	57.0

Variables	P-C Sample %	Alberta %	Canada %
Aware of other programs to increase health	78.0	40.0	41.0
Saw health information at work recently	80.5	44.0	47.0
Found information useful	69.3	76.0	78.0
INTENTIONS:			
Said they DID something to improve health	89.2		66.0
What was DONE to improve health:			
Increase exercise	40.6		29.0
Reduce smoking	5.3		4.0
Improve eating	15.0		12.0
Decrease weight	7.8		4.0
Did nothing	10.8		37.0
Said they SHOULD do something to improve health	79.9	71.0	66.0
What they SHOULD do to improve health:			
Increase exercise	61.5	56.0	41.0
Reduce smoking	9.0	16.0	10.0
Improve eating	10.7		8.0
Decrease weight	12.5		5.0
Reduce alcohol	0.3		<1.0
Intend to do:			
Nothing	20.5		35.0
Something	79.5		65.0
Those that plan to do something, plan to:			
-exercise more	42.8		33.0
-smoke less	5.4		10.0
-eat better	11.1		13.0
-loose weight	10.1		10.0

MEMORANDUM

TO: National Library of Ottawa

FROM: Dianne E.G. Anderson

SUBJECT: Petro-Canada Inc. gave permission for the use of the Petro-Canada logo found on the questionnaire, Appendix B. Although the quality of the print for this questionnaire was poorer than desired, it is the best that could be achieved.